SCHMIDT offers the worldwide largest selection of Tension Meters
A Selection of Tension Meters

The overview of most popular tension meters will help you to find them in our catalog.
### Applications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZF2</td>
<td>A2</td>
</tr>
<tr>
<td>ZD2</td>
<td>A2</td>
</tr>
<tr>
<td>DX2</td>
<td>A3</td>
</tr>
<tr>
<td>DXE</td>
<td>A5</td>
</tr>
<tr>
<td>DXV</td>
<td>A6</td>
</tr>
<tr>
<td>DXP</td>
<td>A6</td>
</tr>
<tr>
<td>DXF/DXL</td>
<td>A7</td>
</tr>
<tr>
<td>DXK</td>
<td>A8</td>
</tr>
<tr>
<td>MKM</td>
<td>A12</td>
</tr>
<tr>
<td>DXB</td>
<td>A9</td>
</tr>
<tr>
<td>DXR</td>
<td>A10</td>
</tr>
<tr>
<td>DXT</td>
<td>A10</td>
</tr>
<tr>
<td>DN1</td>
<td>A13</td>
</tr>
</tbody>
</table>

#### Hand-held, mechanical

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>B1</td>
</tr>
<tr>
<td>MK</td>
<td>B2</td>
</tr>
<tr>
<td>DX2S</td>
<td>B2</td>
</tr>
<tr>
<td>DXES</td>
<td>B2</td>
</tr>
<tr>
<td>DXFS</td>
<td>B2</td>
</tr>
<tr>
<td>DXBS</td>
<td>B2</td>
</tr>
<tr>
<td>DXTS</td>
<td>B2</td>
</tr>
</tbody>
</table>

#### Stationary, mechanical

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td>C1</td>
</tr>
<tr>
<td>ZEF</td>
<td>C3</td>
</tr>
<tr>
<td>ZED</td>
<td>C4</td>
</tr>
<tr>
<td>DTS</td>
<td>C5</td>
</tr>
<tr>
<td>DTX</td>
<td>C6</td>
</tr>
<tr>
<td>DTSB/DTXB</td>
<td>C10</td>
</tr>
<tr>
<td>DTSL/DTXL</td>
<td>C11</td>
</tr>
<tr>
<td>DTSE/DTXE</td>
<td>C12</td>
</tr>
<tr>
<td>DTSF/DTXF</td>
<td>C12</td>
</tr>
<tr>
<td>ETB/ETX</td>
<td>C13</td>
</tr>
<tr>
<td>ETPB/ETPX</td>
<td>C14</td>
</tr>
<tr>
<td>MST</td>
<td>A12</td>
</tr>
<tr>
<td>KXE</td>
<td>C15</td>
</tr>
</tbody>
</table>

#### Hand-held, electronic

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TST1/FS1</td>
<td>D2/D9</td>
</tr>
<tr>
<td>TSP/FSP</td>
<td>D3/D10</td>
</tr>
<tr>
<td>TSH/FSH</td>
<td>D4/D10</td>
</tr>
<tr>
<td>TSL/FSL</td>
<td>D5/D11</td>
</tr>
<tr>
<td>TSF</td>
<td>D5</td>
</tr>
<tr>
<td>TSB1/FSB1</td>
<td>D6/D11</td>
</tr>
<tr>
<td>TSB2</td>
<td>D6</td>
</tr>
<tr>
<td>MZ</td>
<td>D7/D8</td>
</tr>
</tbody>
</table>

#### Stationary, electronic

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSF</td>
<td>D5</td>
</tr>
<tr>
<td>TSB2</td>
<td>D6</td>
</tr>
<tr>
<td>MZ</td>
<td>D7/D8</td>
</tr>
</tbody>
</table>

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This table is for guidance only and does not claim to be exhaustive.

Subject to change without notice.

www.hans-schmidt.com
We solve tension-measuring problems.  
More than 70 years. Worldwide.

In 1948, the founder of the company, Mr. Hans Schmidt, started selling and distributing yarns and textile machinery. He became aware of the importance which the control of tension had for production processes and soon developed and constructed a 3-Roller Tension Meter which featured one measuring roller and two guiding rollers. This ingenious principle of operation has been proved to be the best method for tension measuring.

The 3-roller measuring system has become the hallmark of all SCHMIDT tension meters and remains unsurpassed in its efficiency even today.

Since 1962, the company’s headquarter is in Waldkraiburg, located near Munich, Germany.

In response to today’s needs, involving new advanced materials and stricter production standards, SCHMIDT offers a large selection of tension meters and ranges to satisfy those requirements.

Competition is constantly changing. Higher efficiency requirements and continuous quality control make monitoring of tension more important than ever. If, for instance, the winding tension of a copper wire is too high, the wire diameter will decrease, resulting in a change in the electrical resistance. With natural fibers, excessive fiber tension leads to a change in characteristic.

With synthetic fibers, this results in irreversible molecular shifts, which may cause the fabric to dye unevenly.

The inevitable consequence is a product of poor quality.

SCHMIDT Tension Meters help you to eliminate tension-related defects.

Today, more than 190,000 SCHMIDT tension meters are used worldwide.

We solve tension-measuring problems.
More than 70 years. Worldwide.
SCHMIDT offers the worldwide largest selection of Tension Meters:
- 20 different series,
- 66 models
- and more than
- 2000 possible variations ... 

Wherever precision and superior quality are essential in producing and processing
- Threads
- Yarns
- Fibers
- Carbon fibers
- Split tapes
- Rovings
- Wires
- Cables
- EDM wires
- Steel Cord
- Sawing wires
- Fiber optics
- Tapes & narrow fabrics
- Foil strips
- Films, etc.

SCHMIDT tension meters are indispensable in production monitoring, quality control, automation, and process engineering.
Take benefit of our experience!

Contents

<table>
<thead>
<tr>
<th>Selection Guide</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of typical applications</td>
<td>3</td>
</tr>
<tr>
<td>SCHMIDT Quality Management</td>
<td>6</td>
</tr>
<tr>
<td>What you should know about SCHMIDT Tension Meters</td>
<td>9</td>
</tr>
<tr>
<td>Guidelines for selecting the right tension meter</td>
<td>10</td>
</tr>
</tbody>
</table>

Hand-Held, mechanical

<table>
<thead>
<tr>
<th>Z Series: Model ZF2, ZD2</th>
<th>A 1 – 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX Series: Model DX2</td>
<td>A 3 – 4</td>
</tr>
<tr>
<td>Model DXE, DXV, DXP</td>
<td>A 5 – 6</td>
</tr>
<tr>
<td>Model DXF, DXL</td>
<td>A 7</td>
</tr>
<tr>
<td>Model DXK, FT</td>
<td>A 8</td>
</tr>
<tr>
<td>Model DXB, DXR, DXT</td>
<td>A 9 – 10</td>
</tr>
<tr>
<td>Measuring at sewing machines</td>
<td>A 11</td>
</tr>
<tr>
<td>MKM Series: Model MKM</td>
<td>A 12</td>
</tr>
<tr>
<td>MST Series: Model MST</td>
<td>A 12</td>
</tr>
<tr>
<td>DN Series: Model DN1, DNW</td>
<td>A 13 – 15</td>
</tr>
<tr>
<td>TEN Series: Model TEN</td>
<td>A 16</td>
</tr>
</tbody>
</table>

Stationary, mechanical

| Model Q, MK, DX2S        | B 1 – 2 |

Hand-Held, electronic

<table>
<thead>
<tr>
<th>PT Series: Model PT-100, PT-100-L</th>
<th>C 1 – 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZE Series: Model ZEF, ZED</td>
<td>C 3 – 4</td>
</tr>
<tr>
<td>DT Series: Model DTS, DTX</td>
<td>C 5 – 9</td>
</tr>
<tr>
<td>Model DTSB, DTXB</td>
<td>C 10</td>
</tr>
<tr>
<td>Model DSL, DTXL</td>
<td>C 11</td>
</tr>
<tr>
<td>Model DTSF, DTXF, DTSE, DTXE</td>
<td>C 12</td>
</tr>
<tr>
<td>ET Series: Model ETB, ETX, ETPB, ETPX</td>
<td>C 13 – 15</td>
</tr>
<tr>
<td>KXE Series: Model KXE</td>
<td>C 16</td>
</tr>
<tr>
<td>RTM Series: Model RTM</td>
<td>C 17</td>
</tr>
<tr>
<td>CTM Series: Model CTM</td>
<td>C 18</td>
</tr>
</tbody>
</table>

Stationary, electronic

<table>
<thead>
<tr>
<th>Online Measuring Systems:</th>
<th>D 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS Series: Model TS1, TSP, TSR</td>
<td>D 2 – 3</td>
</tr>
<tr>
<td>Model TSH, TSW, TSL, TSF</td>
<td>D 4 – 5</td>
</tr>
<tr>
<td>Model TS81, TS82</td>
<td>D 6</td>
</tr>
<tr>
<td>Modellreiehe MZ: Model MAZF, MBZF, MAZD, MBZD, MBZB</td>
<td>D 7 – 8</td>
</tr>
<tr>
<td>FS Series: Model FS1, FSP, FSH, FSL, FS81, FS8R, FS8W</td>
<td>D 9 – 12</td>
</tr>
<tr>
<td>FS-digital (USB, RS-232, RS-422, Wi-Fi)</td>
<td>D 13 – 14</td>
</tr>
<tr>
<td>Specifications:</td>
<td>D 14</td>
</tr>
<tr>
<td>TS, FS Series</td>
<td>D 15 – 16</td>
</tr>
<tr>
<td>SF Series: Model SFZ, SFD</td>
<td>D 17 – 18</td>
</tr>
<tr>
<td>SC Series: Model SC-PM, SC-PM1, SC-SC-1, SC-PM4</td>
<td>D 18 – 18</td>
</tr>
</tbody>
</table>

Guide roller dimensions and optional accessories | E 1 – 2 |

Customized designs | F
SCHMIDT Tension Meters are used throughout the world in a wide variety of typical as well as special applications. A few samples are shown below.

Should you need customized solutions for your measuring problem, please contact us. We will be glad to design a model for your special application.

In the Optical Fiber Production e.g. winding machine

In the Man-Made Fiber Production e.g. twisting machine

In the Textile Industry Online tension sensor to control the bobbin creel

In the Knitting Industry exact adjusting of yarn feeders of circular knitting machines

In the Wire Industry e.g. for wire drawing or winding machines
In the Wire EDM Industry
The correct adjusted tension is the condition for best exact cuts.

In the Construction Industry
For measuring pretensioned non-moving ropes, tower guy wires, overhead lines, etc.

In the Fiber Producing Industry
e.g. for winding machines

In Future Technology
processing carbon fibers and NAV
SCHMIDT Tension Meters are used throughout the world.

In the Aircraft Industry
producing parts made by fiber-reinforced materials for airplanes on embroidery machines

In Satellite Technology
Before launching accurately tension setting of the cables holding the solar panels

For Technical Fibers
producing harvesting nets and protection nets with warpknitting machines

In the Medical Industry
e.g. producing bandages and sutures

In Telecommunications
Continuous tension monitoring is essential in the production and processing of copper wires and optic fibers

In the Sewing Industry
For adjusting yarn break on industrial sewing machines e.g. production of airbags

SCHMIDT - ALL OVER THE TECHNICAL WORLD
www.hans-schmidt.com
HANS SCHMIDT & Co GmbH was the first tension meter manufacturer to be certified according to International Standard DIN EN ISO 9001.

This emphasizes our continuous commitment to quality which ensures that our staff produces the highest quality products. This also gives you the confidence in a company in which quality and customer service has the highest priority.

Because of the very low request for this certificate and the very high costs for the procedure of the certification we decided not to make this certification again.

Of course we will work according our quality handbook and the regulations of ISO 9001 furthermore in order to keep our quality standard.

Calibration Standards: Since there are no international standards for the calibration of tension meters, we have established and documented a SCHMIDT Standard which is accepted worldwide.

SCHMIDT Quality Control

When completed, each instrument undergoes an extensive final quality check ensuring proper operation as well as a final calibration verification.

Only those instruments meeting our strict quality regulations receive the SCHMIDT Quality Seal. This is also confirmed in a Certificate of Compliance with the order 2.1 which is supplied free of charge with the instrument.

SCHMIDT Inspection Certificate 3.1

An Inspection Certificate according to European Standard EN 10204, which includes a Calibration Report, is optionally available. The Calibration Report shows the measured values compared to the standards.

This verification of the calibration is performed prior to shipment.

Our Inspection Certificate according to EN 10204 is the European equivalent to the test reports of other international organizations, such as NIST (USA) or JAL (Asia).

Delivery includes: Tension meter (with carrying case if hand-held model), Certificate of Compliance with the order 2.1, operating instructions in English or German as requested.

Warranty: SCHMIDT tension meters are subject to stringent quality checks. We therefore guarantee all our tension meters for 12 months. Improper use, abuse and parts subjected to wear (e.g. guide rollers) are excluded from coverage.
General Information on SCHMIDT Tension Meters

Operating elements DX2:

- All SCHMIDT Tension Meters feature the 3-roller measuring system. The center measuring roller is deflected by the tension of the measured material. This measuring principle assures highest accuracy and repeatability.  
- All rollers are equipped with precision ball bearings.

1 Measured material  
2 Measuring roller (center guide roller)  
3 Outer guide rollers  
4 Filament guide  
5 Scale  
6 Thumbpiece  
7 Sample holder clip  
8 Material thickness compensator

Material thickness compensator:

- SCHMIDT Hand-held tension meters are equipped, if necessary, with a material thickness compensator. This exclusive feature is only found on SCHMIDT tension meters and minimizes any error caused by changing material diameters.

1 Material sample  
2 + 3 two Discs  
4 Sample holder clip

SCHMIDT calibration:

- To ensure highest precision, each Tension Meter is individually calibrated according to the SCHMIDT factory procedure. For calibration a known weight is suspended from the standard calibration material, vertically, as shown in the figure. This method is accepted – worldwide – as the industry standard.

Special scale for customer materials:

- Special calibration to customer-supplied material is optionally available. This takes into account the customer material’s rigidity and diameter, if it differs significantly from the SCHMIDT calibration material. Special calibration to two different materials is optionally available.

The width of the measuring head varies with the model design and the tension range. Dimension »X« defines the minimum access space required along the material path. It is determined by the width of the filament guide, the distance between the two outer guide rollers, or the outside dimensions of the front plate, whichever is the largest.

Special calibration to customer materials:

- Special calibration to customer-supplied material is optionally available. This takes into account the customer material’s rigidity and diameter, if it differs significantly from the SCHMIDT calibration material. Special calibration to two different materials is optionally available.
Guidelines for selecting the right SCHMIDT Tension Meter

1. Select the desired model:
   - According to your desired use:
     - Hand-held or stationary model
     - Mechanical or electronic model
   - According to application:
     - Selection Guide
     - see page 3

2. Determine the appropriate tension range:
   - Recommendations for typical textile and wire applications:

<table>
<thead>
<tr>
<th>Tension Range*</th>
<th>SCHMIDT Calibration Material**</th>
<th>Textile Industry e.g. yarn count max.</th>
<th>Wire Industry e.g. copper wire, soft-annealed</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 cN</td>
<td>Filament: 25 tex</td>
<td>25 tex max. 0.05 mm Ø</td>
<td></td>
</tr>
<tr>
<td>50 cN</td>
<td>PA: 0.12 mm Ø</td>
<td>50 tex max. 0.08 mm Ø</td>
<td></td>
</tr>
<tr>
<td>120 cN</td>
<td>PA: 0.12 mm Ø</td>
<td>120 tex max. 0.13 mm Ø</td>
<td></td>
</tr>
<tr>
<td>200 cN</td>
<td>PA: 0.12 mm Ø</td>
<td>200 tex max. 0.17 mm Ø</td>
<td></td>
</tr>
<tr>
<td>300 cN</td>
<td>PA: 0.20 mm Ø</td>
<td>300 tex max. 0.20 mm Ø</td>
<td></td>
</tr>
<tr>
<td>400 cN</td>
<td>PA: 0.20 mm Ø</td>
<td>400 tex 0.10 - 0.25 mm Ø</td>
<td></td>
</tr>
<tr>
<td>500 cN</td>
<td>PA: 0.20 mm Ø</td>
<td>500 tex 0.10 - 0.25 mm Ø</td>
<td></td>
</tr>
<tr>
<td>1000 cN</td>
<td>PA: 0.30 mm Ø</td>
<td>1000 tex 0.10 - 0.40 mm Ø</td>
<td></td>
</tr>
<tr>
<td>1500 cN</td>
<td>PA: 0.30 mm Ø</td>
<td>1500 tex 0.15 - 0.50 mm Ø</td>
<td></td>
</tr>
<tr>
<td>2000 cN</td>
<td>PA: 0.50 mm Ø</td>
<td>2000 tex 0.30 - 0.60 mm Ø</td>
<td></td>
</tr>
<tr>
<td>3500 cN</td>
<td>PA: 0.80 mm Ø</td>
<td>3500 tex 0.35 - 0.80 mm Ø</td>
<td></td>
</tr>
<tr>
<td>5000 cN</td>
<td>PA: 0.80 mm Ø</td>
<td>5000 tex 0.40 - 1.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>8000 cN</td>
<td>PA: 1.00 mm Ø</td>
<td>8000 tex 0.50 - 1.20 mm Ø</td>
<td></td>
</tr>
<tr>
<td>10 daN</td>
<td>PA: 1.00 mm Ø</td>
<td>10000 tex 0.70 - 1.40 mm Ø</td>
<td></td>
</tr>
<tr>
<td>20 daN</td>
<td>PA: 1.50 mm Ø</td>
<td>20000 tex 1.20 - 2.0 mm Ø</td>
<td></td>
</tr>
<tr>
<td>30 daN</td>
<td>PA: 1.50 mm Ø</td>
<td>30000 tex 1.50 - 2.50 mm Ø</td>
<td></td>
</tr>
<tr>
<td>50 daN</td>
<td>Steel rope: 50000 tex</td>
<td>1.50 - 3.0 mm Ø</td>
<td></td>
</tr>
<tr>
<td>50 daN</td>
<td>1.50 mm Ø (7 x 7 x 0.20)</td>
<td>1.50 - 3.0 mm Ø</td>
<td></td>
</tr>
<tr>
<td>60 daN</td>
<td>Steel rope: 60000 tex</td>
<td>1.80 - 3.5 mm Ø</td>
<td></td>
</tr>
<tr>
<td>60 daN</td>
<td>2.0 mm Ø (7 x 7 x 0.30)</td>
<td>1.80 - 3.5 mm Ø</td>
<td></td>
</tr>
</tbody>
</table>

* Tension measured in N (Newton):
1 cN = 1.02 g = 0.01 N; 1 daN = 1.02 kg = 10 N.
** Calibration with standard materials – such as polyamide monofilament (PA) – according to the SCHMIDT factory procedure has been proved to provide the best results for 95% of all industrial applications.

Note: We recommend selecting the tension range twice the tension you intend to measure. This has the advantage that you can measure higher than expected values. It also facilitates reading the measured tension on analog scales.

If your material to be measured differs in kind and diameter:
Please contact us for assistance to determine the right tension range and model. For this purpose a material sample of 5 m should be supplied.

A wide variety of roller types are offered depending on the material to be measured:
- Roller shape V-grooved or with asymmetrical groove...
- Roller shape U-grooved with radius or cylindrical...
- Roller material (hardcoated aluminium, plastic, steel, etc.)...
- Max. line speed of the measured material...

3. Select the guide rollers according to the following criteria:
   - Roller shape V-grooved or with asymmetrical groove...
   - Roller shape U-grooved with radius or cylindrical...
   - Roller material (hardcoated aluminium, plastic, steel, etc.)...
   - Max. line speed of the measured material...
   - see page E

4. Required accessories:
   - Adjustable damping – Special lever – Memory pointer

5. Special custom-made designs:
   - Special tension ranges
   - Customized measuring head widths for applications with limited access space
   - Customized distance between the two outer rollers to minimize material deflection
   - Calibration for material path other than vertical
   - Calibration to different units, such as g or kg
   - Special custom-made designs: on request

6. Calibration using customer-supplied material:
This is recommended when the material to be measured differs significantly from the SCHMIDT calibration material in diameter, rigidity or shape etc. For this purpose a material sample of about 5 m should be supplied.

7. Inspection Certificate and Calibration Reports:
These Quality Certificates are optionally available and are recommended especially for ISO 9000 certified companies.

If you need assistance ... Should you need any help in selecting your tension meter, please contact us directly, or the service department of your machinery supplier. In any case, please furnish the following information:
- Description of application and machinery, picture
- Kind of tension meter
- Description of the material to be measured (Ø, type, characteristics, etc.)
- Line speed of the material
- Recommended or estimated tension
- Maximum measuring head width or available access space
- If necessary, submit a material sample of about 5 m
Z SERIES
10 Tension ranges from 1 - 5 cN to 20 - 300 cN

Economical low tension measuring instruments for checking fibers, yarns and fine wires

Special features:
+ Light weight
+ Large, easy to read scale (54 mm Ø)
+ Filament guide and roller shifting mechanism ensure easy acquisition of the running material

Standard features:
- Everything in operator’s view:
  – the guide rollers
  – the measured material
  – the readings
- Ball-bearing mounted, V-grooved guide rollers
- Each instrument is individually calibrated for highest accuracy
- Housing made of high-strength plastic
- Inspection Certificate with Calibration Report optionally available

Slim filament guide with small guide rollers – ideal for limited access space

With bigger rollers for universal use

Hand-Held, mechanical
Z Series

Model ZF2-12
Actual size

Model ZD2-100
Actual size

Subject to change without notice.
**Model ZF2**

Most popular tension meter in the textile industry with small rollers!

**Available Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZF2-5</td>
<td>1 - 5</td>
<td>43 Filament: 25 tex</td>
<td></td>
</tr>
<tr>
<td>ZF2-10</td>
<td>1 - 10</td>
<td>43 Filament: 25 tex</td>
<td></td>
</tr>
<tr>
<td>ZF2-12</td>
<td>1 - 12</td>
<td>43 Filament: 25 tex</td>
<td></td>
</tr>
<tr>
<td>ZF2-20</td>
<td>2 - 20</td>
<td>43 Filament: 25 tex</td>
<td></td>
</tr>
<tr>
<td>ZF2-30</td>
<td>3 - 30</td>
<td>43 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZF2-50</td>
<td>5 - 50</td>
<td>43 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZF2-100</td>
<td>10 - 100</td>
<td>43 PA: 0.12 mm Ø</td>
<td></td>
</tr>
</tbody>
</table>

Other tension ranges available on request. Other units of measure available, such as g.

* Width of filament guide

** Suitable for 95% of applications (see also chart on page 11)

PA = Polyamide Monofilament

**Guide Rollers**

<table>
<thead>
<tr>
<th>V-grooved</th>
<th>Line Speed vmax. / m / min</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>900</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>2000</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code T</td>
<td>450</td>
<td>Plastic (POM) black</td>
</tr>
<tr>
<td>Code W</td>
<td>450</td>
<td>Nickel-plated steel</td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Calibration</th>
<th>Accuracy: ±1.5% full scale or ±1 graduation on scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale diameter</td>
<td>54 mm</td>
</tr>
<tr>
<td>Temperature range</td>
<td>10 - 45 °C</td>
</tr>
<tr>
<td>Air humidity:</td>
<td>85% RH, max.</td>
</tr>
<tr>
<td>Housing material:</td>
<td>Plastic (POM)</td>
</tr>
<tr>
<td>Housing dimensions</td>
<td>157 x 85 x 32 mm (LxWxH)</td>
</tr>
</tbody>
</table>
| Weight, net (gross): | approx. 200 g (600 g) |}

Special calibration using customer supplied samples is available.
Please supply a sample of at least 5 m in length.

---

**Model ZD2**

Universal tension meter for a variety of applications in the textile and wire industries

**Available Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZD2-30</td>
<td>3 - 30</td>
<td>63 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZD2-50</td>
<td>5 - 50</td>
<td>63 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZD2-100</td>
<td>10 - 100</td>
<td>63 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZD2-150</td>
<td>20 - 150</td>
<td>63 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZD2-200</td>
<td>20 - 200</td>
<td>63 PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>ZD2-300</td>
<td>20 - 300</td>
<td>63 PA: 0.20 mm Ø</td>
<td></td>
</tr>
</tbody>
</table>

Other tension ranges available on request. Other units of measure available, such as g.

* Width of filament guide

** Suitable for 95% of applications (see also chart on page 11)

PA = Polyamide Monofilament

**Guide Rollers**

<table>
<thead>
<tr>
<th>V-grooved</th>
<th>Line Speed vmax. / m / min</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>2000</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>3500</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code H</td>
<td>5000</td>
<td>Plasma-coated aluminium (for Model ZD2-100 and higher ranges)</td>
</tr>
<tr>
<td>Code T</td>
<td>1000</td>
<td>Plastic (POM) black</td>
</tr>
<tr>
<td>Code W</td>
<td>1000</td>
<td>Nickel-plated steel</td>
</tr>
<tr>
<td>Code ST</td>
<td>1000</td>
<td>Hardened steel</td>
</tr>
<tr>
<td>Code CE 2</td>
<td>1000</td>
<td>Aluminium ceramic-coated</td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Calibration</th>
<th>Accuracy: ±1.5% full scale or ±1 graduation on scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale diameter</td>
<td>54 mm</td>
</tr>
<tr>
<td>Temperature range</td>
<td>10 - 45 °C</td>
</tr>
<tr>
<td>Air humidity:</td>
<td>85% RH, max.</td>
</tr>
<tr>
<td>Housing material:</td>
<td>Plastic (POM)</td>
</tr>
<tr>
<td>Housing dimensions</td>
<td>157 x 85 x 32 mm (LxWxH)</td>
</tr>
</tbody>
</table>
| Weight, net (gross): | approx. 220 g (620 g) |}

SCHMIDT scales are manufactured according to the most stringent quality requirements. Printed scales are not used. Instead, each scale is individually marked for the instrument involved. This ensures highest quality. Our special procedure makes it possible to provide tension meters fine tuned to a specific tension range, or calibrated to custom supplied material, or units of measure such as g.

---

To place an order please indicate **the complete model number**, e.g.:

**Model ZD2-100** + K = ZD2-100-K

---

Hand-Held, mechanical

**Z Series**

**Model ZF2**

Most popular tension meter in the textile industry with small rollers!

**Model ZD2**

Universal tension meter for a variety of applications in the textile and wire industries

---

**Guide Rollers**

<table>
<thead>
<tr>
<th>V-grooved</th>
<th>Line Speed vmax. / m / min</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td></td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td></td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code H</td>
<td></td>
<td>Plasma-coated aluminium (for Model ZD2-100 and higher ranges)</td>
</tr>
<tr>
<td>Code T</td>
<td></td>
<td>Plastic (POM) black</td>
</tr>
<tr>
<td>Code W</td>
<td></td>
<td>Nickel-plated steel</td>
</tr>
<tr>
<td>Code ST</td>
<td></td>
<td>Hardened steel</td>
</tr>
<tr>
<td>Code CE 2</td>
<td></td>
<td>Aluminium ceramic-coated</td>
</tr>
</tbody>
</table>

---

Special calibration using customer supplied samples is available:
Please supply a sample of at least 5 m in length.
DX SERIES

Universal tension meters for most industrial applications

12 Tension ranges from 10-50 cN to 5-20 daN

Special features:
- Built-in material thickness compensator improves accuracy for changing diameters on DX2-1000 and higher ranges
- Special finger support reduces the effort to move the outer roller assembly
- Filament guide and roller shifting mechanism ensure easy acquisition of the running material
- Custom-built configurations and special calibration are available
- Built-in mounting holes permit fixed installation for continuous tension measurement

Standard features:
- Everything in operator’s view:
  - the guide rollers
  - the measured material
  - the readings
- Ball-bearing mounted, V-grooved guide rollers
- Each instrument is individually calibrated for highest accuracy
- 41 mm Ø scale
- Rugged aluminium housing
- Inspection Certificate with Calibration Report optionally available

Adjustable damping (Code A) to provide steady tension readings

Material thickness compensator with material sample inserted

Best selling tension meter worldwide!

Actual size
Hand-Held, mechanical
DX Series

Model DX2

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges (cN)</th>
<th>Measuring Head Width* (mm)</th>
<th>SCHMIDT Calibration Material**</th>
<th>Material thickness compensator included</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX2-50</td>
<td>10-50</td>
<td>66</td>
<td>PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-120</td>
<td>20-120</td>
<td>66</td>
<td>PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-200</td>
<td>20-200</td>
<td>66</td>
<td>PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-400</td>
<td>20-400</td>
<td>66</td>
<td>PA: 0.20 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-1000</td>
<td>50-1000</td>
<td>66</td>
<td>PA: 0.30 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-2000</td>
<td>200-2000</td>
<td>116</td>
<td>PA: 0.50 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-5000</td>
<td>400-5000</td>
<td>116</td>
<td>PA: 0.80 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-8000</td>
<td>1000-8000</td>
<td>116</td>
<td>PA: 1.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-10K</td>
<td>2.5-10 daN</td>
<td>116</td>
<td>PA: 1.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DX2-20K-L</td>
<td>5-20 daN</td>
<td>216</td>
<td>PA: 1.50 mm Ø</td>
<td></td>
</tr>
</tbody>
</table>

* Depending on model, either width of filament guide or outer distance between outside guide rollers
** Suitable for 95% of applications (see also chart on page 11)
PA = Polyamide Monofilament

Guide Rollers

V-grooved
- Standard 2000 Hard-coated aluminium
- Code K 3500 Hard-coated aluminium
- Code H 3000 Plasma-coated aluminium
- Code T 1000 Plastic (POM) black
- Code W 1000 Nickel-plated steel
- Code ST 1000 Hardened steel
- Code B 1000 Tempered steel for tire cord
- Code CE2 1000 Aluminium ceramic-coated
- Code ASY 1000 Hard-coated aluminium*
- Code ASYB 1000 Tempered steel for tire cord*

U-grooved
- Code U 2000 Hard-coated aluminium

Optional Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Air damping (Model DX2-120 to DX2-5000 only)</td>
</tr>
<tr>
<td>L</td>
<td>Special lever (standard for Model DX2-20K) – recommended for Model DX2-10K –</td>
</tr>
<tr>
<td>M</td>
<td>Memory pointer (DX2-120 and higher ranges)</td>
</tr>
<tr>
<td>EDM</td>
<td>Version for electro discharging machines</td>
</tr>
</tbody>
</table>

Model with tension range
- Model DX2-2000-EDM: 50 - 2000 cN
- Model DX2-3000-EDM: 100 - 3000 cN
- Model DX2-4000-EDM: 200 - 4000 cN

Specifications

- Calibration: According to SCHMIDT factory procedure
- Accuracy: ±1 % full scale or ±1 graduation on scale
- Scale diameter: 41 mm
- Temperature range: 10 - 45 ºC
- Air humidity: 85 % RH, max.
- Housing material: Die-cast aluminium
- Housing dimensions: 188 x 85 x 45 mm (LxWxH)
- Weight, net (gross): up to DX2-10 K approx. 470 g (1000 g)
- DX2-20 K-L approx. 580 g (2000 g)

To place an order please indicate the complete model number, e.g.:

DX2-400 + H + A-M = DX2-400-H-A-M

*Gauge without filament guide

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.
Special purpose models feature small measuring heads, where access space is limited or where filaments run close together

These tension meters are recommended where the standard Model DX2 cannot be used.

**Special features:**
- Turned-up outer finger edges guide the running filament into the roller grooves
- Small, ball-bearing mounted, V-grooved guide rollers (Models DXE and DXV)
- Model DXP features ceramic pins for applications with high line speeds or texturizing machines
- Special calibration using customer supplied samples is available (Models DXE and DXV only)
- Apart from that the instruments relate to model DX2;
  **Note:** The below models do not include a material thickness compensator

### Guide Rollers

**Models DXE, DXV**

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V-grooved</strong></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>900  Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>2000 Hard-coated aluminium</td>
</tr>
<tr>
<td>Code T</td>
<td>450  Plastic (POM) black</td>
</tr>
<tr>
<td>Code W</td>
<td>450  Nickel-plated steel</td>
</tr>
</tbody>
</table>

**Guide Pins**

**Model DXP**

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>Pin Material</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V-grooved</strong></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>6000 Aluminium-oxide ceramic 5.2 mm Ø</td>
</tr>
</tbody>
</table>

### Optional Accessories

**Models DXE, DXV, DXP**

<table>
<thead>
<tr>
<th>Code</th>
<th>Accessory</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Air damping (Model -120 and higher ranges)</td>
</tr>
<tr>
<td>M</td>
<td>Memory pointer (Model -120 and higher ranges)</td>
</tr>
</tbody>
</table>

**Specifications**

same as Model DX2 (see page A4)

Special calibration using customer supplied samples is available:
Please supply a sample of at least 5 m in length.

---

**Model DXE**

Special tension meter for limited access space

**Model DXE-400-K**

with guide rollers (Code K) for line speeds up to \(v_{\text{max}}. \ 2000 \text{ m/min}\)

Measuring head, Model DXE

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width X*</th>
<th>Measuring Head Length Y</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXE-50</td>
<td>10 - 50</td>
<td>38</td>
<td>47</td>
<td>0.12 mm Ø</td>
</tr>
<tr>
<td>DXE-120</td>
<td>20 - 120</td>
<td>38</td>
<td>47</td>
<td>0.12 mm Ø</td>
</tr>
<tr>
<td>DXE-200</td>
<td>20 - 200</td>
<td>38</td>
<td>47</td>
<td>0.12 mm Ø</td>
</tr>
<tr>
<td>DXE-400</td>
<td>20 - 400</td>
<td>38</td>
<td>47</td>
<td>0.20 mm Ø</td>
</tr>
<tr>
<td>DXE-1000</td>
<td>50 - 1000</td>
<td>36</td>
<td>47</td>
<td>0.30 mm Ø</td>
</tr>
<tr>
<td>DXE-2000</td>
<td>200 - 2000</td>
<td>36</td>
<td>47</td>
<td>0.50 mm Ø</td>
</tr>
</tbody>
</table>

Other tension ranges available on request. Other units of measure available, such as g.

* Width of bracket assembly
** Suitable for 95 % of applications (see also chart on page 11)

PA = Polyamide Monofilament

---

Subject to change without notice.
Model DXV

This special design provides easier reading when the standard design makes dial reading difficult.

Model DXP

Non-rotating ceramic pins permit line speeds up to $v_{\text{max}}$, 6000 m/min.

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width X*</th>
<th>Measuring Head Length Y</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXV-50</td>
<td>10 - 50</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>DXV-120</td>
<td>20 - 120</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>DXV-200</td>
<td>20 - 200</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>DXV-400</td>
<td>20 - 400</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>DXV-1000</td>
<td>50 - 1000</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>DXV-1500</td>
<td>150 - 1500</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.50 mm Ø</td>
</tr>
<tr>
<td>DXV-2000</td>
<td>200 - 2000</td>
<td>40 mm</td>
<td>42 mm</td>
<td>PA: 0.50 mm Ø</td>
</tr>
</tbody>
</table>

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width X*</th>
<th>Measuring Head Length Y</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXP-50</td>
<td>10 - 50</td>
<td>27 mm</td>
<td>44 mm</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>DXP-120</td>
<td>20 - 120</td>
<td>27 mm</td>
<td>44 mm</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>DXP-200</td>
<td>20 - 200</td>
<td>27 mm</td>
<td>44 mm</td>
<td>PA: 0.12 mm Ø</td>
</tr>
</tbody>
</table>

Other tension ranges available on request. Other units of measure available, such as g.

To place an order please indicate the complete model number, e.g.:

Model with tension range: DXE-400
Code for guide rollers (if not standard): K
Code for accessory: A–M
Complete Order No.: DXE-400–K–A–M
Hand-Held, mechanical
DX Series

Special purpose tension meter features large rollers and a wide roller spacing to minimize the bending of the material

Special features:
- Large, V-grooved guide rollers, ball-bearing mounted
  DXF: 32 mm Ø, DXL: 29.5 mm Ø
- Large bending radius assures gentle handling of the material being measured
- Apart from that, the instruments relate to model DX2;
  Note: These models do not have a built-in material thickness compensator

Model DXF, DXL

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Measuring Head Width</th>
<th>Calibration Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL</td>
<td>cm</td>
<td>mm</td>
</tr>
<tr>
<td>DXF-120</td>
<td>20 - 120</td>
<td>140</td>
</tr>
<tr>
<td>PA: 0.12 mm Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXF-200</td>
<td>20 - 200</td>
<td>140</td>
</tr>
<tr>
<td>PA: 0.12 mm Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXF-400</td>
<td>20 - 400</td>
<td>140</td>
</tr>
<tr>
<td>PA: 0.20 mm Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXF-1000</td>
<td>50 - 1000</td>
<td>140</td>
</tr>
<tr>
<td>PA: 0.30 mm Ø</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXL-2000</td>
<td>200 - 2000</td>
<td>235</td>
</tr>
<tr>
<td>Buffer tube Ø 2.5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXL-5000</td>
<td>400 - 5000</td>
<td>235</td>
</tr>
<tr>
<td>Buffer tube Ø 2.5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DXL-10K</td>
<td>2.5 - 10 daN</td>
<td>288</td>
</tr>
<tr>
<td>Buffer tube Ø 2.5 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Outer distance between outside guide rollers
** Suitable for 95% of applications (see also chart on page 11)
PA = Polyamide Monofilament

Model DXF

For fragile filaments such as optical fibers, glass fibers, single carbon fibers etc., up to max. 1.5 mm Ø

Model DXL

For fiber optics, buffer tubes, fibers, cables, ropes, up to max. 8 mm Ø

Model DXL-5000

Optional Accessories
- Air damping (available for Models -400 to -5000)
- Special lever – recommended for -10K Models
- Memory pointer

Specifications
- same as Model DX2 (see page A4)

Note: Other tension ranges available on request. Other units of measure available, such as g.
Tension meter for measuring warp threads on weaving machines

Model DXK measures the warp thread tension while the weaving machine is not running. We recommend always measuring the same number of ends, such as 5 or 10 ends (repeat of pattern) or only a single end at a time. During measurement make sure that the ends are not pulled or pressed out of their alignment.

Special features:

- Width of the sensing pin 10 mm
- Reference frame (15 x 17 cm) assures a stable, perpendicular position
- Apart from that the instrument relates to model DX2; Note: This model does not have a built-in material thickness compensator.

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXK-300</td>
<td>20 - 300</td>
</tr>
<tr>
<td>DXK-1000</td>
<td>100 - 1000</td>
</tr>
<tr>
<td>DXK-2000</td>
<td>200 - 2000</td>
</tr>
</tbody>
</table>

SCHMIDT calibration material textile ribbon. Other tension ranges available on request. Other units of measure available, such as g.

Optional Accessories

| Code | Memory pointer |

Specifications same as Model DX2 (see page A4)

Screen Printing Tension Meter

Synthetic mesh always loosens tension in time. Correct mesh tension is one of the most important conditions for accurate, reproducible and high quality screen printing.

Special features:

- To be used for synthetic and steel meshes
- Warpwise or weftwise measuring is possible
- 2 adjustable markers to set limits (MIN, MAX)
- Measuring range 6 - 50 N/cm
- Protected precision dial gauge
- Depth of indentation max. 1 mm
- Measuring force 2.1 - 3.0 N
- According DIN EN16611
- Inspection Certificate with Calibration Report optionally available
Special purpose tension meter for measuring all kinds of tapes and bands, such as textile ribbons, films, foils, fiber bunches etc.

**Special features:**

- Dual-flanged outer guide rollers with various widths, from 7 mm to 100 mm (single-flanged rollers optional)
- Special calibration is available
- Apart from that the instrument relates to model DX2;

  **Note:** This model does not include a filament guide and material thickness compensator

When selecting the instrument for your specific application, please keep in mind that:

1. Rollers of different widths are not interchangeable by the user
2. The roller width should correspond with the width of the material to be measured. Otherwise incorrect measuring results may occur and the instrument may be damaged

SCHMIDT has the solution to any tension measuring problem! Please contact us to discuss your application requirements.

To assist you in selecting the right tension meter for your specific application, please furnish:
- Kind and dimensions of the material to be measured
- Expected tension range
- Material sample of about 5 m

**Model DXB, DXR, DXT**

**Guide Rollers**

<table>
<thead>
<tr>
<th>Tension Range cN</th>
<th>Measuring Head Width mm</th>
<th>Roller Width mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXB-50</td>
<td>10 - 50</td>
<td>55</td>
</tr>
<tr>
<td>DXB-120</td>
<td>20 - 120</td>
<td>55, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DXB-200</td>
<td>20 - 200</td>
<td>55, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DXB-400</td>
<td>20 - 400</td>
<td>55, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DXB-1000</td>
<td>100 - 1000</td>
<td>55, 10, 15, 20, 30, 36, 41, 50</td>
</tr>
<tr>
<td>DXB-2000</td>
<td>200 - 2000</td>
<td>117, 7, 10, 15, 20, 30, 36, 41, 50</td>
</tr>
<tr>
<td>DXB-5000</td>
<td>400 - 5000</td>
<td>117, 7, 10, 15, 20, 30, 36, 41, 50</td>
</tr>
<tr>
<td>DXB-10K</td>
<td>2.5 - 10 daN</td>
<td>117, 7, 10, 15, 20, 30, 36, 41</td>
</tr>
</tbody>
</table>

Available Models

**Code A** Air damping (available for Models -400 to -5000) – not available for Model DXR

**Code L** Special lever (Standard for Models -20 K and higher) – recommended for -10 K Models

**Code M** Memory pointer – not available for DXB-50 and DXT-50

**Specifications**

- Dual-flanged outer guide rollers with various widths, from 7 mm to 100 mm (single-flanged rollers optional)
- Special calibration is available
- Apart from that the instrument relates to model DX2;

  **Note:** This model does not include a filament guide and material thickness compensator

When selecting the instrument for your specific application, please keep in mind that:

1. Rollers of different widths are not interchangeable by the user
2. The roller width should correspond with the width of the material to be measured. Otherwise incorrect measuring results may occur and the instrument may be damaged

SCHMIDT has the solution to any tension measuring problem! Please contact us to discuss your application requirements.

To assist you in selecting the right tension meter for your specific application, please furnish:
- Kind and dimensions of the material to be measured
- Expected tension range
- Material sample of about 5 m

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.
Hand-Held, mechanical DX Series

Model DXR
With heavy-duty bracket and special roller support

Model DXT
Cylindrical rollers pointing away from the operator

Available Models

**MODEL**

**Tension Ranges**

**Measuring Head Width**

**Roller Widths**

**DXR-2000**

200 - 2000

125

50, 100

**DXR-5000**

400 - 5000

125

50, 100

**DXR-10K-L**

2.5 - 10 daN

125

50, 100

**DXR-20K-L**

5 - 20 daN

200

50, 100

**DXR-30K-L**

5 - 30 daN

200

50, 100

**DXR-50K-L**

5 - 50 daN

200

50, 100

Note: Standard equipment of Models DXR-10K to DXR-50K includes special lever (Code L).

Other tension ranges and other measuring head widths available on request. Other units of measure available – g or kg.

* SCHMIDT calibration material textile ribbon or film, depending on tension range and roller width

** Outer distance between outside guide rollers

Complete Order No.

To place an order please indicate the complete model number, e.g.:

**Model with tension range**

**Roller width in mm**

**Code for accessory**

**DXB-1000**

20

A

= **DXB-1000-20-A**
**Tension meter for measurement at sewing machines**

Besides strength and the kind of stitch the tension of the upper and lower thread is important for the solidity and the image of the seam. Tension determines the stitching length.

**DX SERIES**

For measuring the upper and under thread of non-operating machines DX2 series is recommended. The tension meter is used after the yarn break and the thread unwinded by hand.

**Most used model:**

DX2-400, DX2-1000 and DX2-2000; these tension meters are often equipped with a memory pointer code M, to read the measuring value after finishing the measurement.

**Further tension meters for measuring the thread tension at sewing machines**

<table>
<thead>
<tr>
<th>Model</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZF2</td>
<td>A1</td>
</tr>
<tr>
<td>DT</td>
<td>C5</td>
</tr>
<tr>
<td>ET</td>
<td>C13</td>
</tr>
<tr>
<td>Q</td>
<td>B1</td>
</tr>
<tr>
<td>TS</td>
<td>D2</td>
</tr>
</tbody>
</table>

Tension meter DX2 with memory pointer Code M
Tension Meter for measuring the tension of sewing machines and yarn breaks
These models can be used for measuring the upper and lower thread. These unique instruments exist out of a tension meter (with analog or digital display) with an integrated motorized take-up fixture with constant speed of thread. Also yarn breaks and bobbin creels can be adjusted under constant conditions (speed of the thread).

Mechanical tension meter with motorized take-up fixture

Model MKM
3 Tension ranges from 10-500 cN to 50-400 cN

Special features:
- Motorized take-up fixture to have constant speed of the thread (v = 8 m/min respectively ~ 15 m/min) for similar conditions
- Handle can be reversed for using the instrument comfortable in all positions

Standard features:
- Battery or mains-operated (MST-2000 only mains-operated)
- Zero setting by using the “Zero” button before measurement
- Output signal (option): analog 0-2 VDC digital RS-232
- Weight, net (gross): approx. 780 g (2000 g)

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Take-up Speed</th>
<th>SCHMIDT Calibration Material*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKM-50</td>
<td>10-50</td>
<td>75</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>MKM-100</td>
<td>10-100</td>
<td>75</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>MKM-400</td>
<td>50-400</td>
<td>8</td>
<td>PA: 0.20 mm Ø</td>
</tr>
</tbody>
</table>

* Suitable for 95 % of applications (see also chart on page 11)
PA = Polyamide Monofilament

Electronic tension meter with motorized take-up fixture

Model MST
3 Tension ranges from 1-500 cN to 1-2000 cN

Special features:
- Motorized take-up fixture to have constant speed of the thread (v = 8 m/min)
- Storage of AVG, LAST, MIN, MAX, PEAK-MAX and PEAK-MIN values as well as statistical analysis (average value) during a user-selected period
- Special fixture to determine shuttle tension
- Section-cup base for positioning the unit on sewing machine table when tension is measured
- Connection to PC using Software »Tension Inspect 3« optional

Standard features:
- Motor rechargeable battery operated
- Ball-bearing mounted, V-grooved guide rollers
- Weight, net (gross): approx. 780 g (2000 g)
- Inspection Certificate with Calibration Report optionally available

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>SCHMIDT Calibration Material*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MST-500</td>
<td>1-500</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>MST-1000</td>
<td>1-1000</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>MST-2000</td>
<td>1-2000</td>
<td>PA: 0.50 mm Ø</td>
</tr>
</tbody>
</table>

* Suitable for 95 % of applications (see also chart on page 11)
PA = Polyamide Monofilament
**DN SERIES**

**Durable tension meters for a wide range of applications in the textile, fiber and wire industries**

**12 Tension ranges**
from 20 - 120 cN to 5 - 50 daN

---

**Special features:**

- Large, easy to read scale (54 mm Ø)
- Linearized scale provides a better reading
- Shock-resistant movement
- Built-in material thickness compensator improves accuracy for changing diameters on DN1-1000 and higher ranges
- Filament guide and roller shifting mechanism ensure easy acquisition of the running material

---

**Standard features:**

- Everything in operator’s view:
  - the guide rollers
  - the measured material
- the readings
- Ball-bearing mounted,
  V-grooved guide rollers
- Each instrument is individually calibrated
  for highest accuracy
- Special calibration is available
- Rugged aluminium housing
- Inspection Certificate with Calibration Report optionally available

---

Material thickness compensator with material sample inserted

---

**Model DN1-400**

Actual size

---

SCHMIDT scales are manufactured according to the most stringent quality requirements. Printed scales are not used. Instead, each scale is individually marked for the instrument involved. This ensures highest quality. Our special procedure makes it possible to provide tension meters fine tuned to a specific tension range, or calibrated to customer supplied material, or units of measure such as g or kg.
Hand-Held, mechanical DN Series

Model DN1

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Tension Ranges (daN)</th>
<th>Measuring Head Width (mm)</th>
<th>SCHMIDT Calibration Material</th>
<th>Material Thickness Compensator Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN1-120</td>
<td>20 - 120</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-200</td>
<td>20 - 200</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-400</td>
<td>20 - 400</td>
<td>65</td>
<td>PA: 0.20 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-1000</td>
<td>50 - 1000</td>
<td>65</td>
<td>PA: 0.30 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-2000</td>
<td>200 - 2000</td>
<td>116</td>
<td>PA: 0.50 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-3500</td>
<td>400 - 3500</td>
<td>116</td>
<td>PA: 0.80 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-5000</td>
<td>400 - 5000</td>
<td>116</td>
<td>PA: 0.80 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-8000</td>
<td>500 - 8000</td>
<td>116</td>
<td>PA: 1.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-10K</td>
<td>2 - 10 daN</td>
<td>116</td>
<td>PA: 1.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-20K-L</td>
<td>5 - 20 daN</td>
<td>216***</td>
<td>PA: 1.50 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-30K-L</td>
<td>5 - 30 daN</td>
<td>265***</td>
<td>PA: 1.50 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DN1-50K-L</td>
<td>5 - 50 daN</td>
<td>265***</td>
<td>Steel rope: 1.50 mm Ø (7 x 7 x 0.20)</td>
<td></td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request.

Guide Rollers

- V-grooved
  - Standard 2000 Hard-coated aluminium
  - Code K 3500 Hard-coated aluminium
  - Code H 5000 Plasma-coated aluminium (not available for DN1-30K and DN1-50K)
- Code T 1000 Plastic (POM) black
- Code W 1000 Nickel-plated steel
- Code ST 1000 Hardened steel
- Code B 1000 Tempered steel for tire cord
- Code CE2 1000 Aluminium ceramic-coated
- Code ASY 1000 Hard-coated aluminium
- Code ASYB 1000 Tempered steel for tire cord
- Code V1 1000 Hard-coated aluminium* (only for DN1-20K up to DN1-50K)

- U-grooved
  - Code U 2000 Hard-coated aluminium

Optional Accessories

- Code A Air damping (Models DN1-120 to DN1-5000 only)
- Code L Special lever (standard for DN1-20K and higher ranges) – recommended for DN1-10K

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

Model with tension range and special lever for easy use at high ranges (Code L)

Other units of measure available – g or kg.

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

** Suitable for 95% of applications (see also chart on page 11)

PA = Polyamide Monofilament

*** Deviating measuring head width 285 mm with Code V1

Guide Rollers

- V-grooved
  - Standard 2000 Hard-coated aluminium
  - Code K 3500 Hard-coated aluminium
  - Code H 5000 Plasma-coated aluminium (not available for DN1-30K and DN1-50K)
- Code T 1000 Plastic (POM) black
- Code W 1000 Nickel-plated steel
- Code ST 1000 Hardened steel
- Code B 1000 Tempered steel for tire cord
- Code CE2 1000 Aluminium ceramic-coated
- Code ASY 1000 Hard-coated aluminium
- Code ASYB 1000 Tempered steel for tire cord
- Code V1 1000 Hard-coated aluminium* (only for DN1-20K up to DN1-50K)

- U-grooved
  - Code U 2000 Hard-coated aluminium

Optional Accessories

- Code A Air damping (Models DN1-120 to DN1-5000 only)
- Code L Special lever (standard for DN1-20K and higher ranges) – recommended for DN1-10K

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

To place an order please indicate the complete model number, e.g.: DN1-400 + ST + A = DN1-400-ST-A
Tension meter for measuring pretensioned ropes up to max. 4 mm Ø

**Model DNW**

- 4 tension ranges from 10-100 daN to 40-400 daN

**Special features:**
- Can be used only for pretensioned, non-moving ropes
- Calibration is done using a closed force system
- Due to the material path the max. error is approx. 3% FS (full scale)
- Special lever reduces the force to extend outer rollers to capture the material to be measured
- Apart from that the instrument relates to model DN1, but no thickness compensator

**Available Models**

| MODEL  | Tension Ranges | Measuring Head Width | SCHMIDT Calibration Material*
|--------|----------------|----------------------|-------------------------------
| DNW-100K | 10-100          | 265                  | steel rope 2 mm Ø             |
| DNW-200K | 20-200          | 265                  | steel rope 2 mm Ø             |
| DNW-300K | 30-300          | 265                  | steel rope 3 mm Ø             |
| DNW-400K | 40-400          | 265                  | steel rope 4 mm Ø             |

* Outer distance between outside guide rollers

**Roller Material**

- Asymmetrical Groove
  - Standard: Tempered steel

---

Tension meter for measuring pretensioned ropes, wires etc., up to max. 2 mm Ø

**Model DXH**

- 3 tension ranges from 400-5000 cN to 5-20 daN

**Special features:**
- Fixed hooks as guide pins
- Usable for application areas with limited access space
- Calibration is done in an open force system using a free hanging weight
- If the instrument is used in a closed force system the accuracy is worse, depending on the fixing length
- Apart from that the instrument relates to model DX2, but no thickness compensator

**Available Models**

| MODEL  | Tension Ranges | Measuring Head Width | SCHMIDT Calibration Material*
|--------|----------------|----------------------|-------------------------------
| DXH-5000 | 400-5000       | 116                  | PA: 0.8 mm Ø                  |
| DXH-10K  | 2.5-10 daN      | 116                  | PA: 1.0 mm Ø                  |
| DXH-20K-L | 5-20 daN       | 116                  | PA: 1.5 mm Ø                  |

Other tension range and measuring head widths on request.
Other units of measure available – g or kg.

**Roller Material**

- Asymmetrical Groove

> see page E
Model TEN

Small, compact tension meter for measuring fibers and threads

Special features:
+ 2-roller measuring system
+ Small, handy design
+ Large encloacement of thread for stable readings when tension fluctuates rapidly

Standard features:
- Ball-bearing mounted, V-grooved guide rollers
- Aluminium housing

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Tension Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEN-3K</td>
<td>0.5 - 3 cN</td>
</tr>
<tr>
<td>TEN-5K</td>
<td>1 - 5 cN</td>
</tr>
<tr>
<td>TEN-10K</td>
<td>2 - 10 cN</td>
</tr>
<tr>
<td>TEN-12K</td>
<td>2 - 12 cN</td>
</tr>
<tr>
<td>TEN-20K</td>
<td>5 - 20 cN</td>
</tr>
<tr>
<td>TEN-30K</td>
<td>5 - 30 cN</td>
</tr>
<tr>
<td>TEN-50K</td>
<td>10 - 50 cN</td>
</tr>
<tr>
<td>TEN-60K</td>
<td>10 - 60 cN</td>
</tr>
<tr>
<td>TEN-70K</td>
<td>10 - 70 cN</td>
</tr>
<tr>
<td>TEN-120K</td>
<td>20 - 120 cN</td>
</tr>
<tr>
<td>TEN-170K</td>
<td>30 - 170 cN</td>
</tr>
</tbody>
</table>

The instrument is designed for one-hand use. To thread in, place the yarn between the two guide rollers. Push and hold the key button at the instrument. The outer roller will be turned up and the instrument is ready for measuring. The measured value will be displayed at the analog display.

Specifications:

- Accuracy: ± 7% full scale up to 10 cN or ± 5% full scale up to 30 cN or ± 2% full scale for higher 30 cN
- Scale diameter: 40 mm
- Temperature range: 10 - 50 °C
- Air humidity: 85% RH, max.
- Housing material: Aluminium
- Housing dimensions: 87 x 57 x 26 mm (L x W x H)
- Weight, net (gross): approx. 150 g (approx. 260 g)
Stationary tension meters for continuous tension measurement applications

Special features:
+ Easy online mounting with screws
+ User-set MIN- and MAX-limits alert operator to out-of-tolerance conditions
(This feature is not available for Model Q)

Note: Stationary tension meters do not include a filament guide and material thickness compensator

Models Q, MK, DX2S

V-grooved

Standard
Code T
Code W

Model DX2S

V-grooved

Standard
Code K
Code H
Code T
Code W
Code ST
Code B
Code CE
Code ASY
Code ASYB

U-grooved

Code U

Optional Accessories

Model MK

Code D

Model DX2S

Code A

Model Q

Tension meter with large, easy to read scale (54 mm Ø)

Stationary, mechanical

Subject to change without notice.

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

Available Models

<table>
<thead>
<tr>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - 10</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>2 - 20</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>3 - 30</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>5 - 50</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>10 - 100</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>20 - 200</td>
<td>65</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>20 - 300</td>
<td>65</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>50 - 500</td>
<td>85</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>50 - 1000</td>
<td>85</td>
<td>PA: 0.30 mm Ø</td>
</tr>
</tbody>
</table>

Other tension ranges available on request. Other units of measure available, such as g.
* Outer distance between outside guide rollers
** SCHMIDT calibration material Polyamide Monofilament PA (see chart on page 11)

Specifications

Model MK

Code D

Tension-detecting screw contacts
Adjustable MIN and MAX contacts trigger a signal, as soon as MIN or MAX tension value is reached

Model DX2S

Code A

Air damping (DX2S-120 to DX2S-5000)
The following models of the DX series are available as stationary models for fixed installation:

Model DXE → Model DXES
Model DXF → Model DXFS
Model DXB → Model DXBS
Model DXT → Model DXTS
PT SERIES

Economical low tension measuring instruments for checking fibers, threads, yarns etc.

Model PT-100

For fast measurements on circular knitting machines

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Measuring Range</th>
<th>Measuring Range</th>
<th>Measuring Range</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-100</td>
<td>0.5 - 100.0</td>
<td>0 - 1999</td>
<td>0 - 1999</td>
<td>24</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>PT-100-L</td>
<td>0.5 - 100.0</td>
<td>0 - 1999</td>
<td>0 - 1999</td>
<td>24</td>
<td>PA: 0.20 mm Ø</td>
</tr>
</tbody>
</table>

* Outer distance between outside guide rollers
** Suitable for 95% of applications (see also chart on page 11) PA = Polyamide Monofilament

Special features

Model PT-100 and PT-100-L:

- Easy threading of the material to be measured using the cone shaped guide rollers and turning the instrument by 180°
- Automatic Zero setting independent to measuring position
- Tension meter can be used for right and left hand use
- Adjustable electronic damping to provide steady tension readings
- Switchable measuring units cN or grs
- The average reading of a series of measurement can be displayed
- LiPo accumulator

Standard features

- Tension meter with small, compact aluminium housing
- Ball-bearing mounted, V-grooved guide rollers
- Tension meter with easy to read LCD display
- CE proofed, interference resistance about static charge
- Inspection Certificate with Calibration Report optionally available
Hand-Held, electronic
PT Series

SCHMIDT · ALL OVER THE TECHNICAL WORLD
www.hans-schmidt.com

Tension meter mostly used for knitting machines

Model PT-100-L

Special Features Model PT-100-L:
+ Multifunctional instrument:
  - Tension Meter
  - Yarn Speed Meter
  - Length Meter to determine the yarn consumption of a single feeder for one or more (max. 10 revolutions) machine cycles of a circular knitting machine

Length measurement - 2 operation modes:
- „Manual“ (without external Sensor): The instrument works as long as the operator presses the button
- „Auto“ (with magnet sensor): Sensor and magnet are supplying a start/stop signal for a user-defined number of machine revolutions (1 to 10)

Model PT-100 and PT-100-L

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Model PT-100 and PT-100-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calibration:</td>
<td>According to SCHMIDT factory procedure</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>± 1.5 % FS* and ± 1 digit,</td>
</tr>
<tr>
<td></td>
<td>Length measuring ± 0.5 % FS*, 1 digit</td>
</tr>
<tr>
<td>Overrange (approx.):</td>
<td>10% FS*, without accuracy guarantee</td>
</tr>
<tr>
<td>Overload protection:</td>
<td>200%</td>
</tr>
<tr>
<td>Measuring principle:</td>
<td>Strain gauge bridge</td>
</tr>
<tr>
<td>Measuring units:</td>
<td>cN, grs switchable</td>
</tr>
<tr>
<td></td>
<td>m, in, m/min, in/min (only PT-100-L)</td>
</tr>
<tr>
<td>Display update rate:</td>
<td>2 times/sec</td>
</tr>
<tr>
<td>Damping:</td>
<td>Selectable electronic damping (moving averaging)</td>
</tr>
<tr>
<td>Display:</td>
<td>LCD 3½ digits, 9 mm high</td>
</tr>
<tr>
<td>Temperature range:</td>
<td>10 - 45 °C</td>
</tr>
<tr>
<td>Air humidity:</td>
<td>5 % RH, max.</td>
</tr>
<tr>
<td>Power supply:</td>
<td>LiPo accumulator (~ 40 h continuous use, charging time 3½ h)</td>
</tr>
<tr>
<td></td>
<td>and AC adapter 100 - 240 V with adapters (EU/USA/UK)</td>
</tr>
<tr>
<td>Auto power off:</td>
<td>Automatically after 3 minutes of non use</td>
</tr>
<tr>
<td>Housing material:</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Housing dimensions:</td>
<td>141 x 36 x 22 mm (L x W x H)</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 170 g (approx. 500 g)</td>
</tr>
</tbody>
</table>

* FS = Full Scale

Model PT-100-L
Actual size

Multifunctional tension meter with low weight

with sensor and magnet for measuring yarn consumption

Accessories

Model PT-100-L (includes delivery)

PT-S          Sensor with cable (3.50 m), magnet and clamping angle
**Hand-Held, electronic ZE Series**

**ZE SERIES**

Economical low tension measuring instruments for checking fibers, yarns and fine wires

**4 Tension ranges from 0.5 - 50 cN to 1- 500 cN**

**Special features:**
- Simple handling
- Automatic »Zero setting« independent to measuring position
- Adjustable electronic damping to provide steady tension readings
- Easy to read LCD display
- Filament guide and roller shifting mechanism ensure easy acquisition of the running material
- Light weight
- LiPo accumulator

**Standard features:**
- Everything in operator’s view: the guide rollers, the measured material, the readings
- Ball-bearing mounted, V-grooved guide rollers
- Housing made of high-strength plastic
- CE proofed, interference resistance about static charge
- Inspection Certificate with Calibration Report optionally available

---

**Model ZEF**

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZEF-50</td>
<td>0.5 - 50.0</td>
<td>43</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>ZEF-100</td>
<td>0.5 - 100.0</td>
<td>43</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>ZEF-200</td>
<td>1 - 200</td>
<td>43</td>
<td>PA: 0.12 mm Ø</td>
</tr>
</tbody>
</table>

* Width of filament guide
** Suitable for 95 % of applications (see also chart on page 11)

PA = Polyamide Monofilament

**Guide Rollers**

<table>
<thead>
<tr>
<th>V-grooved</th>
<th>Line Speed vmax.</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>900 m / min</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>2000 m / min</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code T</td>
<td>450 m / min</td>
<td>Plastic (POM) black</td>
</tr>
<tr>
<td>Code W</td>
<td>450 m / min</td>
<td>Nickel-plated steel</td>
</tr>
</tbody>
</table>

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

---

Model ZEF-100-T with easy running plastic rollers to measure Spandex (Lycra) filaments

---

Subject to change without notice.
Universal tension meter for a variety of applications in the textile and wire industries

**Model ZED**

<table>
<thead>
<tr>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model ZEF and ZED</strong></td>
</tr>
<tr>
<td><strong>Calibration:</strong></td>
</tr>
<tr>
<td><strong>Accuracy:</strong></td>
</tr>
<tr>
<td><strong>Overrange (approx.):</strong></td>
</tr>
<tr>
<td><strong>Overload protection:</strong></td>
</tr>
<tr>
<td><strong>Measuring principle:</strong></td>
</tr>
<tr>
<td><strong>Measuring roller deflection:</strong></td>
</tr>
<tr>
<td><strong>Display:</strong></td>
</tr>
<tr>
<td><strong>Display update rate:</strong></td>
</tr>
<tr>
<td><strong>Damping:</strong></td>
</tr>
<tr>
<td><strong>Signal processing:</strong></td>
</tr>
<tr>
<td><strong>Temperature range:</strong></td>
</tr>
<tr>
<td><strong>Air humidity:</strong></td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
</tr>
<tr>
<td><strong>Housing material:</strong></td>
</tr>
<tr>
<td><strong>Housing dimensions:</strong></td>
</tr>
<tr>
<td><strong>Weight, net (gross):</strong></td>
</tr>
</tbody>
</table>

* FS = Full Scale

### Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Range (cN)</th>
<th>Measuring Head Width (mm)</th>
<th>Calibration Material*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZED-200</td>
<td>1 - 200</td>
<td>63</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>ZED-500</td>
<td>1 - 500</td>
<td>63</td>
<td>PA: 0.20 mm Ø</td>
</tr>
</tbody>
</table>

* Width of filament guide

**Suitable for 95 % of applications (see also chart on page 11)**

**PA = Polyamide Monofilament**

#### Guide Rollers

- **V-grooved**
  - Standard: 2000 Hard-coated aluminium
  - Code K: 3500 Hard-coated aluminium
  - Code H: 5000 Plasma-coated aluminium
  - Code T: 1000 Plastic (POM) black
  - Code W: 1000 Nickel-plated steel
  - Code CE2: 1000 Aluminium ceramic-coated

- **Complete Order No.:**
  - Model with tension range: ZED-200
  - Code for guide rollers (if not standard): K
  - Complete Order No.: ZED-200-K

Special calibration using customer supplied samples is available:
Please supply a sample of at least 5 m in length.

---

To place an order please indicate the complete model number, e.g.:

ZEF-200 + K = ZEF-200-K
Hand-Held, electronic DT Series

Electronic tension meters providing detailed process data and analysis. Two models available: DTS (basic unit) and DTX (with memory and output)

DT SERIES

12 Tension ranges
from 1 - 200 cN to 0.6 - 60 daN

Special features
Models DTMB and DTMX:

- Large, backlight LCD-display with 3 different displays:
  - numeric,
  - numeric with live load bar,
  - numeric with graph (time-tension)
- The display rotates in 90° steps for better reading (see page C9)
- New, unique, force reduced material catching system
- Thickness compensator to reach highest accuracy: the diameter of the material to be measured can be set with a wheel and will be displayed in the screen (not available for all models)
- Automatic „Zero-Setting“ in each measuring position using a special sensor technique
- High speed data sampling (internal 8 kHz) and recording of MIN-, MAX-, LAST-reading, PEAKS, AVG and standard deviation
- Programmable MIN- and MAX-alarms - indication in the display, if reading is out of limits
- Material memory locations for customer made calibrations: 4 model DTS and 9 model DTX
- Cal. adjustment for fine tuning of the calibration, if material differs from the used calibration material
- Flexible menu set-up to meet operators demand
- Menu set-up in English or German language
- Selectable units of measurement: cN, daN, g, kg, N, lb
- Rubberized handle provides a secure hold in the operators’ hand

Standard features
Models DTS and DTX:

- Everything in operator’s view:
  - the guide rollers
  - the measured material
  - the readings
- Filament guide and roller shifting mechanism ensure easy acquisition of the running material
- Ball-bearing mounted, V-grooved guide rollers
- Rugged aluminium housing
- LiPo Accu (approx. 40 h continuous use) with AC adapter
- CE approved (tested for electromagnetic compatibility)
- Inspection Certificate with calibration report optionally available

Model DTS

Model DTS:
The basic unit for easy use, for many applications, without interface

Model DTS-1000

Easy mounting for online applications (Code MH)
Optional for DT series

1st IN TENSION METERS WORLDWIDE®

Subject to change without notice.
Model DTX

For applications requiring additional process data, such as ISO 9000 certified quality management systems

Additional features model DTX:

- USB interface (1000 readings/sec.)
- Memory for 60,000 readings
- 5 different memory modes:
  Mode S: statistics only
  Mode H: storage of the X-Y-diagram for reviewing after finishing a series of measurement (e.g. short time spooling)
  Mode C: continuous logging over a user set time and different series of measurement (2 Hz)
  Mode F: fast, continuous logging over a user set time and different series of measurement (1000 Hz)
  Mode D: storage of single readings and statistic
- Factory-provided calibration with PA Monofilament and Cu wire
- 9 Material memory locations for customer made calibrations
- Wi-Fi modul for wireless communication with a PC (optional)
- Delivery includes: tension meter, USB-cable, and software »Tension Inspect 3«

Model DTX for data acquisition and evaluation (Software see page C9)

Thickness compensator: The display shows the adjusted material diameter

Standard for model DTS and DTX (see page C7/C8)
Model DTS

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
<th>Textile Industry Applications e.g. yarn count</th>
<th>Wire Industry Applications e.g. soft-annealed copper wire</th>
<th>Material thickness compensator included</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTS-200</td>
<td>1 - 200.0</td>
<td>66</td>
<td>0.12 mm Ø</td>
<td>max. 200 tex</td>
<td>max. 0.15 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-500</td>
<td>1 - 500.0</td>
<td>66</td>
<td>0.12 + 0.20 mm Ø</td>
<td>max. 500 tex</td>
<td>max. 0.05 - 0.25 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-1000</td>
<td>10 - 1000</td>
<td>66</td>
<td>0.20 + 0.40 mm Ø</td>
<td>max. 1000 tex</td>
<td>max. 0.10 - 0.40 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-2000</td>
<td>20 - 2000</td>
<td>66</td>
<td>0.40 + 0.70 mm Ø</td>
<td>max. 2000 tex</td>
<td>max. 0.30 - 0.60 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-2500</td>
<td>25 - 2500</td>
<td>116</td>
<td>0.40 + 0.70 mm Ø</td>
<td>max. 2500 tex</td>
<td>max. 0.30 - 0.70 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-4000</td>
<td>40 - 4000</td>
<td>66</td>
<td>0.50 + 0.90 mm Ø</td>
<td>max. 4000 tex</td>
<td>max. 0.35 - 0.90 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-5000</td>
<td>50 - 5000</td>
<td>116</td>
<td>0.60 + 1.20 mm Ø</td>
<td>max. 5000 tex</td>
<td>max. 0.40 - 1.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-10K</td>
<td>0.1 - 10.00 daN</td>
<td>116</td>
<td>0.80 + 1.40 mm Ø</td>
<td>max. 10000 tex</td>
<td>max. 0.70 - 1.40 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-20K</td>
<td>0.2 - 20.00 daN</td>
<td>166</td>
<td>1.20 + 1.80 mm Ø</td>
<td>max. 20000 tex</td>
<td>max. 1.00 - 1.80 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-30K</td>
<td>0.3 - 30.00 daN</td>
<td>216</td>
<td>1.40 + 2.20 mm Ø</td>
<td>max. 30000 tex</td>
<td>max. 1.20 - 2.00 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-50K</td>
<td>0.5 - 50.00 daN</td>
<td>216</td>
<td>Steelrope 1.3 mm Ø (7 x 7 x 0.2)</td>
<td>max. 50000 tex</td>
<td>1.40 - 2.20 mm Ø</td>
<td></td>
</tr>
<tr>
<td>DTS-60K-V1</td>
<td>0.6 - 60.00 daN</td>
<td>280</td>
<td>Steelrope 2.0 mm Ø (7 x 7 x 0.3)</td>
<td>max. 60000 tex</td>
<td>1.80 - 3.00 mm Ø</td>
<td></td>
</tr>
</tbody>
</table>

Other measuring head widths available on request. * Depending on model, either width of filament guide or outer distance between outside guide rollers ** Suitable for 95% of applications (see also chart on page 11)

Guide Rollers

Model DTS

V-grooved

Standard

Code K 2000 Hard-coated aluminium
Code H 3500 Hard-coated aluminium
Code T 5000 Plastic (POM) black
Code W 7000 Nickel-plated steel
Code ST 9000 Hardened steel
Code B 1000 Tempered steel for tire cord
Code CE2 1200 Aluminium ceramic-coated
Code V1 1200 Hard-coated aluminium (only for tension range 60 daN)

asymmetrical groove

(new for tension range 200 daN)

Code ASY 1000 Hard-coated aluminium
Code ASYB 1000 Tempered steel for tire cord
– Gauge is without filament guide –

U-grooved

Code U 2000 Hard-coated aluminium (not for tension range 200 daN)

Optional Accessories

Code MH Mounting thread for online use

– see page E –

Specifications

Model DTS

Calibration: According to SCHMIDT factory procedure
Accuracy: 5% to 100% of range:
± 0.5% FS* and ± 1 digit or better
Remaining range and other calibration material: ± 3% FS* and ± 1 digit or better
Memory for material 1 for SCHMIDT calibration plus curves: 4 for customized calibrations
Measuring units: Force: cN, daN, g, kg, N or lb
Thickness: mm or inch
Overrange: Approx. 10% FS*, without accuracy guarantee
Overload protection: 100% FS*
Measuring principle: Strain gauge bridge
Measuring roller deflection: 0.2 mm max.
Signal processing: Digital, 16 bit A/D converter
Measuring frequency: Max. 1 kHz (1000 measurements/sec.)
Display: Graphic LCD
3 different displays: Numeric, Numeric + bargraph, Numeric + X-Y-diagram (time tension)
Display update rate: 2 times per second
Memory: MIN, MAX, PEAKS, AVG, STD and LAST
Thickness compensation: Max. 2.5 mm (not for all models)
Temperature range: 10 - 45°C
Air humidity: 85% RH, max.
Power supply: LiPo accumulator (about 40 hours of continuous use)
Housing material: Die-cast aluminium
Housing dimensions: 265 x 78.5 x 46 mm (L x W x H)
Weight, net (gross): Up to Model 30 K 875 g (1550 g)
DTS-60 K-V1 1040 g (2700 g)

* FS = Full Scale

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.
Model DTX

Available Models

| Model   | Tension Ranges | Measuring Head Width* | SCHMIDT Calibration Material** | Textile Industry Applications e.g. yarn count | SCHMIDT Calibration Material*** | Wire Industry Applications e.g. soft-annealed copper wire | Material thickness compensator included |
|---------|----------------|-----------------------|-------------------------------|---------------------------------------------|---------------------------------|-----------------------------------------------------|
| DTX-200| 1 - 200.0 66   | 0.12 mm Ø max. 200 tex | 0.10 mm Ø max. 0.15 mm Ø     |                                            |                                 |                                                     |
| DTX-500| 1 - 500.0 66   | 0.20 + 0.20 mm Ø max. 500 tex | 0.16 - 0.25 mm Ø max. 0.05 - 0.25 mm Ø |                                            |                                 |                                                     |
| DTX-1000| 50 - 1000 66 | 0.40 + 0.40 mm Ø max. 1000 tex | 0.25 + 0.40 mm Ø max. 0.10 - 0.40 mm Ø |                                            |                                 |                                                     |
| DTX-2000| 20 - 2000 66 | 0.40 + 0.70 mm Ø max. 2000 tex | 0.40 + 0.60 mm Ø max. 0.30 - 0.60 mm Ø |                                            |                                 |                                                     |
| DTX-2500| 25 - 2500 116 | 0.40 + 0.70 mm Ø max. 2500 tex | 0.40 + 0.60 mm Ø max. 0.30 - 0.70 mm Ø |                                            |                                 |                                                     |
| DTX-4000| 40 - 4000 66 | 0.50 + 0.80 mm Ø max. 4000 tex | 0.50 + 0.80 mm Ø max. 0.35 - 0.90 mm Ø |                                            |                                 |                                                     |
| DTX-5000| 50 - 5000 116 | 0.60 + 1.20 mm Ø max. 5000 tex | 0.60 + 1.00 mm Ø max. 0.40 - 1.00 mm Ø |                                            |                                 |                                                     |
| DTX-10K | 0.1 - 10.00 daN 116 | 0.80 + 1.40 mm Ø max. 10000 tex | 0.70 + 1.20 mm Ø max. 0.70 - 1.40 mm Ø |                                            |                                 |                                                     |
| DTX-20K | 0.2 - 20.00 daN 166 | 1.20 + 1.80 mm Ø max. 20000 tex | Steelrope 1.5 mm Ø max. 1.00 - 2.00 mm Ø |                                            |                                 |                                                     |
| DTX-30K | 0.3 - 30.00 daN 216 | 1.40 + 2.00 mm Ø max. 30000 tex | Steelrope 1.5 mm Ø max. 1.20 - 2.50 mm Ø |                                            |                                 |                                                     |
| DTX-50K | 0.5 - 50.00 daN 216 | Steelrope 1.5 mm Ø (7 x 7 x 0.2) max. 50000 tex | Steelrope 2.0 mm Ø (7 x 7 x 0.3) max. 50000 tex |                                            |                                 |                                                     |
| DTX-60K-V1| 0.6 - 60.00 daN 280 | Steelrope 2.0 mm Ø (7 x 7 x 0.3) max. 60000 tex | Steelrope 2.5 mm Ø (7 x 7 x 0.4) max. 60000 tex |                                            |                                 |                                                     |

Other measuring head widths available on request.  * Depending on model, either width of filament guide or outer distance between outside guide rollers  ** Suitable for 95 % of applications (see also chart on page 11) – PA = Polyamide Monofilament  *** Accuracy: ± 3 % full scale and ± 1 digit

Guide Rollers

same as Model DTS

Standard Accessories

Model DTX

SW-TI3 = Tension Inspect 3= software (WIN XP and higher), incl. USB cable

Optional Accessories

Model DTX

Code MH Mounting thread for online use
Code WL Wi-Fi modul for wireless data transfer (no worldwide approval)

Specifications

Output signal: USB
Memory: 60,000 values at 255 measuring periods
Memory for material curves: 2 for SCHMIDT calibration plus 9 for customized calibrations
Memory modes: 5 memory modes with statistical evaluation

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

To place an order please indicate the complete model number, e.g.: DTX-5000 + H + WL = DTX-5000-H-WL

Model DTX-1000-WL with Wi-Fi Modul optional
DT series: a display with many possibilities

Model DTX for storing and analyzing the measured data with the «software Tension Inspect 3»

«Tension Inspect 3» - Software to display and store on a PC. The series DTX can be connected to a PC using the USB output or the optional Wi-Fi modul.

Features:
- Real-time reading
- The readings are also shown in a X-Y diagram (time/date-tension) with zoom function
- Recording of the buffered readings as CSV-file
- Online recording with automatic storage of the readings as CSV file
- 2 different statistics: a) statistic of all recorded values b) statistic of the buffered diagram readings
- Adjustable set-points with protocol
- Timeshift function for subsequent detailed data viewing of the diagram
- Reloading and displaying of stored readings (PC file and memory of DTX)
- Creating of a HTML report
- Download of values to Excel
- Printing of stored values using Excel functions

This software can be use for all other SCHMIDT Tension Meters
**Hand-Held, electronic DT Series**

**Models DTSB, DTXB**

Special purpose tension meter for measuring all kinds of tapes and bands, such as textile ribbon, films, foils, fiber bunches etc.

Special features:
- Dual-flanged outer guide rollers with various widths, from 7 mm to 41 mm (single-flanged rollers optional)
- Apart from that the instruments relate to model DTS and DTX
  - Note: These models do not include a filament guide and material thickness compensator

When selecting the instrument for your specific application, please keep in mind that:
1. Rollers of different widths are not interchangeable by the user
2. The roller width should correspond with the width of the material to be measured. Otherwise incorrect measuring results may occur and the instrument may be damaged

To assist you in selecting the right tension meter for your specific application, please furnish:
- Kind and dimensions of the material to be measured
- Expected tension range
- Material sample of about 5 m

**Models DTSB, DTXB**

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Tension Ranges*</th>
<th>Measuring Head Width**</th>
<th>Roller Widths</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL</strong></td>
<td>daN</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>DTSB-500</td>
<td>5.0 - 500.0</td>
<td>55</td>
<td>7, 10, 15, 20</td>
</tr>
<tr>
<td>DTSB-1000</td>
<td>50 - 1000</td>
<td>55</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTSB-2000</td>
<td>100 - 2000</td>
<td>55</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTSB-2500</td>
<td>150 - 2500</td>
<td>117</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTSB-4000</td>
<td>200 - 4000</td>
<td>55</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTSB-5000</td>
<td>250 - 5000</td>
<td>117</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTSB-10K</td>
<td>0.5 - 10.00</td>
<td>117</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DTSB-20K</td>
<td>1.0 - 20.00</td>
<td>167</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DTSB-30K</td>
<td>1.5 - 30.00</td>
<td>217</td>
<td>7, 10, 20</td>
</tr>
<tr>
<td>DTSB-50K</td>
<td>2.5 - 50.00</td>
<td>217</td>
<td>7, 10, 20</td>
</tr>
<tr>
<td>DTXB-500</td>
<td>5.0 - 500.0</td>
<td>55</td>
<td>7, 10, 15, 20</td>
</tr>
<tr>
<td>DTXB-1000</td>
<td>50 - 1000</td>
<td>55</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTXB-2000</td>
<td>100 - 2000</td>
<td>55</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTXB-2500</td>
<td>150 - 2500</td>
<td>117</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTXB-4000</td>
<td>200 - 4000</td>
<td>55</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTXB-5000</td>
<td>250 - 5000</td>
<td>117</td>
<td>7, 10, 15, 20, 30, 41</td>
</tr>
<tr>
<td>DTXB-10K</td>
<td>0.5 - 10.00</td>
<td>117</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DTXB-20K</td>
<td>1.0 - 20.00</td>
<td>167</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>DTXB-30K</td>
<td>1.5 - 30.00</td>
<td>217</td>
<td>7, 10, 20</td>
</tr>
</tbody>
</table>

Other measuring head widths available on request.
- SCHMIDT calibration material textile ribbon or film, depending on tension range and roller width
- **Outer distance between outside guide rollers**

Other roller materials (nickel-plated steel or plastic), as well as special coatings (anti adhesive or carbon fibres - NAV optimized) are available on request.

**Optional Accessories**
- **Code MH** Mounting thread for online use
- **Code WL** Wi-Fi modul for wireless data transfer (only model DTXB, no worldwide approval)

**Specifications**
- same as DTS or DTX (see page C 7 and C8)

To place an order please indicate the complete model number, e.g.:

**Model with tension range**

- **DTBB-10K**
- **DTBB-20K**
- **DTBB-30K**
- **DTBB-50K**

**Roller width in mm**

- **10**
- **20**
- **30**
- **50**

**Code for accessory**

- **L**

**Complete Order No.**

- **DTBB-10K−10−L**
- **DTBB-20K−20−L**
- **DTBB-30K−30−L**
- **DTBB-50K−50−L**

*(see page C 7 and C8)*
Hand-Held, electronic DT Series

Special purpose tension meter with large roller diameter and centre distance for minimized material deflection

Special features:

+ Large, ball-bearing mounted guide rollers, made of hardened steel with 29.5 mm groove diameter
  - V-grooved for material with max. 5 mm Ø
  - U-grooved for material with 3 up to 5 mm Ø
  - Tape grooved for material with max. width of 10 mm
+ Large bending radius assures gentle handling of the material being measured
+ Special guides on the bracket assembly permit easy material acquisition

Apart from that the instruments relate to model DTS and DTX

Note: These models do not have a built-in material thickness compensator

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width</th>
<th>Calibration Material*</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTSL-2500</td>
<td>150-2500 daN</td>
<td>185 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTSL-5000</td>
<td>250-5000 daN</td>
<td>185 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTSL-10 K</td>
<td>1.00-10.00 daN</td>
<td>235 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTSL-20 K</td>
<td>2.00-20.00 daN</td>
<td>235 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTXL-2500</td>
<td>150-2500 daN</td>
<td>185 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTXL-5000</td>
<td>250-5000 daN</td>
<td>185 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTXL-10 K</td>
<td>1.00-10.00 daN</td>
<td>235 depending on the roller</td>
<td></td>
</tr>
<tr>
<td>DTXL-20 K</td>
<td>2.00-20.00 daN</td>
<td>235 depending on the roller</td>
<td></td>
</tr>
</tbody>
</table>

* Outer distance between outside guide rollers

** with convenient material for each roller design

Guide Rollers

V-grooved

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>R1</td>
</tr>
<tr>
<td>4000 Hardened steel (max. Ø 5 mm)</td>
<td></td>
</tr>
</tbody>
</table>

U-grooved

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code R1</td>
<td>4000</td>
</tr>
</tbody>
</table>

Tape roller

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code B6</td>
<td>2000</td>
</tr>
<tr>
<td>Code B10</td>
<td>2000</td>
</tr>
</tbody>
</table>

Optional Accessories Specifications same as DTS or DTX (see page C7 and C8)

Model DTSL, DTXL

For buffer tubes, cables, fibre strands, ropes, tapes etc., up to max. 10 mm Ø, as well as 10 mm width

Model DTXL-5000

Large guide rollers minimize material deflection

1st IN TENSION METERS WORLDWIDE®

Subject to change without notice.
Special purpose tension meter with large roller diameter and centre distance or small measuring head where access space is limited

**Models DTSF, DTXF, DTSL, DTXL**

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Tension Range</th>
<th>Measuring Head Width</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL</strong></td>
<td>cN</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>DTSF-200</td>
<td>1.0 - 200.0</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTXF-200</td>
<td>1.0 - 200.0</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTSF-500</td>
<td>1.0 - 500.0</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTXF-500</td>
<td>1.0 - 500.0</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTSF-1000</td>
<td>10 - 1000</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTXF-1000</td>
<td>10 - 1000</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTSF-2000</td>
<td>20 - 2000</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTXF-2000</td>
<td>20 - 2000</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DTSL-200</td>
<td>1.0 - 200.0</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTXL-200</td>
<td>1.0 - 200.0</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTSL-500</td>
<td>1.0 - 500.0</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTXL-500</td>
<td>1.0 - 500.0</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTSL-1000</td>
<td>10 - 1000</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTXL-1000</td>
<td>10 - 1000</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTSL-2000</td>
<td>20 - 2000</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>DTXL-2000</td>
<td>20 - 2000</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

* Outer distance between outside guide rollers
** Suitable for 95% of applications (see also chart on page 11)

**Guide Rollers**

<table>
<thead>
<tr>
<th>DTSF, DTXF</th>
<th>V-grooved</th>
<th>Line Speed</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>4000</td>
<td>Hard-coated aluminium</td>
<td></td>
</tr>
<tr>
<td>Code T</td>
<td>4000</td>
<td>Plastic (PVC) red (Same dimensions as standard roller)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DTSE, DTXE</th>
<th>V-grooved</th>
<th>Line Speed</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>900</td>
<td>Hard-coated aluminium</td>
<td></td>
</tr>
<tr>
<td>Code K</td>
<td>2000</td>
<td>Hard-coated aluminium</td>
<td></td>
</tr>
</tbody>
</table>

**Optional Accessories**

| Specifications | same as DTS or DTX (see page C7 and C8) |

**Model DTSE, DTXE**

These tension meters are recommended where the standard models DTS and DTX cannot be used

**Model DTSF, DTXF**

For fragile filaments such as optical fibres, carbon single fibers and technical fibres etc., up to max. 1.5 mm Ø

**Ideal for applications with limited access space**
ET SERIES
5 Tension ranges
from 0.5 - 100 cN to 3 - 2000 cN

Electronic tension meters for hard to reach and limited access space applications. Two models available: ETB (basic unit) and ETX (with memory and output)

Special features Models ETX and ETPX
+ Coloured, backlight TFT-display with 3 different displays modes:
  - numeric
  - numeric with live bargraph
  - numeric with graph (time-tension)
+ The display rotates in 90° steps for better reading
+ Automatic „Zero-Setting“ in each measuring position using a special sensor technique
+ Selectable units of measurement: cN, g, N, lb
+ Very high data sampling rate (internal 1 kHz)
+ Storage of MIN, MAX, last reading, average and standard deviation per measuring interval
+ User-set MIN and MAX alarms with indication on display, if reading is out of limits
+ Adjustable electronic damping for better reading, if tension fluctuates
+ 3 separate calibration material memory locations for custom calibrations
+ Calibration adjustment for fine tuning of the calibration if material differs from the used calibration material
+ Menu set-up in English or German language

Model ETB-200
Actual size

Subject to change without notice.

The Models ETB and ETX with tension range 1000 cN and 2000 cN are equipped with bigger guide rollers.

Standard features:
- Models ETB and ETX with ball-bearing mounted, V-grooved guide rollers for line speeds up to $v_{\text{max}} = 2000 \text{ m/min}$
- Models ETPB and ETPX with ceramic pins for line speeds up to $v_{\text{max}} = 6000 \text{ m/min}$
- Filament guide for easy material acquisition of running filaments
- Aluminium housing
- LiPo accumulator (approx. 20 hours continuous operation) with AC adapter
- CE approved (tested for electromagnetic compatibility)
- Inspection Certificate with Calibration Report optionally available

ET SERIES
Hand-Held, electronic ET Series
www.hans-schmidt.com

© SCHMIDT control instruments
1st in tension meters worldwide

C13
Hand-Held, electronic ET Series

Model ETX/ETPX offers additionally:
- Large memory
- USB output

Model ETB-200
With ceramic pins
Actual size

Special features Models ETX and ETPX
- USB interfaces (200 readings/sec.)
- Memory for 60000 tension values
- 5 different memory modes:
  - Mode S: statistics only
  - Mode H: storage of the X-Y-diagram for reviewing after finishing a series of measurement
  - Mode C: continuous logging over a user set time and max. 999 series of measurement (2 Hz)
  - Mode F: as C with higher sampling rate of max. 200 Hz
  - Mode D: storage of single readings and statistic
- Software »Tension Inspect 3« for displaying real-time readings on PC

User-friendly TFT full-text display
Some functions can be password protected.

Filament guide for easy material acquisition of running filaments.
If required, the filament guide can be unscrewed.

The two outer rollers can be tilted upwards using the lever on the rear side.

Functions of the software see page C.9.

Subject to change without notice.
Model ET

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width</th>
<th>SCHMIDT Calibration with running filament approx. 100 m/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETB-100</td>
<td>0.5 - 100.0</td>
<td>24</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>ETB-200</td>
<td>2 - 200</td>
<td>24</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>ETB-500</td>
<td>2 - 500</td>
<td>24</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>ETB-1000</td>
<td>3 - 1000</td>
<td>38</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>ETB-2000</td>
<td>3 - 2000</td>
<td>38</td>
<td>PA: 0.50 mm Ø</td>
</tr>
</tbody>
</table>

* Outer distance between outside guide rollers  
** Suitable for 95% of applications (see also chart on page 11) 
PA = Polyamide Monofilament

**Guide Rollers**
- V-grooved
  - Standard
  - V-grooved: 2000 Aluminium hard chrome (up to 500 cN)
  - Standard: 2000 Hard-coated aluminium (from 1000 cN)

**Specifications**
- Calibration: According to SCHMIDT factory procedure
- Accuracy: ± 1% FS* and ± 1 Digit typical ± 0.5% FS*
- Units: cN, g, N or lb, switchable
- Overrange (approx.): 10% FS*, without accuracy guarantee
- Overload protection: 200% FS*
- Measuring principle: Strain gauge bridge
- Measuring roller deflection: 0.5 mm max.
- Damping: Adjustable electronic damping (Moving averaging)
- Sampling rate internal: Approx. 1 kHz
- Sampling rate: Max. 200 Hz (200 readings/sec.)
- Display update time: 2 times/sec.
- Display: Colour-TFT 128 x 160
- 3 display modes: Numeric, numeric + bargraph, numeric + graph (time-tension)
- Memory: Last, AVG, MIN, MAX, STD
- Temperature range: 10 - 45 °C
- Air humidity: 85% RH, max.
- Power supply: LiPo accumulator (20 h continuous use) and mains adapter 100 - 240 V AC
- Housing material: Aluminium
- Housing dimensions: 182 x 54 x 41 mm (LxWxH)
- Weight, net (gross): Approx. 310 g (1220 g)

Depending on the measuring position the TFT display is automatically rotating in 90° steps.

A display with many possibilities

TFT-Display with 3 different display modes

**Model ETP**

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width</th>
<th>SCHMIDT Calibration with running filament approx. 60 m/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETPB-100</td>
<td>0.5 - 100.0</td>
<td>22</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>ETPB-200</td>
<td>2 - 200</td>
<td>22</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>ETPB-500</td>
<td>2 - 500</td>
<td>22</td>
<td>PA: 0.20 mm Ø</td>
</tr>
</tbody>
</table>

* Outer distance between outside ceramic pins  
** Suitable for 95% of applications (see also chart on page 11) 
PA = Polyamide Monofilament

**Guide Pins**
- V-grooved: 6000 Aluminium-oxide ceramic

**Models ETB, ETPB, ETX, ETPX**
- Calibration: According to SCHMIDT factory procedure
- Accuracy: ± 1% FS* and ± 1 Digit typical ± 0.5% FS*
- Units: cN, g, N or lb, switchable
- Overrange (approx.): 10% FS*, without accuracy guarantee
- Overload protection: 200% FS*
- Measuring principle: Strain gauge bridge
- Measuring roller deflection: 0.5 mm max.
- Damping: Adjustable electronic damping (Moving averaging)
- Sampling rate internal: Approx. 1 kHz
- Sampling rate: Max. 200 Hz (200 readings/sec.)
- Display update time: 2 times/sec.
- Display: Colour-TFT 128 x 160
- 3 display modes: Numeric, numeric + bargraph, numeric + graph (time-tension)
- Memory: Last, AVG, MIN, MAX, STD
- Temperature range: 10 - 45 °C
- Air humidity: 85% RH, max.
- Power supply: LiPo accumulator (20 h continuous use) and mains adapter 100 - 240 V AC
- Housing material: Aluminium
- Housing dimensions: 182 x 54 x 41 mm (LxWxH)
- Weight, net (gross): Approx. 310 g (1220 g)

* FS = Full Scale

**Models ETX and ETPX additional:**
- Output signal digital: USB
- Memory: Max. 60000 at9999 measuring periods
- Memory modes: 5 memory modes with statistical evaluation and PEAK capture
**Model KXE**

**Tension meter for measuring the tension of warp threads on out of operation and running weaving machines**

**Special features:**
- Portable measuring head with 100 mm roller width to measure yarn groups of 50 mm width
- The sensor can easily be engaged or disengaged also while the machine is running
- Measurements can be made over the total width of the loom
- 4 different memory modes can be selected by the operator
- Storage of AVG, LAST, MIN, MAX, PEAK-MIN and PEAK-MAX tension values during an operator set measuring period
- Adjustable electronic damping for better reading when tension is constantly changing
- Output signal: digital USB
- Delivery includes: tension meter, USB cable, and software »Tension Inspect 3«

**Standard features:**
- LiPo accumulator
- Inspection Certificate with Calibration Report optionally available

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Measuring Head</th>
<th>Tension Range</th>
<th>SCHMIDT Calibration Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>KXE-20K</td>
<td>2 x 22 mm ball bearing mounted rollers total 50 mm</td>
<td>0.50 - 20.00 daN</td>
<td>fabric tape</td>
</tr>
<tr>
<td>KXE-50K</td>
<td>100 mm, ball bearing mounted</td>
<td>0.5 - 50.0 daN</td>
<td>fabric tape</td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Model KXE (measuring head)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Rollers</td>
<td>2 x 22 mm ball bearing mounted rollers total 50 mm</td>
</tr>
<tr>
<td>Width of outer rollers</td>
<td>100 mm, ball bearing mounted</td>
</tr>
<tr>
<td>Frame height adjustment</td>
<td>24 mm</td>
</tr>
<tr>
<td>Housing material</td>
<td>Anodized aluminium</td>
</tr>
<tr>
<td>Dimensions frame</td>
<td>108 x 138 mm</td>
</tr>
<tr>
<td>Weight, net</td>
<td>approx. 1000 g</td>
</tr>
</tbody>
</table>

Swivel the lever in direction to the handle to move the measuring roller downwards. Hold the measuring head over the yarn group, so that it runs parallel to the measuring feeler and the support rollers. Shove the measuring roller through the yarn group, turn the measuring head by 90° and swivel the lever forwards, to upward the measuring roller in measuring position.
Hand-Held, electronic RTM Series

RTM SERIES
Tension range from 10 - 800 Hz

Belt tension meter (Trummeter) to determine the static tension of flat, V and ribbed belts or pretensioned ropes

Special features:
- The readings can be displayed as frequency (Hz) or strand force (N or lbf)
- The belt tension meter includes a display unit as well as a plug in probe for one-hand operation and a probe with cable for limited access space
- Measuring principle: red LED light source to determine vibration in Hz
- Readings unaffected by nearby magnetic fields or noise
- For determining the spring force in Newton, 2 parameters are needed. Thereby the following restrictions are obtained:
  - free strand length 9.99 m
  - belt mass up to 9.999 kg/m
- Display menu in several user selectable languages
- Manufacturer’s Calibration Report is included

Standard features:
- Battery operated
- Easy and save operation
- Rugged, compact plastic housing
- Microprocessor controlled
- Measurement with highest precision

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Measuring Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTM-400</td>
<td>10 - 800 Hz</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range:</td>
<td>10 - 800 Hz</td>
</tr>
<tr>
<td>Indicator error:</td>
<td>± 1 Hz</td>
</tr>
<tr>
<td>Total error:</td>
<td>&lt; 5 %</td>
</tr>
<tr>
<td>Display:</td>
<td>LCD</td>
</tr>
<tr>
<td>Measuring units:</td>
<td>N or lb, Hz</td>
</tr>
<tr>
<td>Sensing distance:</td>
<td>3 - 20 mm (recommended)</td>
</tr>
<tr>
<td>Temperature ranges:</td>
<td>+10 °C up to +50 °C</td>
</tr>
<tr>
<td>Power supply:</td>
<td>9 V battery</td>
</tr>
<tr>
<td>Housing:</td>
<td>Plastic (ABS)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>126 x 80 x 37 (LxWxH)</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>170 g (660 g)</td>
</tr>
</tbody>
</table>
Cable tension meter to measure the tension of pretensioned, non-moving ropes, cables, tower guy wires, zip lines, overhead lines, elevator ropes etc. up to 25.4 mm Ø

**Model CTM**

*2 Tension ranges up to 10 kN and 45 kN*

**Special features:**
- For rope diameters from 4.75 - 25.4 mm
- Depending to the wire Ø a suitable guide roller must be used
- Changeable units kN, lbf, kgf
- Easy to use - load cell and display integrated in one housing
- The tension reading is quickly shown in the display, no conversion sheets are required
- Large, easy to read LCD display with backlight
- Calibration for one rope is free of charge; up to 20 calibrations of unique wire size and types can be stored
- RS-232 interface for data transfer to PC
- Internal memory. Readings can be transferred to a PC after finishing the work

**Standard features:**
- Portable and rugged - designed for outdoor use
- For quick checks – easy to use
- CE approved
- Battery operation

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges (kN)</th>
<th>Tension Ranges (lbf)</th>
<th>Tension Ranges (kgf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTM-2000</td>
<td>10 2000 1000</td>
<td>CTM-10000</td>
<td>45 10000 4500</td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>up to 45 kN</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 3 % FS* calibrated to specific wire specimen</td>
</tr>
<tr>
<td>Measuring unit</td>
<td>N, lbf, kgf switchable</td>
</tr>
<tr>
<td>Loading error</td>
<td>Rope elongation of only 2 mm</td>
</tr>
<tr>
<td>Material diameter</td>
<td>4.75 - 25.4 mm</td>
</tr>
<tr>
<td>Display</td>
<td>LCD 25 mm high, full text prompts</td>
</tr>
<tr>
<td>Number of calibrations</td>
<td>Up to 20 calibrations can be stored</td>
</tr>
<tr>
<td>Memory</td>
<td>Saves readings for a later data transfer to PC</td>
</tr>
<tr>
<td>Output signal</td>
<td>RS-232</td>
</tr>
<tr>
<td>Power supply</td>
<td>2 Batteries, size AA</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-20 °C up to + 60 °C</td>
</tr>
<tr>
<td>Dimensions</td>
<td>61 x 24 x 8 cm (L x W x H)</td>
</tr>
<tr>
<td>Weight, net (gross)</td>
<td>approx. 5.7 kg (approx. 11 kg)</td>
</tr>
</tbody>
</table>

*FS = full scale

**Guide Rollers**

<table>
<thead>
<tr>
<th>Grooved</th>
<th>Rope Diameter (mm)</th>
<th>Rope Diameter (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTM-SH-L</td>
<td>4.75 - 6.35</td>
<td>3/16 - 1/4</td>
</tr>
<tr>
<td>CTM-SH-P</td>
<td>4.75 - 12.7</td>
<td>3/16 - 1/2</td>
</tr>
<tr>
<td>CTM-SH-S</td>
<td>6.35 - 19.05</td>
<td>1/4 - 3/4</td>
</tr>
<tr>
<td>CTM-SH-T</td>
<td>12.7 - 25.4</td>
<td>1/2 - 1</td>
</tr>
</tbody>
</table>

Delivery includes one roller set (as requested). Additional roller sets can be ordered optional.

Calibration:

The calibration for one sample is free of charge, more will be charged. For calibration send us product details as kind of material, diameter and construction dimensions. If we do not have the rope itself available we need 5 m sample wire from you.
Online Tension Measuring Systems

Depending on the application, SCHMIDT online tension sensors can be supplied on its own or as part of a complete system:

**A. Tension System 3-Roller Sensor only**
- For use with customer supplied indicators and closed loop control units
- Customer must supply regulated DC power source
- Customer Signal Processing: for example closed loop control

**B. Complete Tension System 3-Roller Sensor only**
- Sensor and display unit provide continuous tension readings
- The analog output signal can be used for recording and control purposes
- Customer Signal Processing: for example closed loop control

**C. Tension System 1-Roller Sensor only**
- Replacing an existing reversing point
- External amplifier with analog outputs
- Available with guide roller
- Customer Signal Processing: for example closed loop control

We provide the best solution. Please contact our technical department to discuss your applications.

**Software (optional equipment):**
»Tension Inspect 3« (WIN XP and higher)
The series TS and FS can be used for continuous tension monitoring. The sensor can be connected using RS-232, RS-422, USB or Wi-Fi to a PC.
The readings of max. 24 sensors can be transferred as real time values to a PC, displayed and stored as a CSV file using the program »Tension Inspect 3«. (see page C 9)

**Main Features:**
- Real time tension display (tension and time)
- Long time recording using operator set time span
- Adjustable sampling rate
- Analyzing and printing of all stored data with time (graphs and numeric report)

**SCHMIDT Online Sensors and Indicators:**
For the continuous measurement of the running line tensions of threads and yarns, wires, cables, optic and carbon fibers and similar materials, SCHMIDT offers a wide variety of sensors using different guide rollers and frontplate dimensions.

**Measuring principle 3-Roller Tension System:**
3-roller measuring system, consisting of two outer guide rollers and a middle measuring roller. The tension of the measured material slightly deflects the measuring roller. This deflection (up to 0.5 mm) is measured by a load cell. The built-in amplifier then generates an analog output signal which is proportional to the measured tension.

**Measuring principle 1-Roller Tension System:**
In combination with 2 outer reference guiding points the sensor builds a force triangle. The entry and exit angle must be constant. The sensor uses strain gauges and supplies an output signal in V or mV.
Universal online tension sensor for yarns, fibers, thin wires, etc.

Model TS1

10 Tension ranges from 0–50 cN to 0–50 daN

### Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges (cN)</th>
<th>Measuring Head Width (mm)</th>
<th>SCHMIDT Calibration Material*</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS1-50</td>
<td>0–50</td>
<td>64</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>TS1-100</td>
<td>0–100</td>
<td>64</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>TS1-200</td>
<td>0–200</td>
<td>64</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>TS1-500</td>
<td>0–500</td>
<td>64</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>TS1-1000</td>
<td>0–1000</td>
<td>64</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>TS1-2000</td>
<td>0–2000</td>
<td>124</td>
<td>PA: 0.50 mm Ø</td>
</tr>
<tr>
<td>TS1-5000</td>
<td>0–5000</td>
<td>124</td>
<td>PA: 0.80 mm Ø</td>
</tr>
<tr>
<td>TS1-10K</td>
<td>0–10 daN</td>
<td>124</td>
<td>PA: 1.00 mm Ø</td>
</tr>
<tr>
<td>TS1-20K</td>
<td>0–20 daN</td>
<td>224</td>
<td>PA: 1.50 mm Ø</td>
</tr>
<tr>
<td>TS1-50K</td>
<td>0–50 daN</td>
<td>224</td>
<td>Steel rope 1.50 mm Ø</td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request.

* Suitable for 95% of applications (see also chart on page 11)

**PA = Polyamide Monofilament

### Guide Rollers

- **V-grooved**
  - Standard: 2000 Hard-coated aluminium
  - Code K: 3500 Hard-coated aluminium
  - Code H: 5000 Plasma-coated aluminium (for Model TS1-100 and higher ranges)
  - Code T: 1000 Plastic (POM) block
  - Code W: 1000 Nickel-plated steel
  - Code ST: 1000 Hardened steel
  - Code B: 1000 Tempered steel for tire cord
  - Code CE2: 1000 Aluminium ceramic-coated
  - Code ASY: 1000 Hard-coated aluminium*
  - Code ASYB: 1000 Tempered steel for tire cord*

- **U-grooved**
  - Code U: 2000 Hard-coated aluminium*

* Measuring head width 124 mm for model TS1-500 and higher ranges

### Output Signal

- **Standard**: Analog output signal 0–1 V DC
- **Code A2**: Analog output signal 0–10 V DC
- **Code A3**: Current output signal 4–20 mA
- **Code A10**: Analog DMS output mV/without amplifier

To place an order, please indicate the complete model number, e.g.:

**TS1-1000** + **T** + **A3** = **TS1-1000-T-A3**
Special tension sensors with ceramic pins for yarns and fibers at high speed

**Model TSP**

- **Tension ranges from 0 - 50 cN** to 0 - 500 cN
- **For line speeds up to** \(v_{\text{max}}\) 6000 m/min

**Special features:**
- Non-rotating, exchangeable ceramic pins
- Suitable only for yarns and fibers
- Apart from that the instrument relates to model TS1

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width</th>
<th>SCHMIDT Calibration with running filament approx. 100 m/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSP-50</td>
<td>0 - 50 cN</td>
<td>64 mm PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>TSP-100</td>
<td>0 - 100 cN</td>
<td>64 mm PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>TSP-200</td>
<td>0 - 200 cN</td>
<td>64 mm PA: 0.12 mm Ø</td>
<td></td>
</tr>
<tr>
<td>TSP-500</td>
<td>0 - 500 cN</td>
<td>64 mm PA: 0.20 mm Ø</td>
<td></td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request. Other units of measure available, such as g.

* Outside dimensions of front plate
** Suitable for 95% of applications (see also chart on page 11)

PA = Polyamide Monofilament

**Guide Pins**

- **Line Speed** \(v_{\text{max}}\): 6000 m/min
- **Pin Material**: Aluminium-oxide ceramic 5.2 mm Ø

**Guide Rollers**

- **V-grooved**
  - Standard: 4000 mm 30 Hardened steel
  - Code R1: 4000 mm 30 Hard-chrome plated steel
  - Code F: 4000 mm 70 Hard-coated aluminium
  - Code FB: 4000 mm 70 Tempered steel
- **Tape roller**
  - Code B6: 2000 mm 30 Hardened steel, width 6 mm
  - Code B10: 2000 mm 30 Hardened steel, width 10 mm

For determine the tension range, please send us the following information:
- Line tension \(F_2\)
- In- and outcoming angle \(\alpha\)
- Mounting position
- Desired guide roller
- Application

Special calibration using customer supplied samples is available:

Please supply a sample of at least 5 m in length.

**Output Signal** **Power Supply** **Specifications**

Models TSP and TSR same as Model TS1 (see page D2 and D14)
Stationary, electronic
TS Series

Tension sensor for flexible wire, cable, plastic tubing and other materials up to 8 mm Ø or 10 mm width

Model TSH

6 Tension ranges from 0 - 1000 cN to 0 - 50.00 daN

Special features:

Guide rollers 30 mm Ø, available with V-, U-groove or flat
Apart from that the instrument relates to model TS1

Available Models

MODEL Tension Ranges Measuring Head Width* SCHMIDT Calibration Material**
TSH-1000 0 - 1000 150 PA: 0.30 mm Ø
TSH-2000 0 - 2000 150 PA: 0.50 mm Ø
TSH-5000 0 - 5000 200 PA: 0.80 mm Ø
TSH-10K 0 - 10 daN 200 PA: 1.00 mm Ø
TSH-20K 0 - 20 daN 250 PA: 1.50 mm Ø
TSH-50K 0 - 50 daN 250 Steel rope 1.50 mm Ø

Other tension ranges and measuring head widths available on request.

Other units of measure available, such as g.
* Outside dimensions of front plate
** Suitable for 95 % of applications (see also chart on page 11)
PA = Polyamide Monofilament

Guide Rollers

V-grooved
Standard 4000 Hardened steel (max. Ø 5 mm)
Code R 1 4000 Hard chrome-plated steel (radius R 5)

U-grooved
Code B 6 2000 Hardened steel, width 6 mm
Code B 10 2000 Hardened steel, width 10 mm

Tape rollers

Guide Rollers

V-grooved
Standard
Code R 1

U-grooved
Code B 6
Code B 10

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

Models TSH and TSW same as Model TS1 (see page D 2 and D 14)

To place an order please indicate the complete model number, e.g.:

Model with tension range

TSH-1000 + R 1 + A 3 = TSH-1000-R 1-A 3

Code for guide rollers
( if not standard)

Code for output signal / power supply
( if not standard)

Complete Order No.

Big guide rollers
60 mm Ø, minimizes material deflection

Model TSW

3 Tension ranges from 0 - 20 daN to 0 - 100 daN

Special features:

Guide rollers 60 mm Ø, available with V- or U-groove
Depending to the material to be measured the dimensions of the sensor can be modified
Apart from that the instrument relates to model TS1

Available Models

MODEL Tension Ranges Measuring Head Width* SCHMIDT Calibration Material**
TSW-20K 0 - 20 S50 steel rope 1.5 mm Ø (7 x 7 x 0.25)
TSW-50K 0 - 50 S50 steel rope 1.5 mm Ø (6 x 7 x 0.30)
TSW-100K 0 - 100 S50 steel rope 1.5 mm Ø (6 x 7 x 0.50)

Other tension ranges available on request.

Other units of measure available, such as g.
* Outside dimensions of front plate

Guide Rollers

V-grooved
Standard
Code R 1

U-grooved
Code R 2
Code R 3

To place an order please indicate the complete model number, e.g.:

Model with tension range

TSH-1000 + R 1 + A 3 = TSH-1000-R 1-A 3

Code for guide rollers
( if not standard)

Code for output signal / power supply
( if not standard)

Complete Order No.

To place an order please indicate the complete model number, e.g.:

Model with tension range

TSH-1000 + R 1 + A 3 = TSH-1000-R 1-A 3

Code for guide rollers
( if not standard)

Code for output signal / power supply
( if not standard)

Complete Order No.

Guide Rollers

V-grooved
Standard
Code R 1

U-grooved
Code R 2
Code R 3

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.
Stationary, electronic
TS Series

Special tension sensors feature large rollers to minimize bending of materials like fiber optics, single carbon fibers and technical fibers etc.

**Model TSL**

- 5 tension ranges from 0 - 50 cN to 0 - 1000 cN

32 mm Ø guide rollers minimize material deflection

**Model TSF**

- 6 tension ranges from 0 - 100 cN to 0 - 5000 cN

With movable outer rollers

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSL-50</td>
<td>0 - 50</td>
<td>150</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>TSL-100</td>
<td>0 - 100</td>
<td>150</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>TSL-200</td>
<td>0 - 200</td>
<td>150</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>TSL-500</td>
<td>0 - 500</td>
<td>150</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>TSL-1000</td>
<td>0 - 1000</td>
<td>150</td>
<td>PA: 0.30 mm Ø</td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request. Other units of measure available, such as g. 

* Outside dimensions of front plate
** Suitable for 95% of applications (see also chart on page 11)

PA = Polyamide Monofilament

**Guide Rollers**

<table>
<thead>
<tr>
<th>V-grooved</th>
<th>Line Speed v\text{\text{\text{\text{max.}}} m/min</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>4000</td>
<td>Hard-coated aluminum</td>
</tr>
<tr>
<td>Code T</td>
<td>4000</td>
<td>(same dimensions as standard roller)</td>
</tr>
</tbody>
</table>

→ see page E →

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.

Output Signal | Power Supply | Specifications | Models TSL and TSF same as Model TS1 (see page D2 and D14)
Online sensors for continuous measuring of low or high tensions of textile ribbons, films, foils, fiber bunches etc.

**Model TSB 1**

- **8 Tension ranges from 0 - 100 cN**
  - to 0 - 20 daN
- **Max. width of material to be measured 30 mm**

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges CN</th>
<th>Measuring Head Width mm</th>
<th>Roller Widths</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSB 1-100</td>
<td>0 - 100</td>
<td>60</td>
<td>7, 10, 15, 20</td>
</tr>
<tr>
<td>TSB 1-200</td>
<td>0 - 200</td>
<td>60</td>
<td>7, 10, 15, 20</td>
</tr>
<tr>
<td>TSB 1-500</td>
<td>0 - 500</td>
<td>120</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>TSB 1-1000</td>
<td>0 - 1000</td>
<td>220</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>TSB 1-5000</td>
<td>0 - 5000</td>
<td>220</td>
<td>7, 10, 15, 20, 30</td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request.

Other units of measure available – g or kg.

* SCHMIDT calibration material textile ribbon or film, depending on tension range and roller width

** Guide Rollers **

- **Line Speed (max.) m/min:** 1000 Hard-coated aluminum, 13 mm Ø (Exception: 7 mm rollers are made of nickel-plated steel)
- Other roller materials (nickel-plated steel or plastic), as well as special coatings (anti adhesive or carbon fibres - NAV optimized) are available on request.

**Special features:**

+ Dual-flanged outer guide rollers with various widths, from 7 mm to 30 mm
+ The roller width should correspond with the width of the material to be measured.
+ Apart frommodel TSB 1 this model is custom-built to your specific application requirements.

Please submit the following details:

- Description of application
- Expected tension range
- Kind and dimensions of the material to be measured

**Models TSB 1 and TSB 2 same as Model TS 1** (see page D 2 and D 14)

To place an order please indicate the complete model number, e.g.:

<table>
<thead>
<tr>
<th>Model with tension range</th>
<th>Code for guide rollers (if not standard)</th>
<th>Code for output signal / power supply (if not standard)</th>
<th>Complete Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSB 1-1000</td>
<td>10</td>
<td>A3</td>
<td>TSB 1 – 1000 - 10 – A3</td>
</tr>
</tbody>
</table>
**MZ SERIES**

Online tension sensors for small tensions

**Special features:**
- Slim, compact housing, only 18 mm width
- 2 different designs with different material path:
  - MAZ series: gently material path above the 3 rollers
  - MBZ series: material path warping all 3 rollers
- Integrated amplifier with various output signals

**Standard features:**
- Aluminium housing
- Supplied with a 2 m shield cable

**Model MAZF, MBZF**

3 Tension ranges from 0 - 100 cN to 0 - 500 cN

- Model MAZF-200 with 7.4 mm Ø guide rollers
- Model MBZF-200 with 12 mm Ø guide rollers

Space saving mounting of MZ series by using an optional rail

**Tension sensor for yarns, fibers, textile ribbons, very fine wires, films, foils etc.**

**Model MAZD, MBZD**

3 Tension ranges from 0 - 100 cN to 0 - 500 cN

- Model MAZD-200 with 10 mm tape rollers

Compact sensor for continuous tension measurement

Model MBZB

3 Tension ranges from 0 - 100 cN to 0 - 500 cN

- Model MBZB-200 with 10 mm tape rollers

Subject to change without notice.
Model MAZF, MBZF, MAZD, MBZD

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges (cN)</th>
<th>Measuring Head Width (mm)</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAZF-100</td>
<td>0 - 100</td>
<td>70</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>MBZF-100</td>
<td>0 - 100</td>
<td>70</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>MAZF-200</td>
<td>0 - 200</td>
<td>70</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>MBZF-200</td>
<td>0 - 200</td>
<td>70</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>MAZF-500</td>
<td>0 - 500</td>
<td>70</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>MBZF-500</td>
<td>0 - 500</td>
<td>70</td>
<td>PA: 0.30 mm Ø</td>
</tr>
</tbody>
</table>

Model MBZB

Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges (cN)</th>
<th>Measuring Head Width (mm)</th>
<th>Roller Widths (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBZB-100</td>
<td>0 - 100</td>
<td>70</td>
<td>7, 10</td>
</tr>
<tr>
<td>MBZB-200</td>
<td>0 - 200</td>
<td>70</td>
<td>7, 10</td>
</tr>
<tr>
<td>MBZB-500</td>
<td>0 - 500</td>
<td>70</td>
<td>7, 10</td>
</tr>
<tr>
<td>MBZB-1000</td>
<td>0 - 1000</td>
<td>70</td>
<td>7, 10</td>
</tr>
</tbody>
</table>

Guide Rollers

V-grooved

<table>
<thead>
<tr>
<th>Model MAZF, MBZF</th>
<th>Vmax.</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>900</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>2000</td>
<td>Hard-coated aluminium</td>
</tr>
</tbody>
</table>

V-grooved

<table>
<thead>
<tr>
<th>Model MAZD, MBZD</th>
<th>Vmax.</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>2000</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>3500</td>
<td>Hard-coated aluminium</td>
</tr>
<tr>
<td>Code H</td>
<td>5000</td>
<td>Plasma-coated aluminium</td>
</tr>
</tbody>
</table>

Model MBZB

V-grooved

<table>
<thead>
<tr>
<th>Model MBZB</th>
<th>Vmax.</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>1000</td>
<td>Hard-coated aluminium</td>
</tr>
</tbody>
</table>

Specifications

Calibration: SCHMIDT factory procedure
Accuracy: ± 2% FS* and ± 1 Digit
Other calibration material: ± 3% FS* or better

Overload protection: 100% FS*
Measuring principle: Strain gauge bridge
Measuring roller deflection: max. 0.5 mm
Signal processing: analog

Output signal: Standard: 0 - 1 V DC (analog)
Option: 0 - 10 V DC, mV/V

Output: Shielded cable (2 m) with bare leads
Damping (f2): Standard (analog): 30Hz
Temperature drift: better ± 0.05% FS°/°C
Temperature range: 10 - 45°C
Air humidity: 85% RH, max.
Power supply: +15 ... 24 V DC, 21 mA (regulated);
Code A10: max. +5 V, max. 20 mA

Housing: Aluminium
Housing dimensions: 70 x 55 x 17 mm (L x W x H)
Weight, net: Approx. 100 g

* FS = Full Scale

To place an order, please indicate the complete model number, e.g.:

Model with tension range: MAZF-SO0 + K + A2
Code for guide rollers: (if not standard)
Code for output signal / power supply: (if not standard)
Complete Order No.: MAZF-SO0-K-A2
**FS SERIES**

Economic sensor for many applications

Universal sensor for continuous measurements

---

**Model FS1**

10 Tension ranges from 0 - 50 cN to 0 - 50 daN

### Available Models

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS1-50</td>
<td>0 - 50</td>
<td>64</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>FS1-100</td>
<td>0 - 100</td>
<td>64</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>FS1-200</td>
<td>0 - 200</td>
<td>64</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>FS1-500</td>
<td>0 - 500</td>
<td>64</td>
<td>PA: 0.30 mm Ø</td>
</tr>
<tr>
<td>FS1-1000</td>
<td>0 - 1000</td>
<td>124</td>
<td>PA: 0.50 mm Ø</td>
</tr>
<tr>
<td>FS1-2000</td>
<td>0 - 2000</td>
<td>124</td>
<td>PA: 0.80 mm Ø</td>
</tr>
<tr>
<td>FS1-10K</td>
<td>0 - 10 daN</td>
<td>124</td>
<td>PA: 1.00 mm Ø</td>
</tr>
<tr>
<td>FS1-20K</td>
<td>0 - 20 daN</td>
<td>224</td>
<td>PA: 1.50 mm Ø</td>
</tr>
<tr>
<td>FS1-50K</td>
<td>0 - 50 daN</td>
<td>224</td>
<td>Steel rope 1.50 mm Ø</td>
</tr>
</tbody>
</table>

---

**Special features:**

- Accuracy ±1.5 % full scale or better
- Output signal: analog (voltage or current) digital (USB, RS-232, RS-422)
- Mechanical overload protection
- Easy calibration by operator
- Universal mounting possibility - easy to install housing, mounting or cylindrical hole mounting

---

**Standard features:**

- Ball-bearing mounted, V-grooved guide rollers
- Rugged aluminium housing
- Power supply: +15 ... 24 V DC (1-phase, regulated)
- Inspection Certificate with Calibration Report optionally available

---

**Specifications** → see page D14 →

Special calibration using customer supplied samples is available.

Please supply a sample of at least 5 m in length.

---

**Guide Rollers**

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>Roller Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>vmax. ... m/min</td>
<td>V-grooved</td>
</tr>
<tr>
<td>Standard</td>
<td>2000 Hard-coated aluminium</td>
</tr>
<tr>
<td>Code K</td>
<td>K3500 Hard-coated aluminium</td>
</tr>
<tr>
<td>Code H</td>
<td>H5000 Plasma-coated aluminium (for Model FS1-100 and higher ranges)</td>
</tr>
<tr>
<td>Code T</td>
<td>T1000 Plastic (POM) black</td>
</tr>
<tr>
<td>Code W</td>
<td>W1000 Nickel-plated steel</td>
</tr>
<tr>
<td>Code ST</td>
<td>ST1000 Hardened steel</td>
</tr>
<tr>
<td>Code B</td>
<td>B1000 Tempered steel for tire cord</td>
</tr>
<tr>
<td>Code CE2</td>
<td>CE2100 Aluminium ceramic-coated</td>
</tr>
<tr>
<td>Code ASY</td>
<td>ASY1000 Hard-coated aluminium*</td>
</tr>
<tr>
<td>Code ASYB</td>
<td>ASYB1000 Tempered steel for tire cord*</td>
</tr>
</tbody>
</table>

**U-grooved**

| Code U | 2000 Hard-coated aluminium* |

* Measuring Head Width 124 mm for Model FS1-500 and higher ranges

---

**Output Signal**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog 0 - 1 V DC</td>
<td>Analog 0 - 10 V DC</td>
<td>Current 4 - 20 mA</td>
<td>Digital RS-422</td>
<td>Digital USB</td>
<td>Digital RS-232</td>
<td>Digital wireless (no worldwide approval)</td>
</tr>
</tbody>
</table>

* for model FS1-100 and higher - more information see page D13 - 14

---

Subject to change without notice.
Special tension sensor with ceramic pins for yarns and fibers at high speed

**Model FSP**
- 5 Tension ranges from 0 - 50 cN to 0 - 1000 cN
- Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.
- Tension sensor for flexible wire, cable, plastic tubing and other materials up to 8 mm Ø or 10 mm width

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration**</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSP-50</td>
<td>0 - 50</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>FSP-100</td>
<td>0 - 100</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>FSP-200</td>
<td>0 - 200</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>FSP-500</td>
<td>0 - 500</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>FSP-1000</td>
<td>0 - 1000</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

Special features:
- Non-rotating, exchangeable ceramic pins
- Suitable only for yarns and fibers
- Apart from that the instrument relates to FS1

**Model FSH**
- 6 Tension ranges from 0 - 1000 cN
- Hardened guide rollers for heavy-duty applications and minimized material deflection

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration**</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSH-1000</td>
<td>0 - 1000</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>FSH-2000</td>
<td>0 - 2000</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>FSH-5000</td>
<td>0 - 5000</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>FSH-10K</td>
<td>0 - 10 daN</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>FSH-20K</td>
<td>0 - 20 daN</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>
| FSH-50K | 0 - 50 daN | 250 | Steelrope 1.50 mm Ø 
(7 x 7 x 0.20)

Special features:
- Guide rollers 30 mm Ø, available with V-, U-groove or flat
- Suitable for heavy-duty applications and minimized material deflection
- For custom designs contact our technical department.
- Apart from that the instrument relates to FS1

**Output Signal** | **Power Supply** | **Specifications**

Models FSP and FSH same as Model FS1 (see page D 9 and D 14)

To place an order please indicate the complete model number, e.g.: 

Model with tension range: FSH-1000

For guide rollers (if not standard): + U

For output signal/ power supply (if not standard): + A3

Complete Order No.: FSH-1000 – U – A3

Special calibration using customer supplied samples is available: Please supply a sample of at least 5 m in length.
**Model FSL**

Tension sensor for minimal bending of materials like fiber optics, carbon and technical fibers

**Specs:**
- Tension ranges from 0 - 50 cN to 0 - 1000 cN
- 32 mm Ø guide rollers minimize material deflection

**Special features:**
- Gentle handling of sensitive material during measurement
- Extremely light weight, low inertia guide rollers
- Best suitable for low tension ranges
- Apart from that the instrument relates to model FS1

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges</th>
<th>Measuring Head Width*</th>
<th>SCHMIDT Calibration Material**</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSL-50</td>
<td>0 - 50</td>
<td>150</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>FSL-100</td>
<td>0 - 100</td>
<td>150</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>FSL-200</td>
<td>0 - 200</td>
<td>150</td>
<td>PA: 0.12 mm Ø</td>
</tr>
<tr>
<td>FSL-500</td>
<td>0 - 500</td>
<td>150</td>
<td>PA: 0.20 mm Ø</td>
</tr>
<tr>
<td>FSL-1000</td>
<td>0 - 1000</td>
<td>150</td>
<td>PA: 0.30 mm Ø</td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request.

**Output Signal** | **Power Supply** | **Specifications**
--- | --- | ---
Models FSL and FSB1 same as Model FS1 (see page D9 and D14)

---

**Model FSB1**

Tension sensor for textile ribbons, films, foils, fiber bunches etc.

**Specs:**
- Tension ranges from 0 - 100 cN to 0 - 20 daN
- Max. width of material to be measured 30 mm

**Special features:**
- Dual-flanged outer guide rollers with various widths, from 7 mm to 30 mm
- The roller width should correspond with the width of the material to be measured.
- Apart from that the instrument relates to model FS1

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Ranges*</th>
<th>Measuring Head Width**</th>
<th>Roller Widths</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSB 1-100</td>
<td>0 - 100</td>
<td>60</td>
<td>7, 10, 15, 20</td>
</tr>
<tr>
<td>FSB 1-200</td>
<td>0 - 200</td>
<td>60</td>
<td>7, 10, 15, 20</td>
</tr>
<tr>
<td>FSB 1-500</td>
<td>0 - 500</td>
<td>120</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>FSB 1-1000</td>
<td>0 - 1000</td>
<td>120</td>
<td>7, 10, 15, 20, 30</td>
</tr>
<tr>
<td>FSB 1-5000</td>
<td>0 - 5000</td>
<td>220</td>
<td>7, 10, 15, 20, 30</td>
</tr>
</tbody>
</table>

Other tension ranges and measuring head widths available on request.

**Guide Rollers**

- V-grooved
  - Standard: 4000 Hard-coated aluminum
  - Code T: 4000 Plastic (PVC) red
    (same dimensions as standard roller)

**Output Signal** | **Power Supply** | **Specifications**
--- | --- | ---
Models FSL and FSB1 same as Model FS1 (see page D9 and D14)
Stationary, electronic
FS Series

Tension sensor - single roller system - for installation at an existing deviating pulley

**Model FSR**

- Tension ranges from 0 - 10 N to 0 - 200 N

**Special features:**
- Entry angle and exit angle $\alpha_{\text{min}}$ 20° (must be constant)
- Apart from that the instrument relates to model FS1

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Range</th>
<th>Measuring Head Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSR-10N</td>
<td>0 - 10</td>
<td></td>
</tr>
<tr>
<td>FSR-20N</td>
<td>0 - 20</td>
<td></td>
</tr>
<tr>
<td>FSR-50N</td>
<td>0 - 50</td>
<td></td>
</tr>
<tr>
<td>FSR-100N</td>
<td>0 - 100</td>
<td></td>
</tr>
<tr>
<td>FSR-200N</td>
<td>0 - 200</td>
<td></td>
</tr>
</tbody>
</table>

**Guide Rollers**

- V-grooved
  - Standard: 4000 30 Hardened steel
  - Code R1: 4000 30 Hard-chrome plated steel
  - Code R: 4000 70 Hard-coated aluminium
  - Code RB: 4000 70 Tempered steel

- Tape rollers
  - Code B6: 2000 30 Hardened steel, width 6 mm
  - Code B10: 2000 30 Hardened steel, width 10 mm

**For determine the tension range, please send us the following information:**
- Line tension $F_z$
- In- and outcoming angle $\alpha$
- Mounting position
- Desired guide roller
- Application

**Output Signal**

<table>
<thead>
<tr>
<th>Model with tension range</th>
<th>Code for guide rollers (if not standard)</th>
<th>Code for output signal / power supply (if not standard)</th>
<th>Complete Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSR-100N</td>
<td>R1</td>
<td>A3</td>
<td>FSR-100N-R1-A3</td>
</tr>
</tbody>
</table>

**Models FSR and FSW same as Model FS1** (see page D9 and D14)

---

Tension sensor for wires, ropes and cables up to max. 10 mm Ø

**Model FSW**

- Tension ranges from 0 - 20 daN to 0 - 100 daN

**Special features:**
- Big guide rollers 60 mm Ø, minimizes material deflection
- Guide rollers 60 mm Ø, available with V- or U-groove
- Depending to the material to be measured the dimensions of the sensor can be modified
- Apart from that the instrument relates to model FS1

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Tension Range</th>
<th>Measuring Head Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSW-20K</td>
<td>0 - 20</td>
<td>550 steel rope 1.5 mm Ø (7 x 7 x 0.25)</td>
</tr>
<tr>
<td>FSW-50K</td>
<td>0 - 50</td>
<td>550 steel rope 1.5 mm Ø (6 x 7 x 0.30)</td>
</tr>
<tr>
<td>FSW-100K</td>
<td>0 - 100</td>
<td>550 steel rope 1.5 mm Ø (6 x 7 x 0.50)</td>
</tr>
</tbody>
</table>

Other tension ranges available on request.

Other units of measure available, such as g.

*Outside dimensions of front plate

**Guide Rollers**

- V-grooved
  - Standard: 2000 Hard-coated aluminium
- U-grooved
  - Code R2: 2000 Hard-coated aluminium (Radius R 5)

**For thin wires and ropes**

- Special calibration using customer supplied samples is available:
  - Please supply a sample of at least 5 m in length.

---

To place an order please indicate the complete model number, e.g.
Model FS-Digital
Digital output for all sensors of series FS

Special features Code USB:
+ USB output, max. 500 readings/sec
+ Output plug: socket USB typ B
+ No external power supply is required

Special features Code 232:
+ RS-232 output, max. 200 readings/sec
+ Output plug: socket Sub D9
+ External power supply +15 ... 24 V DC required

Special features Code 422:
+ RS-422 output, communication frequency depending to the number of sensors connected, max. 200 readings/sec
+ To connect several sensors to a PC or one sensor over a long distance (max. 1000 m)
+ Up to 32 sensors with different design and range can be connected in series
+ Individual addressing of each sensor
+ Calibration by operator, analog adjustment
+ Control lamp shows readiness of working
+ External power supply +15 ... 24 V DC required

Online tension sensor with Wi-Fi data communication
Wherever measuring values cannot be transferred using a cable, SCHMIDT offers a new, economic solution - Wi-Fi data communications (no worldwide approval)

Typical applications:
- Machines, where a tension sensor is mounted on rotating parts and the signal is transferred using slip-rings now
- Process data acquisition in modern production process

Solution:
- For rotating applications we equip our online series FS with a new planimetric adjustment system. Therefore gravity forces can be compensated.
- To clarify important parameters please contact us!
- The integrated Wi-Fi module ensures wireless data communication to a control panel, display or computer.

The digital output is available for all models for series FS: e.g. FS1-1000-422, FSH-5000-USB, FSL-200-232, FSB1-500-WL

FS Digital - overview of connections

**A FS-USB:** Connection to a PC using the USB output.
The readings can be displayed and stored with »Tension Inspect 3«

**B FS-232:** Connection to a PC using the RS-232 output.
The readings can be displayed and stored with »Tension Inspect 3«

Online tension sensor with Wi-Fi data communication
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Typical applications:
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FS Digital - overview of connections

**A FS-USB:** Connection to a PC using the USB output.
The readings can be displayed and stored with »Tension Inspect 3«

**B FS-232:** Connection to a PC using the RS-232 output.
The readings can be displayed and stored with »Tension Inspect 3«
## Specifications

<table>
<thead>
<tr>
<th>FS SERIES</th>
<th>TS SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calibration:</strong></td>
<td>According to SCHMIDT factory procedure</td>
</tr>
<tr>
<td><strong>Accuracy:</strong></td>
<td>±1 % full scale and ± digit or</td>
</tr>
<tr>
<td></td>
<td>Other calibration material: ± 3 % FS* or better</td>
</tr>
<tr>
<td><strong>Overload protection:</strong></td>
<td>100 % FS*</td>
</tr>
<tr>
<td><strong>Measuring principle:</strong></td>
<td>Strain gauge bridge</td>
</tr>
<tr>
<td><strong>Meas. roller deflection:</strong></td>
<td>0.5 mm max.</td>
</tr>
<tr>
<td><strong>Signal processing:</strong></td>
<td>Analog</td>
</tr>
<tr>
<td><strong>Output signal:</strong></td>
<td>Standard: 0 - 1 V DC (analog)</td>
</tr>
<tr>
<td></td>
<td>Option: 0 - 10 V DC, 4 - 20 mA, mV/V (analog)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output plug:</strong></td>
<td>Female diode plug bayonet cap</td>
</tr>
<tr>
<td><strong>Damping (f):</strong></td>
<td>Standard: 30 Hz (other values on request)</td>
</tr>
<tr>
<td><strong>Temperature drift:</strong></td>
<td>Less than ± 0.05 % FS°/ºC</td>
</tr>
<tr>
<td></td>
<td>From FS1-500 less than ± 0.05 % FS°/ºC</td>
</tr>
<tr>
<td><strong>Temperature range:</strong></td>
<td>10 - 45 ºC</td>
</tr>
<tr>
<td><strong>Air humidity:</strong></td>
<td>85 % RH, max.</td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
<td>+ 15 ... 24 V DC, 21 mA (regulated); Code A3: 50 mA, Code A10: max. + 5 VDC, max. 20 mA</td>
</tr>
<tr>
<td><strong>Housing material:</strong></td>
<td>Aluminium</td>
</tr>
<tr>
<td><strong>Weight, net (gross):</strong></td>
<td>up to TS1-1000 approx. 250 g (400 g) TS1-2000 - TS1-10K approx. 280 g (430 g) TS1-20K and TS1-50K approx. 330 g (500 g)</td>
</tr>
</tbody>
</table>

**Delivery includes:**
- Tension Sensor with transport packaging

*FS = Full Scale, **plug and cable are not included"
Series SF

**Different tension ranges up to max. 2000 N**

**Special features:**
- Precision DMS sensor with best accuracy
- High overload protection
- Direct, axial force application
- The adjustable axial mounting depth enables an accurate positioning of the guide roller
- Rugged, stainless steel housing
- Output signal mV/V without integrated amplifier
- Supplied with a 5 m shielded cable with bare leads, optional available with plug connection
- Required power supply max. +10 V DC regulated
- Easy mounting of SCHMIDT rollers or customer provided rollers
- Special design for explosive areas on request

Model SFZ

**8 tension ranges from 0 - 10 N up to 2000 N**

**Special features:**
- Easy mounting by using a mounting hole (Ø 50 mm)
- 10 times overload protection, max. 3200 N
- Axle journal with Ø 10 mm for guide rollers (15 and 17 mm optional)
- Different mounting devices optional available
- IP 67 protected, optional IP 54

Tension sensor - single roller system - for installation at an existing deviating pulley

**Model SFD**

**6 tension ranges from 0 - 10 N up to 500 N**

**Special features:**
- Threaded housing with lock-nuts permits easy mounting and simple alignment at a deviating point
- 10 times overload protection, max. 2000 N
- Two mounting nuts wrench size 32
- Axle journal with Ø 10 mm for guide rollers
- IP 54 protected

The sensor can be mounted at an existing deviating point. It is important that the entry angle and exit angle are constant.

**Model SFZ**

**Model SFD**

Tension indicator and amplifier page D17 - D18
**Calculation of the tension range:**

<table>
<thead>
<tr>
<th>Material Path</th>
<th>Wrap Angle</th>
<th>Resultant Force Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30°</td>
<td>0.5 x (Line Tension)</td>
</tr>
<tr>
<td></td>
<td>60°</td>
<td>1.0 x (Line Tension)</td>
</tr>
<tr>
<td></td>
<td>90°</td>
<td>1.4 x (Line Tension)</td>
</tr>
<tr>
<td></td>
<td>180°</td>
<td>2.0 x (Line Tension)</td>
</tr>
</tbody>
</table>

Nominal load $F_N = \text{Multiplikator} \times F_Z$

Recommended wrapping angle 20° ... 180°

---

**Available Models**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Nominal Load N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFZ-10</td>
<td>10</td>
</tr>
<tr>
<td>SFZ-20</td>
<td>20</td>
</tr>
<tr>
<td>SFZ-50</td>
<td>50</td>
</tr>
<tr>
<td>SFZ-100</td>
<td>100</td>
</tr>
<tr>
<td>SFZ-200</td>
<td>200</td>
</tr>
<tr>
<td>SFZ-500</td>
<td>500</td>
</tr>
<tr>
<td>SFZ-1000</td>
<td>1000</td>
</tr>
<tr>
<td>SFZ-2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

**Axle Journal**

<table>
<thead>
<tr>
<th>Axle Ø in mm</th>
<th>Suitable Bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Standard)</td>
<td>10/17 6000 / 6300</td>
</tr>
<tr>
<td>B</td>
<td>15/17 6002 / 6302 (only SFZ)</td>
</tr>
<tr>
<td>C</td>
<td>17/17 6003 / 6303 (only SFZ)</td>
</tr>
</tbody>
</table>

**Options**

**Model SFZ**

- **Code T (Standard)**
  - Axial output with screwed cable gland and open ends. Cable length 5 m

- **Code N2**
  - Axial output with straight plug connection M12 and open ends. Cable length 5 m

- **Code S2**
  - Axial output with right-angled plug connection M12 and open ends. Cable length 5 m

**Specifications**

**Model SFZ**

- Accuracy: 0.5 % full scale or better
- Overload protection: 10 times (max. 3200 N)
- Max. operation force: 160 % of nominal load, overload protection afterwards
- Max. lateral force: max. 100 % of nominal load
- Output signal: up to 20 N: 1 mV/V
  from 50 N: 1.5 mV/V
- Power supply: max. +10 V DC, regulated
- Temperature range: -10°...+70°C
- Bridge resistor: 700 Ω

**Model SFD**

- Accuracy: 0.5 % full scale or better
- Overload protection: 10 times (max. 2000 N)
- Max. operation force: 160 % of nominal load
- Output signal: 1 mV/V
- Power supply: max. +10 V DC, regulated
- Temperature range: -10°...+70°C
- Bridge resistor: 350 Ω

---

To place an order: please indicate the complete model number e.g.

**SFZ-S0** + **A** + **N2** = **SFZ-S0-A-N2**
SC SERIES

Tension indicator with data analysis for one sensor

SCHMIDT indicators are available for all SCHMIDT tension sensors.

SC Series Standard features
- For sensors with output signal 0 - 1 V
- For sensors without amplifier the special designed display unit SC-PMD with integrated amplifier can be used
- Connection for one sensor
- Power supply for connected sensor
- Sensor calibration adjustment (Zero and Gain)
- Analog output 0 - 10 V DC
- User-set damping for output signal and display
- Dotmatrix LCD display
- CE certified with sensor connected
- Software »Tension Inspect 3« for displaying and saving readings on a PC - optional (see page C9)

Special features:
- Panel-mount digital display
- Output 0 - 10 V analog (option: RS-232, RS-422 or current)
- MIN- and MAX-limits with color-coded indicators and open collector
- Calibration of 3 different materials can be saved
- Power supply through separate AC adapter

Model SC-PM / SC-PMD

Model SCD-1

Special features:
- Desktop indicator
- Output 0 - 10 V analog, RS-232 digital
- MIN- MAX-limits with color-coded indicators and open collector output
- Power supply through separate AC adapter

Special features:
- Panel-mount digital display
- Output 0 - 10 V analog (option: RS-232, RS-422 or current)
- MIN- and MAX-limits with color-coded indicators and open collector
- Calibration of 3 different materials can be saved
- Power supply through separate AC adapter

Connecting options of indicators to a controller or a PC

Output Signal

<table>
<thead>
<tr>
<th>Code</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>Analog 0 - 1 V DC</td>
</tr>
<tr>
<td>A3</td>
<td>Analog 0 - 10 V DC</td>
</tr>
<tr>
<td>A10</td>
<td>Current output 4 - 20 mA</td>
</tr>
</tbody>
</table>

Specifications ➔ see page D 18 ➔
### Specifications

<table>
<thead>
<tr>
<th></th>
<th>SC-PM</th>
<th>SC-PMD</th>
<th>SCD-1</th>
<th>SCV-1</th>
<th>SC-PM4</th>
<th>SC-PMD4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital display:</td>
<td>8 digit LCD</td>
<td>8 digit LCD</td>
<td>8 digit LCD</td>
<td>0 - 10 V DC</td>
<td>Graphical display</td>
<td></td>
</tr>
<tr>
<td>Height of digit:</td>
<td>12 mm</td>
<td>12 mm</td>
<td>12 mm</td>
<td>12 mm</td>
<td>cN, daN, g or kg</td>
<td></td>
</tr>
<tr>
<td>Units of measure:</td>
<td>cN, daN, g or kg</td>
<td>cN, daN, g or kg</td>
<td>cN, daN, g or kg</td>
<td>cN, daN, g or kg</td>
<td>cN, daN, g or kg</td>
<td></td>
</tr>
<tr>
<td>Damping (fs):</td>
<td>Electronic adjustable</td>
<td>Electronic adjustable</td>
<td>Electronic adjustable</td>
<td>Electronic adjustable</td>
<td>Electronic adjustable</td>
<td></td>
</tr>
<tr>
<td>Output signal:</td>
<td>0 - 10 V DC, option: RS-232, RS-422, 4 - 20 mA</td>
<td>0 - 10 V DC, option: RS-232, RS-422, 4 - 20 mA</td>
<td>0 - 10 V DC, option: RS-232, RS-422, 4 - 20 mA</td>
<td>0 - 10 V DC, option: RS-232, RS-422, 4 - 20 mA</td>
<td>USB and RS-422, option: 0 - 10 V DC</td>
<td></td>
</tr>
<tr>
<td>Amplifier integrated:</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Input signal:</td>
<td>0 - 1 V DC, mV/V</td>
<td>0 - 1 V DC, mV/V</td>
<td>0 - 1 V DC, mV/V</td>
<td>0 - 1 V DC, mV/V</td>
<td>0 - 1 V DC, mV/V</td>
<td></td>
</tr>
<tr>
<td>Exit hub:</td>
<td>Terminal strip</td>
<td>Terminal strip</td>
<td>Terminal strip</td>
<td>Terminal strip</td>
<td>Terminal strip</td>
<td></td>
</tr>
<tr>
<td>Power supply:</td>
<td>15 ... 24 V DC, 100 mA</td>
<td>15 ... 24 V DC, 100 mA</td>
<td>100 - 240 VAC, 50 - 60 Hz, with 3 adapters (EU/USA/UK)</td>
<td>100 - 240 VAC, 50 - 60 Hz, with 3 adapters (EU/USA/UK)</td>
<td>30 V DC, 200 mA</td>
<td></td>
</tr>
<tr>
<td>AC adapter:</td>
<td>2 x Mini-DIN (PS 2)</td>
<td>2 x Mini-DIN (PS 2)</td>
<td>2 x Mini-DIN (PS 2)</td>
<td>2 x Mini-DIN (PS 2)</td>
<td>2 x Mini-DIN (PS 2)</td>
<td></td>
</tr>
<tr>
<td>Alarm output:</td>
<td>30 V DC, 20 mA, open collector</td>
<td>30 V DC, 20 mA, open collector</td>
<td>30 V DC, 20 mA, open collector</td>
<td>30 V DC, 20 mA, open collector</td>
<td>30 V DC, 20 mA, open collector</td>
<td></td>
</tr>
<tr>
<td>Housing:</td>
<td>Plastic</td>
<td>Plastic</td>
<td>Plastic</td>
<td>Plastic</td>
<td>Plastic</td>
<td></td>
</tr>
<tr>
<td>Dimensions (LxWxH):</td>
<td>120 x 95 x 48 mm</td>
<td>182 x 85 x 34 mm</td>
<td>Approx. 300 g (1000 g)</td>
<td>Approx. 53 g</td>
<td>Approx. 300 g (700 g)</td>
<td></td>
</tr>
<tr>
<td>Cutout required:</td>
<td>92 x 44 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>Approx. 200 g (300 g)</td>
<td>Approx. 300 g (1000 g)</td>
<td>Approx. 53 g</td>
<td>Approx. 300 g (700 g)</td>
<td>Approx. 300 g (700 g)</td>
<td></td>
</tr>
</tbody>
</table>

### Model SC-PM4 / SC-PMD4

**Special features:**

- For connecting max. 4 sensors with different tension ranges.
- Panel mount display unit.
- LCD Display with 2 display modes:
  - readings with alarm control
  - bar graph, reading and alarm control
- Output signal: USB and RS-422, optional analog 0 - 10 V DC.
- 4 material curves can be calibrated and stored per channel.
- MIN and MAX limits with open collector output for each channel.
- Password protected set-up menu.

### Tension indicator with data analysis for max. 4 sensor

**Standard features**

**Model SC-PM4 and SC-PMD4**

- For sensors without amplifier (Code A10) the special designed display unit SC-PMD4 with integrated amplifier can be used.
- Power supply for connected sensor.
- Selectable measuring units.
- User-set damping for output signal and display.
- With AC adapter or customized power supply.
- CE certified with sensor connected.
- Software »Tension Inspect 3« for displaying and saving readings on a PC - optional (see page C 9).
**SCHMIDT Guide Roller Dimensions**

**Standard** All dimensions are given in mm

**Optional** All dimensions are given in mm

- **Code T**: Plastic (POM) black
- **Code W**: Nickel-plated steel
- **Code CE2**: Aluminium ceramic-coated
- **Code ST**: Code ASY
- **Code B**: Code ASYB
- **Code H**: Code U
- **Code R1**: Standard DNW

Subject to change without notice.
SCHMIDT Guide Roller Dimensions

**Standard**  All dimensions are given in mm

![Standard Models](image1.png)

**Optional**  All dimensions are given in mm

![Optional Models](image2.png)

We have a wide range of guide rollers. Please visit us at www.hans-schmidt.com.

Beside the standard rollers, we also offer rollers with different geometry, special coating e.g. ceramic coating or anti-adhesive coating or rollers made of special material like e.g. stainless steel.
Custom designed models

If our standard instruments cannot be used we try to modify our standard models according your demand profile. Please inform us about your application requirements.

**Tension Meter for hand-held use**

- **Model DX2** With splash water protection, as far as possible nickel-plated components are used
- **Model DX2** With extension handle and ceramic pins to reach critical measuring positions
- **Model DX2** With extended measuring head for difficult to reach measuring positions
- **Model DTSE** With fixed ceramic-pins
- **Model DXX** With big rollers and high range up to 80 daN using a unique rope catching system
- **Model DXR** With small, both-sided ball bearing mounted rollers for high tensions up to 50 daN
- **Model DTS** With smaller measuring head width
- **Model DTBB** Equipped with tape rollers with big flanges for better material control

**Tension Meter for online use**

- **Model TSB1** With wide special guide rollers made of stainless steel
- **Model TS1** Sensor with non-rotating ceramic pin and outside rollers, as well as fiber guide plates
- **Model TSF** Tape roller with big Ø for fragile materials to be measured, as fiber optics or glass fiber strands
- **Model TSB** 1-roller-system with anti adhesive coating, e.g. scotch tape foils
- **Model TSB2** Crank handle to open or close the sensor, as well as non-rotating ceramic tape roller
- **Model TSH** Special designed guide rollers with special coating for carbon fibers CFK
- **Model TS1** With additional guide roller to prevent the wire to jump of the roller
- **Model TSB2** With non-rotating ceramic pins for cellulose acetat

Subject to change without notice.
Note
SCHMIDT control instruments – over 70 years all over the world.

Our Product Lines

- Sample Cutter / Weight Balance
- Thickness Gauge
- Moisture Meter
- Torque Meter
- Force Gauge
- Tachometer
- Stroboscope
- Hardness Tester
- Test Stand
- Calibration / Weight Balance
- Weight Balance
- Tension Tester
- Pipe Force Tester
- Force Gauge
- Tachometer
- Stroboscope
- Hardness Tester
- Torque Meter

Language

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