TESA MICRO-HITE 3D – THE WAY TO ACCESS 3D MEASUREMENT

Made to provide Users with absolute ease of use, the TESA MICRO-HITE 3D fills up opportunely the free space between the common gauge and the sophisticated CMM. This measuring machine with remarkable capabilities is best used in industrial applications where dimensional conformity of workpieces either produced as single parts or in small to medium part series requires due approval.

Featuring a modern, yet time-tested design, the machine is based on high quality raw materials and components, thus ensuring its long-term reliability. Being able to identify the shape of the part feature being measured, the intuitive TESA-REFLEX software is easily learn, taking a few hours only.

Launched six years ago, the manual version continues to be a success since then. Three additional versions have been made available meanwhile, all equipped with the TESA-REFLEX software:

- **Standard** machine version with manual displacement.
- **Remote Control** version with manual or motorised displacement.
- **Recorder** version with manual and/or automatic reproduction of part programmes.

**Common Features**

- CMM with moving bridge; light alloy machine base; granite measuring table.
- 22 air bearings ensuring frictionless motion.
- Triangular-shaped bridge guaranteeing high stability.
- TESA’s patented opto-electronic measuring system based on incremental glass scales.

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<table>
<thead>
<tr>
<th>MH3D 454</th>
<th>MH3D 474</th>
<th>MH3D 454 Remote Control</th>
<th>MH3D 474 Remote Control</th>
<th>MH3D 454 Recorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine adjust device</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Measuring volume (mm)</td>
<td>460 x 510 x 420</td>
<td>460 x 710 x 420</td>
<td>460 x 510 x 420</td>
<td>460 x 710 x 420</td>
</tr>
<tr>
<td>MPE (µm) (L in mm)</td>
<td>3 + 4 L/1000</td>
<td>3 + 4 L/1000</td>
<td>3 + 4 L/1000</td>
<td>3 + 4 L/1000</td>
</tr>
<tr>
<td>Overall dimensions (machine) L x P x H (mm)</td>
<td>970 x 930 x 1620</td>
<td>970 x 1130 x 1660</td>
<td>970 x 930 x 1700</td>
<td>970 x 1130 x 1730</td>
</tr>
<tr>
<td>Shipping box L x P x H (cm)</td>
<td>115 x 110 x 220</td>
<td>140 x 158 x 220</td>
<td>135 x 135 x 220</td>
<td>140 x 158 x 220</td>
</tr>
<tr>
<td>Gross weight (kg)</td>
<td>300</td>
<td>445</td>
<td>300</td>
<td>445</td>
</tr>
<tr>
<td>Net weight (kg) incl. granite table</td>
<td>210</td>
<td>315</td>
<td>210</td>
<td>315</td>
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<tr>
<td>Software</td>
<td>TESA-REFLEX MH3D</td>
<td>TESA-REFLEX MH3D</td>
<td>TESA-REFLEX MH3D</td>
<td>TESA-REFLEX MH3D</td>
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<tr>
<td>Remote control</td>
<td>–</td>
<td>–</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
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</tr>
<tr>
<td>Maintenance agreement</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
<td>On request</td>
</tr>
</tbody>
</table>
TWO PROGRAMME VERSIONS

The TESA-REFLEX software is the reference for user-friendliness and reliability. Easy and quick to learn and to run, it lets Users choose between a large number of options:

- Several modes: measuring, scanning, pass-through.
- Summon and save part programmes.
- Qualification of several probe positions.
- Different ways to save the measurement results: USB stick, RS232 digital output or printer.
- Automated operation (TESA-REFLEX Recorder only).

Two software versions are available, depending on the used CMM:

- **TESA-REFLEX MH3D** for the Micro-Hite 3D.
- **TESA-REFLEX Recorder** for the Micro-Hite 3D Recorder.

THREE MANUALLY OPERATED PROBE HEADS

All TESA CMM's can accept 3 different manual probe heads to offer the solution that meets each User’s need. Each probe head is available from the TESASTAR dedicated programme that also includes a full range of touch-trigger probes besides high precision SWISS MADE accessories fitting any type of CNC hand-operated measuring machines.

(For a detailed information on these probe heads, see page Q-10).
**Coordinate Measuring Machines**

**TESA Micro-Hite 3D manual**

**Machine Version 454 or 474**

- Fast and easy workpiece alignment.
- Point-to-point part probing or manual scanning.
- ZMouse for significant time savings.
- Fine adjust device.
- TESA-REFLEX MH3D software.

**Main Features**

- Three probe heads are available:
  - TESASTAR with adjustable trigger force
  - Indexable TESASTAR-i
  - Indexable TESASTAR-i M8 with matching coupling thread (optional)

**General**

- EN ISO 10360-2
- CMM with moving bridge.
- Measuring systems along with air bearing guiding in the three axes.

**Measuring volume (X/Y/Z):**
- Machine version 454: 460 x 510 x 420 mm
- Machine version 474: 460 x 710 x 420 mm

**TESA-REFLEX MH3D:**
- 0.001 mm or 0.00001 in

**Manual or motorised (RC version only)**

- Light alloy machine base; measuring table in granite.
- Opto-electronic measuring systems based on incremental glass scales
- 0.039 µm (system)
- Manual version: 760 mm/sec.
- RC version: 1 µm/pas, 10 or 20 mm/sec.

**TESA-REFLEX MH3D Control Panel**
- 154 x 116 mm display field with illuminated background
- 7-decade display (digits) plus sign for the measured values
- Icon-based graphic User’s interface
- RS232

**MPE**
- \( \frac{L + 4 (L/1000)}{3} \) µm
- MPE = 3 µm

* L in mm
TESA Micro-Hite 3D 454 or 474, Remote Control Machine Version

A well-timed addition to the existing range of TESA small CMMs for exact positioning on small workpieces having a complex shape – Three servo-motors individually controlled over a joystick ensure a correct displacement in each coordinate axis with a positioning accuracy down to the micron – Manual displacement through the fine adjust option – Value acquisition through a single button – Specially recommended for those vision based applications using a CCD camera.

Main Features
- Motorised displacement in the three axes X/Y/Z at a selectable speed of 1 µm/step, 10 mm/sec. or 20 mm/sec.
- Manual displacement in the three coordinate axes at the speed of 760 mm/sec.
- Fine adjust device.
- TESASTAR-i probe head, indexable.
- TESA Reflex software learned in a few hours.
- Joystick with integrated ZMouse.
TESA Micro-Hite 3D 454, Recorder Machine Version

The Recorder coordinate measuring machine is the latest development in the whole range of small TESA MICRO-HITE 3D. An added functionality makes it possible for the operator to control the servomotors in the three coordinate axes, but also to reproduce a programme sequence of the machine displacements in the automatic mode. Each displacement can either be operated manually or using the joystick. No preliminary programming is needed.

Through the evolution of their manual CMM, TESA provide today a flexible and user-friendly machine version for hand-operated and/or automated measurements.

**Main Features**

- Fast and easy workpiece alignment.
- Point-to-point part probing or manual scanning.
- ZMouse for significant time savings.
- Manual displacement in the 3 coordinate axes.
- Automatic reproduction of the manual machine displacement.
- Displacement speed in automatic mode: 200 mm/sec.
- TESA-REFLEX Recorder application software.
- TESASTAR-i indexable probe head.
Sales programme

<table>
<thead>
<tr>
<th>Machine version</th>
<th>Machine type</th>
<th>MH3D</th>
<th>MH3D</th>
<th>MH3D</th>
<th>MH3D</th>
<th>MH3D</th>
<th>MH3D</th>
<th>MH3D</th>
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<td></td>
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<td>454</td>
<td>474</td>
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<tr>
<td>03939020</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>03939030</td>
<td>TESASTAR-i probe head</td>
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<td>–</td>
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<td>–</td>
<td>–</td>
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<td>03969040</td>
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<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>03960381</td>
<td>TESA REFLEX MH3D Control panel plus software</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>03960303</td>
<td>TESA REFLEX Recorder Control panel plus software</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>●</td>
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<td>03969011</td>
<td>Reference sphere</td>
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<td>●</td>
<td>●</td>
</tr>
<tr>
<td>82-703-1</td>
<td>Granite table</td>
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<td>●</td>
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<td>●</td>
<td>●</td>
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<td>049746</td>
<td>Air filter and regulator</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>052283</td>
<td>Joystick (RC version)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>●</td>
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<tr>
<td>M1604.6011</td>
<td>Joystick (Recorder version)</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>01962003</td>
<td>USB-Stick</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Optional Accessories for Manual CMMs

|                  | TESASTAR probe head | TESASTAR-i probe head | TESASTAR-i M8 probe head | ReflexScan software | RS232 connecting cable | RS232 adapter cable for TESA-REFLEX Recorder control panel | Cabinet with top mounted table | TESASTAR-mp touch-trigger probe LF, 0,055 N, L = 10 mm | TESASTAR-mp touch-trigger probe SF, 0,08 N, L = 10 mm | TESASTAR-mp touch-trigger probe MF, 0,10 N, L = 25 mm | TESASTAR-mp touch-trigger probe EF, 0,10 N, L = 50 mm | TESASTAR-mp probe body | Air saver | TESASTAR-mp probe kit (2 TESASTAR-mp probes, type SF + 1 TESASTAR-mp probe body) | TESA practice piece | Hexagon practice piece | Dust cover | M3 styli kit | Camera kit with cross line generator included | Straight probe, Ø 6,35 mm |
TESA MULTI-GAGE

Portable 6-axis gauge that offers a flexible solution for multi-axis inspection. Expanding money in this versatile, high accuracy gauge is rapidly profitable. The TESA MULTI-GAGE is well suited for checking complex workpieces. No need to be an expert in metrology. Its software is easy to learn and to understand.

Main Features
- No special on-site installation needed.
- Easy to use, quick to learn.
- Intuitive operation.
- Modular design with many interchangeable accessories.

Furnished with:
- TESA-REFLEX MULTI-GAGE control panel and software
- Straight probe in stainless steel, Ø 15 mm
- Straight probe with a ruby ball tip, Ø 6 mm
- Reference sphere with calibration certificate, Ø 25.4 mm

Additional technical data on opposite page.
## Accessories for TESA MULTI-GAGE

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03860067</td>
<td>TTP probe holder, already programmed for use with a M2 probe stylus fitted with a ruby ball tip, L = 20 mm, 3 mm dia.</td>
</tr>
<tr>
<td>03860068</td>
<td>Straight reference probe, steel ball tip, L = 50 mm, 15 mm dia.</td>
</tr>
<tr>
<td>03860069</td>
<td>Straight probe, ruby ball tip, L = 50 mm, 6 mm dia.</td>
</tr>
<tr>
<td>03860070</td>
<td>Straight probe, ruby ball tip, L = 50 mm, 3 mm dia.</td>
</tr>
<tr>
<td>03860096</td>
<td>Straight probe, ruby ball tip, L = 50 mm, 2 mm dia.</td>
</tr>
<tr>
<td>050667</td>
<td>TKJ tightening key</td>
</tr>
<tr>
<td>03860036</td>
<td>Probe kit</td>
</tr>
<tr>
<td>03939350</td>
<td>TESASTAR-rp touch-trigger probe</td>
</tr>
<tr>
<td>03939072</td>
<td>TESASTAR-p touch trigger probe MF</td>
</tr>
<tr>
<td>03860051</td>
<td>Magnet set (3 items)</td>
</tr>
<tr>
<td>03860049</td>
<td>WiFi option</td>
</tr>
</tbody>
</table>

### Additional Features
- 12.85 kg
- 100 to 240 Vac
- 50 to 60 Hz
- 1.5 A max.
- 3 h
- 20°C ±3.3°C
- 0°C to 50°C
- -30°C to +70°C
- ≤ 80%, non-condensing
- Travel case
  - (L x D x H): 1000 x 850 x 600 mm
- Inspection report

### Technical Specifications
- 1,5 A max.
- 3 h
- 20°C ±3.3°C
- 0°C to 50°C
- -30°C to +70°C
- ≤ 80%, non-condensing
All probe heads and touch trigger probes from the TESASTAR range, compatible with the TESA-VISIO vision machines, TESA MICRO-HITE CMMs and TESA MULTI-GAGE 6-axis gauge are shown on the pages that follow.

For a further information on the full range, including every motorised probe head and the automatic probe changer for CNC measuring machines, see in the catalogue containing all HEXAGON Metrology Sensors or visit our website at www.tesastar.com.

**TESASTAR Probe Head**

Ideally suited for use on small-sized coordinate measuring machines – Its excellent price/performance relationship is a contributing factor for this compact and cost-effective probe head with adjustable trigger force.

**Key Features**
- High-precision probe head with adjustable triggering force.
- Tilting in one coordinate direction.

**TESASTAR-i and TESASTAR-i M8 Probe Heads**

Each model emanates from the latest TESASTAR concept based on a probe head coupled with a touch trigger probe. Their indexation by increment of 15° in two coordinate axes makes it possible for the stylus to be redirected in a number of positions as high as 168. Touch triggering is generated by the built-in sensor with a repeatability guaranteeing highly accurate measurements. The operator is constantly informed about the angular probe position. Also with single-handed release.

TESASTAR-i M8 can be fitted with any type of accessories featuring a M8 coupling thread, especially:
- every TESASTAR-mp for quick swapping of the probe modules;
- the TESASTAR-rp for measuring applications requiring the use of long styli up to 100 mm;
- the probe extension with a length 50 mm.

**Main Features**
- High-precision, indexable probe head.
- Touch probe with adjustable triggering force.
- Excellent positional repeatability. No need for in-between requalification.
- Indexing capability through to 168 positions by increment of 15°.
- Clearly visible indexation.

### TESASTAR, TESASTAR-i, TESASTAR-m Probe Heads

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Model</th>
<th>Positioning</th>
</tr>
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<tbody>
<tr>
<td>03939020</td>
<td>TESASTAR</td>
<td>manual</td>
</tr>
<tr>
<td>03939030</td>
<td>TESASTAR-i</td>
<td>manual</td>
</tr>
<tr>
<td>03939031</td>
<td>TESASTAR-i M8</td>
<td>manual</td>
</tr>
</tbody>
</table>
**TESASTAR-p Touch Trigger Probes For Probe Heads**

Consist of a small-size module with integrated probe and touch force triggered in 5 directions – M8 thread for coupling any existing probe head, whether manually operated or motor driven – Four models available with a trigger force varying from 0.05 up to 0.10 N.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Trigger Force</th>
<th>Length</th>
<th>Color</th>
<th>Force Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03893070</td>
<td>TESASTAR-p LF – Low Force</td>
<td>0.055 N, L = 10 mm</td>
<td>Red</td>
<td>0.35 µm</td>
<td></td>
</tr>
<tr>
<td>03893071</td>
<td>TESASTAR-p SF – Standard Force</td>
<td>0.08 N, L = 10 mm</td>
<td>Yellow</td>
<td>0.35 µm</td>
<td></td>
</tr>
<tr>
<td>03893072</td>
<td>TESASTAR-p MF – Medium Force</td>
<td>0.10 N, L = 25 mm</td>
<td>Green</td>
<td>0.5 µm</td>
<td></td>
</tr>
<tr>
<td>03893073</td>
<td>TESASTAR-p EF – Extended Force</td>
<td>0.10 N, L = 50 mm</td>
<td>Blue</td>
<td>0.65 µm</td>
<td></td>
</tr>
<tr>
<td>03893074</td>
<td>Probe kit = 4 items</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Probe Extension**

**Probe extension with a M8 thread**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Length</th>
<th>Weight</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>038969065</td>
<td>TESASTAR M8</td>
<td>50 mm</td>
<td>25 g</td>
<td>ALU</td>
</tr>
</tbody>
</table>

**TESASTAR-rp Robust Probe For Probe Heads**

TESASTAR-rp is a complete, robust and precise touch trigger probe, which can be used on any manual or motorised CMM as well as in any manufacturing environment, even the most hostile. Adjustable triggering force for optimum efficiency according to chosen configuration for the stylus. This force also allows for the use of styli whose weight and length are above normal.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Unidirectional µm</th>
<th>Stylus length mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>03893050</td>
<td>TESASTAR-rp</td>
<td>≤ 0.35</td>
<td>0.1÷0.3 N</td>
</tr>
</tbody>
</table>
TESASTAR-mp Magnetic Probes
For Probe Heads

These touch trigger probes include two main parts, i.e. the stylus and the probe body. The isostatic and magnetic system coupling both parts provides a positioning repeatability that let the probe be changed either manually or automatically, without the need for requalification for the stylus.

Four models of the same size, but with a varying triggering force for optimum adaptation to the widest number of metrology applications are available.

TESASTAR-mp can be directed in 5 directions (±X, ±Y, ±Z), no matter what the used model is.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Triggering Force</th>
<th>Length</th>
<th>Color</th>
<th>Traficability</th>
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</thead>
<tbody>
<tr>
<td>03939170</td>
<td>TESASTAR-mp LF – Low Force</td>
<td>0,055 N, L = 10 mm</td>
<td>Red</td>
<td>0,35 µm</td>
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<tr>
<td>03939171</td>
<td>TESASTAR-mp SF – Standard Force</td>
<td>0,08 N, L = 10 mm</td>
<td>Yellow</td>
<td>0,35 µm</td>
<td></td>
</tr>
<tr>
<td>03939172</td>
<td>TESASTAR-mp MF – Medium Force</td>
<td>0,10 N, L = 25 mm</td>
<td>Green</td>
<td>0,5 µm</td>
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<tr>
<td>03939173</td>
<td>TESASTAR-mp EF – Extended Force</td>
<td>0,10 N, L = 50 mm</td>
<td>Blue</td>
<td>0,65 µm</td>
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<tr>
<td>03939175</td>
<td>Kit of 4 touch trigger probes (LF, SF, MF, EF) plus 1 TESASTAR-mp probe body</td>
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### Probe Kits

<table>
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<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>03939210</td>
<td>Probe kit including 2 items (SF, SF) + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939211</td>
<td>Probe kit including 2 items (SF, MF) + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939212</td>
<td>Probe kit including 2 items (SF, EF) + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939213</td>
<td>Probe kit including 2 items (MF, MF) + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939214</td>
<td>Probe kit including 2 items (EF, MF) + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939215</td>
<td>Probe kit including 2 items (EF, EF) + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939216</td>
<td>LF-type probe + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939217</td>
<td>SF-type probe + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939218</td>
<td>MF-type probe + 1 TESASTAR-mp probe body</td>
</tr>
<tr>
<td>03939219</td>
<td>EF-type probe + 1 TESASTAR-mp probe body</td>
</tr>
</tbody>
</table>

**Dimensions:**
- 10 mm / 0.39 in
- 30 mm / 1.18 in
- 50 mm / 1.96 in
- 60 mm / 2.36 in
# Probe styli for probe heads

<table>
<thead>
<tr>
<th>Relevant drawing</th>
<th>mm</th>
<th>L</th>
<th>B</th>
<th>g</th>
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<tbody>
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<td>1 M2 coupling thread, L = 10 mm</td>
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### Probe styli for probe heads

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![Diagram of probe styli for probe heads](image1)

### Probe styli with a probe disc

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![Diagram of probe styli with a probe disc](image2)

### Pointer probe styli

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### Hollow ball probe styli

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### Cylindrical probe styli

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![Cylindrical probe styli diagram](image)

### Parallel probe styli

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![Parallel probe styli diagram](image)

### Cross-shaped probe styli

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![Cross-shaped probe styli diagram](image)
## Probe extensions

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![Diagram 1](image1.png)

![Diagram 2](image2.png)
### Adapters

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### Articulations

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### Additional accessories

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## Styli Kits

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