

Coordinate Measuring Machines





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.



	MH3D 454	MH3D 474	MH3D 454 Remote Control	MH3D 474 Remote Control	MH3D 454 Recorder
Fine adjust device	●	●	●	●	–
Displacement	Manual	Manual	Manual/Motorised	Manual/Motorised	Manual/Automated
Measuring volume (mm)	460 x 510 x 420	460 x 710 x 420	460 x 510 x 420	460 x 710 x 420	440 x 490 x 390
MPE _E (µm) (L in mm)	3 + 4 L/1000	3 + 4 L/1000	3 + 4 L/1000	3 + 4 L/1000	Manual: 3 + 4 L/1000 Auto: 2,5 + 3,9 L/1000
Overall dimensions (machine) L x P x H (mm)	970 x 930 x 1620	970 x 1130 x 1660	970 x 930 x 1700	970 x 1130 x 1730	1030 x 1100 x 1680
Shipping box L x P x H (cm)	115 x 110 x 220	140 x 158 x 220	135 x 135 x 220	140 x 158 x 220	135 x 135 x 220
Gross weight (kg)	300	445	300	445	350
Net weight (kg) incl. granite table	210	315	210	315	225
Software	TESA-REFLEX MH3D	TESA-REFLEX MH3D	TESA-REFLEX MH3D	TESA-REFLEX MH3D	TESA-REFLEX Recorder
Remote control	–	–	●	●	Optional
Warranty	1 year	1 year	1 year	1 year	1 year
Maintenance agreement	On request	On request	On request	On request	On request





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).



TESASTAR

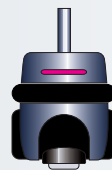


TESASTAR-i

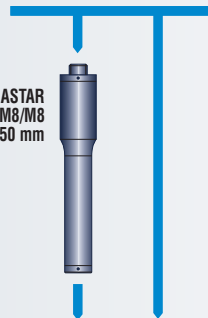


TESASTAR-i M8

TESASTAR-i M8



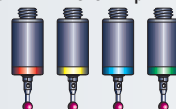
TESASTAR
M8/M8
50 mm



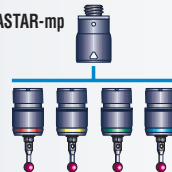
TESASTAR-rp



TESASTAR-p



TESASTAR-mp

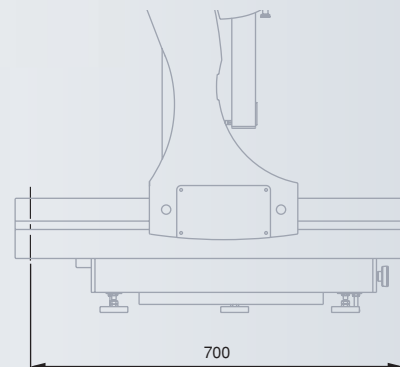
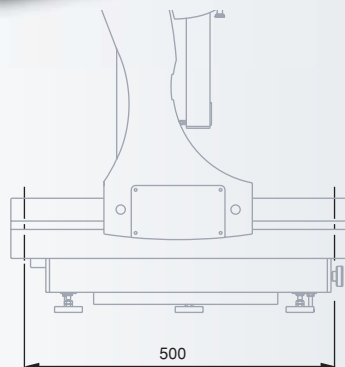
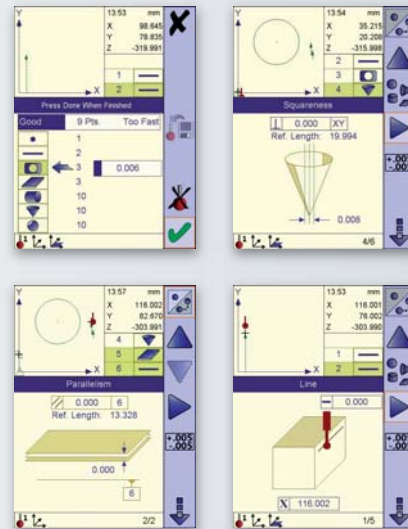


TESA Micro-Hite 3D manual Machine Version 454 or 474

- 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_E* = (3 + 4 L/1000) µm
MPE_P = 3 µm
* L in mm



Workpiece-oriented features

Overall dimensions: (W x D x H):
 Machine version 454
 600 x 750 x 430 mm
 Machine version 474
 600 x 990 x 430 mm

Maximum weight:
 Versions 454: 227 kg
 Versions 474: 200 kg

CMM-oriented features

Mass (W x D x H):
 Machine version 454, manual
 970 x 930 x 1620 mm
 Machine version 474, manual
 970 x 1130 x 1660 mm
 Machine version 474, RC
 970 x 930 x 1700 mm
 Machine version 474, RC
 970 x 1130 x 1730 mm

Net weight:
 Versions 454/474
 = 210/315 kg (granite tables included).
 Tables alone: 99/120 kg.
 Gross weight: 300/445 kg.

Air pressure:
 3,9 bars
 (60 à 120 psi).
 Air absorption:
 60 NI/min.

115 to 230 Vac
 ± 10%,
 50 to 60 Hz

20° ±1°C

13°C to 35°C



Shipping box (W x D x H):
 Version 454, manual
 1100 x 1150 x 2200 mm
 Version 454, RC
 1350 x 1350 x 2200 mm
 Versions 474, manual + RC
 1580 x 1400 x 2200 mm

Inspection report

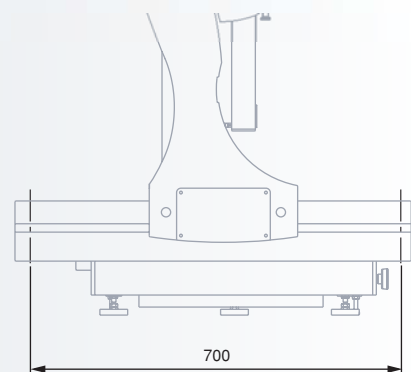
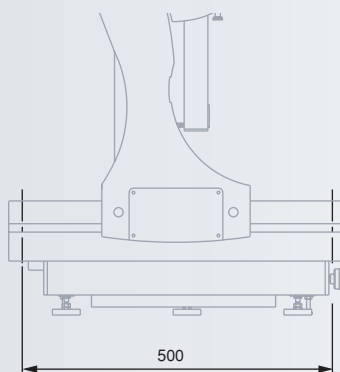
TESA Micro-Hite 3D 454 or 474, Remote Control Machine Version

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.



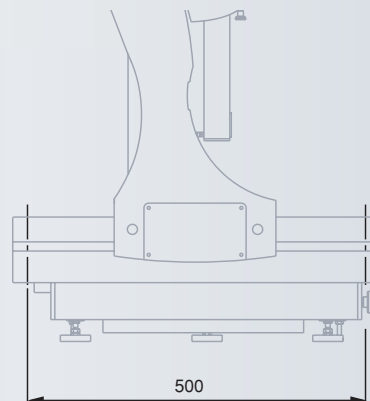
TESA Micro-Hite 3D 454, Recorder Machine Version

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.



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):

440 x 490 x 390 mm



TESA-REFLEX Recorder:
0,001 mm or
0.00001 in



Manual probing movements.

Manual or motorised execution of a part programme.



Light alloy machine base; granite measuring table.



Opto-electronic measuring systems based on incremental glass scales



0,039 µm (system)



Manual version:
760 mm/sec.
Motorised version:
200 mm/sec.

TESA-REFLEX Recorder Control Panel



154 x 116 mm display field with illuminated background



7-decade display (digits) plus sign for the measured values.

Icon-based graphical User interface.



RS232



Manual mode:
 $MPE_E^* = (3 + 4 L/1000) \mu m$

$MPE_p = 3 \mu m$

Motorised mode:

$MPE_E^* = (2,5 + 3,9 L/1000) \mu m$

$MPE_p = 2 \mu m$

* L in mm

Additional technical Data on the page opposite.

Workpiece-oriented features

Overall dimensions: (W x D x H): 600 x 750 x 430 mm

Maximum weight: 227 kg

CMM-oriented features

Mass (W x P x H): 1030 x 1100 x 1680 mm

Net weight: 225 kg (granite table included).
Table alone: 99 kg.
Gross weight: 350 kg

Air pressure: 3,9 bars (60 à 120 psi).
Air absorption: 60 NI/min.

115 to 230 Vac ±10%, 50 to 60 Hz.
Air absorption: 0,3 to 0,7 A

20°C ±1°C

13°C to 35°C



Shipping box (W x D x H): 1350 x 1350 x 2200 mm

Inspection report

EN ISO 10360-2

Sales programme

	Machine version	03939042		03939242		03939043		03939243		03939120		03939122		03939169	
		MH3D F	MH3D F	MH3D Fi	MH3D Fi	MH3D RC	MH3D RC	MH3D RC	MH3D RC	MH3D Recorder	MH3D Recorder				
	Machine type	454	474	454	474	454	474	454	474	454	474	454	474	454	454
<i>Consisting of:</i>															
	Fine adjust device	●	●	●	●	●	●	●	●	●	●	●	●	●	●
03939020	TESASTAR probe head	●	●	—	—	—	—	—	—	—	—	—	—	—	—
03939030	TESASTAR-i probe head	—	—	●	●	●	●	●	●	●	●	●	●	●	●
03969040	M3 probe styli kit	●	●	●	●	●	●	●	●	●	●	●	●	●	●
03960381	TESA REFLEX MH3D Control panel plus software	●	●	●	●	●	●	●	●	●	●	●	●	●	—
03960303	TESA REFLEX Recorder Control panel plus software	—	—	—	—	—	—	—	—	—	—	—	—	—	●
03969011	Reference sphere	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82-703-1	Granite table	●	●	●	●	●	●	●	●	●	●	●	●	●	●
049746	Air filter and regulator	●	●	●	●	●	●	●	●	●	●	●	●	●	●
052283	Joystick (RC version)	—	—	—	—	—	—	●	●	●	●	●	●	—	—
M1604.6011	Joystick (Recorder version)	●	—	—	—	—	—	—	—	—	—	—	—	—	—
01962003	USB-Stick	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Optional Accessories for Manual CMMs

No	Description
03939020	TESASTAR probe head
03939030	TESASTAR-i probe head
03939031	TESASTAR-i M8 probe head
03969009	ReflexScan software
03969007	RS232 connecting cable
03960309	RS232 adapter cable for TESA-REFLEX Recorder control panel
03969001	Cabinet with top mounted table
03939170	TESASTAR-mp touch-trigger probe LF, 0,055 N, L = 10 mm
03939171	TESASTAR-mp touch-trigger probe SF, 0,08 N, L = 10 mm
03939172	TESASTAR-mp touch-trigger probe MF, 0,10 N, L = 25 mm
03939173	TESASTAR-mp touch-trigger probe EF, 0,10 N, L = 50 mm
03939174	TESASTAR-mp probe body
03960175	Air saver
03939210	TESASTAR-mp probe kit (2 TESASTAR-mp probes, type SF + 1 TESASTAR-mp probe body)
82-1631	TESA practice piece
03969095	Hexagon practice piece
03969003	Dust cover
03969040	M3 styli kit
03960223	Camera kit with cross line generator included
03969047	Straight probe, Ø 6,35 mm



TESA MULTI-GAGE

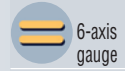
Portable 6-axis gauge that offers a flexible solution for multi-axis inspection. Expanding money in this versatile, high accuracy gauge is rapidly profitable. The TESA MULTI-GAGE is well suited for checking complex workpieces. No need to be an expert in metrology. Its software is easy to learn and to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

Main Features

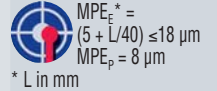
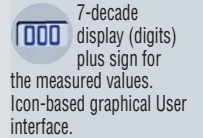
- No special on-site installation needed.
- Easy to use, quick to learn.
- Intuitive operation.
- Modular design with many interchangeable accessories.



General



TESA-REFLEX MULTI-GAGE control panel



Additional technical Data on opposite page.

Nº

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03820000

TESA MULTIGAGE

Furnished with:

03862000 TESA-REFLEX MULTI-GAGE control panel and software






03860068 Straight probe in stainless steel, Ø 15 mm

03860069 Straight probe with a ruby ball tip, Ø 6 mm



03860032 Reference sphere with calibration certificate, Ø 25,4 mm



Gauge-oriented 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

Accessories for TESA MULTI-GAGE

	
03860067	TTP probe holder, already programmed for use with a M2 probe stylus fitted with a ruby ball tip, L = 20 mm, 3 mm dia.
03860068	Straight reference probe, steel ball tip, L = 50 mm, 15 mm dia.
03860069	Straight probe, ruby ball tip, L = 50 mm, 6 mm dia.
03860070	Straight probe, ruby ball tip, L = 50 mm, 3 mm dia.
03860096	Straight probe, ruby ball tip, L = 50 mm, 2 mm dia.
050667	TKJ tightening key
03860036	Probe kit
03939350	TESASTAR-rp touch-trigger probe
03939072	TESASTAR-p touch trigger probe MF
03860051	Magnet set (3 items)
03860049	WiFi option



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.



03939020

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.



03939030

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.



03939031

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

No	=							
		Unidirectional	µm				Positions	Positioning
03939020	TESASTAR	≤ 0,75	–	0,1 ÷ 0,3 N	M3	–	–	manual
03939030	TESASTAR-i	≤ 0,35	≤ 1,5	0,1 ÷ 0,3 N	M3	15°	168	manual
03939031	TESASTAR-i M8	–	≤ 1,5	–	M8	15°	168	manual



EN ISO 10360-1



Manual



M3



Storage temperature range: -30°C to 60°C.



Operating temperature range: 10°C to 40°C (relative humidity 80%).



5 directions: ±X, ±Y, ±Z



Free stylus travel: X/Y ±20°, Z + 6 mm



Shipping box



Inspection report with a declaration of conformity

TESASTAR-i



168 indexing positions



Indexation in increment of 15° clearly visible



Probe orientation: A = 0 up to 90° B = ±180°



Each axis can be locked by means of 2 push-buttons



www.tesastar.com





TESASTAR-p
M2 thread
TESASTAR-rp
M3 thread

TESASTAR-p
13,2 mm
TESASTAR-rp
25 mm

TESASTAR-p
L = 26,3 mm
TESASTAR-rp
L = 41 mm

5 directions
±X, ±Y, +Z

TESASTAR-p
9,5 g
TESASTAR-rp
43 g

600 µA
(external supply)

Free
stylus
travel:
X/Y ±14°, Z + 4 mm
(TESASTAR-p)
X/Y ±22°, Z + 5,5 mm
(TESASTAR-rp)

IP50

10°C to 40°C

-10°C to 70°C

Shipping
box

Inspection
report with
a declaration
of conformity

www.tesastar.com

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.



03939070	TESASTAR-p LF – Low Force	0,055 N, L = 10 mm	Red	0,35 µm
03939071	TESASTAR-p SF – Standard Force	0,08 N, L = 10 mm	Yellow	0,35 µm
03939072	TESASTAR-p MF – Medium Force	0,10 N, L = 25 mm	Green	0,5 µm
03939073	TESASTAR-p EF – Extended Force	0,10 N, L = 50 mm	Blue	0,65 µm
03939074	Probe kit = 4 items			

Styli not included in the delivery scope

Probe Extension



Probe extension with a M8 thread

03969065	TESASTAR M8	50 mm	25 g	ALU
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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.



03939350	TESASTAR-rp	Unidirectional µm ≤ 0,35	0,1÷0,3 N	Styli length mm ≤ 100
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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 ($\pm X$, $\pm Y$, $+Z$), no matter what the used model is.



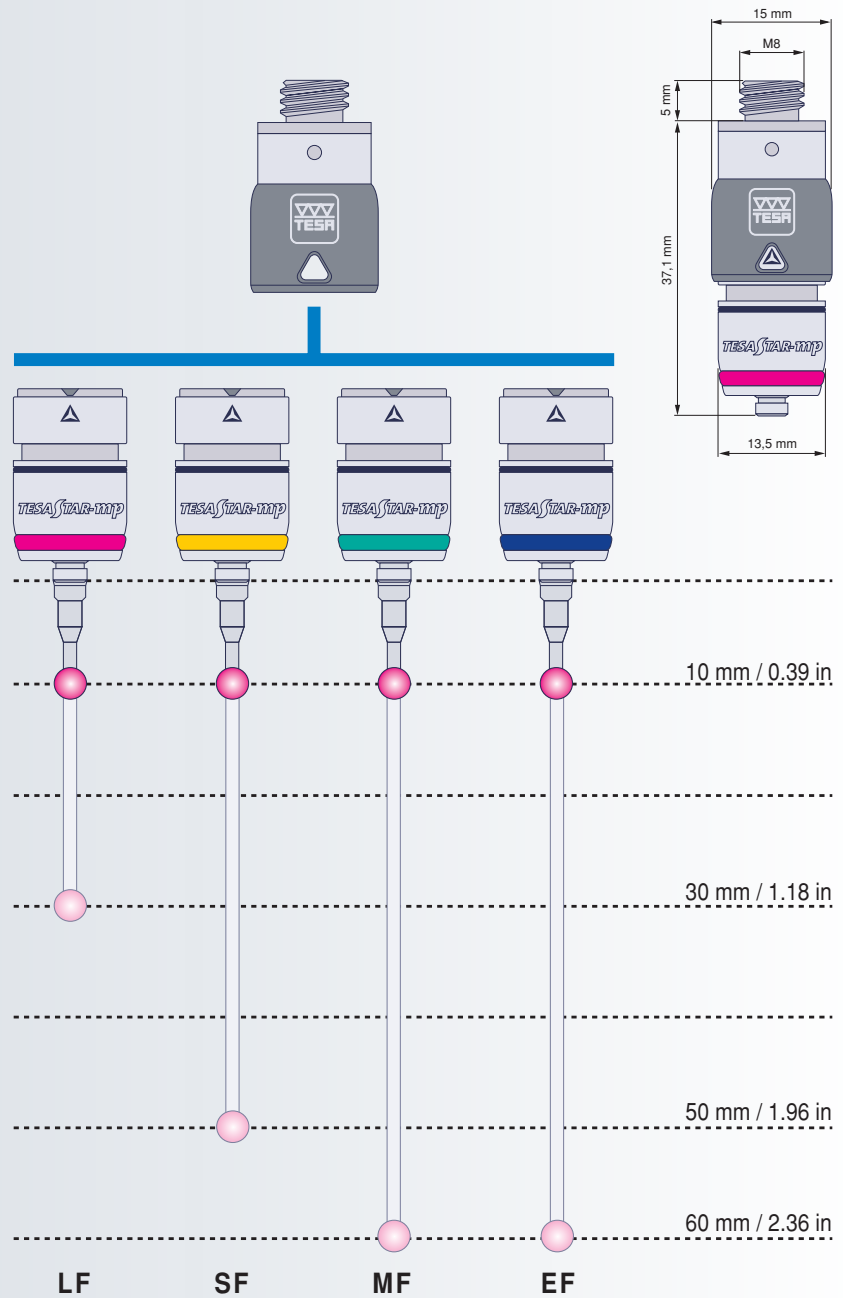
- ✓
- M8 (probe body) or M2 (stylus) coupling threads
- 15 mm
- 37,1 mm in length
- 5 directions $\pm X$, $\pm Y$, $+Z$
- 13,6 g (probe body) 11 g (stylus)
- 600 μA (external supply)
- Stylus tilting through $X/Y \pm 14^\circ$, $Z + 4$ mm
- Triggering force: 10N
- IP30
- 10°C to 40°C
- 30°C to 60°C
- Shipping packaging
- Inspection report with a declaration of conformity
- www.tesastar.com

03939170	TESASTAR-mp LF – Low Force	0,055 N, L = 10 mm	Red	0,35 μm
03939171	TESASTAR-mp SF – Standard Force	0,08 N, L = 10 mm	Yellow	0,35 μm
03939172	TESASTAR-mp MF – Medium Force	0,10 N, L = 25 mm	Green	0,5 μm
03939173	TESASTAR-mp EF – Extended Force	0,10 N, L = 50 mm	Blue	0,65 μm
03939174	TESASTAR-mp probe body			
03939175	Kit of 4 touch trigger probes (LF, SF, MF, EF) plus 1 TESASTAR-mp probe body			



Probe Kits

03939210		Probe kit including 2 items (SF, SF) + 1 TESASTAR-mp probe body
03939211		Probe kit including 2 items (SF, MF) + 1 TESASTAR-mp probe body
03939212		Probe kit including 2 items (SF, EF) + 1 TESASTAR-mp probe body
03939213		Probe kit including 2 items (MF, MF) + 1 TESASTAR-mp probe body
03939214		Probe kit including 2 items (EF, MF) + 1 TESASTAR-mp probe body
03939215		Probe kit including 2 items (EF, EF) + 1 TESASTAR-mp probe body
03939216		LF-type probe + 1 TESASTAR-mp probe body
03939217		SF-type probe + 1 TESASTAR-mp probe body
03939218		MF-type probe + 1 TESASTAR-mp probe body
03939219		EF-type probe + 1 TESASTAR-mp probe body



Probe styli for probe heads



No	=	Relevant drawing	mm			g	Probe shaft	
			A	Ø	L			B
1 M2 coupling thread, L = 10 mm								
03969201	Stylus with ruby ball tip, 1 mm dia.	1	M2	1	10	4,5	0,3	Stainl.steel
03969202	Stylus with ruby ball tip, 2 mm dia.	1	M2	2	10	6	0,3	Stainl.steel
03969203	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	10	7,5	0,4	Stainl.steel
03969204	Stylus with ruby ball tip, 4 mm dia.	1	M2	4	10	10	0,5	Stainl.steel
03969205	Stylus with ruby ball tip, 5 mm dia.	1	M2	5	10	10	0,7	Stainl.steel
03969206	Stylus with ruby ball tip, 6 mm dia.	1	M2	6	10	10	1	Stainl.steel
03969208	Stylus with ruby ball tip, 8 mm dia.	1	M2	8	11	11	1,5	Stainl.steel
03969225	Stylus with ruby ball tip, 2,5 mm dia.	1	M2	2,5	10	6	0,3	Stainl.steel
03969268	Stylus with ruby ball tip, 0,3 mm dia.	1	M2	0,3	10	2	0,3	Carbide
03969267	Stylus with ruby ball tip, 0,7 mm dia.	1	M2	0,7	10	4	0,3	Carbide
03969220	Stylus with ruby ball tip, 0,5 mm dia.	1	M2	0,5	10	3	0,3	Carbide
1 M2 coupling thread, L = 20 mm								
03969212	Stylus with ruby ball tip, 2 mm dia.	1	M2	2	20	14	0,5	Stainl.steel
03969213	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	20	17	0,5	Stainl.steel
03969214	Stylus with ruby ball tip, 4 mm dia.	1	M2	4	20	20,2	0,8	Stainl.steel
03969226	Stylus with ruby ball tip, 2,5 mm dia.	1	M2	2,5	20	14	0,4	Carbide
03969272	Stylus with ruby ball tip, 1,5 mm dia.	1	M2	1,5	20	12,5	0,5	Carbide
03969271	Stylus with ruby ball tip, 1 mm dia.	1	M2	1	20	12,5	0,41	Carbide
03969269	Stylus with ruby ball tip, 0,5 mm dia.	1	M2	0,5	20	7	0,48	Carbide
03969221	Stylus with ruby ball tip, 1 mm dia.	1	M2	1	20	7	0,6	Carbide
03969222	Stylus with ruby ball tip, 2 mm dia.	1	M2	2	20	15	0,45	Carbide
1 M2 coupling thread, L = 30 mm								
03969259	Stylus with ruby ball tip, 12 mm dia.	1	M2	1	27	20,5	0,4	Carbide
03969262	Stylus with ruby ball tip, 2 mm dia.	1	M2	2	30	25	0,99	Carbide
03969263	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	30	25	1,49	Carbide
03969261	Stylus with ruby ball tip, 1,5 mm dia.	1	M2	1,5	30	25	0,58	Carbide
03969286	Stylus with ruby ball tip, 6 mm dia.	2	M2	6	30	30	0,96	Carbon
1 M2 coupling thread, L = 40 mm								
03969282	Stylus with ruby ball tip, 2 mm dia.	1	M2	2	40	35	1,29	Carbide
03969283	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	40	35	1,97	Carbide
03969284	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	40	35	2,04	Carbide
1 M2 coupling thread, L = 50 mm								
03969293	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	50	42,5	2,44	Carbide
03969294	Stylus with ruby ball tip, 4 mm dia.	1	M2	4	50	42,5	2,52	Carbide
03969295	Stylus with ruby ball tip, 5 mm dia.	1	M2	5	50	42,5	3,75	Carbide
03969223	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	50	42,5	0,83	Ceramic
03969224	Stylus with ruby ball tip, 4 mm dia.	1	M2	4	50	42,5	0,91	Ceramic
03969260	Stylus with ruby ball tip, 4 mm dia.	2	M2	4	50	3	1	Carbon
03969276	Stylus with ruby ball tip, 6 mm dia.	2	M2	6	50	50	1,2	Carbon
03969220	Stylus with ruby ball tip, 5 mm dia.	1	M2	0,5	10	3	0,3	Carbide
1 M3 coupling thread, L = 10 mm								
03969324	Stylus with ruby ball tip, 3 mm dia.	–	M3	3	10	–	–	Stainl.steel
03969326	Stylus with ruby ball tip, 6 mm dia.	–	M3	6	10	–	–	Stainl.steel
1 M3 coupling thread, L = 21 mm								
03969301	Stylus with ruby ball tip, 1 mm dia.	1	M3	1	21	4	1,1	Stainl.steel
03969302	Stylus with ruby ball tip, 2 mm dia.	1	M3	2	21	8	1,1	Stainl.steel
03969303	Stylus with ruby ball tip, 3 mm dia.	1	M3	3	21	12	1,1	Stainl.steel
03969304	Stylus with ruby ball tip, 4 mm dia.	1	M3	4	21	17	1,4	Stainl.steel
03969305	Stylus with ruby ball tip, 5 mm dia.	1	M3	5	21	21	1,55	Stainl.steel
03969310	Stylus with ruby ball tip, 0,5 mm dia.	1	M3	0,5	21	3	1,1	Carbide
03969312	Stylus with ruby ball tip, 2 mm dia.	1	M3	2	21	15	0,8	Carbide
03969332	Stylus with ruby ball tip, 2,5 mm dia.	1	M3	2,5	21	12,5	1,3	Carbide

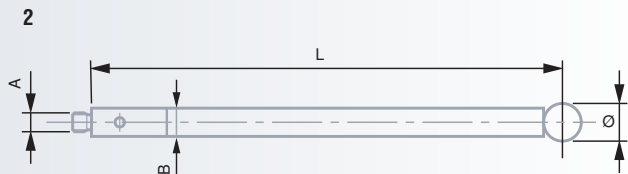
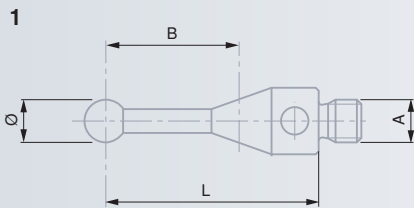




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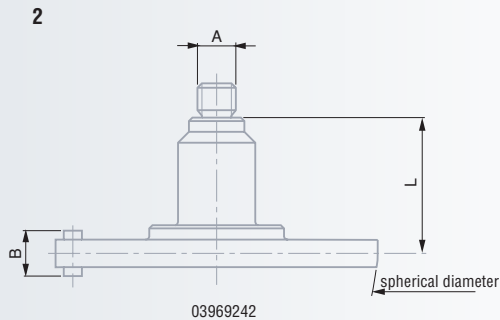
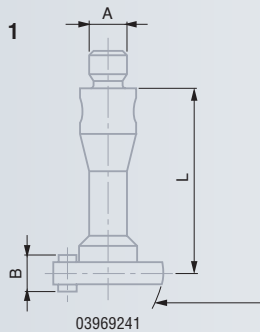
Probe styli for probe heads

	No	=	Relevant drawing	mm				g	Probe shaft
				A	Ø	L	B		
1 M3 coupling thread, L = 40 mm									
	03969343		Stylus with ruby ball tip, 3 mm dia. 1	M3	3	40	32,5	2,3	Carbide
1 M3 coupling thread, L = 50 mm									
	03969353		Stylus with ruby ball tip, 3 mm dia. 1	M3	3	50	42,5	2,78	Carbide
1 M4 coupling thread, L = 20 mm									
	03969402		Stylus with ruby ball tip, 2 mm dia. 1	M4	2	19	8	2,3	Stainl. steel
1 M4 coupling thread, L = 50 mm									
	03969408		Stylus with ruby ball tip, 8 mm dia. 1	M4	8	50	-	5,4	Ceramic
1 M4 coupling thread, L = 100 mm									
	03969418		Stylus with ruby ball tip, 8 mm dia. 1	M4	8	100	-	7	Ceramic



Probe styli with a probe disc

	No	=	Relevant drawing	mm				g	Probe shaft
				A	Ø	L	B		
1 M2 coupling thread,									
	03969241		Stylus with ruby ball tip, 6 mm dia. 1	M2	6	10	2	0,6	Stainl. steel
	03969242		Stylus with ruby ball tip, 18 mm dia. 1	M2	18	7,55	2,5	3,1	Carbide
	03969243		Stylus with ruby ball tip, 18 mm dia. 2	M2	18	3,7	3	2,7	Stainl. steel



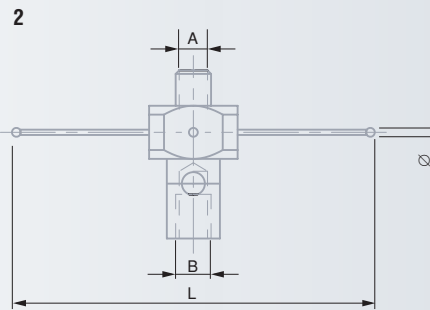
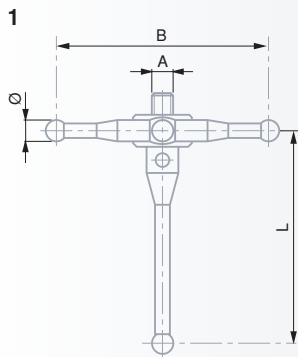
Pointer probe styli

	No	=	Relevant drawing	mm				g	Probe shaft
				A	Ø	L	B°		
1 M2 coupling thread, L = 30 mm									
	03969200		Stylus with ruby ball tip, 6 mm dia. 1	M2	3	15	30	0,7	Stainl. steel
	03969141		Stylus with ruby ball tip, 18 mm dia. 1	M2	1,4	10	30	1	Carbide



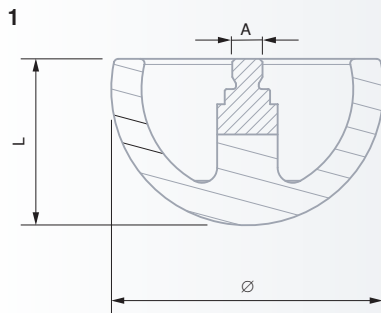
Star probe styli

№	=	Drawing	mm				g	Probe shaft
			A	∅	L	B		
1 M2 coupling thread, 5-way probe styli								
03969081		1	M2	2	18	20	1,3	Stainl. steel
03969055		1	M2	2	20	20	1,5	Stainl. steel
03969082		1	M2	2	18	30	1,7	Stainl. steel
03969056		1	M2	2	20	30	1,8	Stainl. steel
1 M2 coupling thread, 4-way probe stylus								
03969210		2	M2	0,5	20	M2	0,7	Stainl. steel
1 M3 coupling thread, 5-way probe styli								
03969083		1	M2	2	18	20	2,2	Stainl. steel
03969057		1	M2	2	20	20	2,2	Stainl. steel
03969084		1	M2	2	18	30	2,5	Stainl. steel
03969058		1	M2	2	20	30	2,5	Stainl. steel



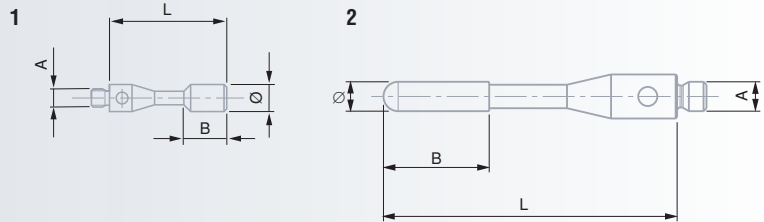
Hollow ball probe styli

№	=	Relevant drawing	mm				g	Probe shaft
			A	∅	L	B		
03969218	M2 coupling thread	1	M2	18	11	-	3,3	Ceramic
03969330	M3 coupling thread	1	M3	30	17	-	13	Ceramic



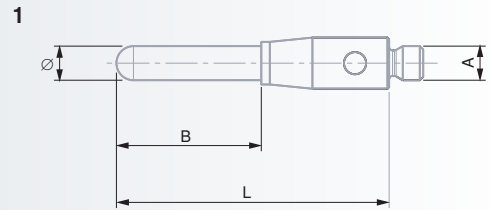
Cylindrical probe styli

№	=	Relevant drawing	mm				g	Probe shaft
			A	∅	L	B		
03969253	M2 coupling thread	1	M2	3	13	4	0,5	Stainl. steel
03969251	M2 coupling thread	1	M2	1,5	11	1,5	0,3	Stainl. steel
03969252	M2 coupling thread	1	M2	3	13	3,8	0,6	Stainl. steel
03969292	M2 coupling thread	2	M2	2	20	7,2	0,5	Carbide



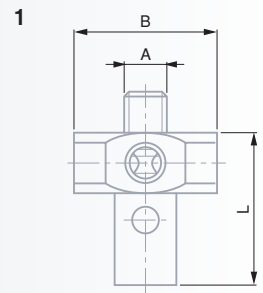
Parallel probe styli

№	=	Relevant drawing	mm				g	Probe shaft
			A	∅	L	B		
03969277	M2 coupling thread	1	M2	0,5	15,3	7,8	0,3	Carbide
03969278	M2 coupling thread	1	M2	1	35,5	29,8	0,7	Carbide
03969279	M2 coupling thread	1	M2	2	16	8,5	0,8	Carbide
03969280	M2 coupling thread	1	M2	2	40	32	2	Carbide
03969281	M2 coupling thread	1	M2	3	22,5	-	2	Carbide



Cross-shaped probe styli

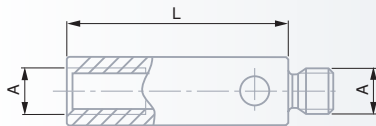
№	=	Relevant drawing	mm				g	Probe shaft
			A	∅	L	B		
03969054	M2 coupling thread, 5-way stylus	1	M2	-	7,5	7	1,1	Stainl. steel
03969046	M3 coupling thread, 5-way stylus	1	M3	-	13	10	3,7	Stainl. steel



Probe extensions

No	=	Relevant drawing	mm			g	Probe shaft	
			A	Ø	L			
1 M2 coupling thread								
03969231		1	M2	–	10	–	0,5	Stainl. steel
03969232		1	M2	–	20	–	1	Stainl. steel
03969233		1	M2	–	30	–	1,6	Stainl. steel
03969230		1	M2	3	5	–	–	Stainl. steel
03969234		1	M2	3	40	–	1,8	Stainl. steel
03969247		1	M2	3	50	–	1,51	Ceramic
03969246		1	M2	3	40	–	1,22	Ceramic
03969238		1	M2	3	50	–	1	Carbon
03969239		1	M2	3	70	–	1,3	Carbon
03969240		1	M2	3	90	–	1,5	Carbon
03969270		1	M2	3	40	–	0,9	Carbon
1 M3 coupling thread								
03969044		1	M3	–	10	–	0,8	Stainl. steel
03969245		1	M3	–	20	–	1,8	Stainl. steel
03969320		1	M3	–	35	–	2,9	Stainl. steel
1 M4 coupling thread								
03969401		2	M4	7	30	–	5,1	Ceramic

1

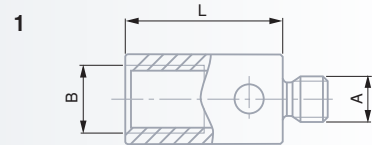


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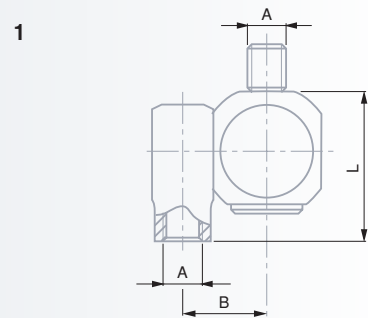
Adapters

№	=	Relevant drawing	mm		L	B	g	Probe shaft
			A	∅				
03969061	M2-M3 coupling thread,	1	M2	-	7	M3	0,5	Stainl. steel
03969062	M3-M2 coupling thread	1	M3	-	5	M2	0,5	Stainl. steel
03969403	M4-M3 coupling thread	1	M4	-	9	M3	1,4	Stainl. steel



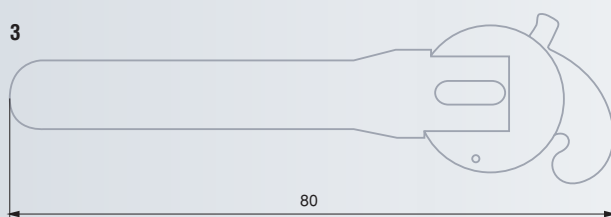
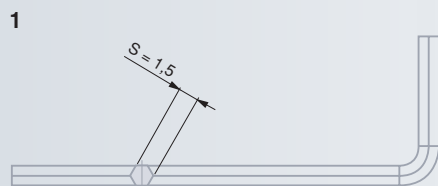
Articulations

№	=	Relevant drawing	mm		L	B	g	Probe shaft
			A	∅				
03969059	M2 coupling thread	1	M2	-	8	4,5	1,7	Stainl. steel
03969060	M3 coupling thread	1	M3	-	12	6	3,8	Stainl. steel




Additional accessories

№	=	Relevant drawing
042086	Socket head key, 1,5 mm	1
047866	Tightening key for styli, M2-M3	2
050697	Tightening key for carbon-fibre styli	3



Styli Kits

№		Probe Styli Kit 8 – M2 03969086	Probe Styli Kit 3 – M2 03969063	Probe Styli Kit 1 – M2 03969075
042086	Socket head key, 1,5 mm	–	1	–
047866	Tightening key for probe styli	2	2	2
049652	Tightening key	2	–	–
050697	Tightening key	2	–	–
03969044	M3 probe extension, L = 10 mm	–	–	–
03969045	M3 probe extension, L = 20 mm	–	–	–
03969046	5-way cross-shaped stylus, M3	–	–	–
03969047	Fixed probe, 6,35 mm dia.	–	–	–
03969054	5-way cross-shaped stylus, M2	1	–	1
03969081	5-way star probe stylus, M2	–	–	1
03969082	5-way star probe stylus, M2	1	1	–
03969059	Articulation, M2	–	1	–
03969065	M8 probe extension, L = 50 mm	–	–	–
03969066	M8 probe extension, L = 100 mm	–	–	–
03969067	M8 probe extension, L = 200 mm	–	–	–
03969078	Storage case for accessories	–	1	1
03969079	Storage case for accessories	–	–	–
03969085	Storage case for accessories	1	–	–
03969201	M2 probe stylus with a ruby ball tip, 1 mm dia.	–	1	2
03969202	M2 probe stylus with a ruby ball tip, 2 mm dia.	1	1	4
03969203	M2 probe stylus with a ruby ball tip, 3 mm dia.	–	1	2
03969204	M2 probe stylus with a ruby ball tip, 4 mm dia.	1	–	1
03969206	M2 probe stylus with a ruby ball tip, 6 mm dia.	–	–	1
03969212	M2 probe stylus with a ruby ball tip, 2 mm dia.	2	1	2
03969213	M2 probe stylus with a ruby ball tip, 3 mm dia.	2	1	2
03969214	M2 probe stylus with a ruby ball tip, 4 mm dia.	–	–	1
03969221	M2 carbide probe stylus with a ruby ball tip, 1 mm dia.	1	–	–
03969230	M2 probe extension, L = 5 mm	–	–	2
03969231	M2 probe extension, L = 10 mm	1	2	2
03969232	M2 probe extension, L = 20 mm	1	–	2
03969233	M2 probe extension, L = 30 mm	–	–	2
03969241	M2 probe stylus with a probe disc, 6 mm dia., L = 10 mm	–	1	–
03969242	M2 probe stylus with a probe disc, 18 mm dia., L = 7,55 mm	–	–	1
03969253	Cylindrical probe stylus	–	–	1
03969260	M2 carbon probe stylus with a ruby ball tip L = 50 mm	1	–	–
03969270	M2 carbon probe extension L = 40 mm	1	–	–
03969302	M3 probe stylus with a ruby ball tip, 2 mm dia.	–	–	–
03969303	M3 probe stylus with a ruby ball tip, 2 mm dia.	–	–	–
03969304	M3 probe stylus with a ruby ball tip, 2 mm dia.	–	–	–



Probe Styli Kit 7 – M2 03969076	Probe Extension Kit 03969077	Probe Accessory Kit TESASTAR 03969040	Probe Accessory Kit TESASTAR 03969101	Probe Styli Kit – M2 TESASTAR-m 03969087	Probe Styli Kit – M3 03969102
1	-	-	-	-	-
2	-	-	-	-	-
-	2	-	-	-	-
-	-	-	-	-	-
-	-	1	1	-	1
-	-	1	1	-	1
-	-	1	1	-	1
-	-	1	-	-	-
1	-	-	-	-	-
-	-	-	-	-	-
1	-	-	-	-	-
1	-	-	-	-	-
-	1	-	-	-	-
-	1	-	-	-	-
-	1	-	-	-	-
1	-	-	-	-	-
-	1	-	-	-	-
-	-	-	-	-	-
2	-	-	-	1	-
6	-	-	-	1	-
2	-	-	-	1	-
2	-	-	-	1	-
-	-	-	-	-	-
2	-	-	-	-	-
1	-	-	-	-	-
1	-	-	-	-	-
1	-	-	-	-	-
-	-	-	-	-	-
2	-	-	-	1	-
1	-	-	-	1	-
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-	-	-	-	-	-
-	-	1	1	-	1
-	-	1	1	-	1
-	-	1	1	-	1



03969076

