SCHMIDT control instruments – over 70 years all over the world.

Our Product Lines

- Stroboscope
- Tachometer
- Hardness Tester
- Test Stand
- Force Gauge
- Torque Meter
- Thickness Gauge
- Sample Cutter / Weight Balance
- Moisture Meter
Please visit us in the World Wide Web!

We solve measuring problems. Take advantage of our experience! SCHMIDT control instruments are indispensable in production monitoring, quality control, automation and process engineering in a wide variety of industrial applications.

We are Partner of many Industries

- Aircraft & Aeronautic
- Automotive
- Beverage Industry
- Cosmetic Industry
- Engine Construction
- Electronic Production
- Food Industry
- Medical Engineering
- Pharma Industry
- Packing Industry
- Plastic Industry
- Research
- Textile Industry
- Wire and Cable Industry

SCHMIDT – more than 70 years all over the world wherever precision and superior quality are essential in production and processing
### Product Directory

#### Force Gauges and Test Stands

- Force gauges with analog and digital display
- Attachments, cables, grips
- Horizontal and vertical test stands
- Universal testing machine (force displacement)
- Wire terminal tester

#### Torque Meters

- Cap torque meters
- Torque meters with separate sensor for mobile use

#### Speed- and Length Meters

- Universal yarn speed tachometer
- Yarn consumption meters for circular knitting machines

#### Tachometers

- Electronic hand-held tachometers for contact or non-contact use

#### Stroboscopes

- For measuring revolutions and for inspection of moving objects

#### Thickness Gauges

- Analog or digital for static measurements
- Analog or digital for moving objects (e.g. wires)
- Digital gauges according standards

#### Sample Cutter

- For fabric, paper etc. cut outs

#### Shore Durometers

- To measure the hardness of rubbers, elastomers, plastic, thermoplastic etc.

#### Yarn Package Hardness Testers

- To measure winding hardness of textile bobbins

#### Bending Stiffness Tester

- To determine stiffness of different materials

#### Textile Moisture Meter

- To determine the moisture of yarn, fabric etc.

#### Elongation Tester

- To determine the elongation of fabric

#### Maintenance Instruments

- Leak-detect for checking leakages

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This brochure informs of our extensive range of measuring instruments.

MORE THAN 70 YEARS

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Force Gauges

Selection Guide

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<td>X</td>
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<td>5000 N</td>
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<td>X</td>
<td>X</td>
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<td></td>
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<td>ZTA</td>
<td>X</td>
<td></td>
<td>5000 N</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td>ZTS-DPU</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>ZTA-DPU</td>
<td>X</td>
<td></td>
<td>20 kN</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</table>

Physical Therapy Force Gauge

Standard Attachments

Accessories

Special Attachments

Horizontal Test Stands

Vertical Test Stands

Universal Testing Machines for force and displacement

Wire Pull Tester

Torque Meters

Subject to change without notice.
**Force Gauges**

**Applications:**
- Pull-off force values of electrical leads, crimped terminals, connectors etc.
- Switch, keyboard contact pressure
- Test Wire-Wrap on clip connection
- Test of strength of various circuit components as transistors etc.
- Testing shear load of components mounted on circuits
- Compression and tensile strength testing of springs, plastic, foils and films
- Glass, ceramic, pills crush strength
- Brake, clutch pedal operating pressure
- Adhesive bond of glues, stickers etc.
- Needle penetration force
- Plastic, cardboard box breaking strength
- Paste materials, fruit firmness
- Measures torque of screws, torque-wrenches etc.
- Measures torque of bottle caps

**Force Gauges, Test Stands and Attachments to measure compression, tension (push and pull) and peeling forces**

**Application Industries:**
- Aircraft
- Automotive
- Electronics
- Precision
- Plastics & Chemicals
- Machinery & Manufacturing
- Business equipment
- Medical and Health
- Textile
- Sport goods
- Foods
- Toys

**Tests and Measurements:**
- **Pop test:** Measurement of can opening force.
- **Adhesion test:** Adhesion test of PCB and adhesive tapes.
- **Break-down test:** Tension break-down test of wire.
- **Bending test:** Ceramic, glass, plastic and raw materials.
- **Compression / Tension:** Simple testing of springs.
- **Contact point test:** Measurement of contact point operating force.
- **Extension test:** Tension test of rubber and raw materials.
- **Hardness test:** Drugs, pills, fruits, lip-sticks, paste materials.
- **Pull test of terminal:** Operating force of terminal.
- **Test of key switch:** Operating force of telephone, car stereo key board, remote control.
- **Test of electronic components strength:** Resistor, condenser, capacitor & etc.
- **Insertion / Withdrawal test:** Measurement of connector insertion and withdrawal force.

**SCHMIDT - ALL OVER THE TECHNICAL WORLD**

[www.hans-schmidt.com](http://www.hans-schmidt.com)
Standard features for all mechanical Imada Force Gauges:
- Easy to use
- Ergonomic rugged die-cast aluminium housing
- Easy to read dial
- Real Time and Peak Force display
- PEAK Hold function captures transient values and peaks
- Zero tare ring to zero the gauge in each position
- Facilities for mounting on test stands

Application examples:

### PS Series

High precision model for accurate measurements

#### Standard features:
- Easy to use
- Ergonomic rugged die-cast aluminium housing
- Easy to read dial
- Real Time and Peak Force display
- PEAK Hold function captures transient values and peaks
- Zero tare ring to zero the gauge in each position
- Facilities for mounting on test stands

#### Capacity and Resolution

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS-10N</td>
<td>0 - 10 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>PS-20N</td>
<td>0 - 20 N</td>
<td>0.2 N</td>
</tr>
<tr>
<td>PS-30N</td>
<td>0 - 30 N</td>
<td>0.25 N</td>
</tr>
<tr>
<td>PS-50N</td>
<td>0 - 50 N</td>
<td>0.5 N</td>
</tr>
<tr>
<td>PS-100N</td>
<td>0 - 100 N</td>
<td>1 N</td>
</tr>
<tr>
<td>PS-200N</td>
<td>0 - 200 N</td>
<td>2 N</td>
</tr>
<tr>
<td>PS-300N</td>
<td>0 - 300 N</td>
<td>2.5 N</td>
</tr>
<tr>
<td>PS-500N</td>
<td>0 - 500 N</td>
<td>5 N</td>
</tr>
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</table>

**Other units as Kgf and lbf are available on request.**

#### Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Series PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement:</td>
<td>10 mm</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>± 0.1% FS*</td>
</tr>
<tr>
<td>Temperature range:</td>
<td>5 - 45 °C</td>
</tr>
<tr>
<td>Air humidity:</td>
<td>85% RH, max.</td>
</tr>
<tr>
<td>Housing dimensions:</td>
<td>233 x 65 x 50 mm (LxWxH)</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 530g (1000g)</td>
</tr>
</tbody>
</table>

**Delivery includes:** Force gauge, standard attachments, carrying case, manufacturer’s calibration report

*FS = Full Scale*
### FB Series

**Economic model for a wide variety of applications**

- **Model FB**
  - The most popular force gauge
  - Push
  - Dimensions see Model PS (page A3)
  - Model FB with standard attachments in carrying case

#### Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB-10N</td>
<td>0-10N</td>
<td>0.1N</td>
</tr>
<tr>
<td>FB-20N</td>
<td>0-20N</td>
<td>0.2N</td>
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<tr>
<td>FB-30N</td>
<td>0-30N</td>
<td>0.25N</td>
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<td>FB-50N</td>
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</tr>
<tr>
<td>FB-100N</td>
<td>0-100N</td>
<td>1N</td>
</tr>
<tr>
<td>FB-200N</td>
<td>0-200N</td>
<td>2N</td>
</tr>
<tr>
<td>FB-300N</td>
<td>0-300N</td>
<td>2.5N</td>
</tr>
<tr>
<td>FB-500N</td>
<td>0-500N</td>
<td>5N</td>
</tr>
</tbody>
</table>

- Other units as Kgf and lbf are available on request.

### PSH Series

- **For high forces**
  - Pull
  - Model PSH
  - Dimensions Series PSH

#### Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSH-1000N</td>
<td>0-1000N</td>
<td>10N</td>
</tr>
<tr>
<td>PSH-2000N</td>
<td>0-2000N</td>
<td>20N</td>
</tr>
<tr>
<td>PSH-3000N</td>
<td>0-3000N</td>
<td>25N</td>
</tr>
</tbody>
</table>

- Other units as Kgf and lbf are available on request.

### Specifications

#### FB Series

- **Displacement:** 10 mm
- **Accuracy:** ± 0.3 % FS*
- **Temperature range:** 5 - 45 °C
- **Air humidity:** 85 % RH, max.
- **Housing dimensions:** 235 x 65 x 50 mm (LxWxH)
- **Weight, net (gross):** approx. 530 g (1000 g)

- Delivery includes: Force gauge, standard attachments, carrying case, manufacturer’s calibration report

#### PSH Series

- **Displacement:** 10 mm
- **Accuracy:** ± 0.1 % FS*
- **Temperature range:** 5 - 45 °C
- **Air humidity:** 85 % RH, max.
- **Housing dimensions:** 285 x 95 x 63 mm (LxWxH)
- **Weight, net (gross):** approx. 3100 g (4000 g)

- Delivery includes: Force gauge, standard high-capacity attachments, carrying case, manufacturer’s calibration report

*FS = Full Scale
For Force Gauges

Gauges for a wide variety of applications

Standard features for all digital FG series

Force Gauges:

- User switchable units: FGJN: N and Kgf (gf)  
  FGP: N, Kgf (gf) and lbf (ozf)
- Selectable Real Time or Peak Modes
- Display can be reversed for inverted use
- High measuring frequency 1000 Hz
- 200 % overload protection
- Small, compact, rugged die-cast aluminium housing
- Facilities for mounting on test stands

FGJN Series

Basic unit without interface

FGP Series

The universal unit which meets all requirements

Additional features:

- Output (USB, RS-232, analog)
- Overload output signal
- Storage of 1000 readings for continuous measuring; 100 readings for single measurement

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGJN-2</td>
<td>0 - 20.00 N</td>
<td>0.01 N</td>
</tr>
<tr>
<td>FGJN-5</td>
<td>0 - 50.00 N</td>
<td>0.01 N</td>
</tr>
<tr>
<td>FGJN-20</td>
<td>0 - 200.0 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>FGJN-50</td>
<td>0 - 500.0 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>FGP-0.2</td>
<td>0 - 2.000 N</td>
<td>0.001 N</td>
</tr>
<tr>
<td>FGP-0.5</td>
<td>0 - 5.000 N</td>
<td>0.001 N</td>
</tr>
<tr>
<td>FGP-1</td>
<td>0 - 10.00 N</td>
<td>0.01 N</td>
</tr>
<tr>
<td>FGP-2</td>
<td>0 - 20.00 N</td>
<td>0.01 N</td>
</tr>
<tr>
<td>FGP-5</td>
<td>0 - 50.00 N</td>
<td>0.01 N</td>
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<td>FGP-10</td>
<td>0 - 100.0 N</td>
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<td>FGP-20</td>
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<tr>
<td>FGP-50</td>
<td>0 - 500.0 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>FGP-100</td>
<td>0 - 1000 N</td>
<td>1 N</td>
</tr>
</tbody>
</table>

Other units as Kgf and lbf are available on request.

Model FGJN

Model FGP

FGJN with standard attachments in carrying case

FGP with standard attachments in carrying case

Dimensions Series FGJN and FGP:

Mounting thread 4 x M 4 – Depth max. 6 mm

Dimensions in bracket: Model FGP-0.2 and Model FGP-0.5

Series FGJN / FGP

Specifications

Displacement: 0.5 mm
Accuracy: FGJN: ± 0.3 % FS* ± 1 digit  
FGP: ± 0.2 % FS* ± 1 digit
Display: 4 digit LCD, 12 mm high
Overload capacity: 200 % FS*, display flashes beyond 120 % FS*
Zero adjustment: 10 % FS*
Sampling rate: internal max. 1000 Hz
Temperature range: 5 - 45 °C
Air humidity: 85 % RH, max.
Power supply: Rechargeable NiMh battery pack and/or 100 ... 240 V AC adapter
Housing dimensions: 147 x 75 x 38 mm (L x W x H)
Weight, net (gross): approx. 450 g (1000 g)

For FGP Series

Output signal: USB, RS-232, analog ± 1 V DC, overload signal: open collector (DC 30 V, 5 mA)

Delivery includes: force gauge, standard attachments, carrying case, AC adapter, USB connecting cable (FGP only), certificate of compliance with the order, instruction manual in englisch

* FS = Full Scale

Subject to change without notice.
Standard features for all digital Imada Force Gauges:
- User selectable units: N, kgf (gf) and lbf (ozf)
- High display update rate
- Selectable Real Time or PEAK Modes
- Easy to read digital display
- «Zero Set» to zero the gauge in all operating positions
- 200 % overload protection
- Ergonomically-designed, rugged die-cast aluminium housing
- Facilities for mounting on test stands
- Operates on rechargeable battery and/or AC adapter

Special features:
- Adjustable sensitivity
- Internal sampling rate up to 1000 times/sec
- Output (USB, RS-232)

Special features DSV:
- Internal memory for 1000 readings
- Alarm signal, if the actual position differs too much from the calibration position of the instrument - tare

Application examples:
- Display can be reversed for inverted use; e.g. on test stands

Available Models

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<thead>
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<th>Model</th>
<th>Capacity</th>
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<td>0-2.000 N</td>
<td>0.001 N</td>
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<td>DST-5N</td>
<td>0-5.000 N</td>
<td>0.001 N</td>
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<td>DST-20N</td>
<td>0-20.000 N</td>
<td>0.01 N</td>
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<tr>
<td>DST-50N</td>
<td>0-50.000 N</td>
<td>0.01 N</td>
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<tr>
<td>DST-200N</td>
<td>0-200.0 N</td>
<td>0.1 N</td>
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<tr>
<td>DST-500N</td>
<td>0-500.0 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>DST-1000N</td>
<td>0-1000 N</td>
<td>1 N</td>
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<tr>
<td>DSV-2N</td>
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<td>0.001 N</td>
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<tr>
<td>DSV-5N</td>
<td>0-5.000 N</td>
<td>0.001 N</td>
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<tr>
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<tr>
<td>DSV-50N</td>
<td>0-50.000 N</td>
<td>0.01 N</td>
</tr>
<tr>
<td>DSV-200N</td>
<td>0-200.0 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>DSV-500N</td>
<td>0-500.0 N</td>
<td>0.1 N</td>
</tr>
<tr>
<td>DSV-1000N</td>
<td>0-1000 N</td>
<td>1 N</td>
</tr>
</tbody>
</table>

Specifications

- Accuracy: ± 0.2 % FS* ± 1 digit
- Selectable units: N, kgf (gf), lbf (ozf)
- Display: LCD, 4 digit
- Overload capacity: 200 % FS*, > 5 N 150 % FS*
- Zero adjustment: 10 % FS*
- A/D Converter: 16 bit
- Output signal: USB, RS-232 (8, 1, N, 19200)
- Temperature range: 5 - 45 °C
- Air humidity: 85 % RH, max.
- Power supply: Rechargeable NiMH battery pack and/or 100 - 240 V AC Adapter
- Housing dimensions: 181 x 72 x 32 mm (LxWxH)
- Weight, net (gross): approx. 460 g (1300 g)

Delivery includes: Force gauge, standard attachments, AC adapter, carrying case, manufacturer’s calibration report

* FS = Full Scale
ZT Series

Model ZTS with USB, RS232 C, analog and digimatic output up to 5000N
Model ZTA with additional features up to 5000N

Special features:

- Extremely high internal sampling rate (2000 times/sec) for fast measurements and best peak capture
- OLED display is highly visible in dark locations
- Storage of 1000 readings which can be recalled on the display or transferred to a PC for simple data analysis (reading, time, date, limits) using the Software »ZT-Logger« free of charge
- The header- and footline of the display can be set up by the operator (time, date, force transition etc.)
- Programmable high / low set-points for go/no-go testing with color-coded indicators in the LED display and relays outputs
- Real Time: to display current values
- PEAK Modes: to capture the peak force achieved during a test
- Damping rate, display functions, auto power off, etc. are adjustable by the operator
- Selectable languages for the display (english, german and 6 other languages)
- Overload alarm and output signal

Special features model ZTA in comparison to model ZTS

- In combination with a test stand with length measurement
- Code FA - force and displacement values can be displayed or shown as graph including data analyse on a PC using software »Force Recorder Professional«
- Displayed readings and stored readings can be transferred to a USB flash drive (100 readings/sec)
- 1st and 2nd peak values can be captured before load value drops

Specifications

Model ZTS and ZTA

| Accuracy: | ± 0.2 % FS* ±1 digit |
| Selectable units: | N, Kg (gf), lbf (ozf) |
| Display: | OLED, 4 digit; update 10 times/sec |
| Overload capacity: | 200 % FS* (display flashing beyond 110 % FS*) |
| Memory: | Internal memory for max. 1000 values recallable peak, tension and compression |
| Setpoints: | Min, Max (programmable), with output signal ZTA: 4 setpoints |
| Output signal: | USB, RS-232 (8, 1, N, 19200) Mitutoyo Digimatic, analog ± 2 V DC, Open collector Comparator 3x (+NG, Ok, -NG), overload signal |
| Temperature range: | 0 - 40 ºC |
| Air humidity: | 80 % RH, max. |
| Power supply: | Rechargeable NiMH battery pack (approx. 8 hour continuous use) and / or AC adapter 100...240 V AC with two adapters (EU/USA) |
| Dimensions: | up to 1000 N: 191 x 75 x 34 mm (LxWxH) from 2500 N: 221 x 83 x 44.5 mm (LxWxH) |

Delivery includes: Force gauge, standard attachments, AC adapter, carrying case, manufacturer’s calibration report, USB cable 1.5 m, CD-ROM with driver and simple software for communication and data logging »ZT-Logger« – Model ZTA additional: USB adapter

Available Models

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZTS-2N</td>
<td>ZTA-2N</td>
</tr>
<tr>
<td>0 - 2.000 N</td>
<td>0.001 N</td>
</tr>
<tr>
<td>ZTS-5N</td>
<td>ZTA-5N</td>
</tr>
<tr>
<td>0 - 5.000 N</td>
<td>0.001 N</td>
</tr>
<tr>
<td>ZTS-20N</td>
<td>ZTA-20N</td>
</tr>
<tr>
<td>0 - 20.00 N</td>
<td>0.01 N</td>
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</tr>
<tr>
<td>ZTS-1000N</td>
<td>ZTA-1000N</td>
</tr>
<tr>
<td>0 - 1000 N</td>
<td>1 N</td>
</tr>
<tr>
<td>ZTS-2500N</td>
<td>ZTA-2500N</td>
</tr>
<tr>
<td>0 - 2500 N</td>
<td>1 N</td>
</tr>
<tr>
<td>ZTS-5000N</td>
<td>ZTA-5000N</td>
</tr>
<tr>
<td>0 - 5000 N</td>
<td>1 N</td>
</tr>
</tbody>
</table>

* FS = Full Scale
Model ZTS / ZTA
For measuring high forces
2500N and 5000N

Model ZTS-DPU/ZTA-DPU
With separate remote load sensor

Function, specifications and delivered equipment same as for model ZTS / ZTA.
Dimensions of the remote sensor e.g. Model ZTS-50-DPU: 73 x 73 x 21 mm (L x W x H)

Available Models

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZTS-2-DPU</td>
<td>ZTA-2-DPU</td>
</tr>
<tr>
<td>ZTS-5-DPU</td>
<td>ZTA-5-DPU</td>
</tr>
<tr>
<td>ZTS-20-DPU</td>
<td>ZTA-20-DPU</td>
</tr>
<tr>
<td>ZTS-50-DPU</td>
<td>ZTA-50-DPU</td>
</tr>
<tr>
<td>ZTS-100-DPU</td>
<td>ZTA-100-DPU</td>
</tr>
<tr>
<td>ZTS-200-DPU</td>
<td>ZTA-200-DPU</td>
</tr>
<tr>
<td>ZTS-500-DPU</td>
<td>ZTA-500-DPU</td>
</tr>
<tr>
<td>ZTS-1000-DPU</td>
<td>ZTA-1000-DPU</td>
</tr>
<tr>
<td>ZTS-2000-DPU</td>
<td>ZTA-2000-DPU</td>
</tr>
<tr>
<td>ZTS-5000-DPU</td>
<td>ZTA-5000-DPU</td>
</tr>
<tr>
<td>ZTS-10K-DPU</td>
<td>ZTA-10K-DPU</td>
</tr>
<tr>
<td>ZTS-20K-DPU</td>
<td>ZTA-20K-DPU</td>
</tr>
</tbody>
</table>

*No standard attachments are included with model ZTS / ZTA-10K-DPU and higher. These models do not have measuring shaft, but there is a female thread in place of a measuring shaft.
Physical Therapy & Strength Testing Kits

Model RZTA-1000N with USB, RS-232 C, Digimatic and analog output
Model RDSV-1000N with USB and RS-232 C output
Model RFB-750N mechanical, analog force gauge

Force gauges for determination of muscle strength, useable for numerous applications in rehabilitation and physical therapy

Special features Model RZTA-1000N - laboratory instrument to meet the highest demands:
(specifications same as model ZTA-1000N, see page A 7)
+ Max. range 1000 N
+ 2 selectable display modes: Real Time and PEAK Mode
+ Highest sampling rate 2000 Hz
+ Storage of 1000 readings
+ Programmable high/low set points with color-coded LED display
+ USB output, connecting cable and Software Force Recorder

Special features Model RDSV-1000N - most used economic model with basic functions:
(specifications same as model DSV-1000N, see page A 6)
+ Max. range 1000 N
+ 2 selectable display modes: Real Time and PEAK Mode
+ Internal sampling rate up to 1000 Hz
+ Programmable high/low set points with OK indication in the display

Special features Model RFB-750N - for quick and easy use:
(specifications same as model FB-500N, see page A 4)
+ Max. range 750 N
+ 2 selectable display modes: Real Time and PEAK Mode

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Output Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>RZTA-1000N</td>
<td>0-1000 N</td>
<td>USB, RS-232, Digimatic, analog</td>
</tr>
<tr>
<td>RDSV-1000N</td>
<td>0-1000 N</td>
<td>USB, RS-232</td>
</tr>
<tr>
<td>RFB-750N</td>
<td>0-750 N</td>
<td>none</td>
</tr>
</tbody>
</table>

Delivery includes following attachments:
A: Curved pad, e. g. for arms and legs (MED-R80)
B: Rectangular pad, e. g. for arms and legs (MED-100-25)
C: Square pad, e. g. for face or tongue (MED-25-25)
D: Round pad, e. g. for back (MED-D80)
E: Large hook, e. g. doors, wagons, cartons (S-7)
F: Y-hook, e. g. doors, wagons, cartons (S-8)

Delivery includes: Force gauge, 6 inserts (A-F), handle, AC adapter, manufacturer’s calibration report and instruction manual in english
Standard Attachments

<table>
<thead>
<tr>
<th>Small Hook</th>
<th>Flat Tip</th>
<th>Conical Tip</th>
<th>Chisel Tip</th>
<th>Notched Tip</th>
<th>Extension</th>
<th>Shaft</th>
<th>Handles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>A-2</td>
<td>A-3</td>
<td>A-4</td>
<td>A-5</td>
<td>80 mm</td>
<td>S-3</td>
<td>S-4</td>
</tr>
<tr>
<td>S-1</td>
<td>S-2</td>
<td>Ø 16 mm</td>
<td>Ø 13 mm</td>
<td>Ø 16 mm</td>
<td>100 mm</td>
<td>S-5</td>
<td>S-6</td>
</tr>
</tbody>
</table>

»A« Series (aluminium M 6) attachments are supplied for models with capacities up to 100 N

<table>
<thead>
<tr>
<th>S1</th>
<th>Flat Tip</th>
<th>Conical Tip</th>
<th>Chisel Tip</th>
<th>Notched Tip</th>
<th>Extension</th>
<th>Shaft</th>
<th>Handles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-7</td>
<td>A-8</td>
<td>A-9</td>
<td>A-10</td>
<td>A-11</td>
<td>85 mm</td>
<td>B-1</td>
<td>B-2</td>
</tr>
</tbody>
</table>

»S« Series (steel M 6) attachments are supplied for models with capacities from 100 N to 1000 N

<table>
<thead>
<tr>
<th>B1</th>
<th>Flat Tip</th>
<th>Conical Tip</th>
<th>Chisel Tip</th>
<th>Notched Tip</th>
<th>Extension</th>
<th>Shaft</th>
<th>Handles</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-3</td>
<td>B-4</td>
<td>B-5</td>
<td>B-6</td>
<td>B-7</td>
<td>Ø 23 mm</td>
<td>B-8</td>
<td>B-9</td>
</tr>
</tbody>
</table>

»B« Series (steel M 10) attachments are supplied for models PSH, ZTS, ZTA with capacity > 1000 N

Accessories

Connecting cables
Available for all digital force gauges with output:
- for RS-232 for connection to PC
- Model CB-203: Sub D 9 female for model DST, DSV
- Model CB-208: Sub D 9 female for models ZTS, ZTA, HTGS, HTGA, DTXS and DTXA

for connection to a line recorder
- Model CB-108: for models ZTS, ZTA, HTGS, HTGA DTXS and DTXA

for connection to Mitutoyo evaluation units
- Model CB-308: For models ZTS, ZTA, HTGS, HTGA, DTXS and DTXA

for connection of extern units
- Model CB-808: For model ZTS, ZTA, HTGS, HTGA, DTXS and DTXA
- Model CB-908: With open ends for model ZTS, ZTA, HTGS, HTGA, DTXS and DTXA

for stands series MX
- Model CB-508: Force control for models ZTS, ZTA

for stands series MH2, MX2 and EMX
- Model CB-518: Force control for models ZTS and ZTA
- Model CB-706: With open ends, customized in / output signal for EMX MX2-CN and MH2-CN

Optional handles
Imada’s mechanical and digital force gauges can easily be fitted with a handle. This ensures safe and consistent measuring conditions. Please contact us!

Software
Requirements:
- Windows 7 / 8 / 8.1 / 10 (32 Bit/64 Bit)
- CPU: Pentium 4 (1 GHz or more), 2GB RAM, hard disk 10 GB or more, Microsoft .NET Framework 4.6

Only for model DST, DSV, DS2, Z2, ZP, HTG2 and DTX2:

ZLink2
Data acquisition using RS-232 output
- Data transfer 50 data / sec
- Displays the actual reading
- Data storage as CSV file

Only for model ZTS, ZTA, HTGS, HTGA, DTXS, DTXA and IPTS

Force Recorder (Light/Standard/Professional)
- 3 versions with different features

Printer
Model DP-1 VR:
To print stored values using Mitutoyo Digimatic output

Version:

<table>
<thead>
<tr>
<th>Graph type:</th>
<th>Light</th>
<th>Standard</th>
<th>Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000 Data/s</td>
<td>2000 Data/s</td>
<td>2000 Data/s</td>
</tr>
<tr>
<td>Data transfer:</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Graph overlaying function:</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Trigger function:</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Point marking:</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Border line function:</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Graph editing:</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Statistics output:</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Comment function:</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Description:</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Print:</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
Special Attachments

We offer a wide selection of various attachments for any application required:

### Penetrating Pin Gauges Series PG
- To check the hardness of clay-like materials, the burst strength of plastic coverings, skins etc.
- Model PG-2: outer Ø 2 mm
- Model PG-3: outer Ø 3 mm
- Model PG-4: outer Ø 4 mm

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG-2PG-3</td>
<td>100 N</td>
<td>M10</td>
</tr>
<tr>
<td>PG-4PG-5</td>
<td>200 N</td>
<td>M10</td>
</tr>
</tbody>
</table>

### Pin Grip Model CP-150N
- For gripping small diameter wires, pins, filaments etc.
- Model CP-150N: for Ø 0 to 3.2 mm
- Max. capacity: 150 N
- Length: 20 mm
- Weight: 8 g
- Width of jaw: 1 mm

### Fine Point Grips Series FP
- For fine wires up to max. Ø 0.5 mm.
- Model FP-30: Width of jaw: 1 mm
- Weight: 19 g
- Max. capacity: 100 N

### Film Grips Series FC
- Use these spring loaded film grips to check tensile strength of thin film samples up to 2 mm thickness; serrated jaws.
- Max. capacity: 500 N

### Flat Chucks Series GC
- Squared serrated face, heavy-duty flat grip for many applications.
- Model GC-1100:
  - Grip dimensions: 20 x 20 mm (W x H)
  - max. opening width: 10 mm
  - max. capacity: 1000 N
- Model GC-1200:
  - Grip dimensions: 20 x 20 mm (W x H)
  - max. opening width: 20 mm
  - max. capacity: 2000 N
- Model GC-1500:
  - Grip dimensions: 25 x 37.5 mm (W x H)
  - max. opening width: 30 mm
  - max. capacity: 5000 N
- Mounting thread: M10

### Force Gauges Series GC
- For fixing shafts, rigid rods and small wires.
- Model GC-3:
  - for Ø 0.5 to 5 mm
  - Max. capacity: 500 N
- Model GC-15:
  - for Ø 2 to 15 mm
  - Max. capacity: 1000 N

### Jacob’s Chucks Series GC
- To mount various objects, especially for testing thin materials.
- Model WG-5000N:
  - Mounting screw: M10
  - Max. capacity: 5000 N
  - Max. opening width: 2 mm
  - Width of chuck: 50 mm
- Model WG-1000N:
  - Mounting screw: M10
  - Max. capacity: 1000 N
  - Max. opening width: 2 mm
  - Width of chuck: 50 mm
- Model WG-250N:
  - Mounting screw: M10
  - Max. capacity: 250 N
  - Max. opening width: 5 mm
- Model WG-100N:
  - Mounting screw: M10
  - Max. capacity: 100 N
  - Max. opening width: 2 mm

### Wedge Grips Series GC
- Eccentrically mounted, serrated roller grips allow for self-tightening of thin material.
- Model GR-10:
  - width of chuck: 50 mm
  - max. opening width: 2 mm
  - max. capacity: 500 N
- Model GR-2000:
  - width of chuck: 50 mm
  - max. opening width: 4 mm
  - max. capacity: 2000 N
- Mounting thread: M10

### Tape Grips Series GC
- Self-tightening by spring force for tensile tests of materials up to 22 mm height; serrated jaws, width 15 mm.
- Model KC-100:
  - for materials up to 8 mm thickness
  - Max. capacity: 500 N

### Fine Point Grips Series FP
- For testing small to medium diameter wires, small components, ribbon tapes (max. opening width 1 mm).
- Model SC-3:
  - Width of jaw: 3 mm
  - Max. capacity: 100 N
- Model SC-8:
  - Width of jaw: 8 mm
  - Max. capacity: 50 N

### Wire Wrapping Grip Model WG
- For measuring the strength of wires, filaments, fibres etc. Wrapping a sample avoids breaking at the gripping point.
- Model GC-1500:
  - Max. capacity: 1500 N
  - Width: 15 mm
- Model GC-5000:
  - Max. capacity: 5000 N
  - Width: 15 mm
- Model GC-1000:
  - Max. capacity: 1000 N
  - Width: 8 mm
- Model GC-500:
  - Max. capacity: 500 N
  - Width: 5 mm

### Wedge Grips Model KG
- Eccentrically mounted, serrated roller grips allow for self-tightening of thin material.
- Model GR-10:
  - width of chuck: 50 mm
  - max. opening width: 2 mm
  - max. capacity: 500 N
- Model GR-2000:
  - width of chuck: 50 mm
  - max. opening width: 4 mm
  - max. capacity: 2000 N
- Mounting thread: M10

### Table and Grip Model LF
- For pull down and shear tests of electronic components.
- Model QFP45-100N: 45° table, hook and x-y stage
- Model TIP-90-100N: 90° table, shear hook and x-y stage

### Peeling Attachments Series GT
- To measure the peeling force of laminates or electronic components on circuit boards etc.
- Model GT-10:
  - Pull test peeling
  - Max. capacity: 10 N
- Model GT-20:
  - Push test peeling
  - Max. capacity: 50 N

### Compression jig
- Spring loaded jaws automatically close on the specimen and tighten as tension is applied. For testing wires, strips, tapes and films.
- Model KC-1000:
  - max. opening width: 2 mm
  - Grip dimensions: 9.8 x 15 mm (W x H)
  - max. capacity: 1000 N
- Model KC-5000:
  - max. opening width: 5 mm
  - Grip dimensions: 21.8 x 24 mm (W x H)
  - max. capacity: 5000 N
  - Mounting screw: M10

### Peeling Attachments Series GT
- For analysis surface conditions of paper and printed matter and coefficient of friction measurement of various materials.
- Model COF-10N:
  - Max. capacity: 10 N
  - Including software with graphics

### Attaction for pull test QFP45-100N
- For pull down and shear tests of electronic components.
- Model QFP45-100N: 45° table, hook and x-y stage
- Model TIP-90-100N: 90° table, shear hook and x-y stage

Some grips require an adapter coupling from M6 shaft to M10. In case of order please mention force gauge model and range. For the grips we can supply detailed drawings and additional specifications. Please ask us.

For more grips visit www.hans-schmidt.com
Horizontal Test Stands

The test stands assure consistent, identical measuring conditions for a wide range of applications. All Imada force gauges can easily be mounted to these stands.

Motorized Test Stand

IPTS Series

to determine peeling force of SMD-packages, emboss tapes, stickers, films etc.

Special features model IPTS:

- With integrated load cell DPU
- Sample width: max. 88 mm
- Including software Force Recorder Standard with graphics

Delivery includes: Test stand without force gauge, instruction manual in english

Specifications

<table>
<thead>
<tr>
<th>Max. capacity:</th>
<th>SH-1000N</th>
<th>SH-3000N</th>
<th>Typ MH2-500N</th>
<th>MH2-2500N</th>
<th>IPTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke:*</td>
<td>1000 N</td>
<td>3000 N</td>
<td>500 N</td>
<td>2500 N</td>
<td>5, 20 oder 50 N</td>
</tr>
<tr>
<td>Travel speed in mm/min:</td>
<td>300 mm</td>
<td>370 mm</td>
<td>245 mm</td>
<td>340 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>Power supply:</td>
<td>–</td>
<td>–</td>
<td>10 - 300</td>
<td>10 - 300</td>
<td>120, 300, 500</td>
</tr>
<tr>
<td>Weight:</td>
<td>15 kg</td>
<td>22 kg</td>
<td>14 kg</td>
<td>27 kg</td>
<td>11 kg</td>
</tr>
<tr>
<td>Dimensions in mm:</td>
<td>560 x 265 x 220</td>
<td>696 x 285 x 225</td>
<td>554 x 220 x 219</td>
<td>666 x 340 x 261</td>
<td>710 x 300 x 126</td>
</tr>
</tbody>
</table>

For grips see page A 11

Model IPTS-5N

Model SH-1000N

Model MH2-2500N

Model MH2-500N

Model MH2-500N

Special features SH series:

- Table for sample height adjustable:
- Max. sample length
- SH-1000N: 250 mm
- SH-3000N: 355 mm

Special features MH2 series:

- Force controlled: to enable force controlled testing and conditional overload prevention (only with ZT series)
- Manual operation: The carriage is moving as long as switch is pressed. It stops when travel limits are reached.
- Cycle mode: Carriage travels up and down within the limits, numbers of cycle can be set.
- JOG mode: Moves the cross head exactly 0.01 mm.
- Endurance tests: Setting number of cycle and time period to keep force.
- LCD display with many functions: digital setting of travel speed and traveling distance

For compression and tension test

Motorized Test Stand

IPTS Series

to determine peeling force of SMD-packages, emboss tapes, stickers, films etc.

Special features model IPTS:

- With integrated load cell DPU
- Sample width: max. 88 mm
- Including software Force Recorder Standard with graphics

Delivery includes: Test stand without force gauge, instruction manual in english
Vertical Test Stands

The test stands assure consistent, identical measuring conditions for a wide range of applications. All Imada force gauges can easily be mounted to these stands.

**Manual Test Stands with small knob**

**Model MSF-50N**
- Max. capacity: 50 N
- Stroke: 80 mm
- One complete turn of knob = 1.8 mm
- Weight, net: approx. 1.2 kg
- Dimensions (L x W x H): 110 x 81 x 204 mm
- Code FA optional (= model MSL)

**Model KV-50N**
- Max. capacity: 50 N
- Stroke: 70 mm
- One complete turn of knob = 1 mm
- Weight, net: approx. 2 kg
- Dimensions (L x W x H): 140 x 180 x 220 mm

**Manual Test Stand with Lever Model SVL-1000N**
- Max. capacity: 1000 N
- Stroke: 60 mm
- Stroke control by mechanical stops
- Fixed position (clearance): adjustable from 0 to 265 mm
- Weight, net: approx. 7 kg
- Dimensions (L x W x H): 200 x 280 x 410 mm

**Distance Meter Code S**
- To measure the exact travel distance all vertical test stands are also available with a length measurement system:
  - Adjustable display in mm or inch
  - Resolution of length measurement 0.01 mm
  - Zero setting
  - Digimatic output

Available for Models:
- KV-50N ........... 100 mm*
- SVL-1000N ...... 100 mm*
- SVH-1000N ...... 100 mm*
- HV-500N ........ 300 mm*
- HV-1000N ....... 300 mm*
- MX2-500N ...... 300 mm*
- MX2-1000N .... 300 mm*
- MX2-2500N ..... 300 mm*
- MX-500N ...... 300 mm*
- MX-1000N ....... 300 mm*
- SH-1000N ...... 300 mm*
- SH-3000N ...... 300 mm*
- MH2-500N ...... 300 mm*
- MH-1000N ....... 300 mm*

* Measuring range

**Manual Test Stand with Hand Wheel Model HV-500N**
- Max. capacity: 500 N
- Stroke: 288 mm
- One complete turn of the hand wheel = 2 mm
- Weight, net: approx. 10 kg
- Dimensions (L x W x H): 327 x 309 x 597 mm

**Manual Test Stand with Hand Wheel Model HV-1000N and Model HV-3000N**
- Max. capacity: 1000 N (HV-1000N)
  3000 N (HV-3000N)
- Stroke: 430 mm
- One complete turn of the hand wheel = 0.6 mm (HV-3000N)
- One complete turn of the hand wheel = 1.2 mm (HV-1000N)
- Weight, net: approx. 18 kg (HV-1000N)
  approx. 24 kg (HV-3000N)
- Dimensions (L x W x H):
  - HV-1000N: 305 x 275 x 730 mm
  - HV-3000N: 355 x 310 x 744 mm

Delivery includes: Test stand without force gauge, instruction manual in English

Subject to change without notice.
Delivery includes: Test stand without force gauge, instruction manual in English

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Model MX-500N</th>
<th>MX-1000N</th>
<th>MX-5000N</th>
<th>MX2-500N</th>
<th>MX2-1000N</th>
<th>MX2-2500N</th>
<th>EMX-1000N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. capacity:</td>
<td>500 N</td>
<td>1000 N</td>
<td>5000 N</td>
<td>500 N</td>
<td>1000 N</td>
<td>2500 N</td>
<td>1000 N</td>
</tr>
<tr>
<td>Stroke:*</td>
<td>275 mm</td>
<td>420 mm</td>
<td>340 mm</td>
<td>230 mm</td>
<td>290 mm</td>
<td>290 mm</td>
<td>290 mm</td>
</tr>
<tr>
<td>Travel speed in mm/min:</td>
<td>10 - 300</td>
<td>8 - 240</td>
<td>10 - 300</td>
<td>10 - 300</td>
<td>10 - 300</td>
<td>10 - 300</td>
<td>10 - 300</td>
</tr>
<tr>
<td>Power supply:</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
<td>100 ... 240 VAC, 50 / 60 Hz</td>
</tr>
<tr>
<td>Weight net:</td>
<td>13 kg</td>
<td>24 kg</td>
<td>30 kg</td>
<td>18 kg</td>
<td>19 kg</td>
<td>26 kg</td>
<td>23.5 kg</td>
</tr>
<tr>
<td>Dimensions in mm:</td>
<td>214 x 428 x 573</td>
<td>263 x 368 x 903</td>
<td>250 x 420 x 816</td>
<td>220 x 380 x 562</td>
<td>280 x 410 x 660</td>
<td>280 x 410 x 644</td>
<td>280 x 410 x 643</td>
</tr>
<tr>
<td>Attachment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long stroke:</td>
<td>L (250 N)</td>
<td>L (300 N)</td>
<td>–</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Length meter:**</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Linear encoder:**</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

*according to the used force gauge  **Code S (see page A13)  ***Code FA (for force displacement-graphing)

Special features MX series:
- Enables force controlled testing and conditional overload prevention
- Manual operation: The carriage is moving as long as switch is pressed. It stops when travel limits are reached
- Single cycle mode: Carriage travels up and down once within the limits
- Continuous cycle mode: Carriage travels up and down continuously within the limits
- 2 manual adjustable limits to adjust range of movement

Special features EMX series:
- Force controlled: To enable force controlled testing and conditional overload prevention (only with ZT series)
- Manual operation: The carriage is moving as long as switch is pressed. It stops, when travel limits are reached
- Cycle mode: Carriage travels up and down within the limits, numbers of cycles can be set
- JOG mode: Moves the cross head exactly 0.01 mm
- Endurance tests: Setting number of cycles and time period to keep force
- LCD display with many functions:
  - MX2: digital setting of travel speed
  - EMX: digital setting of travel speed and travel distance
- 3 different speeds adjustable (start, measuring, back)
- Stronger main shaft improves measurement accuracy

For grips see page A11
**Force-DiDisplacement Measuring Unit**

**FSA Series**

*Ranges from 2N up to 2500N*

For force-displacement measurements. Using the software »Force Recorder Professional« force-displacement and force-time graphs can be easily created and analyzed.

For compression and tension measurements, strength tests, shearing and peeling tests, longterm tests etc.

**Special features:**

- Force gauge with high sampling rate of 2000 measurements/sec
- Force gauges with different ranges can be mounted on the test stand
- Test stands with high precision linear scale Code FA (resolution using software 0.001 mm)
- The displacement readings can be shown on the force gauge display (resolution 0.01 mm)

**Software »Force Recorder Professional«:**

- High sampling rate (2000 readings/sec)
- Automatic statistic calculation (MIN-, MAX-, average values)
- 5 graphs can be displayed and easily compared at the same time
- It is possible to start/stop the recording automatically when the measured value reaches set points

The FSA system exists out of following components:

- **Motorized test stand**
  Model MX2-500N, MX2-1000N, EMX-1000N, MX2-2500N and MH2-500N each with Code FA (linear scale)
  ➔ see page A12 ➔ see page A14 ➔

- **Manual vertical test stand**
  Series MSF-50 is used as a portable, mini material tester. (model MSL = model MSF with linear scale)
  ➔ see page A13 ➔

- **Force gauge ZTA series**
  Force gauge ZTA series for compression and tension forces with measuring range 2N up to 2500N
  ➔ see page A7 ➔

**Available Models**

<table>
<thead>
<tr>
<th>Nominal load:</th>
<th>50 N</th>
<th>500 N</th>
<th>1000 N</th>
<th>1000 N</th>
<th>2500 N</th>
<th>500 N</th>
<th>2500 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model FSA:</td>
<td>MSL</td>
<td>0.5K2</td>
<td>1K2</td>
<td>1KE</td>
<td>2.5K2</td>
<td>0.5HK2</td>
<td>2.5HK2</td>
</tr>
<tr>
<td>Travel distance:</td>
<td>80 mm</td>
<td>235 mm</td>
<td>300 mm</td>
<td>320 mm</td>
<td>320 mm</td>
<td>240 mm</td>
<td>220 mm</td>
</tr>
</tbody>
</table>

To place an order please indicate the complete model number, e.g.: FSA + 0.5K2 + 200N = FSA-0.5K2-200N

**Delivery includes:**
- Force gauge, standard attachments, AC adapter, carrying case, manufacturer’s calibration report, USB cable 1.5 m, USB adapter, CD-ROM with driver and simple software for communication and data logging »ZT-Logger«, software »Force Recorder Professional«, instruction manual in English
Universal Test Stand

ZPM Series

*Tester for tensile and compression forces including displacement measurement.*

To determine tensile strength, crushing strength, peeling-, friction- or shear forces etc.

**Special features:**
- Interchangeable load cell to cover capacities up to max. 5000 N
- USB port to control the machine and for communication to PC
- High precision drive using ball screw, ball bearings and timing belt
- Length measurement with encoder, resolution 0.01 mm (display)
- The supplied software offers several tests:
  - Tensile strength, peeling- and friction tests and constant load holding
- A machine with excellent value and many features

**Standard features:**
- Working area of 500 mm (exclude grips), optional 1200 mm.
- Load cell and grips can easily be changed.
- Strong, rugged, bending resistant housing design.
- A wide range of grips and fixtures are optionally available; please send us your demand profile.
- Calibration report of load cell is included free of charge.

### Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZPM-50-500</td>
<td>50 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-100-500</td>
<td>100 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-200-500</td>
<td>200 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-500-500</td>
<td>500 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-1000-500</td>
<td>1000 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-2000-500</td>
<td>2000 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-3000-500</td>
<td>3000 N</td>
<td>500 mm</td>
</tr>
<tr>
<td>ZPM-5000-500</td>
<td>5000 N</td>
<td>500 mm</td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Model ZPM</th>
<th>Load cell: Linearity - better than ± 0.03 %, Hysteresis ± 0.02 nominal load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distance measuring by encoder 0.0001 mm (internal)</td>
</tr>
<tr>
<td>Overload capacity:</td>
<td>Approx. 120 % nominal load</td>
</tr>
<tr>
<td>Display:</td>
<td>LCD with double-spaced display: force, distance, speed</td>
</tr>
<tr>
<td>Resolution:</td>
<td>Force 0.01 N (50 N load cell), 0.1 N (load cells up to 5000 N)</td>
</tr>
<tr>
<td>Distance:</td>
<td>0.01 mm (LCD), 0.001 mm (PC)</td>
</tr>
<tr>
<td>Measuring frequency:</td>
<td>50 Hz, USB output with fast data transfer</td>
</tr>
<tr>
<td>Feed:</td>
<td>Under load: 1 - 500 mm/min continously adjustable</td>
</tr>
<tr>
<td>Without load:</td>
<td>1 - 700 mm/min continously infinitely adjustable</td>
</tr>
<tr>
<td>Max. travel distance:</td>
<td>500 mm excluding grips (optional 1200 mm)</td>
</tr>
<tr>
<td>Software:</td>
<td>Win XP and higher</td>
</tr>
<tr>
<td>Power supply:</td>
<td>230 V (switchable to 110 V)</td>
</tr>
<tr>
<td>Housing material:</td>
<td>Rugged construction; aluminium and stainless steel</td>
</tr>
<tr>
<td>Weight net, (gross):</td>
<td>Approx. 48 kg (60 kg)</td>
</tr>
</tbody>
</table>

**Delivery includes:** 1 test stand, load cell, software, calibration certificate.

**Examples of grips:**
- **TH56-K** Vice grip for clamping paper, foil, fabric etc. max. load 1 kN
- **TH76-S** Rope grip with deflecting cylinder and wedge clamp max. load 5 kN

*Easy to use software for machine control, to create hysteresis graphs and force-distance diagrams.*
Wire Terminal Testers

For testing the pull-off force of wire/terminal connections

Model LH-500N

- Max. capacity: 500 N
- Stroke: 85 mm
- Weight: approx. 11 kg
- Dimensions (L x W x H): 450 x 155 x 182 mm
- Delivery includes: test stand, wedge grip CW-500N and wire terminal clamp CH-500N, without force gauge

Model ACT-1000N

Measures accurately the pull-off force on most soldered or solderless wire terminals, crimped connectors and similar wire terminations.

Special features:
+ For testing accordance UL 486A-486B and JIS C2805 standards
+ For wires with diameter between 1 up to 8 mm
+ Terminal grip with 12 slots from 1 up to 8 mm
+ 2 selectable modes: Break Mode; to capture peak force
  Keep Mode; to apply the adjusted force for a specified time
+ To store test conditions for 26 samples (name, mode, speed, force)
+ Internal memory for recall readings at the display or transfer to a PC with software free of charge
+ Programmable high/low setpoints for go/no-go testing with color-coded indicators (orange, green, red) in the LED display and relais outputs

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Resolution</th>
<th>Speed mm/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT-1000N</td>
<td>1000 N</td>
<td>1 N</td>
<td>10/25/50/100</td>
</tr>
<tr>
<td>ACT-1000N-V300</td>
<td>1000 N</td>
<td>1 N</td>
<td>25/50/100/300</td>
</tr>
</tbody>
</table>

Specifications

- Terminal grip slot: 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 6, 7 and 8 mm
- Wire diameter: 1 - 8 mm
- Accuracy: ±0.5 % FS*; ± 1 digit
- Sampling rate: 2000 times/sec
- Selectable units: N, kgf, lbf
- Stroke: 50 mm
- Sample length: 100 mm or more
- Overload: 150 % FS* (Symbol flashes at 110 %)
- Output: USB, RS-232
- Power supply: 100 ... 240 V AC
- Temperature range: 0 - 40 °C
- Air humidity: 80 % RH, max.
- Housing dimensions: 400 x 240 x 150 mm
- Weight, net (gross): 11 kg

Delivery includes: Test stand with force gauge and clamps, instruction manual in english

* FS = Full Scale

Operation:
The user inserts the sample into the wire terminal slot and the wire end into the combined clamp-pull device. Press start key to zero the gauge and to start the pull motor. The wire will be fixed and constantly pulled off from the clamp. When the wire breaks, the display will show the peak force and the wire grip will return to home position.
Torque Meter

HTG Series

Hand-held torque meter with separate sensor, output signal and memory

For measuring the torque of screws, screw and plug connectors, components or screwdrivers etc.

Special features:

- Display of opening or closing torque (left and right torque)
- Real Time: to display the current values
- PEAK Modes: to capture the peak force achieved during a test
- Selectable units: Nm, Ncm, kgf/m, kgf/cm, lbf.in, ozf.in
- Programmable high/low setpoints for go/no-go testing with color-coded indicators (orange, green, red) in the LED display and relais outputs
- Storage of 1000 values, which can be recalled or downloaded to a PC
- Output signals (USB, RS-232, analog) and Mitutoyo Digimatic
- OLED display is highly visible in dark locations

Special features of model HTGA in comparison with model HTGS

- Readings can be transferred from the internal memory to a USB flash drive or directly saved on it
- 2 output values can be set, from which the actual reading will be sent to external devices
- Indication of two peak values per measurement

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTGS-2N</td>
<td>0 - 2.000 Nm (200 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>HTGS-SN</td>
<td>0 - 5.000 Nm (500 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>HTGS-10N</td>
<td>0 - 10.00 Nm (1000 Ncm)</td>
<td>0.01 Nm (1 Ncm)</td>
</tr>
<tr>
<td>HTGA-2N</td>
<td>0 - 2.000 Nm (200 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>HTGA-SN</td>
<td>0 - 5.000 Nm (500 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>HTGA-10N</td>
<td>0 - 10.00 Nm (1000 Ncm)</td>
<td>0.01 Nm (1 Ncm)</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Series HTG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>± 0.5 % F.S ±1 digit</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>2000 times/s</td>
</tr>
<tr>
<td>Selectable units</td>
<td>Nm, Ncm, kgfm, kgfcm, lbf.in, ozf.in</td>
</tr>
<tr>
<td>Display</td>
<td>OLED, 4 digit; update 10 times/sec</td>
</tr>
<tr>
<td>Overload capacity</td>
<td>200 % F.S* (display flashing beyond 110% F.S*)</td>
</tr>
<tr>
<td>Memory</td>
<td>Internal memory for max. 1000 values (clockwise or counter clockwise torque and peak values)</td>
</tr>
<tr>
<td>Output signal</td>
<td>USB, RS-232 (8, 1, N, 19200) Mitutoyo Digimatic, analog ± 2 V DC, Open collector 3x Comperator (+NG, Ok, -NG), overload signal</td>
</tr>
<tr>
<td>Setpoints</td>
<td>MIN, MAX (adjustable), with output signal</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 - 40 °C</td>
</tr>
<tr>
<td>Power supply</td>
<td>Rechargeable NiMH battery pack (approx. 8 hours continuous use) and/or 100...240 VAC adapter with two adapters (EU/USA)</td>
</tr>
<tr>
<td>Housing dimensions</td>
<td>Display unit: 187 x 75 x 34 mm (LxWxH) Sensor: 183 x 38 mm (LxØ)</td>
</tr>
<tr>
<td>Weight</td>
<td>Weight (approx.)</td>
</tr>
<tr>
<td></td>
<td>Display unit: 440 g/Sensor: 530 g complete set: 2000 g</td>
</tr>
</tbody>
</table>

Delivery includes: Torque meter with 1 sensor without pin chuck, handle (only HTGS-10N and HTGA-10N), USB cable, AC adapter, carrying case, manufacturer’s calibration report, CD-ROM with driver and simple software for communication and data logging »ZT-Logger«

* F.S = Full Scale
Cap Torque Meters

DTX Series

For checking the cap torque of bottles, glass jars, cans etc. in the food, pharmaceutical and beverage industry

Special features:
- Display of opening or closing torque
- Real Time: to display current values
- PEAK Mode: to capture the peak force achieved during a test
- Selectable units: Nm, kgf, lbf.in or Ncm, kgfcm, lbf.oz
- Clamps containers from Ø 20 to 180 mm
- Real Time: to display current values
- PEAK Mode: to capture the peak force achieved during a test
- Selectable units: Nm, kgf, lbf.in or Ncm, kgfcm, lbf.oz
- Clamps containers from Ø 20 to 180 mm
- Programmable high / low setpoints for go / no-go testing with indicators in the LED display and relais output
- Storage of 1000 values which can be recalled on the display or downloaded to a PC
- Output signals (USB, RS-232, analog) and Mitutoyo Digimatic
- OLED display is highly visible in dark locations

Special features of model DTXA in comparison with model DTXS
- Readings can be transferred from the internal memory to an USB flash drive or directly saved on it
- 2 output values can be set, from which the actual reading will be sent to external devices
- Indication of two peak values per measurement

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTXS-2N</td>
<td>0 - 2.000 Nm (200 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>DTXS-5N</td>
<td>0 - 5.000 Nm (500 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>DTXS-10N</td>
<td>0 - 10.00 Nm (1000 Ncm)</td>
<td>0.01 Nm (1 Ncm)</td>
</tr>
<tr>
<td>DTXA-2N</td>
<td>0 - 2.000 Nm (200 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>DTXA-5N</td>
<td>0 - 5.000 Nm (500 Ncm)</td>
<td>0.001 Nm (0.1 Ncm)</td>
</tr>
<tr>
<td>DTXA-10N</td>
<td>0 - 10.00 Nm (1000 Ncm)</td>
<td>0.01 Nm (1 Ncm)</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Series DTX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy: ± 0.5 % FS ± ±1 digit</td>
</tr>
<tr>
<td>Sampling rate: 2000 times/sec</td>
</tr>
<tr>
<td>Selectable units: Nm, Ncm, kgf, kgfcm, lbf.in, ozf.in</td>
</tr>
<tr>
<td>Display: OLED, 4 digit, 14 mm high</td>
</tr>
<tr>
<td>Overload capacity: 200 % FS* (flashing LED beyond 110 % FS*)</td>
</tr>
<tr>
<td>Output signal: USB, RS-232 (8, 1, N, 19200), Mitutoyo Digimatic, analog ± 2 V DC, Open collector 3x, (+NG, Ok, -NG) overload signal</td>
</tr>
<tr>
<td>Setpoints: MIN, MAX (programmable), with output signal</td>
</tr>
<tr>
<td>Memory: Internal memory for max. 1000 values (clockwise or counter clockwise torque and peak values)</td>
</tr>
<tr>
<td>Temperature range: 5 - 40 ºC</td>
</tr>
<tr>
<td>Air humidity: 85 % RH, max.</td>
</tr>
<tr>
<td>Power supply: Rechargeable NiMH battery pack (approx. 8 hours continuous use) and/or 100...240 V AC adapter with two adapters (EU/USA)</td>
</tr>
<tr>
<td>Dimensions: 305 x 233 x 127 mm (L x W x H)</td>
</tr>
<tr>
<td>Weight, net (gross): approx. 4900 g (5900 g)</td>
</tr>
</tbody>
</table>

Delivery includes: Torque meter, 1 table, 1 set of chuck pins 25 mm long, AC adapter, manufacturer’s calibration report, USB cable 1.5 m, CD-ROM with driver, simple software for communication and data logging »ZT-Logger«, instruction manual

* FS = Full Scale
Torque Meters

MTS Series

Motorized torque stand
for constant measuring conditions

For checking the cap torque of bottles, glass jars, cans etc.
in the beverage, cosmetic and pharmaceutical industry.

Special features:

+ The motorized torque test stand can be configured according the customer's demand. The torque stand exists out of a test stand depending on the sample height, a torque meter with different ranges and features as well as an upper chuck and lower table.
+ The torque will be measured without influence of the operator. The results are more accurate and significant as measured with a manual device.
+ 3 selectable modes: Normal: Revolution in one direction until manual stop NG Stop: Revolution in one direction until the adjusted value is reached Endurance Test: Repeats the operation in two directions within the adjusted limits (MTS series). The number of repeats are shown in the display. The opening and closing angel as well as the number of repeats can be adjusted with MTS-RA series
+ Max. size of samples:
  - upper clamping chuck Ø 20 - 90 mm or Ø 7 - 50 mm
  - lower clamping table Ø 20 - 160 mm or Ø 7 - 50 mm
+ The rotation speed can continuously be adjusted between 3 - 90 degree/sec. The value will be displayed.

- You will find information about the torque meter at page B2 and online at www.hans-schmidt.com

Required Modules

Torque stand (Model MTS)
Torque meter (Series DTX)
Lower clamping table
Upper clamping chuck
Software

Specifications

| Sample Height: | max. 140, 240 or 340 mm |
| Speed: | 3-90°/sec adjustable |
| Temperature range: | 0-40°C |
| Air humidity: | 80% RH, max. |
| Power supply: | 100-240V AC, 50/60Hz, max. 3 A |
| Weight: | 14 kg net without accessories |

Delivery includes: Torque stand, power cable, cable for torque meter, centering stick and operation instruction in English

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTS-10N</td>
<td>140 mm</td>
</tr>
<tr>
<td>MTS-10N-L</td>
<td>240 mm</td>
</tr>
<tr>
<td>MTS-10N-2L</td>
<td>340 mm</td>
</tr>
<tr>
<td>MTS-10N-RA</td>
<td>140 mm with rotary encoder</td>
</tr>
<tr>
<td>MTS-10N-L-RA</td>
<td>240 mm with rotary encoder</td>
</tr>
<tr>
<td>MTS-10N-2L-RA</td>
<td>340 mm with rotary encoder</td>
</tr>
</tbody>
</table>

Clamping Chucks:
A large and small table with different table pins, various torque pin chucks and an adapter with M10 male thread are available. For more information visit us at www.hans-schmidt.com

For more information visit us at
www.hans-schmidt.com
Speed- and Length Meter as well as Tachometer

Model YS-20

Tachometer to measure yarn or wire speed and length as well as revolutions and surface speed.

Measures the speed or length of yarns, wires and other filaments (material diameter up to 0.5 mm) – for example on circular knitting and hosiery machines – using a yarn measuring adapter with an easy-run, rubber coated measuring wheel and unique »wrapper« roller. This technique eliminates filament slip and breakage. The YS-20 can also be used either as a contact or a non-contact tachometer to measure revolutions of shafts, motors, pulleys etc. or line speed of moving surfaces as conveyor belts, webs of paper or fabric etc.

Speed measurement
- 0.10 ... 1999 m/min
- 0.30 ... 6500 feet/min
- 4.00 ... 78000 inch/min

Length measurement
- 0.02 ... 99999 m
- 0.01 ... 99999 feet
- 1.00 ... 99999 inch

Revolution measurement
Non-contact measurement: 1.00 ... 99999 RPM
Contact measurement: 1.00 ... 19999 RPM

Specifications

<table>
<thead>
<tr>
<th>Model YS-20</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy:</td>
<td>± 0.2 % of displayed value ± 1 digit (not for length measurement)</td>
</tr>
<tr>
<td>Measuring time:</td>
<td>0.5 s</td>
</tr>
<tr>
<td>Resolution:</td>
<td>0.01 m (length measurement)</td>
</tr>
<tr>
<td>Display:</td>
<td>5 digit LCD, 10 mm high – floating decimal point</td>
</tr>
<tr>
<td>Memory:</td>
<td>Min, Max, last reading</td>
</tr>
<tr>
<td>Auto Power Off:</td>
<td>after 30 s of non-use</td>
</tr>
<tr>
<td>Temperature range:</td>
<td>5 - 45 °C</td>
</tr>
<tr>
<td>Air humidity:</td>
<td>85 % RH, max.</td>
</tr>
<tr>
<td>Batteries:</td>
<td>2x 1.5 V Type AA (approx. 20 h continuous use)</td>
</tr>
<tr>
<td>Housing material:</td>
<td>ABS plastic</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>145 x 60 x 30 mm (L x W x H)</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 150 g (700 g)</td>
</tr>
</tbody>
</table>

Delivery includes: Tachometer in carrying case with standard accessories:
- 2 batteries, 1 adapter for yarn speed measurement, 1 adapter for contact measurement, 1 rubber Tip, 1 measuring wheel (10 cm circumference), 1 set of reflective tapes
Yarn Consumption Meter

LM Series

Electronic Yarn Consumption Meter (Inch-Meter)

The LM Series accurately measures the accumulated total yarn consumption of a single yarn feeding system for one or more machine cycles of a circular knitting machine.

Special features:

+ 2 Different Models:
  — Sensor controlled unit with an external sensor (Code V) for automatic start/stop signal
  — Basic unit without sensor for manual use
+ Both models are available in cm (LMC) or inch (LMI)
+ Precision, ball-bearing mounted wheel is recessed into an adjustable slot on the rear side
+ Magnet base for convenient mounting. It is stationary mounted on the cylinder ring between filament break monitors and the filament guides.

Advantage of use:

- Yarn consumption measurements of all knitting feeds ensure uniform stitch lengths and homogeneous fabric structure.
- Fabric specifications can be reliably maintained and repeated.
- The quantities of yarn which are required for producing particular fabrics can be simply and accurately calculated.
- The use of LM ensures the same fabric quality, respectively structures can be produced on different machines in the same quality.

Operation of model LMC-V and model LMI-V:

— **Auto-mode** The sensor/magnet supplies the start/stop signal for measurement during user-selected number of machine revolutions (from 1-99 rev. set on front-panel rotary switches).
— **Manual-mode**: The unit works without external sensor as long as the operator desires — this function is equivalent to the operating principle of basic unit model LMC and model LMI.

### Specifications

<table>
<thead>
<tr>
<th>Model LMC / LMC-V</th>
<th>Model LMI / LMI-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range:</td>
<td>1 - 999999 cm</td>
</tr>
<tr>
<td>Resolution:</td>
<td>1 cm</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>± 1 % of displayed value ± 1 digit</td>
</tr>
<tr>
<td>Measuring principle:</td>
<td>Pulse counting</td>
</tr>
<tr>
<td>Preselect switch:</td>
<td>1-99 Machine revolutions (Option Code V)</td>
</tr>
<tr>
<td>Display:</td>
<td>LCD, 5 mm high</td>
</tr>
<tr>
<td>Auto Power Off:</td>
<td>after 2 min of non-use</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>Batteries:</td>
<td>2x1.5 V Type AAA (about 30 h of continuous use)</td>
</tr>
<tr>
<td>Housing material:</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>Instrument: 160 x 55 x 51 mm (LxWxH)</td>
</tr>
<tr>
<td></td>
<td>Magnetic base: height 190 mm, diameter 40 mm</td>
</tr>
<tr>
<td>Weight:</td>
<td>Instrument: approx. 210 g</td>
</tr>
<tr>
<td></td>
<td>Magnetic base: approx. 430 g</td>
</tr>
<tr>
<td></td>
<td>Complete with carrying case (gross): approx. 1400 g</td>
</tr>
</tbody>
</table>

Delivery includes:

- Model LMC / LMI: Length meter with transport packaging incl. 2 batteries and 1 magnetic base
- Model LMC-V / LMI-V: Length meter with transport packaging incl. 2 batteries, 1 magnetic base, 1 sensor with cable 1 m, 1 magnet
- EK0630: Extension cable 0.8 m
- EK0631: Additional sensor and magnet
Model DT-105A

Electronic hand-held tachometers
Contact type

Specifications

Model DT-105A

Measuring ranges:
Revolutions: 0.1 - 25000 rpm
Speed: e.g. 0.02 - 3810 m/min
Length: e.g. 0.5 - 99999 cm
Accuracy: 0 - 999.9 rpm (± 0.1 rpm) ± 1 digit
1000 - 9999.9 rpm (± 1 rpm) ± 1 digit
10000 - 25000 rpm (± 0.01 % of reading) ± 1 digit
Speed and Length: ± 0.4 % of reading ± 1 digit

Measuring units:
Revolutions: rpm; rph; total revolutions (counter): rev
Speed: m / min; m / h; feet / min; feet / h;
yards / min; yards / h; inch / min; miles / h
Length: cm; m; inch; feet; yard

Display: 5 digit LCD 12 mm high
Auto power off: after 5 min of non-use
Batteries: 2x 1.5 V Type AA approx. 65 h continuous use
Memory system: 13 readings (incl. LAST + MIN + MAX) are stored and retained for 5 min
Temperature range: 5 - 45 °C
Air humidity: 85 % RH, max.
Housing material: Die-cast aluminium
Dimensions: 180 x 60 x 47 mm (L x W x H)
Weight, net (gross): approx. 350 g (800 g)

Model DT-107A

Specifications

Model DT-107A

Measuring ranges:
Revolutions: 0.1 - 25000 rpm
Speed: e.g. 0.02 - 3810 m/min
Length: e.g. 0.5 - 99999 cm
Accuracy: 0 - 999.9 rpm (± 0.1 rpm) ± 1 digit
1000 - 9999.9 rpm (± 1 rpm) ± 1 digit
10000 - 25000 rpm (± 0.01 % of reading) ± 1 digit
Speed and Length: ± 0.4 % of reading ± 1 digit

Measuring units:
Revolutions: rpm; rph; total revolutions (counter): rev
Speed: m / min; m / h; feet / min; feet / h;
yards / min; yards / h; inch / min; miles / h
Length: cm; m; inch; feet; yard

Display: 5 digit LED 10 mm high
Auto power off: 10 s
Batteries: 2x 1.5 V Type AA approx. 40 h continuous use
Memory system: 13 readings (incl. LAST + MIN + MAX) are stored and retained for 5 min
Temperature range: 5 - 45 °C
Air humidity: 85 % RH, max.
Housing material: Die-cast aluminium
Dimensions: 180 x 60 x 47 mm (L x W x H)
Weight, net (gross): approx. 350 g (800 g)

Model DT-105A and DT-107A is also available with 12 inch grooved wheel (groove 24 mm) to determine wire speed and length of ropes, tapes etc. Code 12C e.g. DT-107A-12C

Special accessories: Grooved measuring wheel (G) with 6 inch circumference for measuring yarn and wire speeds, calibration certificate

Delivery includes: Tachometer in carrying case with standard accessories:
2 batteries, 2 rubber Tips (A), 1 funnel (B), 1 rubber measuring wheel (F) 6 inch circumference, 1 extension shaft (E) 75 mm, certificate of compliance with the order, instruction manual in german and english

Subject to change without notice.
Specifications

Model DT-205L

Measuring ranges:

<table>
<thead>
<tr>
<th>Revolution (non contact):</th>
<th>6 - 99999 rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revolution (contact):</td>
<td>1 - 25000 rpm</td>
</tr>
<tr>
<td>Speed (contact):</td>
<td>e.g. 0.11 - 3810 m/min</td>
</tr>
<tr>
<td>Length (contact):</td>
<td>e.g. 0.02 - 99999 m</td>
</tr>
</tbody>
</table>

Accuracy:

- 6 - 8300 (± 1 rpm) ± 1 digit
- 8301 - 25000 (± 2 rpm) ± 1 digit
- 25001 - 99999 (± 0.01 % of reading) ± 1 digit

Speed and Length:

- ± 0.4 % of reading ± 1 digit

Measuring units:

<table>
<thead>
<tr>
<th>Revolution</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>m/min; feet / min; yards / min; inch / min</td>
</tr>
<tr>
<td>Length</td>
<td>m; inch; feet; yard</td>
</tr>
</tbody>
</table>

Laser:

- Class 2: Output < 1 mW, wavelength 670 nm, max. measuring distance 2 m

Display:

- 5 digit LCD 12 mm high
- 5 digit LED 10 mm high

Auto power off:

- after 5 min of non-use
- 10 s

Batteries:

- 2x 1.5 V Type AA approx. 40 h...
- approx. 25 h continuous use

Memory system:

- 13 readings (incl. LAST + MIN + MAX) are stored and retained for 5 min

Temperature range:

- 5 - 45 °C

Air humidity:

- 85 % RH, max.

Housing material:

- Die-cast aluminium

Dimensions:

- 167 x 60 x 47 mm (L x W x H)

Weight, net (gross):

- approx. 365 g (950 g)

Model DT-207L

- Same as DT-205L, but with LED display

- Built-in selector switch permits the user to display readings in a wide variety of measuring units.

Model DT-205L and DT-207L:

- Bright, easy to read LED display

- Bright, easy to read LCD display

Model DT-205LS

Series DT is also available with measuring wheel 12 inch circumference (Code-S)

e.g. DT-205LS

Special accessories:

- Set with 140 self-adhesive reflective tapes, grooved measuring wheel (G) with 6 inch circumference for measuring yarn and wire speeds, calibration certificate

Delivery includes:

- Tachometer in carrying case with standard accessories:
  - 2 batteries, 35 self-adhesive reflective tapes, 1 adapter, 2 rubber tips (A), 1 funnel (B), 1 rubber measuring wheel (F) 6 inch circumference, 1 extension shaft (E) 75 mm, certificate of compliance with the order, Instruction manual in german and english
Tachometers

**PH Series**

*Electronic hand-held tachometers  
Contact and non-contact type*

**Standard features:**
- Easy to read LCD display  
- Built-in memory for Max, Min, Average, Last and 10 separate readings for recall in display  
- Compact, rugged plastic housing  
- 10 user selectable measuring units

**Model PH-100 A**
Contact type: Measures revolutions, surface speed and length

**Model PH-200 LC**
Combined instrument:  
1. Non-Contact mode uses laser beam and reflective tape for measuring rpm  
2. Contact type mode uses screwed-in adapter for measuring rpm, surface speed and length

**Model PH-200 L**
Non-Contact type: Measures revolutions with laser beam

---

**Specifications**

**Model PH-100 A**
- **Measuring ranges:**
  - Revolutions (non contact): 6 - 99999 rpm  
  - Speed: e.g. 0.1 - 3810 m/min  
  - Length: e.g. 0.01 - 99999 m  
- **Accuracy:**
  - 1 - 599 rpm (± 1 rpm) ± 1 digit  
  - 600 - 25000 rpm (± 0.01 % of reading) ± 1 digit  
  - Speed and Length: ± 0.4 % of reading ± 1 digit  
- **Measuring units:**
  - Revolutions: rpm; total rotations (counter): rev  
  - Speed: m/min; feet/min; yards/min; inch/min  
  - Length: m; inch; feet (only Model PH-100 A); yard  
- **Memory system:**
  - 14 readings (incl. Last + Middle + MIN + MAX) are stored and retained for 5 min  
- **Laser, class 2:**
  - Output < 1 mW, wavelength 670 nm, max. measuring distance 2 m  
- **Batteries:**
  - 3x 1.5 V Type AA, approx. 50 h ...  
  - approx. 35 h continuous use  
  - approx. 35 h continuous use  
- **Display:**
  - 5 digit LCD 12 mm high  
- **Auto power off:**
  - after 5 min of non-use  
- **Temperature range:**
  - 5 - 45 ºC  
- **Air humidity:**
  - 85 % RH, max.  
- **Housing material:**
  - Plastic (ABS)  
- **Dimensions:**
  - 123 x 64 x 32 mm (L x W x H)  
  - approx. 180 g (400 g)  
- **Weight, net (gross):**
  - approx. 170 g (390 g)

**Model PH-200 LC**
- **Measuring ranges:**
  - 6 - 99999 rpm  
  - 6 - 25000 rpm  
  - e.g. 1.0 - 3810 m/min  
  - e.g. 0.2 - 99999 m  
- **Accuracy:**
  - 6 - 599 (± 1 rpm) ± 1 digit  
  - 600 - 25000 (± 2 rpm) ± 1 digit  
  - 25001 - 99999 (± 0.01 % of reading) ± 1 digit  
- **Measuring units:**
  - Revolutions: rpm  
- **Memory system:**
  - 14 readings (incl. Last + Middle + MIN + MAX) are stored and retained for 5 min  
- **Laser, class 2:**
  - Output < 1 mW, wavelength 670 nm, max. measuring distance 2 m  
- **Batteries:**
  - 3x 1.5 V Type AA, approx. 50 h ...  
  - approx. 35 h continuous use  
  - approx. 35 h continuous use  
- **Display:**
  - 5 digit LCD 12 mm high  
- **Auto power off:**
  - after 5 min of non-use  
- **Temperature range:**
  - 5 - 45 ºC  
- **Air humidity:**
  - 85 % RH, max.  
- **Housing material:**
  - Plastic (ABS)  
- **Dimensions:**
  - 123 x 64 x 32 mm (L x W x H)  
  - approx. 180 g (400 g)  
- **Weight, net (gross):**
  - approx. 170 g (390 g)

**Model PH-200 L**
- **Measuring ranges:**
  - 6 - 99999 rpm  
- **Accuracy:**
  - 6 - 599 (± 1 rpm) ± 1 digit  
- **Measuring units:**
  - Revolutions: rpm  
- **Memory system:**
  - 14 readings (incl. Last + Middle + MIN + MAX) are stored and retained for 5 min  
- **Laser, class 2:**
  - Output < 1 mW, wavelength 670 nm, max. measuring distance 2 m  
- **Batteries:**
  - 3x 1.5 V Type AA, approx. 50 h ...  
  - approx. 35 h continuous use  
  - approx. 35 h continuous use  
- **Display:**
  - 5 digit LCD 12 mm high  
- **Auto power off:**
  - after 5 min of non-use  
- **Temperature range:**
  - 5 - 45 ºC  
- **Air humidity:**
  - 85 % RH, max.  
- **Housing material:**
  - Plastic (ABS)  
- **Dimensions:**
  - 123 x 64 x 32 mm (L x W x H)  
  - approx. 180 g (400 g)  
- **Weight, net (gross):**
  - approx. 170 g (390 g)

---

**Delivery includes:** Tachometer in carrying case with 3 Batteries, Certificate of compliance with order, Instruction manual in german and english:
- 1 rubber tip (A), 1 funnel (B), 1 rubber measuring wheel (F) with 6 inch circumference  
- 1 Adapter (LC), 35 reflective tapes, 1 rubber tip (A), 1 funnel (B), 1 rubber measuring wheel (F)  
- 1 Grooved measuring wheel (G) with 6 inch circumference for measuring yarn and wire speeds, calibration certificate  
- 35 self-adhesive reflective tapes  
- 1 Set with 140 self-adhesive reflective tapes, calibration certificate  

---

**Subject to change without notice.**
**Model DT-2100**

*Electronic hand-held tachometer Contact and non-contact type*

**Specifications**

**Measuring ranges:**
- Revolutions (non contact): 6 - 99999 rpm
- Revolutions (standard adapter): 0.8 - 25000 rpm
- Revolutions (low speed adapter): 0.10 - 10.00 rpm

**Accuracy:**
- Standard adapter: ± 0.006 % of reading, ± 1 Digit
- Low speed adapter:
  - 0.10 - 1.00 rpm: ± 0.06 rpm
  - 1.01 - 6.00 rpm: ± 0.6 rpm
  - 6.01 - 10.00 rpm: ± 1.00 rpm

**Measuring units:**
- Revolutions: rpm
- Speed: m/min; feet/min; yards/min; inch/min, etc.
- Length: cm; m; inch; feet; yard

**Laser, class 2:**
- Output < 1 mW, wavelength 650 nm, max. measuring distance 4 m

**Display:**
- OLED display for better reading

**Display update rate:**
- 100 msec, 500 msec, 1 sec oder 5 sec

**Output signal:**
- USB

**Auto power off:**
- after 1, 10 or 30 min of non-use

**Power supply:**
- 2x 1.5 V Type AA for approx. 20 h with brightness 20% or USB

**Memory system:**
- Internal memory for max. 1000 readings

**Temperature range:**
- 0 - 45 °C

**Housing material:**
- Polycarbonate

**Dimensions:**
- 155 x 55 x 35 mm (LxWxH)

**Weight, net (gross):**
- approx. 159 g (567 g)

**Delivery includes:**
- Tachometer in carrying case with standard accessories:
  - 2 batteries, 1 strip self-adhesive reflective tapes, 1 standard adapter, 2 rubber Tips (A), 1 funnel (B), 1 rubber measuring wheel (F) 6inch circumference, 1 extension shaft (E) 75 mm, certificate of compliance with the order, instruction manual in english

**Special accessories:**
- Sheet with 35 self-adhesive reflective tapes, grooved measuring wheel (G) with 6 inch circumference for measuring yarn and wire speeds, calibration certificate

---

**Saved readings can be shown in the display**

---

**3 different graphs can be displayed:**
- line graph, tacho graph or bargraph
# Model MS-1

**Pocket-Stroboscope**

## Standard features:
- Small, handy unit for one hand operation
- Easy to read LCD display
- For measuring 30 to 12500 FPM and higher using „harmonics“
- Brightest flash in his class
- Trigger input for external triggering the strobe
- Battery operated with high quality batteries and short charging time
- Last displayed value is stored and strobe runs at that speed when switched on again
- Tripod mounting facility

## Specifications

<table>
<thead>
<tr>
<th>Model MS-1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flash range:</strong></td>
<td>0.5 - 208.3 Hz = 30 - 12500 FPM (rpm)</td>
</tr>
<tr>
<td><strong>Accuracy:</strong></td>
<td>± 0.01% of displayed value ± 1 digit</td>
</tr>
<tr>
<td><strong>Resolution:</strong></td>
<td>± 1 FPM</td>
</tr>
<tr>
<td><strong>Light intensity:</strong></td>
<td>approx. 1200 Lux 20 cm distance</td>
</tr>
<tr>
<td><strong>Flash duration:</strong></td>
<td>&lt; 9 µsec</td>
</tr>
<tr>
<td><strong>Display:</strong></td>
<td>5 digit LCD, 9 mm high</td>
</tr>
<tr>
<td><strong>Flash tube:</strong></td>
<td>Xenon-Longlife (Lifetime approx. 200 million flashes) at 6000 FPM</td>
</tr>
<tr>
<td><strong>External trigger input:</strong></td>
<td>0 - 5 V DTL/TTL compatible, ( V_{out} = 7.2 \text{ V unregulated, } R_f = 100 \Omega )</td>
</tr>
<tr>
<td><strong>Tripod mount:</strong></td>
<td>( \frac{1}{4}” \times 20 )</td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
<td>Li-ion rechargeable battery (2h continuous use, 5 h recharging time) and/or AC Adapter 100 ... 240 V DC, 50 / 60 Hz</td>
</tr>
<tr>
<td><strong>Temperature range:</strong></td>
<td>0 - 40 °C</td>
</tr>
<tr>
<td><strong>Air humidity:</strong></td>
<td>85 % RH, max.</td>
</tr>
<tr>
<td><strong>Housing material:</strong></td>
<td>ABS</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>240 x 65 x 40 mm (LxWxH)</td>
</tr>
<tr>
<td><strong>Weight, net (gross):</strong></td>
<td>approx. 420 g (approx. 1300 g)</td>
</tr>
</tbody>
</table>

## Special accessories:
- Belt-clip holster: Model 20003 R

## Delivery includes:
- Stroboscope with carrying case and manufacturer’s inspection report,
- battery recharger with 4 adapters for world wide use, jack 3.5 mm plug for trigger signal,
- instruction manual in several languages

Subject to change without notice.
**Series 3000**

**Compact stroboscopes**

**Standard features:**
- 4 different models
- Light weight and handy size
- Analog or digital display
- Mains use or battery-operated
- Display in Hz (flashes/sec) and rpm

---

**Specifications**

<table>
<thead>
<tr>
<th>Model 3000-NA</th>
<th>Model 3000-BA</th>
<th>Model 3000-ND</th>
<th>Model 3000-BD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash range:</td>
<td>2.5 - 300 Hz = 150 - 18000 FPM</td>
<td>4 - 335 Hz = 240 - 20100 FPM</td>
<td></td>
</tr>
<tr>
<td>Power supply*:</td>
<td>220...250 V AC</td>
<td>12 V DC</td>
<td>12 V DC</td>
</tr>
<tr>
<td>Light intensity:</td>
<td>50/60 Hz</td>
<td>max. 450 Lux in 50 cm distance (depending on flash rate)</td>
<td></td>
</tr>
<tr>
<td>Flash duration:</td>
<td>7 µsec, max.</td>
<td>± 0.01% of set value, ± 1 digit</td>
<td></td>
</tr>
<tr>
<td>Flash tube:</td>
<td></td>
<td></td>
<td>Xenon-longlife (Lifetime approx. 100 million flashes)</td>
</tr>
<tr>
<td>Temperature range:</td>
<td>5 - 45 ºC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air humidity:</td>
<td>85% RH, max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing material:</td>
<td>Plastic shatterproof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions:</td>
<td>155 x 95 x 80 mm (LxWxH)</td>
<td></td>
<td>approx. 600 g (800 g)</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Special accessories:**

| Accumulator / Charger*: | Model 2020.03 | Model 2020.03 |
| Leather case: | Model 3000.10 | Model 3000.10 |

* Standard 220 - 250 V
(In case you require 115 V, please indicate in your order)
Model DT-311N
Mains operated, portable

**Standard features:**
- For revolutions up to 35000 rpm
- Easy to operate controls
- Easy to read LED display
- Detachable pistol-grip handle and mounting possibility on tripod
- Double-flash (x2) and half-rate (+2) flash selection for easy determination of true flash rate
- Provides synchronizing pulse output for other stroboscopes
- Accepts external trigger input: Phase shift adjustment 0° to 359° permits movement of objects to desired position for best view and flash photography
- Flash delay switch to move a frozen object slowly within 6 s
- Rugged aluminium housing

Model DT-315N
With internal battery, portable

**Additional features:**
- Same functions as Model DT-311N, but additionally with:
  + Integrated rechargeable battery, 12 V power required
  + AC adapter for recharging and/or mains operating

---

**Specifications**

<table>
<thead>
<tr>
<th>Model DT-311N</th>
<th>Model DT-315N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flash range:</strong></td>
<td>0.7 - 585 Hz = 40 - 35000 fpm (rpm)</td>
</tr>
<tr>
<td><strong>Accuracy:</strong></td>
<td>± 0.1 % of reading, ± 1 digit</td>
</tr>
<tr>
<td><strong>Resolution:</strong></td>
<td>40 - 4999 fpm: 0.1 fpm; 5000 - 7999 fpm: 0.2 fpm</td>
</tr>
<tr>
<td><strong>Light intensity:</strong></td>
<td>approx. 300 Lux (depending on flash rate)</td>
</tr>
<tr>
<td><strong>Flash duration:</strong></td>
<td>10 - 40 µs</td>
</tr>
<tr>
<td><strong>Display update time:</strong></td>
<td>approx. 0.2 s</td>
</tr>
<tr>
<td><strong>Display:</strong></td>
<td>LED 5 digit, 10 mm high</td>
</tr>
<tr>
<td><strong>Flash tube:</strong></td>
<td>Xenon, 10 W (Lifetime approx. 100 million flashes)</td>
</tr>
<tr>
<td><strong>Phase shift:</strong></td>
<td>0º - 359º with 1º resolution</td>
</tr>
<tr>
<td><strong>Triggering input signal:</strong></td>
<td><strong>H-level:</strong> 2.5 - 12 V – <strong>L-level:</strong> 0 - 0.8 V, pulse width minimum 50 µs, positive edge trigger; input resistance approx. 4.7 KΩ</td>
</tr>
<tr>
<td><strong>Output signal for sensor:</strong></td>
<td>12 V ± 0.6 V DC, 40 mA</td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
<td>230 V AC ± 10 %, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>NiCd battery (1 h continuous use)</td>
</tr>
<tr>
<td></td>
<td>and/or AC adapter 230 V DC</td>
</tr>
<tr>
<td><strong>Temperature range:</strong></td>
<td>5 - 45°C</td>
</tr>
<tr>
<td><strong>Air humidity:</strong></td>
<td>85 % RH, max.</td>
</tr>
<tr>
<td><strong>Housing material:</strong></td>
<td>Aluminium profil, ABS</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>185 x 120 x 120 mm (L x W x H)</td>
</tr>
<tr>
<td></td>
<td>250 x 120 x 120 mm (L x W x H)</td>
</tr>
<tr>
<td><strong>Weight, net (gross):</strong></td>
<td>approx. 1200 g (1800 g)</td>
</tr>
<tr>
<td></td>
<td>approx. 2000 g (3200 g)</td>
</tr>
</tbody>
</table>

---

*Standard 230 V
(In case you require 115 V, please indicate in your order – extra charge)*
Model QLED
Hand-held LED Stroboscope

Standard features:
- For revolutions up to 300000 rpm (FPM)
- Latest LED technique with 40 or 118 LEDs, depending on model
- Recommended distance to object: 1 m or 3 m depending on model
- Rugged aluminium housing for industrial use
- 5 flash frequencies can be saved for fast adjustment
- IP 30 protected
- Power supply: Li-Ion accumulator
- AC adapter for charging

Special features:
- Powerful light output: 1750 or 6500 Lux at 1° / 300 mm depending on model
- 2 operation modes:
  - Standard: frequency, brightness, phase shifting
  - Profi: additional e.g. slow motion, frame rate, pulse divider, memory
- Can be triggered internal and external: for phase shifting and additional functions
- Illuminants with adjustable light intensity and sharpness
- Adjustable units: FPM, Hz, 1/min
- LCD Display
- Resolution depending on flash frequency 0.1, 1 or 10 FPM
- Thread insert for handle or stationary use

Specifications

<table>
<thead>
<tr>
<th>Model QLED-40</th>
<th>Model QLED-118</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of LEDs:</td>
<td>40</td>
</tr>
<tr>
<td>Frequency range:</td>
<td>30 - 300000 FPM (rpm)</td>
</tr>
<tr>
<td>Display:</td>
<td>LCD, multiline</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>±0.02% ±1 digit/ ±0.025 µ</td>
</tr>
<tr>
<td>Resolution:</td>
<td></td>
</tr>
<tr>
<td>External trigger input:</td>
<td>3-30V/max. 5 mA, DIN 41524 5-Pin standard plug</td>
</tr>
<tr>
<td>Flash duration:</td>
<td>Adjustable</td>
</tr>
<tr>
<td>Light intensity:</td>
<td>Approx. 1750 Lux at 1° / 300 mm</td>
</tr>
<tr>
<td>Flash color:</td>
<td>Approx. 5000 - 8000 K</td>
</tr>
<tr>
<td>Power supply:</td>
<td>Integrated Li-Ion accumulator</td>
</tr>
<tr>
<td>Operating time:</td>
<td>Approx. 7h at 0.5° (~ 875 Lux)</td>
</tr>
<tr>
<td>Temperature range:</td>
<td>0 - 40°C</td>
</tr>
<tr>
<td>Housing material:</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>150 x 130 x 112 mm (LxWxH)</td>
</tr>
<tr>
<td>Weight:</td>
<td>1050 g</td>
</tr>
</tbody>
</table>

Delivery includes: Stroboscope with carrying case, AC adapter with 4 adapters (EU, GB, USA, AUS), trigger plug, handle, calibration certificate and instruction manual
**Series DSL**

**LED Stroboscopes, hand-held, portable**

**Standard features:**
- For revolutions up to 300000 rpm (FPM)
- Latest LED technique
- Lifetime of LEDs do not need wear-out or replacement
- Easy to use just in one hand
- Recommended distance to object: 20 - 50 cm
- Double-flash-function (x2) and half-rate-flash-function (:2) for easy and fast determination of the true flash rate
- Rigid Aluminium housing

**Special features**
- Exceptionally light-intense: 1500 Lux at 6000 FPM, distance 20 cm
- User programmable settings: flash duration, phase shift, delay and much more
- IP65 protected (dust and splash water)
- Model DSL-T with combined trigger input/output
- 3 standard AA-batteries provide 6 hours continuous use

**Available Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Measuring Range</th>
<th>Trigger Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSL-300</td>
<td>30 - 300000 FPM (0.5-5000 Hz)</td>
<td>no</td>
</tr>
<tr>
<td>DSL-300-T</td>
<td>30 - 300000 FPM (0.5-5000 Hz)</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Specifications**

**Model DSL-300**
- Flash range: 0.5 - 5000 Hz = 30 - 300000 FPM (rpm)
- Accuracy: ± 1 digit
- Resolution: 0.1 FPM (30 - 999 min⁻¹), 1 FPM (1000+)
- Light intensity: 1500 Lux at 6000 FPM at 20 cm distance
- Display: LCD, multiple lines
- Flash color: Approx. 6500K
- Phase shift internal: 360° (increment 1°)
- Power supply: 3 x AA batteries, operation: approx. 6 h
- Temperature range: Operation: -40 °C
- Housing material: Aluminium/ABS
- Dimensions: 191 x 82 x 60 mm (L x W x H)
- Weight, net (gross): Approx. 420 g (approx. 850 g)

**Model DSL-300-T only**
- Trigger output: Optocoupler non-isolated
- Level: NPN, max. 32 V, 50 mA
- Pulse length: Adjustable
- Trigger input: Optocoupler, isolated
- Level: 3...32 V NPN + PNP
- Minimal pulse length: 50 usec
- Phase shift external: 360° (increment 1°)
- Delay time: 0...999 ms
- Reverse voltage protection: yes

**Delivery includes:** Stroboscope with carrying case, 6 batteries, manufacturer’s inspection report and instruction manual in different languages, DSL-300-T: 3 m trigger cable
Series DSL
LED Stroboscopes, hand-held

Standard features:
- For revolutions up to
  DSL-200: max. 150,000 rpm (FPM)
  DSL-600: max. 120,000 rpm (FPM)
- Easy to read LED display
- Highly efficient LED illuminants
  assure a good illumination of the
  observing object
- Double-flash-function (x2) and
  half-rate-flash-function (:2) for
  easy and fast determination of the
  true flash rate
- 9 flash rates can be stored
- Adjustable flash duration time for
  best illumination
  - shorter flash period - tighter image
  - longer flash period - more
    brightening
- Handy, rugged aluminium housing
- Battery operated

Additional features DSL-200:
- 359° digital phase shift adjustment
  in 1° increments to permit move-
  ment of objects
- External trigger input and output
- Tripod mountable

Specifications

<table>
<thead>
<tr>
<th>DSL-200</th>
<th>DSL-600</th>
</tr>
</thead>
</table>
| Flash range: | 0.2 - 2500 Hz  
12 - 150,000 FPM (rpm) | 0.2 - 2000 Hz  
12 - 120,000 FPM (rpm) |
| Accuracy: | 0.01 % (± 1 Digit) | 0.01 % (± 1 Digit) |
| Resolution: | 0.1 (12 - 9999.9 FPM)  
1 (10,000 - 150,000 FPM) | 0.1 (12 - 9999.9 FPM)  
1 (10,000 - 120,000 FPM) |
| Light intensity: | 4300 Lux at 6000 FPM  
at 20 cm distance | 1200 Lux at 6000 FPM  
at 20 cm distance |
| Flash duration: | adjustable | adjustable |
| Display: | LCD, 5 digit, 12 mm high | LCD, 5 digit, 12 mm high |
| Power supply: | NiMH rechargeable | 2 x AA Battery |
| Operation time: | 6 h bei 6000 FPM (continuous use) | 8 h bei 6000 FPM (continuous use) |
| Temperature range: | 0 - 45 °C | 0 - 45 °C |
| Housing material: | Aluminium | Aluminium |
| Dimensions: | 190 x 33 x 30 mm (L x W x H) | 168 x 39 x 33 mm (L x W x H) |
| Weight, net (gross): | Approx. 350 g (1200 g) | Approx. 225 g (610 g) |

Delivery includes: Stroboscope with carrying case, 2 batteries, charger (only DSL-200) and
operating manual in english
Thickness Gauges

Thickness gauges are used for measuring the thickness of leather, textiles, cardboard, felt, rubber, sheet metal, foils, plywood, plastic parts of all kinds etc. Depending on the application, the following points are important for selecting the best model:

- Max. resolution required
- Measuring range
- Depth of jaw
- Shape of feelers
- Measurement principle

The aluminium housing is lightweight and rugged. It can be easily zeroed by turning the outer knurled ring of the scale. Specified Test Report with calibration report can be made only for the dial gauge for an extra charge.

To order, please indicate the desired feeler, e.g. JA-50-B for gauge with feeler »B«.

Customized feeler type »A« with diameter greater than 30 to 56 mm are available on request.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>J-15</th>
<th>J-45</th>
<th>J-50</th>
<th>JA-50</th>
<th>J-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
</tr>
<tr>
<td>Measuring range:</td>
<td>10 mm</td>
<td>10 mm</td>
<td>10 mm</td>
<td>10 mm</td>
<td>10 mm</td>
</tr>
<tr>
<td>Depth of jaws:</td>
<td>18 mm</td>
<td>45 mm</td>
<td>50 mm</td>
<td>50 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>Scale diameter:</td>
<td>36 mm</td>
<td>36 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
</tr>
<tr>
<td>Measuring pressure:</td>
<td>0.5 N</td>
<td>0.5 N</td>
<td>1.2 N</td>
<td>1.2 N</td>
<td>0.6 N/2 N</td>
</tr>
<tr>
<td>On request:</td>
<td>0.6 N/2 N</td>
<td>0.6 N/2 N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeler shape*:</td>
<td>F</td>
<td>F</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
</tr>
<tr>
<td>Lifting wheel:</td>
<td></td>
<td></td>
<td>A/B/C/D/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring force:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifting device:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight, net:</td>
<td>90 g</td>
<td>110 g</td>
<td>300 g</td>
<td>300 g</td>
<td>450 g</td>
</tr>
</tbody>
</table>

* To order, please indicate the desired feeler, e.g. JA-50-B for gauge with feeler »B«.
## Specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.001 mm</td>
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<tr>
<td>Measuring range:</td>
<td>10 mm</td>
<td>30 mm</td>
<td>10 mm</td>
<td>30 mm</td>
<td>10 mm</td>
<td>30 mm</td>
<td>1 mm</td>
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<tr>
<td>Depth of jaws:</td>
<td>200 mm</td>
<td>200 mm</td>
<td>300 mm</td>
<td>300 mm</td>
<td>400 mm</td>
<td>400 mm</td>
<td>30 mm</td>
</tr>
<tr>
<td>Scale diameter:</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
</tr>
<tr>
<td>Measuring pressure:</td>
<td>2.0 N</td>
<td>2.0 N</td>
<td>2.0 N</td>
<td>2.0 N</td>
<td>2.0 N</td>
<td>2.0 N</td>
<td>2.2 N</td>
</tr>
<tr>
<td>On request:</td>
<td>1.2N/3N</td>
<td>1.2N/3N</td>
<td>1.2N/3N</td>
<td>1.2N/3N</td>
<td>1.2N/3N</td>
<td>1.2N/3N</td>
<td>0.7N/3N</td>
</tr>
<tr>
<td>Feeler shape*:</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
<td>A/B/C/D/E</td>
<td>F</td>
</tr>
<tr>
<td>Lifting wheel:</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Spring force:</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Lifting device:</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>Weight, net:</td>
<td>1100 g</td>
<td>1100 g</td>
<td>1350 g</td>
<td>1350 g</td>
<td>1500 g</td>
<td>1500 g</td>
<td>340 g</td>
</tr>
</tbody>
</table>

*To order, please indicate the desired feeler, e.g. JA-50-B for gauge with feeler »b«.

Model JA-50

- Special-purpose thickness gauge for foils and thin materials with a resolution of 1 µm.
- An insulated handle prevents transfer of heat from the hand to the movement.

Model J-200-30

- Model JA-50
- Model J-300
- Model J-300-30
- Model J-400
- Model J-400-30
- Model F-1000-30

Model J-100

- High resolution for foils

Model F-1000-30

- Special-purpose thickness gauge for foils and thin materials with a resolution of 1 µm.
- An insulated handle prevents transfer of heat from the hand to the movement.
The Model K-200, K-300, K-400 and K-600-50 thickness gauges are provided with a swing-out foot for on-table operation.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
<td>0.1 mm</td>
</tr>
<tr>
<td>Measuring range:</td>
<td>10 mm</td>
<td>10 mm</td>
<td>20 mm</td>
<td>30 mm</td>
<td>50 mm</td>
<td>30 mm</td>
<td>30 mm</td>
<td>30 mm</td>
<td>30 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td>Depth of jaws:</td>
<td>50 mm</td>
<td>50 mm</td>
<td>50 mm</td>
<td>50 mm</td>
<td>50 mm</td>
<td>100 mm</td>
<td>200 mm</td>
<td>300 mm</td>
<td>400 mm</td>
<td>600 mm</td>
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<tr>
<td>Scale diameter:</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
<td>54 mm</td>
</tr>
<tr>
<td>Measuring pressure:</td>
<td>0.4 N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5 N</td>
<td>1.5 N</td>
<td>1.5 N</td>
<td>1.5 N</td>
<td>1.5 N</td>
</tr>
<tr>
<td>On request:</td>
<td></td>
<td>1.2 N</td>
<td></td>
<td></td>
<td></td>
<td>0.9/2.5 N</td>
<td>0.9/2.5 N</td>
<td>0.9/2.5 N</td>
<td>0.9/2.5 N</td>
<td>0.9/2.5 N</td>
</tr>
<tr>
<td>Spring force:</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lifting device:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight, net:</td>
<td>300 g</td>
<td>300 g</td>
<td>330 g</td>
<td>330 g</td>
<td>350 g</td>
<td>450 g</td>
<td>700 g</td>
<td>1000 g</td>
<td>1400 g</td>
<td>1900 g</td>
</tr>
</tbody>
</table>

* To order, please indicate the desired feeler, e.g. K-SO-8 for gauge with feeler »b«.
Digital Thickness Gauges

**JD and FD Series**
- Easy to read LCD display
- Highest accuracy
- User selectable units mm and inch
- Dial gauge: Sylvac S229
- USB or RS-232 output for data-collection
- Includes swing-out foot for on-table operation (Model JD-200-25 only)

**Accessory:**
USB or RS-232 connecting cable to connect the gauge with a computer; it is delivered with a Windows program (Win XP and higher) to transfer the data to the PC and to store them as an Excel file.

---

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>JD-50</th>
<th>JD-100</th>
<th>JD-200</th>
<th>JD-200-25</th>
<th>FD-50</th>
<th>FD-200-25</th>
<th>FD-1000-30-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.01 mm</td>
<td>0.001 mm</td>
<td>0.001 mm</td>
<td>0.001 mm</td>
</tr>
<tr>
<td></td>
<td>0.001 inch</td>
<td>0.001 inch</td>
<td>0.001 inch</td>
<td>0.001 inch</td>
<td>0.0001 inch</td>
<td>0.0001 inch</td>
<td>0.0001 inch</td>
</tr>
<tr>
<td>Measuring range:</td>
<td>10 mm / 0.4 inch as JD-50</td>
<td>as JD-50</td>
<td>25 mm / 1 inch as JD-200</td>
<td>as JD-200-25</td>
<td>0.01 mm</td>
<td>0.001 mm</td>
<td>0.0005 inch</td>
</tr>
<tr>
<td>Depth of jaws:</td>
<td>50 mm</td>
<td>100 mm</td>
<td>200 mm</td>
<td>200 mm</td>
<td>50 mm</td>
<td>200 mm</td>
<td>30 mm</td>
</tr>
<tr>
<td>Shape of jaws:</td>
<td>as J-50</td>
<td>as J-100</td>
<td>as J-200</td>
<td>as J-200-25</td>
<td>as J-50</td>
<td>as J-200</td>
<td>as F-1000-30</td>
</tr>
<tr>
<td>Measuring pressure:</td>
<td>0.8 N</td>
<td>0.8 N</td>
<td>1.9 N</td>
<td>1.9 N</td>
<td>0.7 N</td>
<td>1.8 N</td>
<td>1.7 N</td>
</tr>
<tr>
<td>Feeler shape*:</td>
<td>A/B/C/D/E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display:</td>
<td>LCD 6 digit, 8.5 mm high</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring principle:</td>
<td>Capacitive (Sylvac)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range:</td>
<td>10 - 45 ºC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery:</td>
<td>3 V Lithium, CR2032</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Data output:</td>
<td>USB or RS-232, galvanic isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lifting device:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight, net:</td>
<td>300g</td>
<td>450g</td>
<td>1100g</td>
<td>700g</td>
<td>300g</td>
<td>1100g</td>
<td>300g</td>
</tr>
</tbody>
</table>

* To order, please indicate the desired feeler, e.g. JD-200-25-D for gauge with feeler »d«.
**Thickness Gauges with big jaws and enlarged measuring range**

Max. 650 mm depth of jaw, max. 100 mm measuring range

**Standard Features:**

- **Measuring principle:**
  - Measurement by spring force (pressure) – opening by lifting device (self closing), not model RMU
  - Measurement by manual pressure by plunger (self opening) – opening by spring force (only series RMU)
- Big foot for on table use is optional available, Code F (not RMU)
- Depending to the application a big variety of feeler shapes are available ➔ see page F 1 ➔

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Measuring Range mm</th>
<th>Depth of jaw mm</th>
<th>Resolution</th>
<th>Measuring Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMD-3</td>
<td>0 - 10 mm</td>
<td>50 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-3-1</td>
<td>0 - 25 mm</td>
<td>50 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-820</td>
<td>0 - 10 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-820-1</td>
<td>0 - 25 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-830-F</td>
<td>0 - 10 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-830-1-F</td>
<td>0 - 25 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-850-F</td>
<td>0 - 10 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMD-850-1-F</td>
<td>0 - 25 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>MDM-815-1</td>
<td>0 - 50 mm</td>
<td>150 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>MDM-820-1</td>
<td>0 - 50 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>MDM-830-1-F</td>
<td>0 - 50 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>MDM-835-F</td>
<td>0 - 75 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-840</td>
<td>0 - 100 mm</td>
<td>400 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-850</td>
<td>0 - 25 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-850-1</td>
<td>0 - 50 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>MDM-865-1</td>
<td>0 - 50 mm</td>
<td>650 mm</td>
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<td>2 N</td>
</tr>
<tr>
<td>DMH-3-1</td>
<td>0 - 25 mm</td>
<td>50 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-820-1</td>
<td>0 - 25 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-830</td>
<td>0 - 25 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-830-1</td>
<td>0 - 25 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-835-F</td>
<td>0 - 75 mm</td>
<td>350 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-840</td>
<td>0 - 100 mm</td>
<td>400 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-850-1</td>
<td>0 - 25 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
</tbody>
</table>

**Available Models**

**Analog display**

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Measuring Range</th>
<th>Depth of jaw</th>
<th>Resolution</th>
<th>Measuring Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM-820</td>
<td>0 - 25 mm</td>
<td>200 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-820-1</td>
<td>0 - 50 mm</td>
<td>300 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-830</td>
<td>0 - 25 mm</td>
<td>300 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-830-1</td>
<td>0 - 50 mm</td>
<td>300 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-840</td>
<td>0 - 75 mm</td>
<td>350 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-850</td>
<td>0 - 100 mm</td>
<td>400 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-850-1</td>
<td>0 - 25 mm</td>
<td>500 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DM-865-1</td>
<td>0 - 50 mm</td>
<td>650 mm</td>
<td>0.1 mm</td>
<td>2 N</td>
</tr>
<tr>
<td>DMH-3-1</td>
<td>0 - 25 mm</td>
<td>50 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-820-1</td>
<td>0 - 25 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-830</td>
<td>0 - 10 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-830-1</td>
<td>0 - 25 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-835-F</td>
<td>0 - 75 mm</td>
<td>350 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-840</td>
<td>0 - 100 mm</td>
<td>400 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
<tr>
<td>DMH-850-1</td>
<td>0 - 25 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>1 N</td>
</tr>
</tbody>
</table>

To order, please indicate the desired feeler: (a, b, c, g, h), e.g. DMD-820-A for gauge with feeler »a«

Subject to change without notice.
Measuring moving objects

With analog or digital display

8.7 mm rollers permit measurement on moving materials such as wires, tapes, foils etc. up to a speed of 150 m/min. The rollers are ground.

The lower roller is standard equipped with flanges.

If wider material has to be measured, the lower roller is available without flanges. To order use Code-O e.g. FD-50-RO.

Model JD-50-R

Model J-50-R

Model FD-50-R

Accessory:
USB or RS-232 connecting cable to connect the gauge with a computer; it comes with a Windows program (Win XP or higher) to transfer the data to the PC and to store them as an Excel file.

Specifications

<table>
<thead>
<tr>
<th>Model J-50-R</th>
<th>Model J-50-RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution: 0.01 mm</td>
<td>0.005 mm</td>
</tr>
<tr>
<td>Measuring range: 0 - 5 mm</td>
<td>0 - 5 mm</td>
</tr>
<tr>
<td>Depth of jaws: 50 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td>Measuring pressure: 1.2 N</td>
<td>1.2 N</td>
</tr>
<tr>
<td>Scale diameter: 54 mm</td>
<td>54 mm</td>
</tr>
<tr>
<td>Display: LCD 6 digit, 8.5 mm high</td>
<td></td>
</tr>
<tr>
<td>Measuring principle: Capacitive (Sylvac)</td>
<td></td>
</tr>
<tr>
<td>Temperature range: 10 - 45 °C</td>
<td></td>
</tr>
<tr>
<td>Battery: 3 V Lithium, CR 2032</td>
<td></td>
</tr>
<tr>
<td>Data output: USB or RS-232, galvanic isolation</td>
<td></td>
</tr>
<tr>
<td>Lifting device: O</td>
<td>O</td>
</tr>
<tr>
<td>Weight, net: 300 g</td>
<td>300 g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model JD-50-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution: 0.01 mm / 0.001 inch</td>
</tr>
<tr>
<td>Measuring range: 10 mm / 0.4 inch</td>
</tr>
<tr>
<td>Depth of jaws: 50 mm</td>
</tr>
<tr>
<td>Measuring pressure: 0.7 N</td>
</tr>
<tr>
<td>Scale diameter: 54 mm</td>
</tr>
<tr>
<td>Display: LCD 6 digit, 8.5 mm high</td>
</tr>
<tr>
<td>Measuring principle: Capacitive (Sylvac)</td>
</tr>
<tr>
<td>Temperature range: 10 - 45 °C</td>
</tr>
<tr>
<td>Battery: 3 V Lithium, CR 2032</td>
</tr>
<tr>
<td>Data output: USB or RS-232, galvanic isolation</td>
</tr>
<tr>
<td>Lifting device: O</td>
</tr>
<tr>
<td>Weight, net: 300 g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model FD-50-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution: 0.01 mm / 0.001 mm</td>
</tr>
<tr>
<td>Measuring range: 10 mm / 0.001 mm</td>
</tr>
<tr>
<td>Depth of jaws: 50 mm</td>
</tr>
<tr>
<td>Measuring pressure: 0.7 N</td>
</tr>
<tr>
<td>Scale diameter: 54 mm</td>
</tr>
<tr>
<td>Display: LCD 6 digit, 8.5 mm high</td>
</tr>
<tr>
<td>Measuring principle: Capacitive (Sylvac)</td>
</tr>
<tr>
<td>Temperature range: 10 - 45 °C</td>
</tr>
<tr>
<td>Battery: 3 V Lithium, CR 2032</td>
</tr>
<tr>
<td>Data output: USB or RS-232, galvanic isolation</td>
</tr>
<tr>
<td>Lifting device: O</td>
</tr>
<tr>
<td>Weight, net: 300 g</td>
</tr>
</tbody>
</table>

* The lower roller is standard equipped with flanges; if required without flanges use Code-O e.g. FD-50-RO
Series DD

To determine the thickness of textiles, fleece, leather etc. corresponding to the standard. This thickness gauge is used for quick comparative measurements.

Special features:

- Depending on the application the measuring feeler size and measuring pressure is corresponding to the standard
- Measuring range 0 - 10 mm (optional Code E: 0 - 25 mm)
- Big foot for on table operation
- Optional: USB interface for data transfer to PC

Standard features:

- Easy to use; opening by lifting device (self closing)
- LCD display 4 digits, with selectable units (mm or inch)
- Zero setting by pushing a button
- Manufacturer’s calibration report is included

Available Models

<table>
<thead>
<tr>
<th>Available Models</th>
<th>Measuring Range</th>
<th>Dept of jaw</th>
<th>Resolution</th>
<th>Application</th>
<th>Standard</th>
<th>Feeler Ø</th>
<th>Face of Feeler</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD-50-T</td>
<td>0 - 10 mm</td>
<td>50 mm</td>
<td>0.01 mm</td>
<td>Textiles and non-woven textiles</td>
<td>corresponding DIN EN ISO 5084</td>
<td>50.42 mm</td>
<td>20 cm²</td>
<td>1 kPa</td>
</tr>
<tr>
<td>DD-200-T</td>
<td>0 - 10 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>Textiles and non-woven textiles</td>
<td>corresponding DIN EN ISO 5084</td>
<td>56.42 mm</td>
<td>25 cm²</td>
<td>0.5 kPa</td>
</tr>
<tr>
<td>DD-300-T</td>
<td>0 - 10 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>Leather</td>
<td>corresponding DIN EN ISO 2589</td>
<td>10 mm</td>
<td>0.785 cm²</td>
<td>49.1 kPa</td>
</tr>
<tr>
<td>DD-500-T</td>
<td>0 - 10 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>Leather</td>
<td>corresponding DIN EN ISO 2589</td>
<td>10 mm</td>
<td>0.785 cm²</td>
<td>49.1 kPa</td>
</tr>
<tr>
<td>DD-50-V</td>
<td>0 - 10 mm</td>
<td>50 mm</td>
<td>0.01 mm</td>
<td>Standard fleece</td>
<td>corresponding DIN EN ISO 9073-2</td>
<td>56.42 mm</td>
<td>25 cm²</td>
<td>0.5 kPa</td>
</tr>
<tr>
<td>DD-200-V</td>
<td>0 - 10 mm</td>
<td>200 mm</td>
<td>0.01 mm</td>
<td>Standard fleece</td>
<td>corresponding DIN EN ISO 9073-2</td>
<td>56.42 mm</td>
<td>25 cm²</td>
<td>0.5 kPa</td>
</tr>
<tr>
<td>DD-300-V</td>
<td>0 - 10 mm</td>
<td>300 mm</td>
<td>0.01 mm</td>
<td>Standard fleece</td>
<td>corresponding DIN EN ISO 9073-2</td>
<td>56.42 mm</td>
<td>25 cm²</td>
<td>0.5 kPa</td>
</tr>
<tr>
<td>DD-500-V</td>
<td>0 - 10 mm</td>
<td>500 mm</td>
<td>0.01 mm</td>
<td>Standard fleece</td>
<td>corresponding DIN EN ISO 9073-2</td>
<td>56.42 mm</td>
<td>25 cm²</td>
<td>0.5 kPa</td>
</tr>
</tbody>
</table>

Optional measuring range 0 - 25 mm (e.g. DD-50-T Code E) as required. Please mention when ordering.

Accessories:

- Code USB - indicator with USB output signal
- 35009W - cable for data transfer and power supply via USB interface
- 35010W - cable for data transfer via USB interface
Thickness gauges according to International Standards

Series D-2000

Thickness gauge with digital display to meet highest accuracy for textiles, fleece, carpet, geomaterials, leather, paper, foils, rubber, etc.

Special features:
- Isolated dial gauge to protect the instrument against outside external impacts; this ensures highest accuracy and repeatability
- Rigid housing frame
- Feeler movement manual by plunger
- Digital display with RS-232 interface and RS-232/USB adapter cable
- Measuring depth 110 mm (centre of the feeler)
- Measuring range 0 - 10 mm, optional 0 - 25 mm or 0 - 50 mm
- Resolution 0.01 mm, optional 0.001 mm

Standard features:
- Easy to use
- LCD display with switchable units mm or inch
- Inspection sheet of manufacturer - free of charge
- DAkkS calibration certificate (German calibration institute) optional

Optional accessories:
- Additional weights and measuring feeler depending on the required standard
- Software SW-50 (see page F9)
- Motorized to lift and lower the measuring feeler
- Adjustable measuring time (2...32 sec)

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Application</th>
<th>Feeler Ø mm</th>
<th>Feeler cm²</th>
<th>Test Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-2000-T</td>
<td>DIN EN ISO 5084</td>
<td>Textiles</td>
<td>50.42</td>
<td>20</td>
<td>0.1 kPa and 1 kPa</td>
</tr>
<tr>
<td>D-2000-V1</td>
<td>DIN EN ISO 9073-2</td>
<td>Fleece</td>
<td>56.42</td>
<td>25</td>
<td>0.5 kPa</td>
</tr>
<tr>
<td>D-2000-V2</td>
<td>DIN EN ISO 9073-2</td>
<td>Fleece</td>
<td>56.42</td>
<td>25</td>
<td>0.1 kPa and 0.5 kPa</td>
</tr>
<tr>
<td>D-2000-G1</td>
<td>DIN EN ISO 9863-1</td>
<td>Geomaterials</td>
<td>56.42</td>
<td>25</td>
<td>2 kPa</td>
</tr>
<tr>
<td>D-2000-G2</td>
<td>DIN EN ISO 9863-1</td>
<td>Geomaterials</td>
<td>56.42</td>
<td>25</td>
<td>2 kPa, 20 kPa and 200 kPa</td>
</tr>
<tr>
<td>D-2000-NW</td>
<td>DIN 53855</td>
<td>Non-woven textiles</td>
<td>56.42</td>
<td>25</td>
<td>0.5 kPa and 1 kPa</td>
</tr>
<tr>
<td>D-2000-P*</td>
<td>DIN EN ISO 534</td>
<td>Paper</td>
<td>56.42</td>
<td>25</td>
<td>2 kPa</td>
</tr>
<tr>
<td>D-2000-HY</td>
<td>DIN EN ISO 54540</td>
<td>Hygienic paper</td>
<td>56.42</td>
<td>25</td>
<td>2 kPa</td>
</tr>
<tr>
<td>D-2000-L</td>
<td>DIN EN ISO 2589</td>
<td>Leather</td>
<td>10</td>
<td>0.785</td>
<td>49.1 kPa</td>
</tr>
<tr>
<td>D-2000-G</td>
<td>DIN EN ISO 2589</td>
<td>Leather</td>
<td>10</td>
<td>0.785</td>
<td>49.1 kPa</td>
</tr>
<tr>
<td>D-2000-F*</td>
<td>DIN 53370</td>
<td>Foils</td>
<td>R 30 mm Feeler Calotte</td>
<td>0.5 N</td>
<td></td>
</tr>
</tbody>
</table>

* Resolution 0.001 mm standard

All designs are available for series D-2010 and D-2020 with standard resolution 0.001 mm

Series D-2010

Thickness gauge with graphic display

Special features:
- Motorized feeler movement
- Graphic display - touch-screen
- 2 modes: single or a series of measurements
- Adjustable measuring time
- Statistics (no. of readings, average, standard deviation)
- USB output

Software SW-50 (see page F9)

Series D-2020

Thickness gauge with feed roller system

Special features:
- Motorized feeler movement
- Graphic display - touch-screen
- 2 modes: single or a series of measurements
- Feed roll for material transport during a series of measurements
- Adjustable measuring time
- Statistics (no. of readings, average, standard deviation)
- USB output
Thickness gauges according to International Standards

Series D-1000
Thickness gauge with digital display to meet high accuracy for textiles, fleece, carpet, geomaterials, leather, paper, foils, rubber, etc.

Special features:
- Precise measuring setup
- Rigid housing frame
- Feeler and test pressure are adapted to standards
- Feeler movement manual by hand-wheel
- Digital display with USB interface (optional RS-232)
- Measuring depth 95 mm (centre of the stamp)
- Measuring range 0 - 10 mm, optional 0 - 25 mm or 25 - 50 mm
- Resolution 0.01 mm, optional 0.001 mm

Standard features:
- Easy to use
- LCD display with switchable units mm or inch
- AC adapter for power supply of the dial gauge
- Inspection sheet of manufacturer - free of charge
- DAkkS calibration certificate (German calibration institute) optional

Optional accessories:
- Software SW-50 and USB cable

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard</th>
<th>Application</th>
<th>Feeler Ø mm</th>
<th>Feeler cm²</th>
<th>Test Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1000-T</td>
<td>DIN EN ISO 5084</td>
<td>Textiles</td>
<td>50.42</td>
<td>20</td>
<td>0.1 kPa and 1 kPa</td>
</tr>
<tr>
<td>D-1000-V</td>
<td>DIN EN ISO 9073-2</td>
<td>Fleece</td>
<td>56.42</td>
<td>25</td>
<td>0.5 kPa</td>
</tr>
<tr>
<td>D-1000-G</td>
<td>DIN EN ISO 9863-1</td>
<td>Geomaterials</td>
<td>56.42</td>
<td>25</td>
<td>2 kPa</td>
</tr>
<tr>
<td>D-1000-HY</td>
<td>DIN EN ISO 54340</td>
<td>Hygienic paper</td>
<td>56.42</td>
<td>25</td>
<td>2 kPa</td>
</tr>
<tr>
<td>D-1000-L</td>
<td>DIN EN ISO 2589</td>
<td>Leather</td>
<td>10</td>
<td>0.785</td>
<td>49.1 kPa</td>
</tr>
<tr>
<td>D-1000-GI</td>
<td></td>
<td>Rubber</td>
<td>35.68</td>
<td>10</td>
<td>5 kPa</td>
</tr>
<tr>
<td>D-1000-F1</td>
<td>DIN 53370</td>
<td>Foils</td>
<td>R 30 mm Calotte</td>
<td></td>
<td>5 kPa</td>
</tr>
<tr>
<td>D-1000-F2</td>
<td>DIN 53370</td>
<td>Foils</td>
<td>7.5</td>
<td>0.442</td>
<td>0.9 N</td>
</tr>
</tbody>
</table>

Software SW-50 for data transfer, displaying and analysis of measured data on PC
- Adjusting menu:  
  - Language (german/english)  
  - Data storage  
  - Charge No.  
- Statistical analysis:  
  - Actual value  
  - Average value  
  - Standard deviation  
  - Maximum  
  - Minimum  
  - Register of all readings  
- Data storage in Excel is possible
Sample Cutters

**Model 240 and Model 230**

The cutters are designed to precisely cut samples out of various materials, such as woven, non-woven and knitted fabric, carpet, film or paper.

**Standard features:**
- Easy to use
- Rugged design
- 4 High quality blades for precision cut

**Procedure:**
The material to be cut is placed under the cutter between the cutting board and the cutter. While holding the cutter with one hand, apply pressure to the handle and rotate it by at least 90°.

**Specifications**

<table>
<thead>
<tr>
<th></th>
<th>Model 240/100</th>
<th>230/100</th>
<th>230/140</th>
<th>230/50</th>
<th>230/38</th>
<th>230/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting thickness:</td>
<td>max. 3 mm</td>
<td>max. 10 mm</td>
<td>max. 5 mm</td>
<td>max. 5 mm</td>
<td>max. 5 mm</td>
<td>max. 5 mm</td>
</tr>
<tr>
<td>Sample cutout:</td>
<td>100 cm²</td>
<td>100 cm²</td>
<td>154 cm²</td>
<td>50 cm²</td>
<td>12 cm²</td>
<td>10 cm²</td>
</tr>
<tr>
<td>Sample diameter:</td>
<td>113 mm</td>
<td>113 mm</td>
<td>140 mm</td>
<td>80 mm</td>
<td>38 mm</td>
<td>36 mm</td>
</tr>
<tr>
<td>Weight net:</td>
<td>2200 g</td>
<td>1500 g</td>
<td>2000 g</td>
<td>1100 g</td>
<td>750 g</td>
<td>750 g</td>
</tr>
<tr>
<td>Weight gross:</td>
<td>2800 g</td>
<td>2100 g</td>
<td>2600 g</td>
<td>1700 g</td>
<td>1400 g</td>
<td>1400 g</td>
</tr>
<tr>
<td>Dimensions Ø:</td>
<td>165 mm</td>
<td>151 mm</td>
<td>175 mm</td>
<td>118 mm</td>
<td>85 mm</td>
<td>80 mm</td>
</tr>
<tr>
<td>Dimensions H:</td>
<td>115 mm</td>
<td>103 mm</td>
<td>110 mm</td>
<td>110 mm</td>
<td>113 mm</td>
<td>113 mm</td>
</tr>
</tbody>
</table>

For ordering spare parts:
- Blades (100 pcs.): 60001M, 60002M (20 pcs.), 60001M, 60001M, 60007M, 60007M
- Rubber cutting boards: 1 or 10 pcs.

---

Spare parts

**Models 240/100, 230/50 and 230/10 with sample cutouts and cutting board**

**Delivery includes:**
Cutter with one cutting board and 4 spare blades
Shore Durometers

HPS Series
According DIN 53505, ISO 7619, ISO 868, ASTM D 2240
With constant measuring pressure

For determining the surface hardness of soft rubbers, elastomers, natural rubber products etc.

Special features:

✦ Easy to use
✦ Constant pressure indicating system assures uniform test pressure eliminating false reading due to differences between operators
✦ High repeatability
✦ Flat big working base (44.5 mm) prevent tilting and improve the measuring accuracy
✦ Adjustable Min. Max. indicator marks

For measuring the hardness, the spring-loaded outer ring of the housing is pressed downwards until the edge of the ring meets the red marking on the housing. This ensures a constant pressure and prevents measuring errors.

Model HPSA-M
with optional accessory memory pointer (Code M)

Constant measuring pressure eliminates errors caused by the operator

Series PHPS
For hard to reach areas

Model PHPSA

Special features:

✦ Working base = measuring face Ø 18 mm

Series SHT
Compact durometer for fast measurements

Model SHTA

When measuring, place the durometer vertical and shock-free on the material to be measured and press the housing down, till the measuring face rests on the sample.

Special features:

✦ Working base = measuring face Ø 18 mm

Series HPSA-R
For cots, pressure rollers and many other rubber coated rollers, etc.

Model HPSA-3SR-M

Special features:

✦ Working base lightly curved to fit on rollers and to improve accuracy

Subject to change without notice.
# Shore Durometers

According DIN 53505, ISO 7619-1, ISO 868, ASTM D 2240

## Specifications

<table>
<thead>
<tr>
<th>Shore:</th>
<th>Model HPSPA</th>
<th>Model HPSAO</th>
<th>Model HPSO</th>
<th>Model HPSB</th>
<th>Model HPSC</th>
<th>Model HPSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indenter:</td>
<td>Cone 35°</td>
<td>Ball Ø 5 mm</td>
<td>U-grooved 3/32°</td>
<td>Tapered pin 30°</td>
<td>Cone 35°</td>
<td>Tapered pin 30°</td>
</tr>
<tr>
<td>Typical applications:</td>
<td>Soft rubber, elastomers, natural rubber, soft PVC, leather, etc.</td>
<td>Foams, steering wheels and inner linings of motor vehicles</td>
<td>Soft elastomers, often elastic materials, medium fast textiles</td>
<td>For harder material than Shore A</td>
<td>Medium hard rubber, elastomers and plastic</td>
<td>Hard rubber, rigid thermoplast, resopal, hard plastic materials</td>
</tr>
<tr>
<td>Application range:</td>
<td>10 - 90 Shore A</td>
<td>&lt; 20 Shore A</td>
<td>20 - 80 Shore O</td>
<td>10 - 90 Shore B</td>
<td>10 - 90 Shore C</td>
<td>10 - 90 Shore D</td>
</tr>
<tr>
<td>Measuring spring force:</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>4.45 - 44.5 N</td>
<td>4.45 - 44.5 N</td>
</tr>
<tr>
<td>Test pressure*:</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 50 N</td>
<td>approx. 50 N</td>
</tr>
<tr>
<td>Display range:</td>
<td>0 - 100 Shore units</td>
<td>The principle used to measure hardness is based on measuring the resistance force of the penetration of a pin into the test material under a known spring load. The amount of penetration (max. 2.5 mm) is converted to hardness reading on a scale with 100 Shore units.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale diameter:</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
</tr>
<tr>
<td>Measuring face:</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 200 g (300 g)</td>
<td>approx. 200 g (300 g)</td>
<td>approx. 200 g (300 g)</td>
<td>approx. 200 g (300 g)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
</tr>
</tbody>
</table>

* Spring load of outer ring to create constant pressure when outer ring is pulled down to red marking

## Specifications

<table>
<thead>
<tr>
<th>Shore:</th>
<th>Model PHPSA</th>
<th>Model PHPSAO</th>
<th>Model PHPSB</th>
<th>Model SHTA</th>
<th>Model SHTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indenter:</td>
<td>Cone 35°</td>
<td>U-grooved 3/32°</td>
<td>Tapered pin 30°</td>
<td>Cone 30°</td>
<td>Tapered pin 30°</td>
</tr>
<tr>
<td>Measuring face:</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
<td>18 mm Ø</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 200 g (300 g)</td>
<td>approx. 200 g (300 g)</td>
<td>approx. 200 g (300 g)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>50 x 58 x 170 mm (L x W x H)</td>
<td>50 x 58 x 170 mm (L x W x H)</td>
<td>50 x 58 x 170 mm (L x W x H)</td>
<td>50 x 58 x 170 mm (L x W x H)</td>
<td>50 x 58 x 170 mm (L x W x H)</td>
</tr>
</tbody>
</table>

## Specifications

<table>
<thead>
<tr>
<th>Shore:</th>
<th>Model HPSA-R20-M</th>
<th>Model HPSA-R35-M</th>
<th>Model HPSA-R55-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended roller Ø:</td>
<td>&lt; 40 mm</td>
<td>40 - 70 mm</td>
<td>70 - 110 mm</td>
</tr>
<tr>
<td>Radius of working face:</td>
<td>20 mm</td>
<td>35 mm</td>
<td>55 mm</td>
</tr>
<tr>
<td>Measuring base:</td>
<td>44.5 mm Ø</td>
<td>44.5 mm Ø</td>
<td>44.5 mm Ø</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
</tr>
</tbody>
</table>

* Spring load of outer ring to create constant pressure when outer ring is pulled down to red marking

For more specifications see Shore durometers HPS series

# Model HP-P20-100

Control rings:
Control of the measuring distance (available as optional accessory)
1 pcs. (20 Shore) or 1 set with 4 pcs. (20, 40, 60, 80 Shore) and one base disk (not for HPSA-R)

# Model PSHP

For testing series:
Spring loaded lever for fast, precise positioning (only for HPS series)
**Textile Hardness Tester**

**HP Series**

With constant measuring pressure

To measure the winding density (hardness) of textile bobbins, beams, spools, cones, dye packages etc.

**Special features:**

- 6 different models with different ball sizes and working faces are available
- Constant pressure system eliminates false reading due to difference between operators
- Ball shaped indentor prevents damage to bobbins
- Working face slightly curved to fit on small bobbins
- Special flat bottom versions for bobbins with diameters over 400 mm, such as warp beams
- Also available with optional accessory memory pointer (Code M)

The principle used to measure textile hardness is based on measuring the resistance force of the penetration of a ball against the spool under a known spring load. The measuring principle is the same as for the Shore A hardness test.

---

### Specifications

<table>
<thead>
<tr>
<th></th>
<th>Model HP-2.5</th>
<th>Model HP-S</th>
<th>Model HP-10</th>
<th>Model HP-2.5-F</th>
<th>Model HP-S-F</th>
<th>Model HP-10-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indentor:</td>
<td>Ball 2.5 mm Ø</td>
<td>Ball 5 mm Ø</td>
<td>Ball 10 mm Ø</td>
<td>Ball 2.5 mm Ø</td>
<td>Ball 5 mm Ø</td>
<td>Ball 10 mm Ø</td>
</tr>
<tr>
<td>Area applications:</td>
<td>for closely wound bobbins of synthetic, finished fibers and filaments</td>
<td>for loosely wound bobbins of synthetic fibers and closely wound natural fibers, yarns and threads</td>
<td>for very loosely wound bobbins of thick yarns, such as carpet yarns</td>
<td>with flat working face for measuring warp beams</td>
<td>Same as Model HP 2.5, but for bobbins with diameters over 400 mm</td>
<td>Same as Model HP 5, but for bobbins with diameters over 400 mm</td>
</tr>
<tr>
<td>Depth of indentation*:</td>
<td>0 - 2.5 mm</td>
<td>0 - 2.5 mm</td>
<td>0 - 2.5 mm</td>
<td>0 - 2.5 mm</td>
<td>0 - 2.5 mm</td>
<td>0 - 2.5 mm</td>
</tr>
<tr>
<td>Test pressure**:</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
<td>approx. 12.5 N</td>
</tr>
<tr>
<td>Measuring spring force*:</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
<td>0.55 - 8.065 N</td>
</tr>
<tr>
<td>Display range:</td>
<td>0 - 100 hardness graduation marks</td>
<td>0 - 100 hardness graduation marks</td>
<td>0 - 100 hardness graduation marks</td>
<td>0 - 100 hardness graduation marks</td>
<td>0 - 100 hardness graduation marks</td>
<td>0 - 100 hardness graduation marks</td>
</tr>
<tr>
<td>Scale diameter:</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
<td>51 mm</td>
</tr>
<tr>
<td>Working face radius:</td>
<td>55 mm</td>
<td>55 mm</td>
<td>55 mm</td>
<td>55 mm</td>
<td>55 mm</td>
<td>55 mm</td>
</tr>
<tr>
<td>Working face flat:</td>
<td>45 mm Ø</td>
<td>45 mm Ø</td>
<td>45 mm Ø</td>
<td>45 mm Ø</td>
<td>45 mm Ø</td>
<td>45 mm Ø</td>
</tr>
<tr>
<td>Weight, net (gross):</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
<td>approx. 300 g (500 g)</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
<td>50 x 58 x 110 mm (L x W x H)</td>
</tr>
</tbody>
</table>

* Meets requirements of Shore A  ** Spring load of outer ring to create constant pressure when outer ring is pulled down to red marking

Subject to change without notice.
Stiffness Tester - Softometer

Series KWS
To determine the suppleness and stiffness of fabric, fleece, plastic, leather, paper and other limp materials

Special features:
+ High repeatability of test results through
- Elimination of subjective influence by the operator
- Precisely defined test conditions
- Electronic timing of the test procedure

+ 2 operating modes
- Display of measurement result after 10 sec.
- Instant display of actual values, which change over time with testing materials with relaxation ability

+ Rotable test table, 30° bending radius
+ Recommended sample size:
  - Max. width 60 mm,
  - Max. length 75 mm
  - Max. thickness 5 mm

Operation:
A test sample of defined size and thickness is clamped onto the test table. The test table is tilted by 30° into the test position, thereby bending the sample. The sample presses against the force sensor and the measured force is displayed in newtons and millinewton.

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>KWS-500</td>
<td>0 - 500 mN</td>
<td>0.5 mN</td>
</tr>
<tr>
<td>KWS-2000</td>
<td>0 - 2000 mN</td>
<td>1 mN</td>
</tr>
<tr>
<td>KWS-20K</td>
<td>0 - 20 N</td>
<td>10 mN</td>
</tr>
</tbody>
</table>

Specifications Series KWS

- Unit of Measure: mN (0.001N)
- Sample bending angle: max. 30°
- Sample dimensions: max. width 60 mm, max. length 75 mm, max. thickness 5 mm
- Display: digital, LCD, 13 mm
- Operating modes: actual value display or display after 10 sec, user-selectable
- Interface: RS-232 (8, T, N, 9600)
- Temperature range: 5 - 45°C
- Air humidity: 85 % RH, max.
- Power supply: AC adapter 230 V AC, 50 Hz
- Weight net (gross): approx. 2.4 kg (approx. 4 kg)
- Dimensions: 280 mm x 180 mm x 225 mm (L x W x H)
Textile Moisture Meter

Model TEM-I

For determination the residual moisture content of yarn bobbins, fabric rolls, filaments, fiber flocks etc.

Special features:
+ Easy to use for many applications
+ Multiple scale for direct readings for wool, rayon and cotton and 0 - 100 scale for comparison tables used for other materials
+ Portable, battery-operated
+ Compact housing supplied in leather carrying case

Measuring principle:
The moisture content is determined by measuring the electrical conductivity of the material which always is proportional to the content of moisture.

Direct readings for wool, rayon and cotton, and 0 - 100 scale for comparison tables

Comparison tables for 36 fiber types

Specifications

Measuring ranges:
- Wool: 8 to 24.5 % moisture content
- Rayon: 3 to 23 % moisture content
- Cotton: 2 to 12 % moisture content
- Comparison measurement: 0 - 100 scale

Battery: 9 V E-block

Weight instrument: approx. 400 g, net

Weight total set: approx. 1200 g, net

Dimensions: 200 x 250 x 70 mm (L x W x H)

Delivery includes:
- Instrument with leather carrying case
- 1 Connecting cable
- 1 Electrode Holder with electrodes 50205M and 50207M
- 1 Operating manual with comparison tables

Various interchangeable electrodes are available for use in a wide variety of applications:

- S0205M: Needle electrode for yarns in cops, cross-wound bobbins and hanks (needle length 25 mm)
- S0207M: same as 205 but with needle length 100 mm
- S0208M: Needle electrode for leather (needle length 17 mm)
- S0209AM: Stab electrode for textiles in sacks and rolls (needle length 325 mm)
- S0210M: Knife electrode for fabric rolls (knife length 110 mm)
- S0211M: Roller electrode for running webs of fabric (roller 27 mm Ø)
- S0212M: Continuous run electrode for yarn hanks and single filaments, max. line speed 60 m/min (roller 16 mm Ø)
- S0213M: Surface electrode for fabrics (surface 23 mm Ø)
- S0299M: Electrode for calibration

Subject to change without notice.
Moisture Meter

For determination the residual moisture content of different materials

Special features:

- For universal and fast operations
- % scale depending on the material to be measured and 0-100 scale
- Portable, battery-operated
- Compact housing supplied in leather carrying case

Measuring principle:
The moisture content is determined by measuring the electrical conductivity of the material which always is proportional to the content of moisture.

Specifications

- Accuracy: ± 0.2 % full scale
- Battery: 9 V E-block
- Weight instrument: approx. 400 g, net
- Weight total set: approx. 1200 g, net
- Dimensions: 200 x 250 x 70 mm (L x W x H)

Delivery includes:

- Instrument with leather carrying case
- 1 Connecting cable
- 1 Electrode Holder (without electrodes)

Various interchangeable electrodes are available for use in a wide variety of applications:

<table>
<thead>
<tr>
<th>Model</th>
<th>Application</th>
<th>Measuring Range</th>
<th>Recommended Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM-I</td>
<td>Paper, all types</td>
<td>4 - 12 %</td>
<td>S0201M, S0208M, S0210M, S0213M</td>
</tr>
<tr>
<td>PM-II</td>
<td>Paper, cardboard</td>
<td>6 - 30 %</td>
<td>S0201M, S0208M, S0210M, S0213M</td>
</tr>
<tr>
<td>BAF-I</td>
<td>Lint cotton, pure</td>
<td>2.5 - 13 %</td>
<td>S0202M, S0218M</td>
</tr>
<tr>
<td>JFM-I</td>
<td>Jute</td>
<td>6 - 30 %</td>
<td>S0202M, S0207M</td>
</tr>
<tr>
<td>SL-I</td>
<td>Sisal</td>
<td>6 - 30 %</td>
<td>S0207M, S0210M</td>
</tr>
<tr>
<td>LM-I</td>
<td>Leather</td>
<td>6 - 28 %</td>
<td>S0201M, S0208M, S0210M, S0213M</td>
</tr>
<tr>
<td>LM-II</td>
<td>Leather</td>
<td>8 - 50 %</td>
<td>S0201M, S0208M, S0210M, S0213M</td>
</tr>
<tr>
<td>KAM-IIIa</td>
<td>Cacao</td>
<td>10 - 34 %</td>
<td>S0202M, S0209BM</td>
</tr>
<tr>
<td>KAF-I</td>
<td>Raw coffee</td>
<td>6 - 18 %</td>
<td>S0202M, S0209BM</td>
</tr>
<tr>
<td>KAF-III</td>
<td>Raw coffee</td>
<td>9 - 30 %</td>
<td>S0202M, S0209BM</td>
</tr>
<tr>
<td>TEF-I</td>
<td>Tea</td>
<td>2 - 12 %</td>
<td>S0202M, S0209BM</td>
</tr>
</tbody>
</table>

Attention: The electrodes have to be ordered, according to the application.

Subject to change without notice.
Model DHT-3

Multi-functional instrument to determine the residual moisture of yarn bobbins, fabric rolls, filaments, cotton bales, fiber flocks as well as to measure room temperature and humidity RH %

Special features:

- Digital display for direct moisture percentage reading of 10 materials and 10 often used material mixtures (50 PES/50 Zw, 50 PES/50 PAC, 50 PES/50 Bw, 67 PES/33 Bw, 70 PES/30 Zw, 70 PES/30 Wo, 67 PAC/33 BW, 70 PAC/30 Wo, 60 Bw/40 PES, 50 Wo/50 Zw).

- Scale with 0 - 100 for non stored materials; with the help of supplied comparison tables the moisture of additional 20 materials can be determined.

- Portable, battery operated

Digital display with 0 - 100 scale for comparison tables for 20 often used material mixtures

Specifications

<table>
<thead>
<tr>
<th>Model DHT-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
</tr>
<tr>
<td>Room temperature: -30° to 70° Celsius (optional) with 50428M. 5% to 95% RH% (optional) with 50428M.</td>
</tr>
<tr>
<td>Display: LCD, resolution 0.1</td>
</tr>
<tr>
<td>Measuring accuracy: 1% full scale</td>
</tr>
<tr>
<td>Power supply: Battery 9V E Block, low battery signal</td>
</tr>
<tr>
<td>Weight net (gross): 600 g (1300 g)</td>
</tr>
<tr>
<td>Dimensions: 170 x 250 x 65 mm (L x W x H)</td>
</tr>
</tbody>
</table>

Delivery includes:

- Instrument with leather carrying case
- 1 Connecting cable
- 1 Electrode holder with 2 electrodes: 50414M and 50418M
- 1 Operating manual with comparison tables

Various interchangeable electrodes are available for use in a wide variety of applications:

- 50414M: 2 Needles, 100 mm long
- 50418M: 8 Needles, 80 mm long
- 50412M: Stab electrode for sacks and rolls, 300 mm long
- 50416M: Roller electrode for running fabrics and webs
- 50422M: 2 Calibration electrodes with constant values
- 50426M: Surface electrode for fabrics (surface 30 mm Ø)
- 50428M: Thermo-hygrometric probe to measure temperature and RH %
## Elongation Tester

### Series EFT

**for measuring static and permanent elongation of fabrics**

**Special features:**
- 3 different designs with 1, 3 or 6 test stations
- Rugged warp resistant aluminium frame
- Recommended size of the test specimen: 5 x 160 mm (non-metal fabrics)
- Capacity 25, 50, 75, 100 or 125 N
- Max. test period 99 minutes
- Elongation force tester with 0.01 mm resolution
- Accuracy at max. elongation is 0.4 mm
- According VW standard PV3909

**Test procedure:**
Adjust the measuring force. Fix the test specimen, e.g. 50 x 160 mm, between the two clamps. Determine the length exactly by using the length measuring system and mark this initial value. Activate the timer. Read the static elongation at the end of the test period. Determine the permanent elongation after the adjusted balancing time.

### Model EFT-3

With 3 test stations

## Leak Detector

### Model LDT-1

**Reduces the operating costs of compressed air-systems**

Convenient for locating leakages in compressed air-systems, pneumatic systems, valves, fittings, steam pipe lines, oxygen sockets in hospitals as well as checking internal sealing of e.g. cockpits, pressure chambers etc.

**Special features:**
- For leakages with diameter more than 0.1 mm and 1 bar
- Signal indication over headset and LED indicator
- Longer probes and a ultrasonic parabolic reflector optional available
- For checking cabins ultrasonic transmitter optional available

**Specifications**

<table>
<thead>
<tr>
<th>Model LDT-1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Display:</strong></td>
</tr>
<tr>
<td><strong>Power supply:</strong></td>
</tr>
<tr>
<td><strong>Housing material:</strong></td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
</tr>
<tr>
<td><strong>Weight, net (gross):</strong></td>
</tr>
</tbody>
</table>

**Functions:**

Flowing gas from a leakage is a typical source of non-audible ultrasonic sound with defined frequency. LDT-1 converts this source into an audible signal and displays the signal level on a LED optically.
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