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Measuring Instruments for Large Dimensions

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Electronic Length Measuring Equipment

Optical Measurement

Coordinate Measuring Machines



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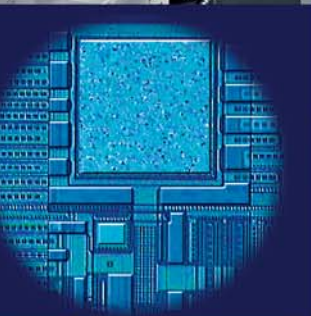
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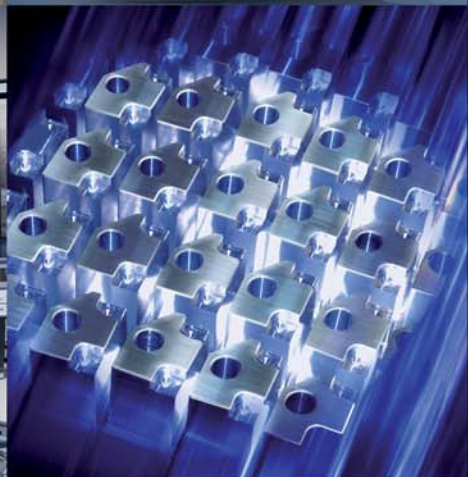
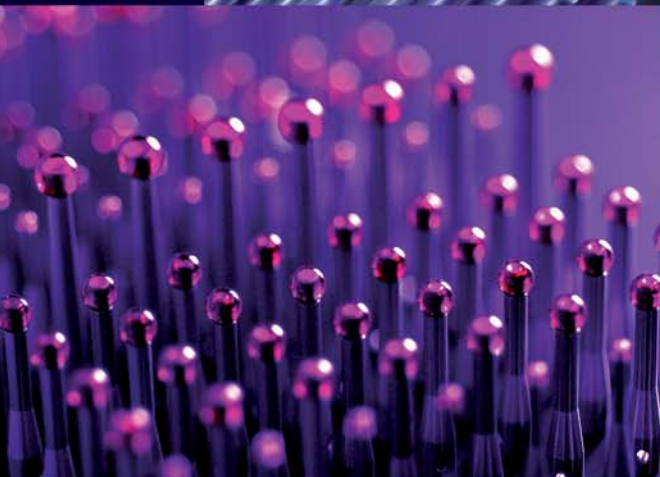
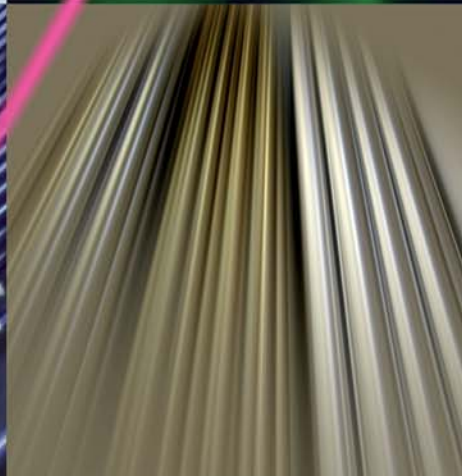
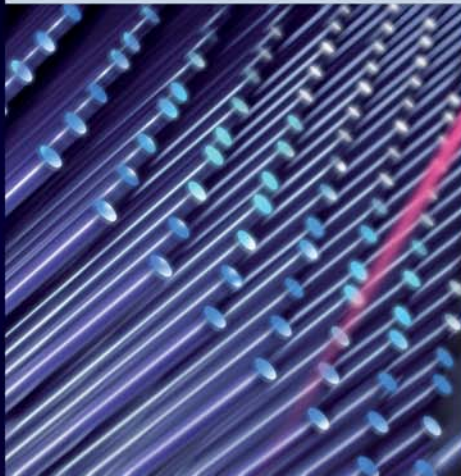
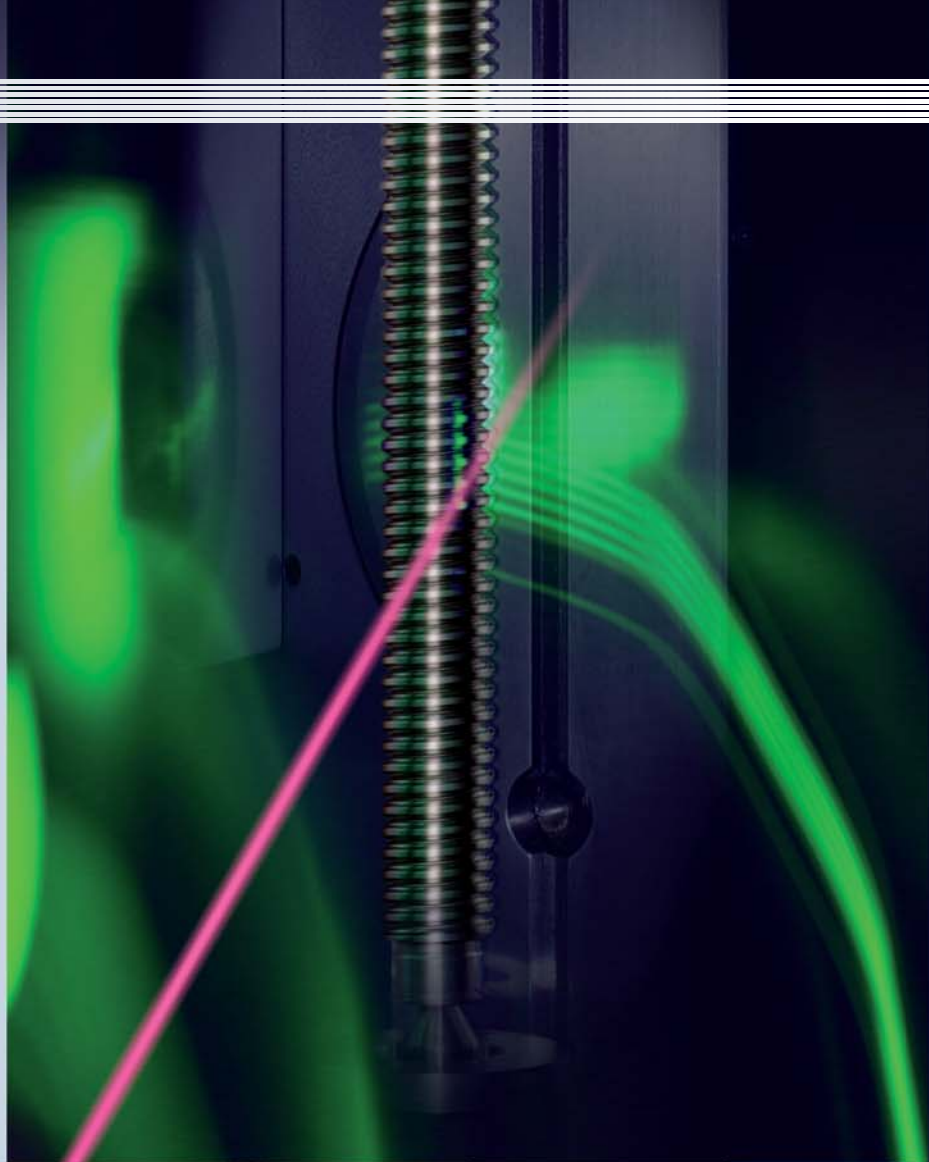
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5 good reasons for choosing a TESA's product

- 1 – Finest raw materials***
- 2 – Guaranteed precision
throughout
the measuring range***
- 3 – Latest technology***
- 4 – Individual inspection
and calibration***
- 5 – Long-term dependability***



Dear customer,

We invite you to browse the pages of this general catalogue, which not only offers a large range of inspection tools from the smallest gauge to the coordinate measuring machine, but also delivers a vast amount of information and advice with regard to dimensional metrology.

For this new edition, our engineers have worked towards solving the equation of providing higher performance besides greater ease of use. For comfort of the operator and reliability of the measurements, TESA intends to play a pioneering role in applying this trend seen in other industrial fields, to metrology.

Our catalogue from the year 2010 has been deeply modified to make room next to the traditional precision instruments and systems that forged our reputation, to the many innovations that reflect this new direction. You will no doubt find among this diversified range the instrument that fits your needs and meets your most stringent requirements.

Because the accuracy of your measurements is your guarantee for quality, our priority is to ensure the reliability of our metrology products, from design to final inspection certificate.

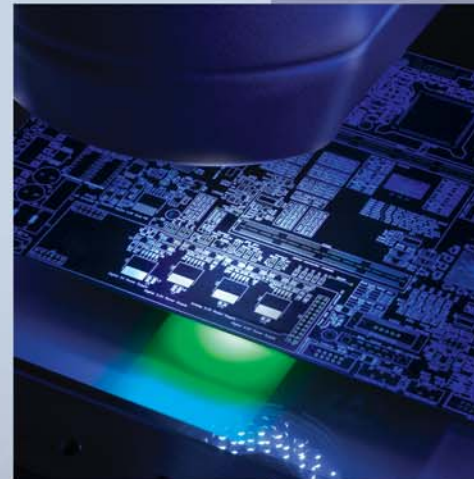
We thank you for the trust you place in us.



*Martin Hedman
General Manager*

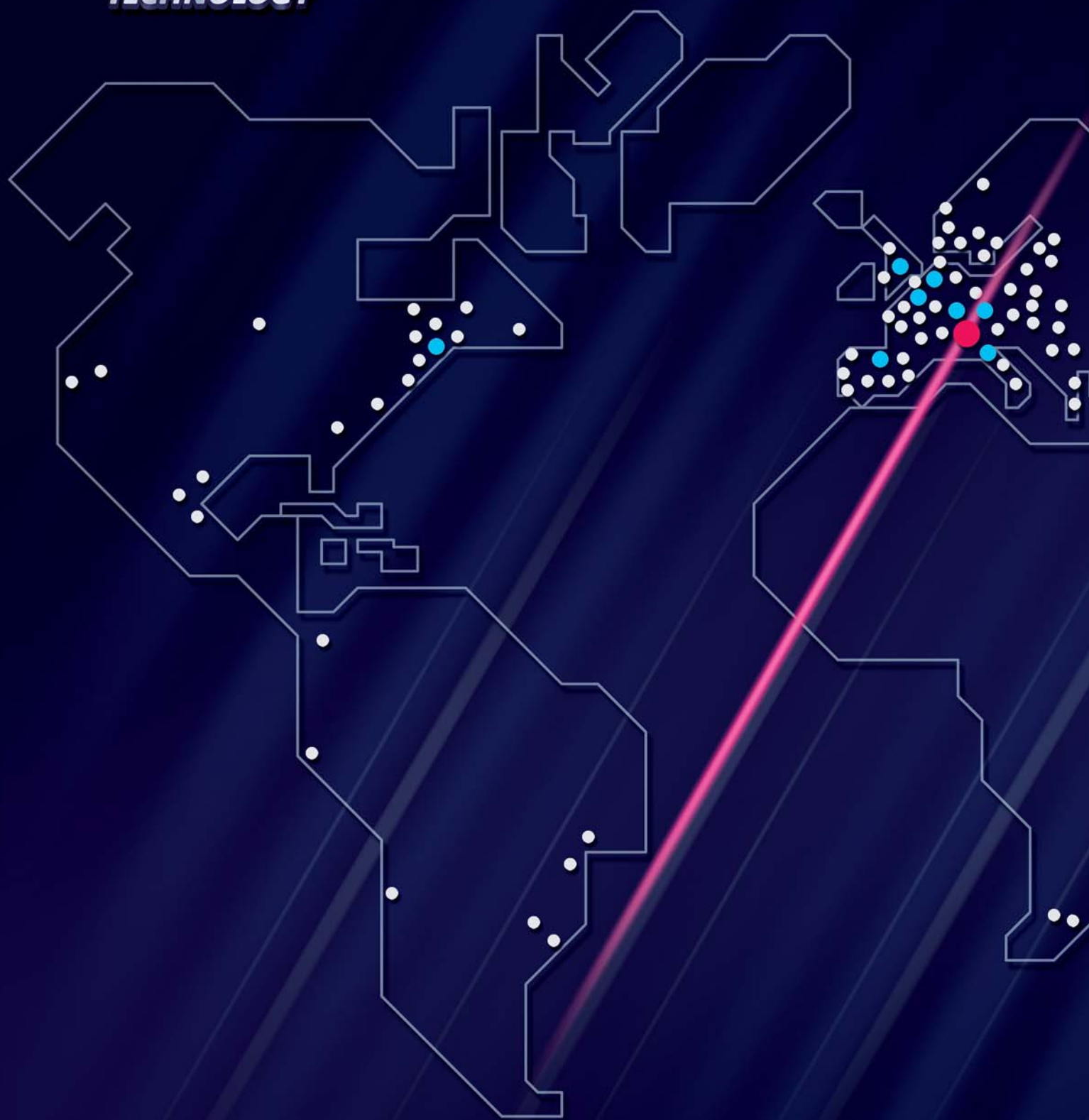


*Marcel Bila
Sales & Marketing
Director*





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International System of Units (SI)

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D: *Internationales Einheitensystem (SI)*

Derived units (of measurement)

F: *Unités dérivées*

D: *Abgeleitete Einheiten*

Quantity	SI base unit	
	Name	Symbol
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

Quantity	Unit		Relationship to
	Name	Symbol	SI base unit
plane angle	radian	rad	1 rad = 1 mm 1 rad = 57,295 779 51°
frequency	hertz	Hz	1 Hz = 1 s ⁻¹
force	newton	N	1 N = 1 m kg s ⁻²
pressure	pascal	Pa	1 Pa = 1 m ⁻¹ kg s ⁻²
power	watt	W	1 W = 1 m ² kg s ⁻³
electrical potential	volt	V	1 V = 1 m ² kg s ⁻³ A ⁻¹

Unit	Symbol	m	cm	mm	µm	nm
kilometre	km	1 ³ m	1000 m	1 000 000 mm		
Metre	m	1 m	1 m	1 000 mm	1 000 000 µm	
decimetre	dm	10 ⁻¹ m	0,1 m	100 mm	100 000 µm	
centimetre	cm	10 ⁻² m	0,01 m	10 mm	10 000 µm	
Millimetre	mm	10⁻³ m	0,001 m	0,1 cm	1 mm	1 000 000 nm
tenth millimetre		10 ⁻⁴ m	0,000 1 m	0,1 mm	100 µm	100 000 nm
hundredth millimetre		10 ⁻⁵ m	0,000 01 m	0,01 mm	10 µm	10 000 nm
Micrometre	µm	10⁻⁶ m	0,000 001 m	0,001 mm	1 µm	1 000 nm
tenth micrometre		10 ⁻⁷ m	0,000 000 1 m	0,000 1 mm	0,1 µm	100 nm
hundredth micrometre		10 ⁻⁸ m	0,000 000 01 m	0,000 01 mm	0,01 µm	10 nm
Nanometre	nm	10⁻⁹ m	0,000 000 001 m	0,000 001 mm	0,001 µm	1 nm

Definition of the metre

F: *Définition du mètre – D: Meterdefinition*

«The metre is defined as the distance travelled by light in vacuum during a time of 1/299 792 458 of a second.»

17th General Conference on Weights and Measures, 1983.

Reference temperature

F: *Température de référence*

D: *Bezugstemperatur*

For measuring instruments and workpieces, ISO R1 assesses this temperature is at 20°C.

The temperature of 20°C is assumed to be valid for any size, material measure, measurement result etc., unless otherwise specified.

Inspecting

F: *Contrôler – D: Prüfen*

Determining whether a test object complies with specified requirements (e.g. as regards both dimensions and form).

Measuring

F: *Mesurer – D: Messen*

Obtaining a value (e.g. length value) measured by comparison against a master standard (e.g. material measure).

Calibrating

F: *Etalonner – D: Kalibrieren*

Establishing the actual deviation of a measuring instrument from desired value.

This is usually done through measurement operations. The result of a calibration is documented in the form of a calibration certificate and can be used later on for adjustment purposes, for instance.

Indication related definitions

Indication

F: Indication – D: Anzeige

The indication, which provides the information about the measured value, is directly perceptible by human senses. It may be optical, acoustic or based on any other output feature. Displaying devices may either have a digital, analogue or any other special indication.

For material measures, the indication matches displayed value.



Scale indication

F: Indication de l'échelle – D: Skalenanzeige

Scale indication is the readable position of a scale mark.



Line scale

F: Echelle à traits – D: Strichskale

Scale substrat with a number of graduations following one another.



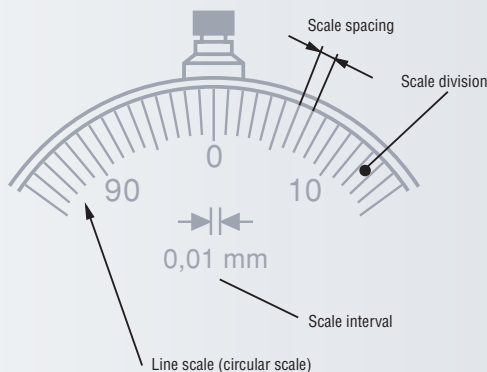
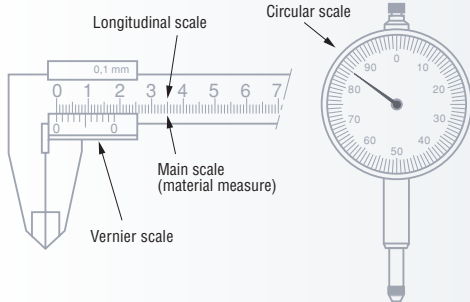
Scale spacing

F: Longueur d'une division (d'échelle)

D: Teilstrichabstand

Scale spacing is expressed in length units as the distance between two successive scale marks measured along the same line by a marker (e.g. the end of a pointer).

Line scales



Scale division

F: Division d'échelle (échelon) – D: Skalenteil

Part of a scale between two successive scale marks.



Scale interval

F: Echelon, valeur d'une division (d'échelle)

D: Skalenteilungswert

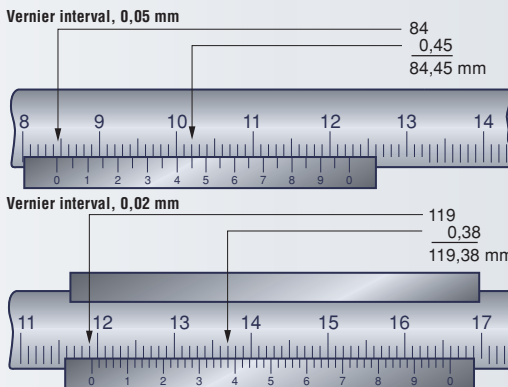
The scale interval is the difference between the values matching two successive scale marks. This characteristic is expressed in the units marked on the scale.



Vernier interval

F: Valeur du vernier – D: Noniuswert

The vernier interval is the alteration of the value of a measurand, which in turn changes the indication by one scale division of the vernier scale.



Numerical (digital) indication

F: Indication numérique

D: Ziffernanzeige

The numerical indication is shown in the form of a digit (succession of digits).



Numerical scale

F: Echelle numérique – D: Ziffernskale

A numerical scale is a succession of digits (usually 0 to 9). On a multi-scale, the single numerical scales are arranged side by side in a decimal fraction.



Numerical interval

F: Valeur du pas (échelon) numérique

D: Ziffernschritt

The numerical interval is the alteration by one numerical value of the indication. This characteristic, which matches the scale interval, is expressed in the units of the measurand.

Metrological Definitions



Range of indication

F: Etendue d'indication – D: Anzeigebereich

The range of indication lies between both highest and smallest display values of a measuring instrument.



Measuring range

F: Etendue de mesure – D: Messbereich

The measuring range of an indicating device is the range within which the measured values cannot exceed the maximum permissible errors.

For tools having several measuring ranges, these errors may vary from a range to another. The measuring range may well be contained within the related whole range of indication.



Measuring span

F: Champ de mesure – D: Messspanne

This span equals the difference between both first and last values of the measuring range as specified.



Displacement range

F: Etendue de déplacement – D: Verstellbereich

Measurand related extent within which the measuring range can be moved.



Application range

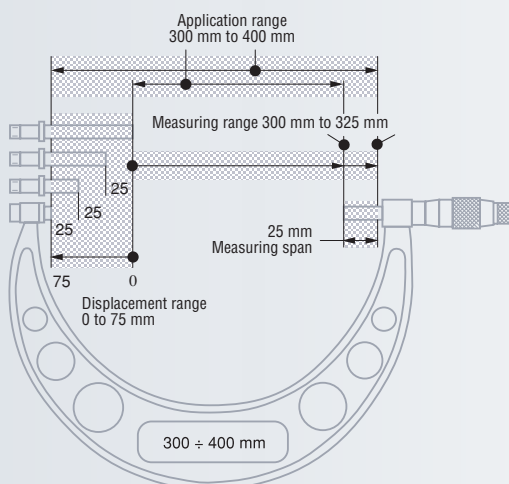
F: Etendue d'application

D: Anwendungsbereich

The application range is equal to the sum of both displacement and measuring ranges.

Note

The first and last values make each range different from one another.



Measurand

F: Mesurande – D: Messgröße

Physical quantity of a measurement. In other words, the measurand is the length or the angle as measured or to be measured.

Measured value

F: Valeur mesurée – D: Messwert

Any measured value expresses the result of a measurement. Therefore, this value is directly associated with the measurand and further allocated to the output feature (e.g. display) of a measuring instrument or device.

A measured value is expressed as the product of both numerical value and unit.

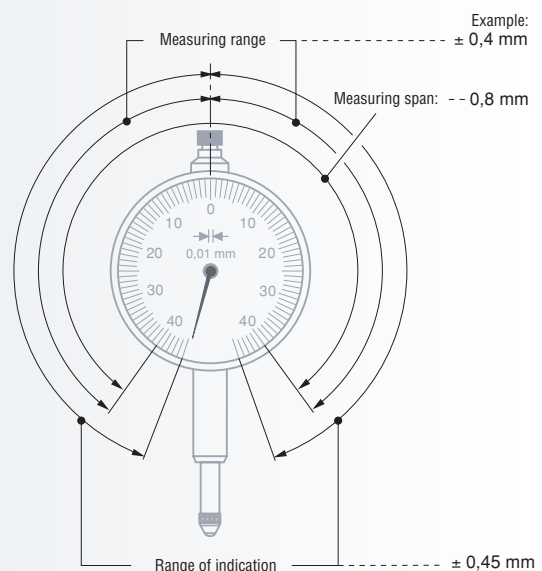
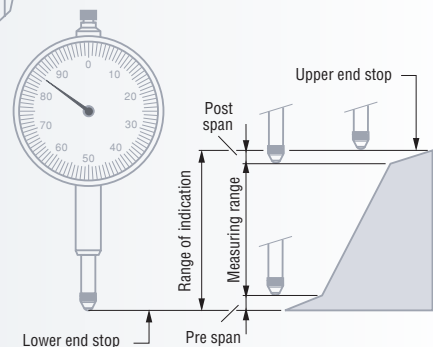
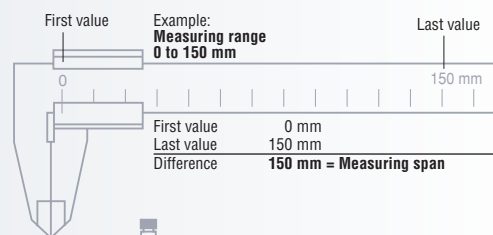
The measured value includes the true value plus the random and systematic errors of the relevant tool.

Result of measurement

F: Résultat de mesure – D: Messergebnis

Product of a measured value once corrected on the basis of the known systematic errors.

This result is further increased by the uncertainty of measurement, which includes the random as well as any unknown systematic error.





Permissible limits of a metrological characteristic MPL

F: Limites tolérées d'une caractéristique métrologique MPL

D: Grenzwerte eines Messtechnischen Merkmals MPL

Extreme permissible values of a metrological characteristic of a given measuring equipment, according to specifications or standards proper to the manufacturer or others.



Maximum permissible errors G

F: Erreurs maximales tolérées G

D: Fehlergrenzen G

These errors are assimilated to the «Permissible limits of a metrological characteristic MPL».

Being related to both upper and lower highest deviations of a measuring instrument, they are usually symmetrical in practical metrology and, therefore, stated as single value, without any sign.



Maximum permissible errors for a metrological characteristic MPE

F: Erreurs maximales tolérées d'une caractéristique métrologique MPE

D: Grenzwerte für Messabweichungen für ein messtechnisches Merkmal MPE

Extreme values of the permissible error for a metrological characteristic of a given measuring equipment, according to specifications or standards proper to the manufacturer or others.



Deviation span of indication

F: Champ d'erreur d'indication

D: Abweichungsspanne

This deviation span matches the distance from the highest to the lowest point of a coordinate as shown on the relevant diagram. The value obtained is either applicable to whole or the local measuring span or measuring range.

All needed measurements are carried out in one direction (without reversal of the measuring force) - i.e. with upward plunger movement for a dial gauge. For those needed to establish the whole deviation span, they are performed in both directions (with reversal of the measuring force) - i.e. with upward and downward movement of the plunger for a dial gauge.



Repeatability

F: Fidélité (répétabilité)

D: Wiederholpräzision

Ability of a measuring instrument to repeat the results obtained from the same measurand successively measured in the same direction, also under the same conditions.

Repeatability, which delivers an important information for the assessment of the uncertainty of measurement, is quantitatively expressed as standard deviation of dispersion values.



Hysteresis

F: Hystérésis

D: (Messwert-) Umkehrspanne

Hysteresis expresses the difference between various indications of a measuring instrument. This value is achieved through measurements of the increasing/decreasing value of a same measurand, taken under the same conditions.

Hysteresis, which is quantitatively stated as standard deviation of value dispersion, can be determined anywhere within the measuring span or range. Its amount can also be obtained from the diagram of the deviation span in its whole.

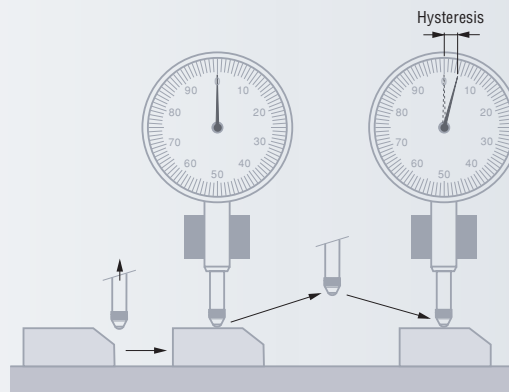
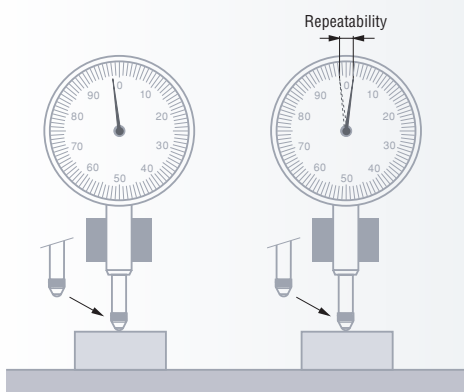


Repeatability limit

F: Fidélité (répétabilité) limite

D: Wiederholgrenze

Extrem value for repeatability.



Decision Rules for Proving Conformance or Non-Conformance with Specifications

Relationship with the uncertainty of measurement

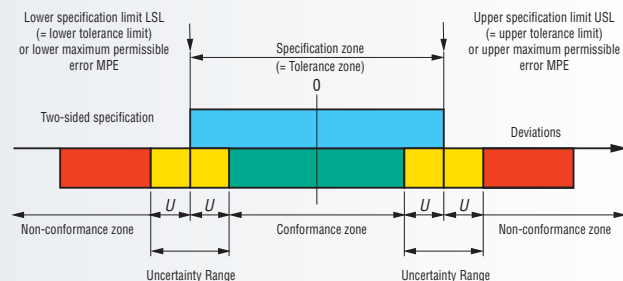
ISO 14253-1, which is a part of «Geometrical Product Specification GPS», provides «Rules for establishing the conformance or non-conformance with specifications». These rules are valid for «Inspection by measurements of work pieces and measuring equipment».

This ISO standard makes allowances for the uncertainty of measurement – or more precisely for the true uncertainty of any measurement whenever the conformance or non-conformance with a given specification must be proved. So, for a workpiece, the specification matches a preset tolerance while being equal to the maximum permissible errors for a metrological characteristic (MPE) for a measuring instrument.

Any given specification is a constant whereas the measurement uncertainty is a variable, which is affected by many components. Therefore, the zone of the conformance or non-conformance zone depends on the size of the effective expanded uncertainty U .

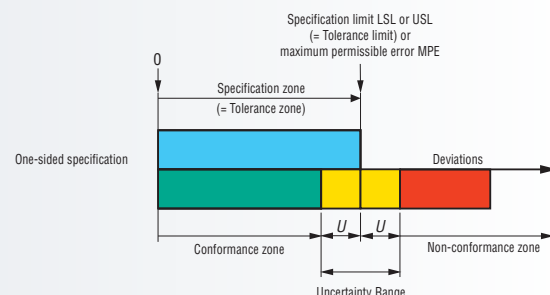
Rule for proving conformance

Conformance is proved when the **measurement result y is lying within the specification zone, reduced on either side by the expanded uncertainty U** . Consequently, workpieces or measuring instruments can be accepted as far as their conformance with the specification is proved by the manufacturer (supplier).



Rule for proving non-conformance

Non-conformance is proved when the **measurement result y is lying beyond the specification zone, increased on either side by the expanded uncertainty U** . In a such case, the relevant measuring instruments can be rejected if the purchaser (customer) gives evidence of its non-conformance.



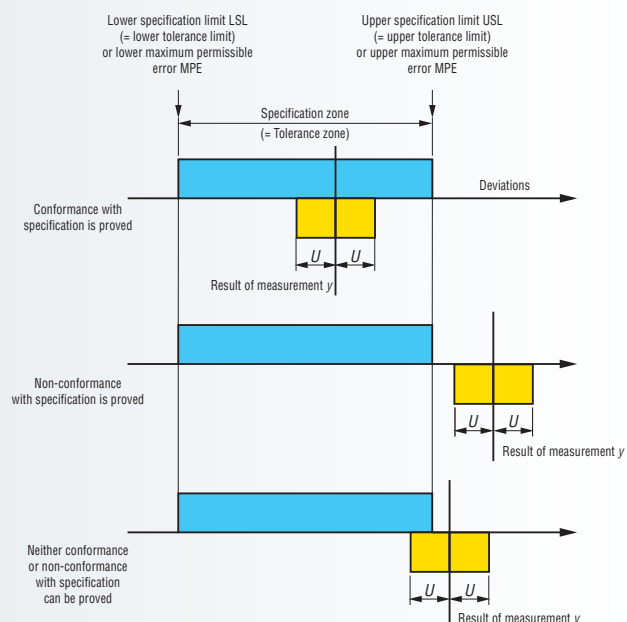
Conformance or non-conformance can neither be proven

This often happens when the **measurement result y associated with the expanded uncertainty U includes either of both LSL and USL specification limits**. As a result, work pieces or measuring instruments can neither be automatically accepted nor rejected.

For such «dead end cases», it is advisable to follow the rule below.

– Repeat all measurements based on a reduced uncertainty, so that conformance or non-conformance can clearly be demonstrated. Usually, proceeding in this way benefit to the party that's able to provide the needed proof.

– Come to a mutual agreement providing the procedure to be applied if such cases arise.

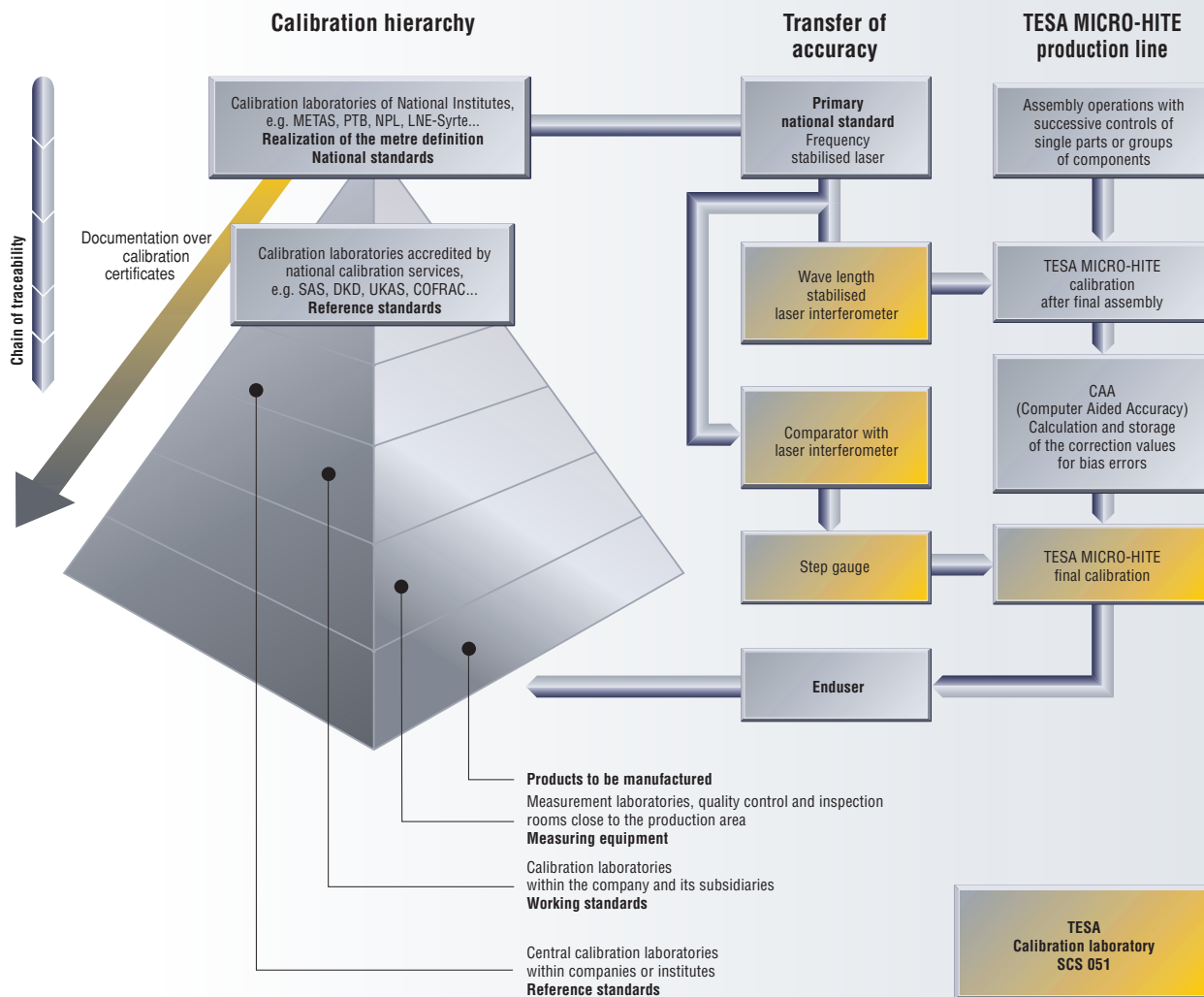


Traceability to National Standards

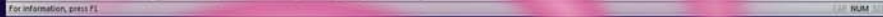
All measuring equipment consistently used on our production site are traceable to national standards or reference fixtures through our quality management system.

Traceability is established by recalibration at regular intervals with documentary evidence as specified in the standards.

The illustration that follows shows the hierarchy of calibrations within the chain of traceability. The example set for the transfer of accuracy to our MICRO-HITE height gauges also shows how they are calibrated. Each feature is supplied with a free SCS calibration certificate issued by our laboratory officially accredited by the Swiss Calibration Service.



A-1



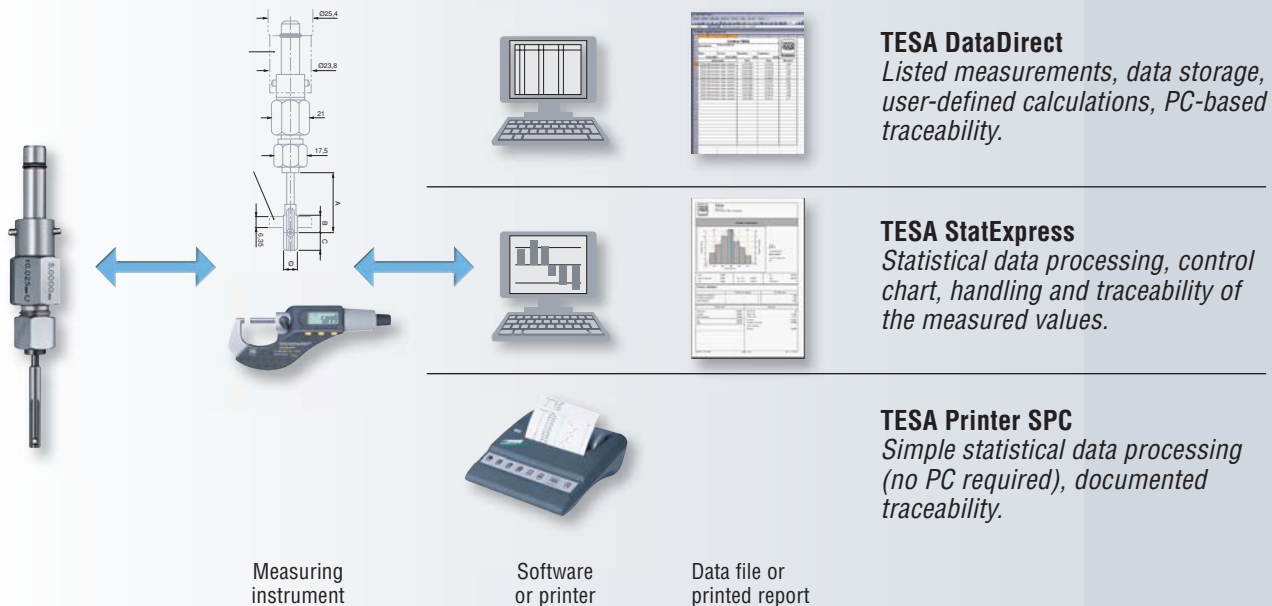
TESA LINK

Inspection, traceability and cost reduction have a growing significance in all industrial sectors. This involves high quality metrology products, but also a suitable evaluation and further application of the measurements carried out.

Manufacturing Inspection

Evaluation

Documentation



TESA DataDirect

Listed measurements, data storage, user-defined calculations, PC-based traceability.

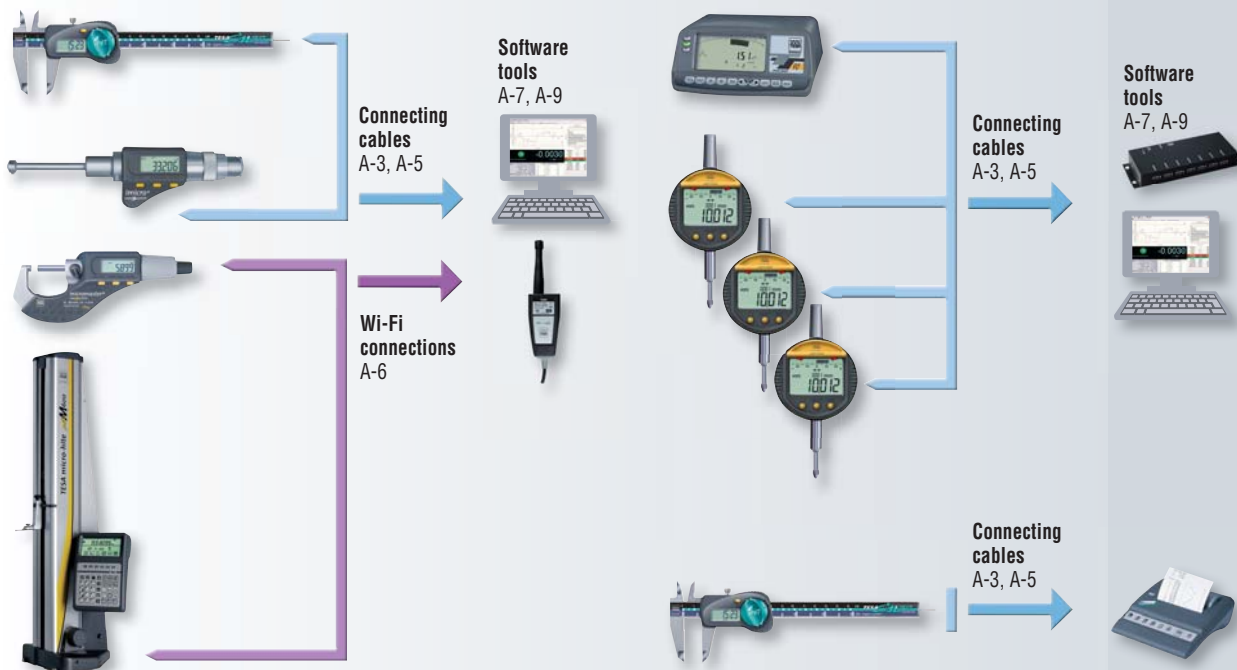
TESA StatExpress

Statistical data processing, control chart, handling and traceability of the measured values.

TESA Printer SPC

Simple statistical data processing (no PC required), documented traceability.

Besides Software tools, TESA also offers a wide variety of cable links between the precision tool and the computer in order to optimize your manufacturing processes, improve quality and help you originate any document needed for traceability.



OPTO and Sub-D standard connections

Any cable connection is defined through both connectors fitted at each cable end to link the computer, but mainly the measuring instrument being used.

To achieve highest compatibilities, TESA uses standardized and proven connectors essentially.

Common systems



TESA Printer SPC



Computer*



Sub-D 9p/f



USB



Ansley 10p/f



Sub-D 9p/f

*Some computers are provided with other interfaces or do no longer have a serial port (Sub-D 9p).

OPTO Connection



RS 232 opto-coupled, monodirectional or bidirectional



The table below contains the cables convenient for precision tools fitted with an OPTO connector, such as TESA-CAL IP67, IP65, INTERAPID Light, TESA Micromaster, TESA Imicro, TESA Alesometer, TESA Digico 10 - 11 - 205 - 305 - 400 - 500 - 600 - 705, TESATRONIC TT20-60-80-90, among others.



No		L in m	System
04761062	Opto-USB DUPLEX Comes with drivers and software in DEMO version on CD.	2	USB
04761046	Opto-RS Simplex For data transfer from handtool t to host computer. Allows a single request only.	2	Sub-D 9p/f Simplex
S47010022	Same as item 04761046, except for the length.	5	
04761049	Opto-RS Duplex avec possibilité d'envoi de Setting commands can be sent to the precision tool.	2	Sub-D 9p/f Duplex
S47010024	Same as item 04761049, except for the length.	5	
04761027	Connecting cable alone	2	w/o connector

Sub-D Connexion



RS 232, Sub-D 9p/m connector



Connecting cables for the following CMMs or precision handtool:

TESA Micro-Hite, TESA-Hite, TESA μ Hite, TESA TG.



Nº	=		System
		L in m	
04761063	Sub-D USB Comes with drivers and software in DEMO version on CD	2	USB
04761052	Uncrossed cable.	2	Sub-D 9p/f
S47010025	Same as item 04761052, except for the length.	10	Sub-D 9p/f

USB Accessories

Nº	=		
		L in m	
S47120002	USB Adapter Comes with drivers on CD, USB Sub-D connector, 9p/m	0,1	
S47120003	Multiplexer, 7 USB ports 2.0 Robust steel housing, external powering using a C-type AUX connector, 4 pins. (4 ports for 04761062 and 04761063) <i>Furnished with:</i> DC mains adapter (EU) Connecting cable to PC. Recommended highest number of ports: 49 USB ports connectable on 2 levels.	1,5	
04761071	USB Foot Switch Direct connection to any USB port. Takes DataDirect or StatExpress into account when transferring the measured values from all connected measuring tools.	2	



S47120002



S47120003



04761071

Connecting cables and cable adapters

N°			System	Instrument
		L in m		
04761023	Connecting cable for TT10 – TESA Micro-Hite, versions 10/11/12	2	Sub-D 9p/f	MiniDIN 8p/m
04761024	Connecting cable to matrix printer for TT10 – TESA Micro-Hite, versions 10/11/12	2	Sub-D 25p/m	
04761038	Connecting cable for TESA Digico 1 and 2, also with power outlet	3	Sub-D 25p/f	Special Digico 1-2
S47078588	Connecting cable for TESA Digico 1 and 2 – TESA Printer SPC	2	Ansley 10p/f	
04761060	Connecting cable for TESA Digico 12 – Electronic dial test indicator	2	Sub-D 9p/f	Special Digico 12
03969007	Connecting cable, RS232 serial for TESA-SCOPE – Reflex 1 – Readouts TS100 – 300	3	Sub-D 9p/f	
04761017	Cable adapter		Sub-D 25p/m Sub-D 9p/m	
S47001891	Cable adapter for OPTO simplex used to link DIGIMATIC	0,2	Sub-D 9p/m Ansley 10p/f	
S53300165	Connecting cable for Clinobevel 1	1,8	USB	Special Clinobevel
S53070174	Connecting cable for Clinobevel 2	2,5	Sub-D 9p/f	

Accessories

N°			
		L in m	Connectors
04761054	Mains adapter, 100 to 240 VAC 50 to 60 Hz, 6,6 Vdc, 750 mAh (provided w/o mains cable)	2	DC-Jack
04761055	EU cable for mains adapter N° 04761054	1,5	
04761056	US cable for mains adapter N° 04761054	1,5	
04761037	Mains adapter, 230 VAC, 9 Vdc, 22 mAh, 1,8 VA – TESA Digico 1 or 2	2	Special Digico 1-2
04761057	Mains adapter, 110 VAC, 9 Vdc, 22 mAh, 1,8 VA – TESA Digico 1 or 2	2	
04761058	Adapter cable with mini-jack cable entry for hand switch or foot switch		Sub-D 9p/m Sub-D 9p/f
04768000	Hand switch for triggering data transfer – Adapter cable 04761058 – TESA Printer SPC	2	
04768001	Foot switch for triggering data transfer – Adapter cable 04761058 – TESA Printer SPC	2	



047681058



04768000



04768001

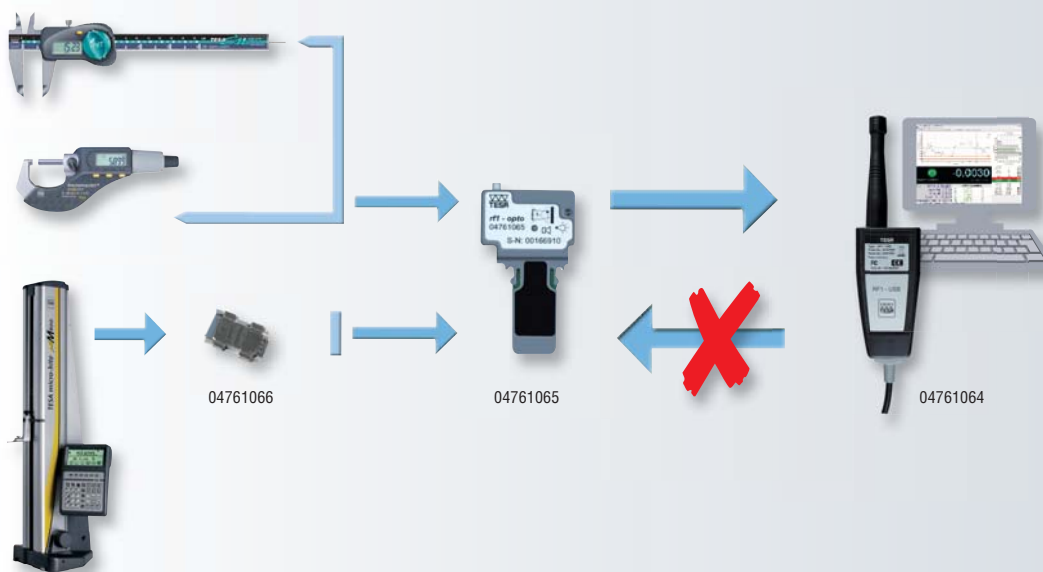
Wireless Connection

The solution for a freely move. The use of this technology ensures full flexibility and makes the measuring instrument easily traceable owing to a distinct address with acknowledgment.



Scale 1:1

Possible connection of up to 120 precision handtools to a single or several host computers (max. distance 150 m). Where data transmission cannot visually be checked for correctness, the combined acoustic/optical signal lets you get a confirmation that data transfer has occurred, so that no data can be lost.



≤ 150 m



2 x 1,5V SR920W
or as per model
1 x 3V CR2032



≈ 100'000
data transfers



0°C to 50°C



-30°C to 60°C



EN 300 220

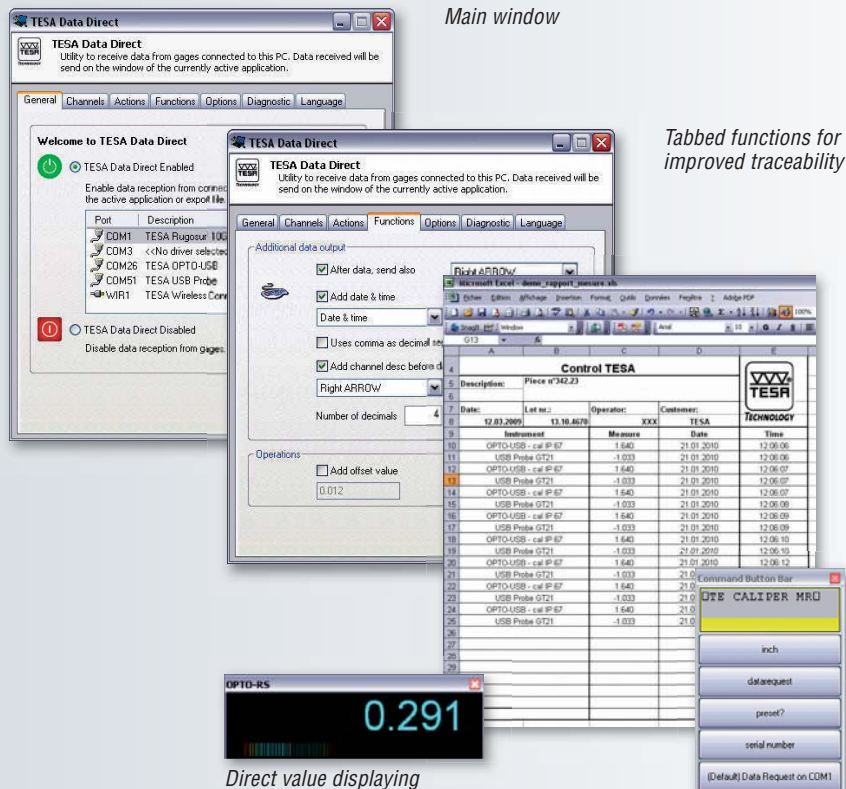
Nº				
04761064	Rf-USB Receiver, type rf-USB, for host computer, provided with utility for setting purpose (SimKey)	USB	mm 47 x 275 x 30	g ≈ 175
04761065	Opto-rf1 Transmitter, type rf, for Opto connector (except for TESA Digico and calipers >500 mm)	OPTO	25 x 42 x 12	≈ 8
04761066	Opto – Sub-D Opto-adaptor Sub-D for serial interface (Sub-D)	Sub-D 9p/m	31 x 51 x 17	≈ 10
04761067	RS 232 – rf Transmitter, type Sub-D, for CMMs along with mains supply	Sub-D 9p/m	47 x 275 x 30	≈ 175
04761068	Digico 12 – rf Transmitter specially designed for TESA Digico 12 and electronic dial test indicator	Special	35 x 49 x 11	≈ 10
04761069	Opto – rf Digico Transmitter, type rf, for TESA Digico 205, 305, 400, 500, 600, 705	OPTO	30 x 50 x 11	≈ 8

DataDirect

This software solution is an easy way to collect and report in real time all measured values taken with nearly any TESA's precision tools featuring an RS 232 data output.

DataDirect is provided with serial input/output drivers specially configured for TESA's products, but also for those purchased from other manufacturers. It works effectively for data transfer to your data sheets, database, statistical modules or any other Windows-based applications.

With this user-friendly software you will be able to create your own reports for the relevant part inspection.



04981001

TESA DataDirect

Software including:

CD for installation

USB dongle

Instruction manual (PDF)

For information on functionalities and compatibilities, see page A-9.

StatExpress

This dedicated software lets quality assurance enter into your manufacturing processes in that it makes it possible for your quality-oriented control charts to be conveniently downloaded, reported, swapped and stored.

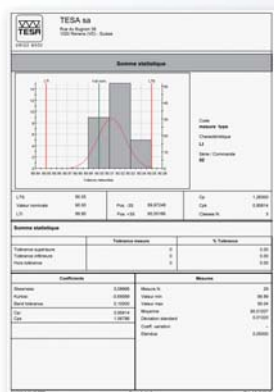
StartExpress is compatible with all TESA's products – from the caliper up to the CMM or Vision machine. As integrated component, DataDirect provides the needed flexibility for easy data transfer to most of the electronic gauges currently available on the market.

Running StatExpress you will have the ability to create protocols including the measured values obtained from a single or several handtools, assign tolerances, calculate statistics, print out various measurement reports, compute XR control charts, and much more.



Simultaneous measuring of multiple parts.

Main window with or without instructions



Detailed report for each measured part features



Report by measured parts with number of the part series



XR control chart



04981002 TESA StatExpress
Extended programme version

04981003 TESA StatExpress Light
Lightened programme version (see next page)

provided with:

CD for installation – USB dongle – Instruction manual (PDF)

For information on fonctionnalités and compatibilities, report to page A-9.

TESA Software Tools

This overview shows the main functionalities and compatibilities using a TESA's software for data acquisition and data processing.

Ask your local distributor or visit our web site www.tesabs.ch and get access to the free software version available for evaluation.

Minimum requirements:

Pentium 4 or alike – 512 MB RAM – 10 GB HD – Windows XP or 7 (32 bits).



			04981001 DataDirect	04981003 StatExpress Light	04981002 StatExpress
Compatible instruments and systems					
OPTO-RS / USB			●	●	●
Height gauges (TESA-HITE, MICRO-HITE)			●	●	●
USB probes			●	●	●
Rugosurf 10, 10G, 90G			●	–	●
Micro-Hite 3D Reflex, TS 300			●	–	●
TPS			●	●	●
BPI intelligent probe boxes			–	–	●
Custom made instruments, type RS 232			●	●	●
Instruments from other makers (Mitutoyo, DMX3 - DMX8, Steinwald single 6, etc.)			●	●	●
Wireless TESA systems			●	●	●
Options available					
Export CSV data files			●	●	●
ASCII commands			●	–	–
Dynamic displaying (Direct displaying of the measured value on used monitor - Not available with a wireless system)			●	–	–
TESA DataDirect included			–	–	●
Import CSV data files			–	–	●
Table with all measured values included			–	●	●
XR control chart			–	–	●
Report by measured parts			–	–	●
Report by measured feature			–	●	●
Simultaneous data acquisition			–	–	●
Overall report			–	●	●
Protection according to Users skills level			–	●	●
Inspection report in PDF, HTML or other format.			–	●	●
Setting option for USB type inductive probes, BPI probe boxes. Zero-setting procedure and plausibility test.			–	–	●

TESA Portable Printer

Intelligent printer designed for the inspection of finished parts or incoming goods – Provides SPC statistics and prints out measurement results with graphical representations.



TESA PRINTER SPC

Can be connected to TESA measuring instruments, but also to those provided with a DIGIMATIC output – Your TESA PRINTER SPC is capable to recognise the plug in tool and will execute the appropriate configuration, automatically.

	«Normal»	«Tolerance»
Statistical features		
Lower limit of size (LSL)	–	●
Upper limit of size (USL)	–	●
Tolerance	–	●
Number of captured values:		
– sampling extent	●	●
– < lowest size	–	●
– > highest size	–	●
– out of tolerances in per-cent	–	●
Lowest list value	●	●
Highest list value	●	●
Value dispersion R	●	●
Arithmetical mean $\bar{x}$	●	●
Standard deviation σ_n, σ_{n-1}	●	●
Process capability C_p, C_{pk}	–	●
Graphical Representations		
Position of each single value within the tolerance range (10 classes)	–	●
Histogramme	–	●
Display (luminous LEDs)		
Sorting of each single value with green for <i>Good</i> , yellow for <i>Rework</i> and red for <i>Reject</i>	–	●

- Memory capacity: 9999 single values for one feature per sample.
- Two operating modes: «Normal» and «Tolerance».
- Limits of size quickly set on the display of the connected instrument with subsequent transfer to TESA PRINTER SPC.
- Output of statistical values printed out with graphical representations.
- Output of reports with headings to be filled in by the operator.
- Hardcopies printed in preferred language (English, German, French, Italian or Spanish).
- Battery-powered (6 V) printer unit for use on the fly (optional).



Matrix printer using thermal paper roll

Paper width: 110 mm.
Print mode:

40 signs/line

RS232 for data inputs (9-pin male, trapezoid connector)
DIGIMATIC (Ansley connector, 10-pin)
Connector with mini-jack for remote triggering of data transfer

Mains adapter 100 to 240 Vac, 6,6 Vdc.
Optional accessory: 6 V battery pack, rechargeable

10°C to 40°C

–10°C to 60°C

IP40 (IEC 60529)

EN 50081-1, EN 50081-2, EN 50082-1, EN 50082-2

180x180x84 mm (W x D x H)

0,55 kg

Shipping packaging

Identification number

Declaration of conformity



06430000



TESA PRINTER SPC

Printer with SPC capability, value classification and memory; prints all results with graphical representations using the matrix printer provided with a 110 mm wide thermal paper roll; RS232 interface.

Supplied with the following accessories:

04765013 1 Thermal paper roll, 110 mm in width

04761054 1 Adapter 100 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA

04761055 1 EU adapter cable

Optional accessories

04768035 Battery pack, 6V

04761056 US adapter cable

Calipers



THE FAVOURITES

Calipers are the most popular length measuring instruments used worldwide. Owing to their simple construction, ease of handling and quick operation, they are the favourites in dimensional measurement. The wide variety of forms and shapes available with exclusive measuring faces make them the universal hand-held tools.

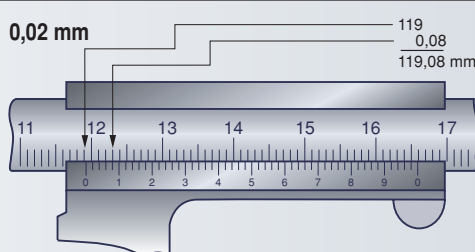
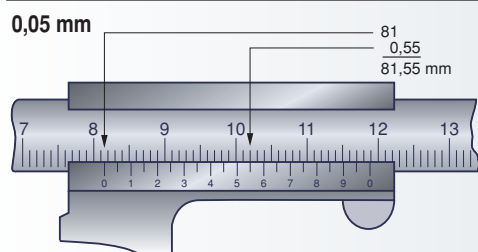
All calipers of the famous TESA, ETALON, INTERAPID and ROCH brand names are recognised for their superior quality – the guarantee for precise measurement. The flawless guide of the slider on the beam ensures silky-smooth operation while also preventing the measuring jaws from tilting.

The choice of the material with exactly defined heat treatment as well as a robust design result in further distinctive advantages such as wear and corrosion resistance.

For quick and easy reading of your measured values – a condition that's essential in the certainty of any measurement – we offer dial calipers for a comfortable reading or more sophisticated digital models for error-free reading besides regular vernier calipers.



Vernier Calipers



Chosen length l mm	0,1 0,05 mm	0,02 mm	0,01 mm
50	50	20	20
100	50		
150	50		
300	60	30	30
400	70		
500	80		
600	90		
700	100		
800	110	40	40
900	120		
1000	140		
1200	160	50	
1400	180		
1600	200	60	
1800	220		
2000			



Max. Permissible Errors

The max. permissible errors (G) are expressed by the equation given below, where the values should be rounded down to two decimal fractions (0,01 mm).

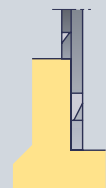
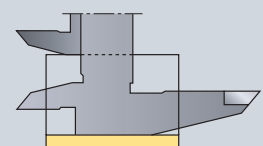
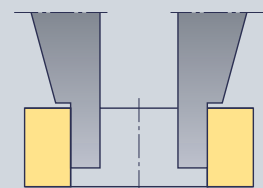
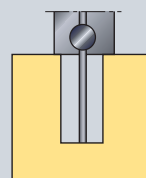
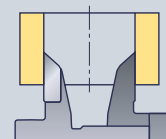
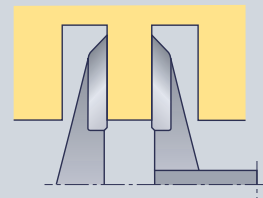
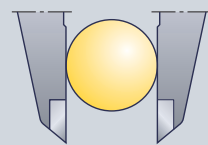
They apply in measurement taken under the same measuring force. For all other measurements, including those performed with use of the depth foot, the values obtained have to be increased by 20 µm.

Calipers with scale or vernier reading to 0,1 or 0,05 mm:

$$G = (20 + l / 10 \text{ mm}) \mu\text{m} \geq 50 \mu\text{m}$$

Calipers with analogue indication (scale or vernier reading to 0,02 mm) or numerical indication:

$$G = (22 + l / 50 \text{ mm}) \mu\text{m}$$



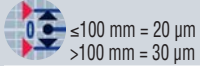
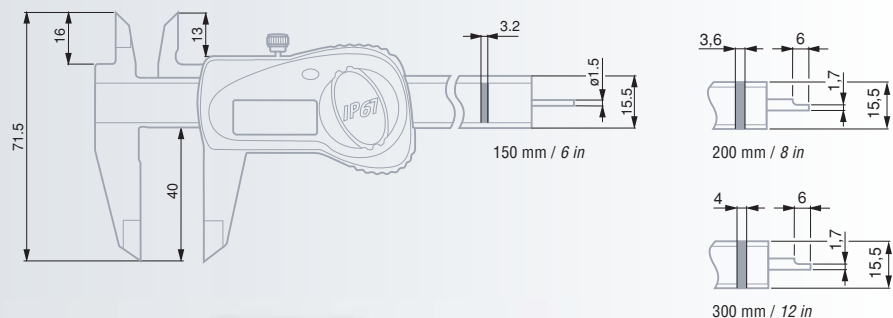
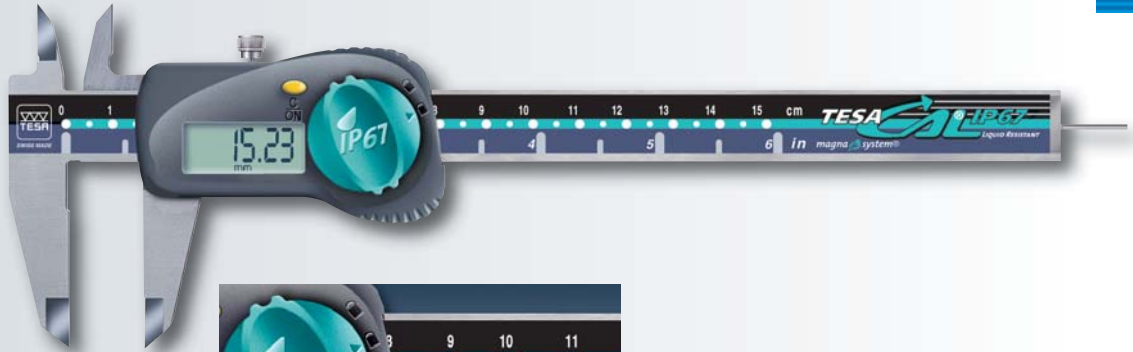
TESA CAL IP67 magna μ system



Patented measuring system – TESA magna μ system

New electronic caliper – The highest degree of protection ever achieved with hand-held tools of this type – Totally immune to the penetration of liquids and particles of metal.

Magnetic measuring system – a TESA's technology guaranteeing full reliability and accuracy, even in the toughest conditions of use – SWISS MADE.



	mm / in	RS232	Thumb roller	A mm	B mm	C mm	g
00530300	150 / 6	—	—	40	16	71,5	140
00530301	150 / 6	—	●	40	16	71,5	140
00530302	200 / 8	—	●	50	20	89,5	200
00530303	300 / 12	—	●	64	22	105,5	270
00530311	150 / 6	●	●	40	16	71,5	140
00530312	200 / 8	●	●	50	20	89,5	200
00530313	300 / 12	●	●	64	22	105,5	270

Optional Accessories

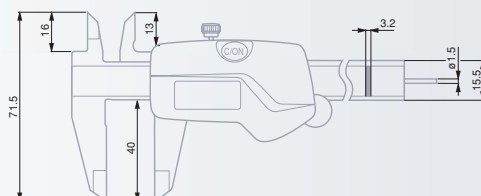
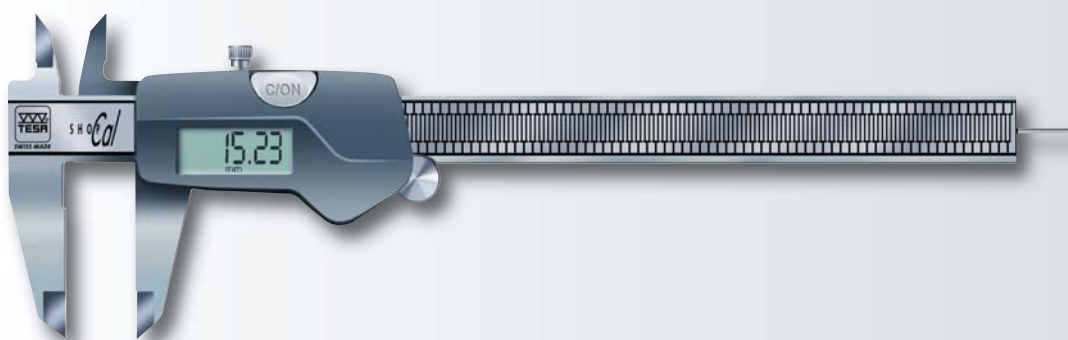
01961000	3 V lithium battery, 190 mAh, type CR 2032
00560013	Depth foot for calipers having a 150 mm measuring span (also see on page B-24)
	For connecting cables, see section A

TESA SHOP-CAL



Patented measuring system – TESA magna μ system

- ABSOLUTE or DIFFERENCE measurements
- High quality precision mechanics
- Large LC display
- Easy-to-use
- Best Price/Performance relationship



						
00530090	mm / in 150 / 6	●	A mm 40	B mm 16	C mm 71,5	g 140
<i>Optional Accessories</i>						
01961000	3 V lithium battery, 190 mAh, type CR 2032					
00560013	Depth foot for calipers having a 150 mm measuring span (also see on page B-24)					



✓



DIN 862
(Style 1AZ)



0,01 mm
0.0005 in



LCD, 7 mm



Floating zero



«ABS» and
«DIFF»



Conversion
mm / in



≤ 100 mm = 20 μ m
 > 100 mm = 30 μ m



10 μ m



Capacitive
glass scale with
incremental
divisions



> 2 m / s



Hardened
stainless steel



3V lithium
battery, CR 2032



≈ 2 a
(≈ 2000 h / a)



Idle mode
after 10 min,
automatic switch
off after 2 h.



10°C to 40°C



-10°C to 60°C



80%



IP40
(IEC 60529)



EN 50081-1
EN 50082-1



Suited
plastic case



Identification
number



Inspection
report with a
declaration of
conformity



DIN 862
(Style 1AR)

≤100 mm = 20 µm
>100 mm = 30 µm

Hardened
stainless steel

32 mm
diameter
rotating dial
with lock

Slider with
locking screw

Steel gear mechanism,
hardened
and ground

Patented
shockproof
design

Suited
plastic case

Identification
number

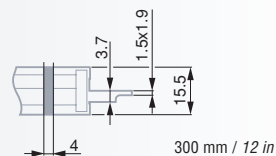
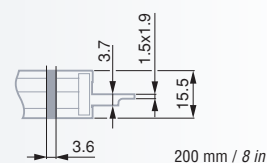
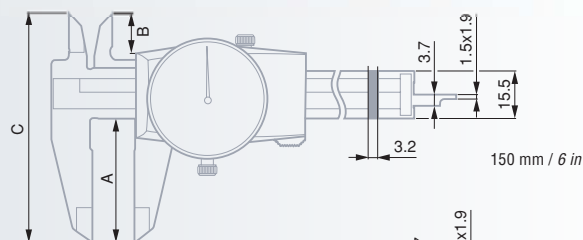
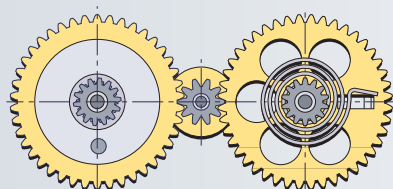
Inspection report
with a declaration
of conformity

Dial Calipers

Rugged construction – High accuracy – Patented shockproof design – Ideal for use in the workshop.

Models TESA CCMA-M

Easy-to-read dial calipers – Slider with metal dial housing – Models with a 200 or 300 measuring span fitted with a thumb roller.



Thumb roller

	A mm	B mm	C mm
00510008	0 ÷ 150 mm	0,02 mm	2 mm
00520002	0 ÷ 6 in	0,001 in	0.1 in
00510045	0 ÷ 200 mm	0,02 mm	2 mm
00510046	0 ÷ 300 mm	0,02 mm	2 mm

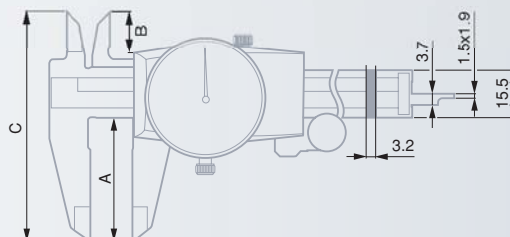
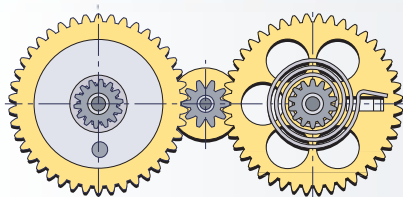
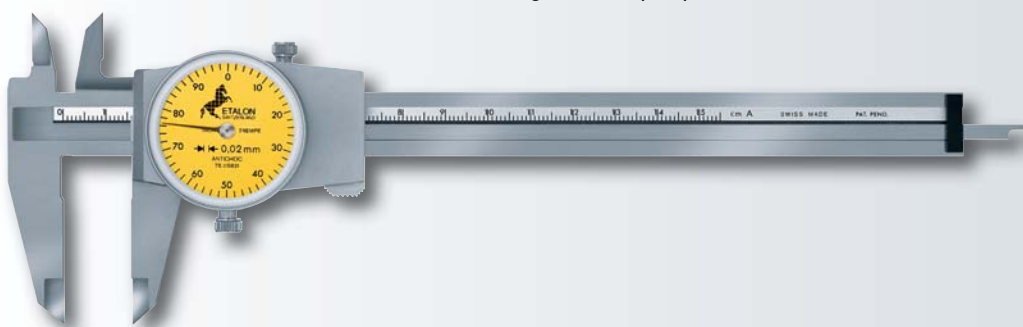
Optional Accessory

00560013 Depth foot for models 150 mm/6 in (also see page B-24)



Model ETALON 125

Slider with metal dial housing – 1 mm per pointer revolution.



075115821



0 ÷ 150 mm



0,02 mm



1 mm



without thumb roller

Optional Accessory

00560013

Depth foot (also see page B-24)



DIN 862
(Style 1AR)



≤ 100 mm = 20 μm
> 100 mm = 30 μm



Hardened
stainless steel



32 mm
diameter
rotating dial
with lock



Slider with
locking screw



Steel gear mechanism,
hardened
and ground



Patented
shockproof
design



Suited
plastic case



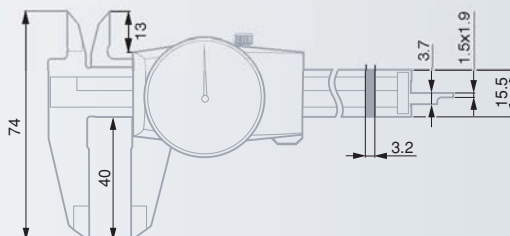
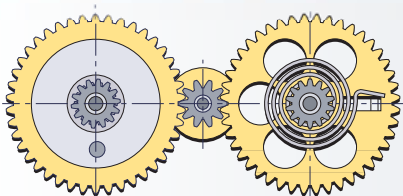
Identification
number



Inspection report
with a declaration
of conformity

Model TESA CCMA-M, 0,01 mm

Slider with metal dial housing – 1 mm per pointer revolution.



00510050



0 ÷ 150 mm



0,01 mm



1 mm

Optional Accessory

00560013

Depth foot (also see page B-24)



DIN 862
(Style 1AR)



≤ 100 mm = 20 μm
> 100 mm = 30 μm



Hardened
stainless steel



32 mm dia.
rotating dial
with lock



Slider with
locking screw



Steel gear,
hardened
and ground



Patented
shockproof
design



Suited
plastic case



Identification
number



Inspection report
with a declaration
of conformity

Model TESA CCMA-P

Quick and easy reading – Slider with plastic dial housing.



DIN 862
(Style 1AR)



≤100 mm = 20 µm
>100 mm = 30 µm



Hardened
stainless steel



32 mm dia.
rotating dial
with lock



Slider
with plastic dial
housing plus
locking screw



Steel gear,
hardened
and ground



Patented
shockproof
design



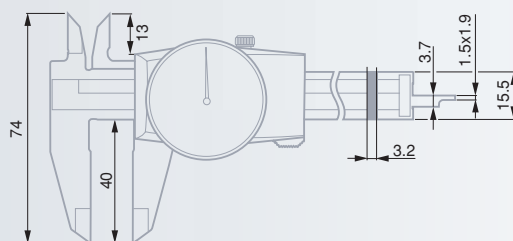
Suited
plastic case



Identification
number



Inspection report
with a declaration
of conformity



00510004



0 ÷ 150 mm



0,02 mm



2 mm

00520001

0 ÷ 6 in

0.001 in

0.1 in

Optional Accessory

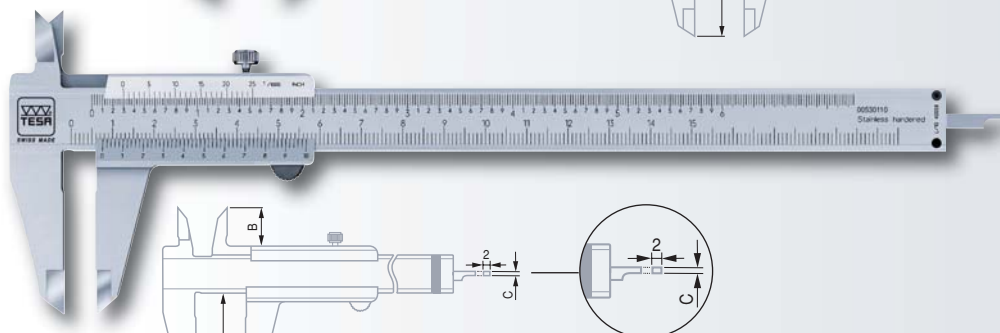
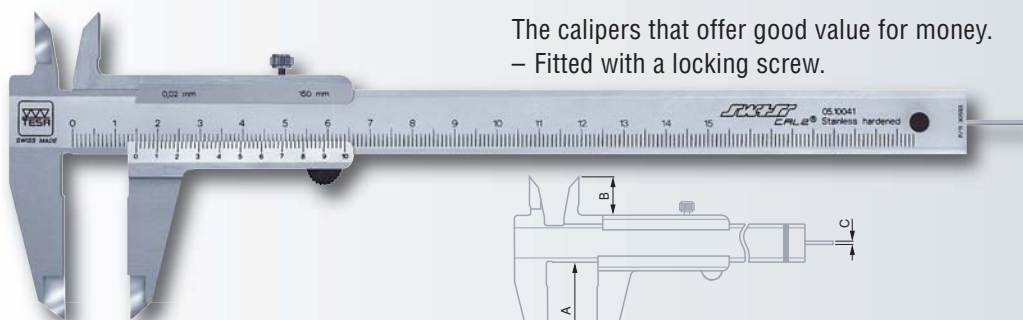
00560013

Depth foot (also see page B-24)



TESA Calipers with Vernier Reading

The calipers that offer good value for money.
– Fitted with a locking screw.



DIN 862
(Style 1AN-2)
NF E 11-091



Satin-chrome scale
background;
main scale
slightly set back for wear
protection



See page B-2



Hardened
stainless steel



Suited
plastic case



Identification
number



Inspection report
with a declaration
of conformity



		mm	mm	in	in	A mm	B mm	C mm
00510041	SWISSCAL 2	0 ÷ 150	0,02	—	—	40	15,5	Ø 1,5
00510047	Standard model	0 ÷ 150	0,05	—	—	40	15,5	Ø 1,5
00530103	Standard model	0 ÷ 150	0,05	0 ÷ 6	$\frac{1}{128}$	40	15,5	Ø 1,5
00530104	Standard model	0 ÷ 200	0,05	0 ÷ 8	$\frac{1}{128}$	50	18	1,5 x 2
00530105	Standard model	0 ÷ 300	0,05	0 ÷ 12	$\frac{1}{128}$	64	22	—
00530110	Standard model	0 ÷ 150	0,02	0 ÷ 6	0.001	40	15,5	Ø 1,5
00530111	Standard model	0 ÷ 200	0,02	0 ÷ 8	0.001	50	18	1,5 x 2
00530112	Standard model	0 ÷ 300	0,02	0 ÷ 12	0.001	64	22	—
00530120	Self-locking model	0 ÷ 150	0,05	0 ÷ 6	$\frac{1}{128}$	40	15,5	1,5 x 2
00530121	Self-locking model	0 ÷ 150	0,02	0 ÷ 6	0.001	40	15,5	1,5 x 2
00530130	Self-locking model with parallax-free readout	0 ÷ 150	0,05	0 ÷ 6	$\frac{1}{128}$	40	15,5	1,5 x 2
00530131	Self-locking model with parallax-free readout	0 ÷ 150	0,02	0 ÷ 6	0.001	40	15,5	1,5 x 2

Optional Accessories

- 00560013 Depth measuring foot (also see page B-24)
- 0051610365 Magnetic magnifying glass, 3x magnification

Magnetic Magnifying Glass

Can be mounted on calipers and the like for easier vernier reading.



Plastic
pocket bag



2 permanent
magnets



0051610365

3x magnification



 DIN 862 and factory standard

 See table

 0,01 mm
0.0005 in

 LCD, 8,5 mm

 Floating zero

 Display lock

 mm / in conversion

 Scale with incremental divisions, magnetic

 > 1,5 m / s

 RS232
opto-coupled,
mono- and
bi-directional

 Hardened steel jaws for external dimensions. Also with TiN coating, thickness to 7 mm. Tungsten carbide inserts for internal dimensions, 5 mm dia. Beam with light alloy hollow section, supported by hardened stainless steel rods.

 3V lithium battery, CR 2032

 ≈ 1,5 a
(≈ 3300 h / a)

 5°C to 40°C

 -10°C to 60°C

 IP40
(IEC 60529)

 EN 50081-1
EN 50082-1

 Shipping packaging

 Identification number

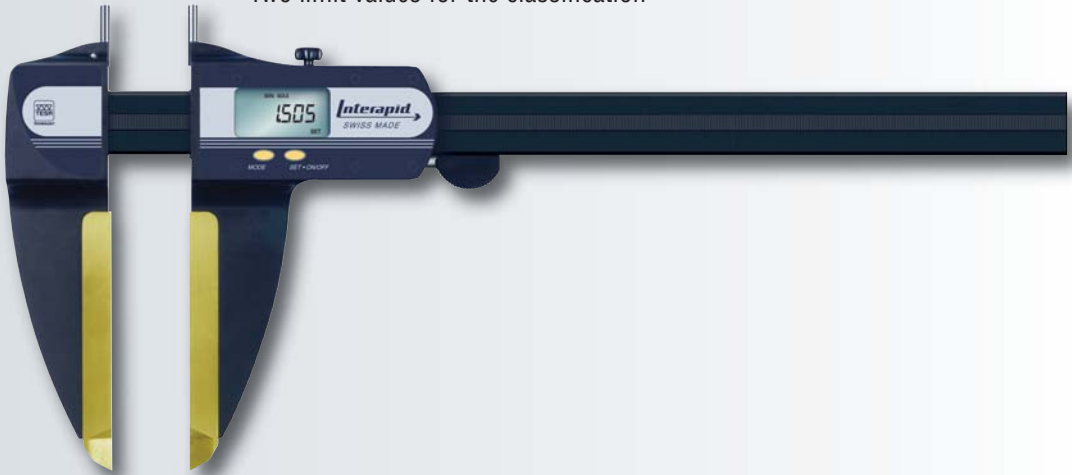
 Inspection report for models up to 1500 mm

 Declaration of conformity

INTERAPID Light

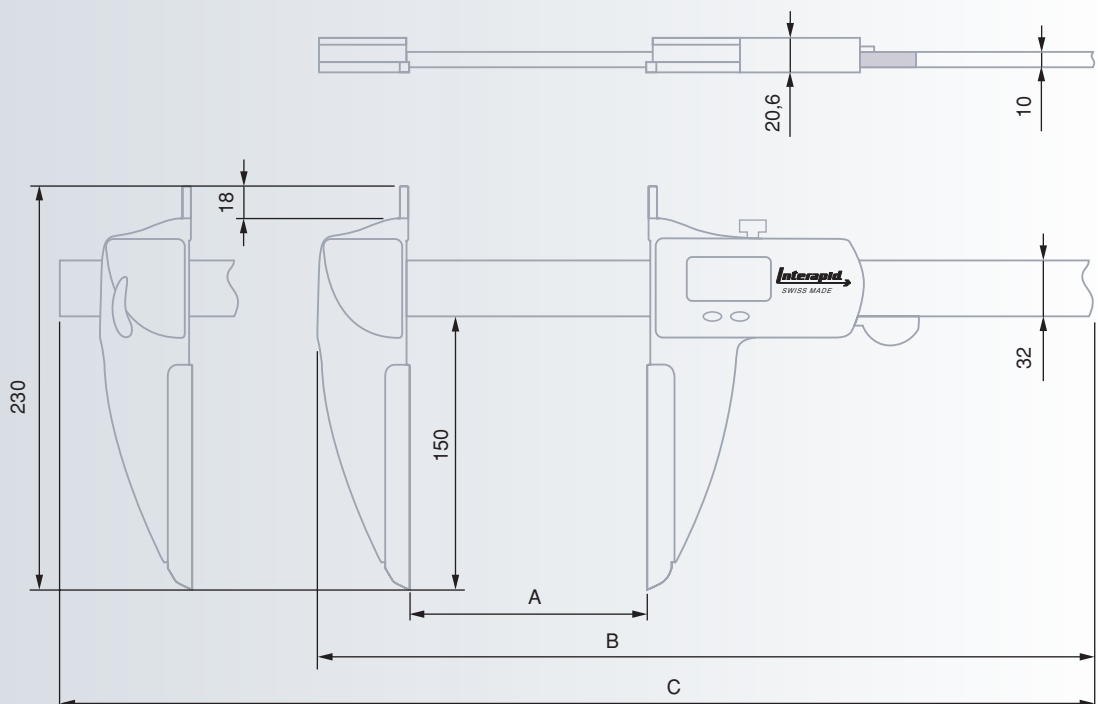
Measuring functions

- Zero setting
- Metric/Inch conversion
- Hold function for displayed value
- OPTO-RS data transfer, mono- and bi-directional
- Two adjustable points of origin (Ref I / Ref II)
- PRESET function
- MIN/MAX mode
- Two limit values for the classification



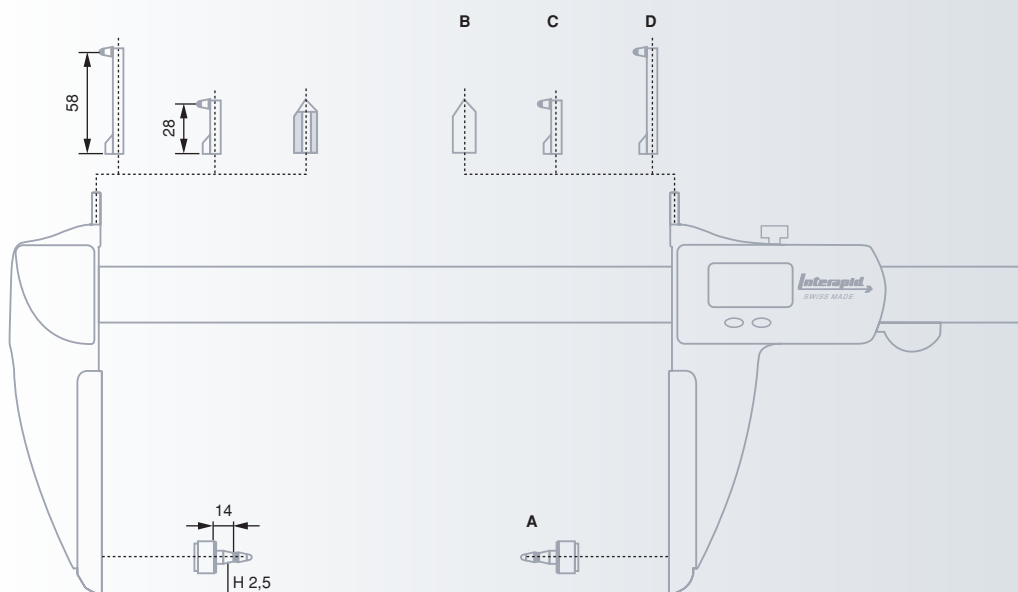
No								
			μm	μm	A mm	B fixed	C movable	kg
00590061	INTERAPID Light	300	30	20	330	618	—	1,1
00590062	INTERAPID Light	600	40	20	630	918	—	1,3
00590063	INTERAPID Light	1000	60	20	1025	—	1306	1,6
00590064	INTERAPID Light	1500	150	20	1525	—	1806	2
00590065	INTERAPID Light	2000	250	30	2040	—	2306	2,3
00590066	INTERAPID Light	2500	350	30	2545	—	2806	2,6
00590067	INTERAPID Light	3000	450	40	3050	—	3306	3

Models 300 and 600 mm with a fixed jaw (left), any other model with a movable one.



Standard Accessories

Nº		
00560095	A	Insert-holder with a M2,5 thread
00560096	B	60° conical steel pin, hardened steel for measuring centre distances >10 mm
00560097	C	Holder for dial gauge inserts used for groove measurement, L = 28 mm
00560098	D	Holder for dial gauge inserts used for groove measurement, L = 58 mm
00560099		Wooden case for INTERAPID Light 300 mm
00560100		Wooden case for INTERAPID Light 600 mm
00560101		Wooden case for INTERAPID Light 1000 mm
00560102		Wooden case for INTERAPID Light 1500 mm
01961000		3V lithium battery, 190 mAh, type CR 2032
For connecting cables, see section A		





✓

DIN 862
(Style E-ZS/B-ZS)

See table

0,01 mm
0.0005 in

LCD, 7 mm



Floating zero

Display
lockmm / in
conversion

See page B-2

Steel scale with
incremental
divisions, magnetic

> 1,8 m / s

RS232
opto-coupled,
mono- and
bi-directionalHardened
stainless steel3V lithium
battery, CR 2032≈ 1,5 a
(≈ 2000 h / a)Idle mode
after 10 min.,
automatic switch
off after 2 h.

10°C to 40°C



-10°C to 60°C



100%

IP67
(IEC 60529)EN 50081-1
EN 50082-1Wooden or
plastic case
depending on
the modelIdentification
numberInspection
report with a
declaration of
conformity

TESA IP67

**Models with rounded measuring faces
for internal dimensions**



No

mm

in

A mm

B mm

00530221

0 ÷ 200

0 ÷ 8

5

80

00530222

0 ÷ 250

0 ÷ 10

5

80

00530223

0 ÷ 300

0 ÷ 12

5

90

00530224

0 ÷ 500

0 ÷ 20

10

150

00530225

0 ÷ 600

0 ÷ 24

10

150

00530226

0 ÷ 800

0 ÷ 32

10

150

00530227

0 ÷ 1000

0 ÷ 39

10

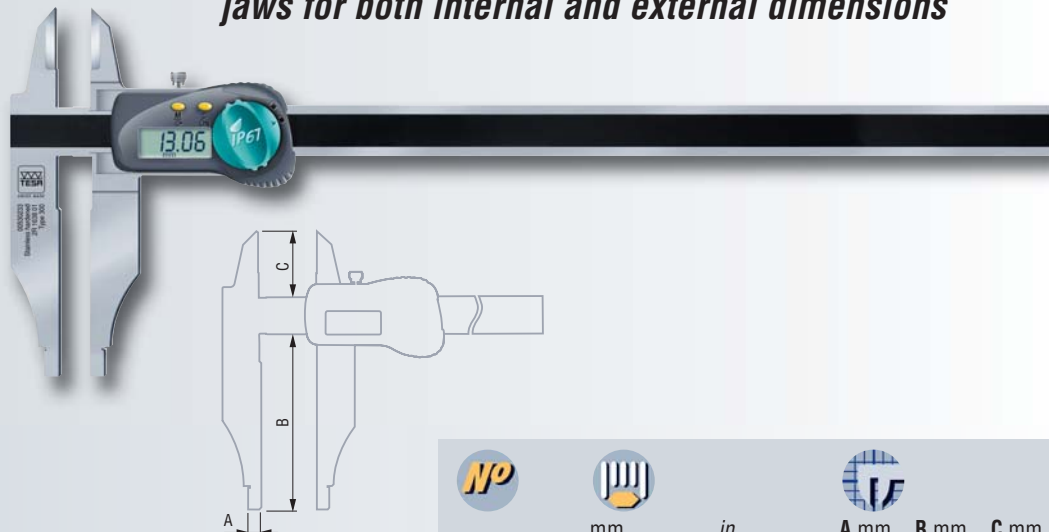
150

Optional Accessory

01961000

3V lithium battery, 190 mAh, type CR 2032
For connecting cables, see section A

**Models with rounded measuring faces and knife-edge
jaws for both internal and external dimensions**



No

mm

in

A mm

B mm

C mm

00530231

0 ÷ 200

0 ÷ 8

5

80

30

00530232

0 ÷ 250

0 ÷ 10

5

80

37

00530233

0 ÷ 300

0 ÷ 12

5

90

37

00530234

0 ÷ 500

0 ÷ 20

10

150

60

00530235

0 ÷ 600

0 ÷ 24

10

150

60

00530236

0 ÷ 800

0 ÷ 32

10

150

56

00530237

0 ÷ 1000

0 ÷ 39

10

150

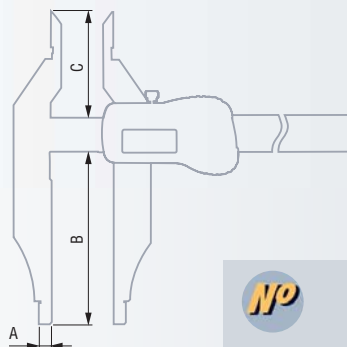
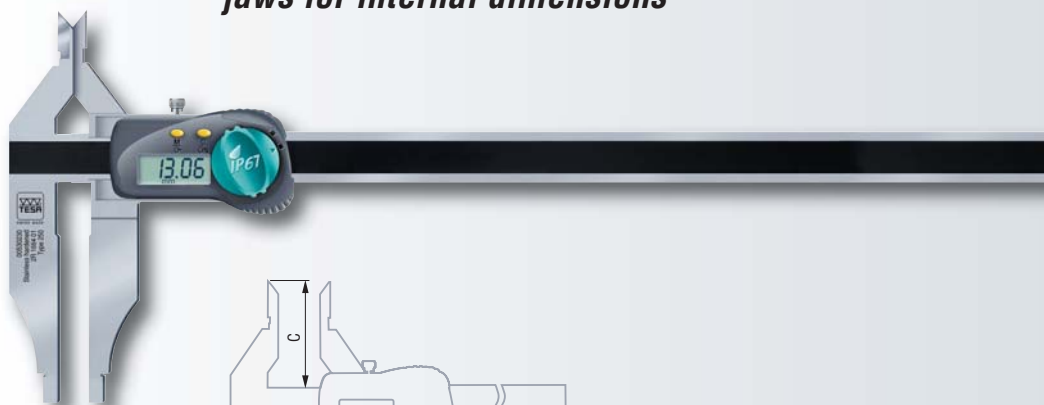
56

Optional Accessory

01961000

3V lithium battery, 190 mAh, type CR 2032
For connecting cables, see section A

Model with rounded measuring faces and knife-edge jaws for internal dimensions



						
00530230		0 ÷ 250	0 ÷ 10	5	80	54
<i>Optional Accessory</i>						
01961000		3V lithium battery, 190 mAh, type CR 2032 For connecting cables, see section A				

-  ✓
-  DIN 862
(Style D-ZS)
-  0,01 mm
0.0005 in
-  LCD, 7 mm
-  Floating zero
-  Display lock
-  mm / in
conversion
-  See page B-2
-  Steel scale with
incremental
divisions, magnetic
-  > 1,8 m / s
-  RS232
opto-coupled,
mono- and
bi-directional
-  Hardened
stainless steel
-  3V lithium
battery, CR 2032
-  ≈ 1,5 a
(≈ 2000 h / a)
-  Idle mode
after 10 min.,
automatic switch
off after 2 h.
-  10°C to 40°C
-  -10°C to 60°C
-  100%
-  IP67
(IEC 60529)
-  EN 50081-1
EN 50082-1
-  Wooden case or
plastic case
depending on
the model
-  No
Identification
number
-  Inspection
report with a
declaration of
conformity



DIN 862
(Style EN-2)
NF E 11-091

Satin-chrome scale
background;
main scale
slightly set back for
wear protection

See page B-2

Hardened
stainless steel

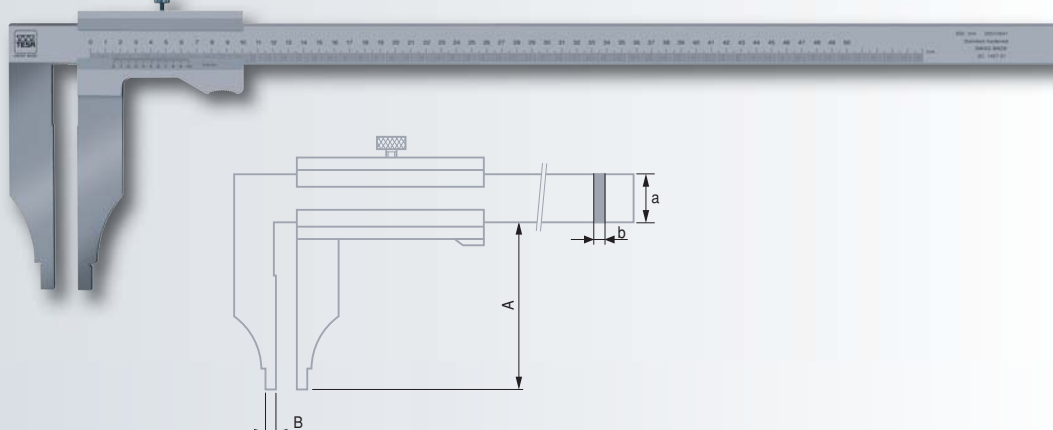
Wooden case or
plastic case
depending on
the model

Identification
number

Inspection report
with a declaration
of conformity

Models with rounded measuring faces for internal dimensions

– Without fine adjust device



						mm			
		mm	mm	in	in	a	b	A	B
00510509*		0 ÷ 200	0,02	–	–	17	3,5	80	5
00530509		0 ÷ 200	0,02	0 ÷ 8	0.001	17	3,5	80	5
00510506		0 ÷ 200	0,05	–	–	17	3,5	80	5
00510511		0 ÷ 250	0,02	–	–	20	4	90	5
00510512		0 ÷ 250	0,05	–	–	20	4	90	5
00510521		0 ÷ 300	0,02	–	–	20	4	90	5
00530521		0 ÷ 300	0,02	0 ÷ 12	0.001	20	4	90	5
00510522		0 ÷ 300	0,05	–	–	20	4	90	5
00510531		0 ÷ 400	0,02	–	–	24,5	5	125	10
00530531		0 ÷ 400	0,02	0 ÷ 15	0.001	24,5	5	125	10
00510541		0 ÷ 500	0,02	–	–	28	6	150	10
00510542		0 ÷ 500	0,05	–	–	28	6	150	10
00510551		0 ÷ 600	0,02	–	–	28	6	150	10

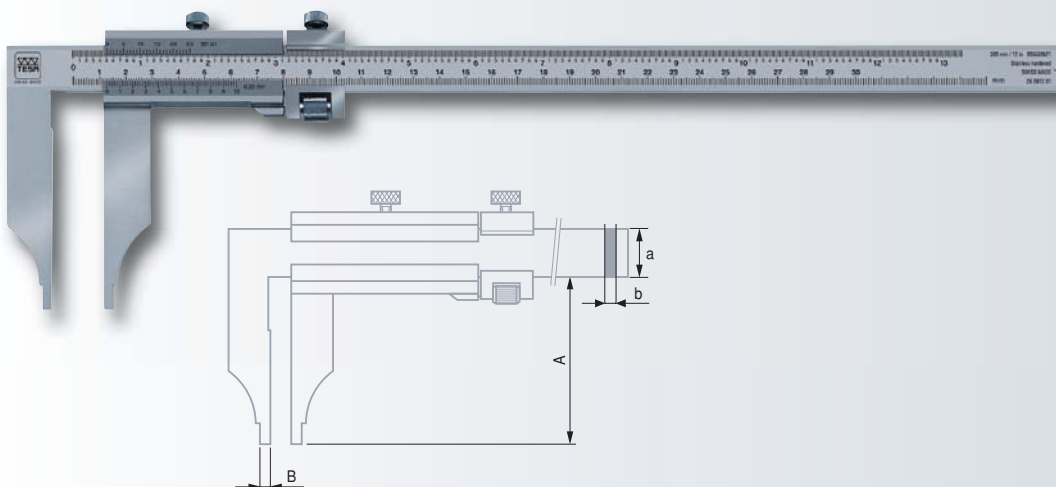
Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification

* Provided with a stainless steel rule No. 0951750181, 200 mm long.

Models with rounded measuring faces for internal dimensions

– With fine adjust device



DIN 862
(Style EN-2F)
NF E 11-091



Satin-chrome
scale background;
main scale
slightly set back for
wear protection



See page B-2



Hardened
stainless steel



Wooden case or
plastic case
depending on
the model



Identification
number



Inspection report
with a declaration
of conformity

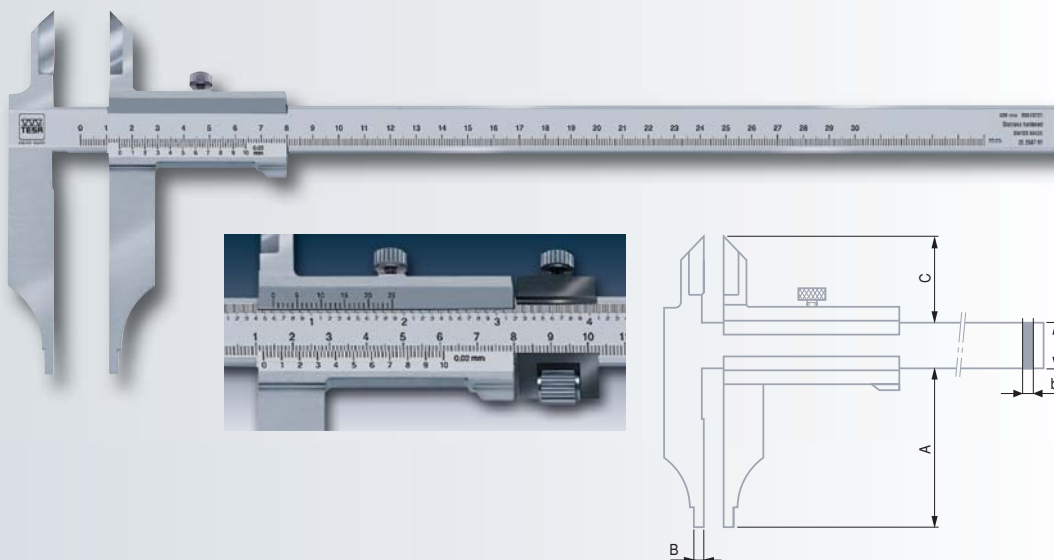
No					 mm		A	B
					a	b		
00510601	0 ÷ 200	0,02	—	—	17	3,5	80	5
00510611	0 ÷ 250	0,02	—	—	20	4	90	5
00510621	0 ÷ 300	0,02	—	—	20	4	90	5
00510641	0 ÷ 500	0,02	—	—	28	6	150	10
00510651	0 ÷ 600	0,02	—	—	28	6	150	10
00510661	0 ÷ 800	0,02	—	—	32	8	150	10
00510671	0 ÷ 1000	0,02	—	—	32	8	150	10
00510681	0 ÷ 1500	0,02	—	—	40	8	300	15
00510691	0 ÷ 2000	0,02	—	—	40	8	300	15

Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification

Models with knife-edge jaws and rounded measuring faces for both external and internal dimensions

– With or without fine adjust device



DIN 862
(Style BN-2)
NF E 11-091



Satin-chrome
scale background;
main scale
slightly set back for
wear protection



See page B-2



Hardened
stainless steel



Wooden case
or plastic case
depending on
the model



Identification
number



Inspection report
with a declaration
of conformity



mm

mm

mm

in

in

a

b

A

B

C

Without fine adjust device

00510701	0 ÷ 200	0,02	–	–	17	3,5	80	5	30
00530701	0 ÷ 200	0,02	0 ÷ 8	0.001	17	3,5	80	5	30
00510711	0 ÷ 250	0,02	–	–	20	4	80	5	38
00510721	0 ÷ 300	0,02	–	–	20	4	90	5	38
00530721	0 ÷ 300	0,02	0 ÷ 12	0.001	20	4	90	5	38
00510722	0 ÷ 300	0,05	–	–	20	4	90	5	38
00510741	0 ÷ 500	0,02	–	–	28	6	150	10	60
00530741	0 ÷ 500	0,02	0 ÷ 20	0.001	28	6	150	10	60
00510751	0 ÷ 600	0,02	–	–	28	6	150	10	60

With fine adjust device

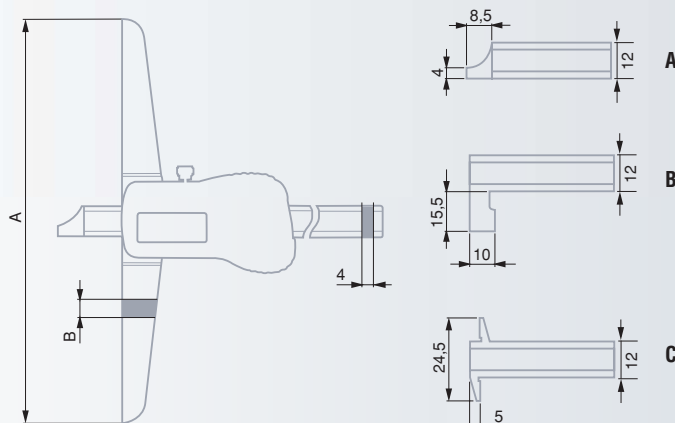
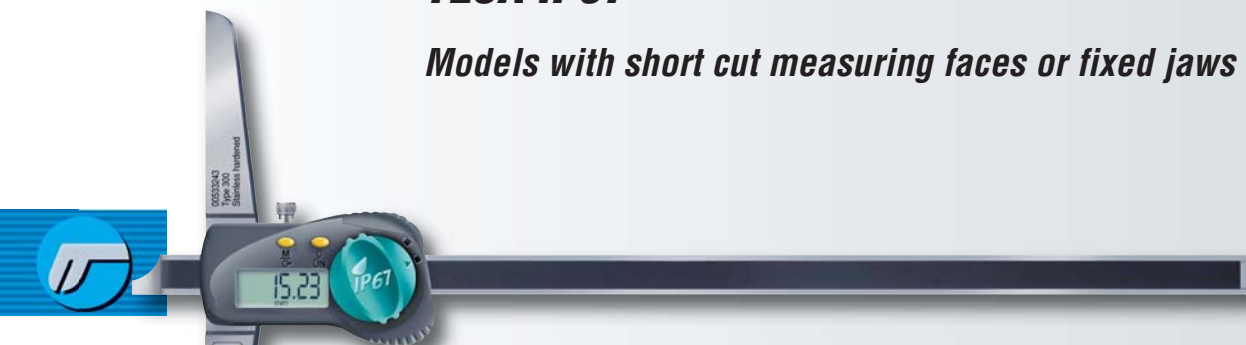
00510801	0 ÷ 200	0,02	–	–	17	3,5	80	5	30
00510821	0 ÷ 300	0,02	–	–	20	4	90	5	38
00530821	0 ÷ 300	0,02	0 ÷ 11	0.001	20	4	90	5	38
00510822	0 ÷ 300	0,05	–	–	20	4	90	5	38
00510841	0 ÷ 500	0,02	–	–	28	6	150	10	60
00530841	0 ÷ 500	0,02	0 ÷ 20	0.001	28	6	150	10	60
00510861	0 ÷ 800	0,02	–	–	32	8	150	10	56
00510871	0 ÷ 1000	0,02	–	–	32	8	150	10	56

Optional Accessory

0051610365	Magnetic magnifying glass, 3x magnification
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TESA IP67

Models with short cut measuring faces or fixed jaws



	mm	in	A mm	B mm

Models A with a short cut measuring face

00530241	0 ÷ 200	0 ÷ 8	100	8
00530242	0 ÷ 250	0 ÷ 10	100	8
00530243	0 ÷ 300	0 ÷ 12	150	8
00530244	0 ÷ 500	0 ÷ 20	150	8

Models B with one fixed jaw

00530245	0 ÷ 300	0 ÷ 12	150	8
00530246	0 ÷ 500	0 ÷ 20	150	8

Models C with two fixed jaws

00530247	0 ÷ 300	0 ÷ 12	150	8
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Optional Accessories

	200, 300 or 400 mm removable bridge (see page B-19)			
01961000	3V lithium battery, 190 mAh, type CR 2032 For connecting cables, see section A			



DIN 862
(Style C-ZS)



See table



0,01 mm
0.0005 in



LCD, 7 mm



Floating zero



Display
lock



mm / in
conversion



See page B-2



Glass scale with
incremental divi-
sions, magnetic



> 1,8 m / s



RS232 opto-
coupled, mono-
and bi-directional



Hardened
stainless
steel



3V lithium battery,
CR 2032



≈ 1,5 a
(≈ 2000 h / a)



Idle mode
after 10 min.,
automatic switch
off after 2 h.



10°C to 40°C



-10°C to 60°C



100%



IP67
(IEC 60529)



EN 50081-1
EN 50082-1



Wooden case
or plastic case
depending on
the model

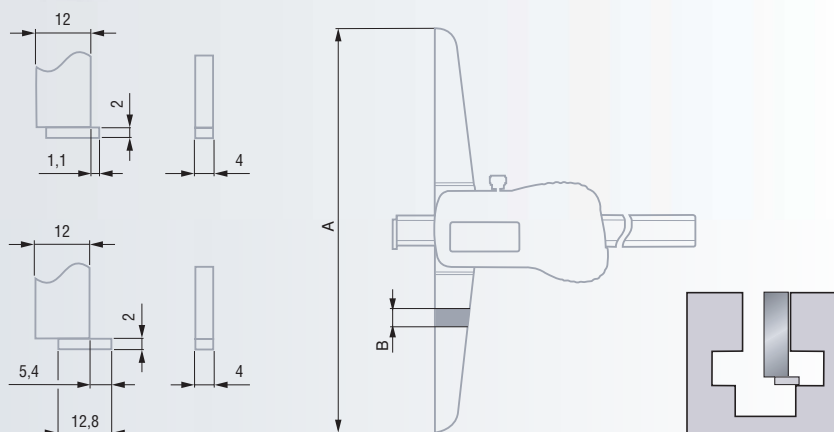
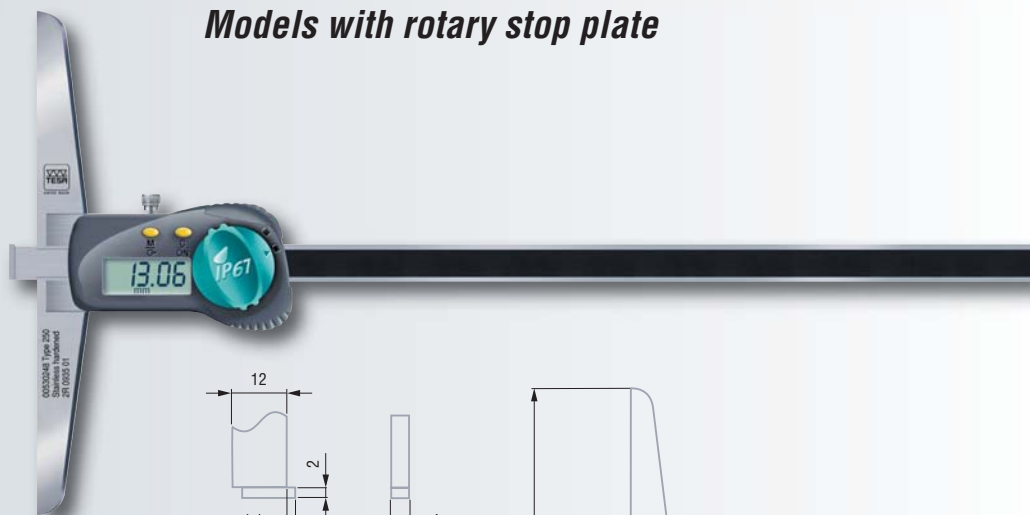


Identification
number



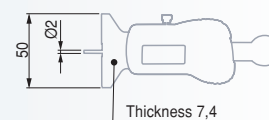
Inspection report
with a declaration
of conformity

Models with rotary stop plate



No	mm	in	A mm	B mm
00530248	0 ÷ 250	0 ÷ 10	150	8,5
00530249	0 ÷ 350	0 ÷ 14	150	8,5
00530250	0 ÷ 500	0 ÷ 20	150	8,5
Optional Accessories				
	200, 300 or 400 mm removable bridge (also see page B-19)			
01961000	3V lithium battery, 190 mAh, type CR 2032			
	For connecting cables, see section A			

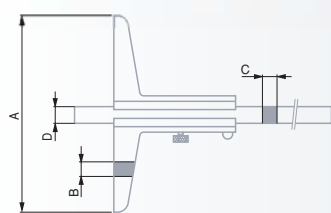
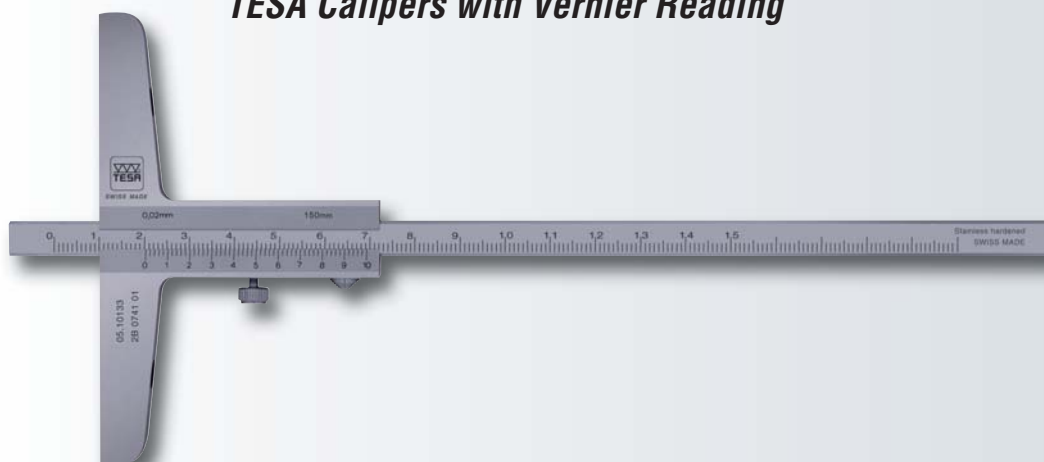
Small-sized caliper with measuring tip



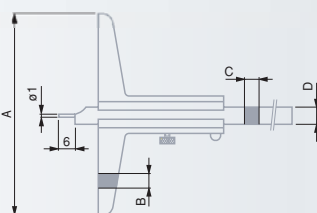
No	mm	in
00530251	0 ÷ 25	0 ÷ 1
Optional Accessory		
01961000	3V lithium battery, 190 mAh, type CR 2032	
	For connecting cables, see section A	



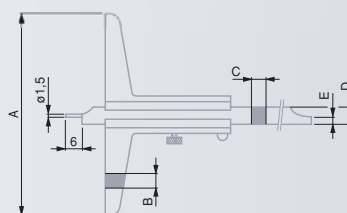
TESA Calipers with Vernier Reading



A



B



C



DIN 862
(Style C-2)
NF E 11-096



Satin-chrome
scale background;
main scale
slightly set back for
wear protection



See page B-2



Hardened
stainless steel



Plastic case



Identification
number



Inspection report
with a declaration
of conformity



mm



mm



mm

A

B

C

D

E

Models A with a flat measuring face

00510133	0 ÷ 150	0,02	100	7,5	3	8	—
00510134	0 ÷ 150	0,05	100	7,5	3	8	—
00510143	0 ÷ 250	0,02	100	7,5	3	8	—
00510144	0 ÷ 250	0,05	100	7,5	3	8	—
00510163	0 ÷ 500	0,02	100	8,5	4	12	—
00510164	0 ÷ 500	0,05	100	8,5	4	12	—
00510173	0 ÷ 600	0,02	150	8,5	4	12	—

Model B with a steel tip

00510111*	0 ÷ 80	0,02	50	7,5	3	8	—
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Models C with both a short cut measuring face and steel tip. Convertible models

00510123	0 ÷ 150	0,02	100	7,5	3	8	3,5
00510124	0 ÷ 150	0,05	100	7,5	3	8	3,5
00510125	0 ÷ 250	0,02	100	7,5	3	8	4
00510126	0 ÷ 250	0,05	100	7,5	3	8	4

Optional Accessories

0051610365	Magnetic magnifying glass, 3x magnification 200, 300 or 400 mm removable bridge (see page B-19)
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* The removable bridges available as an option is not convenient for this model.



DIN 862
(Style C-2)
NF E 11-096



Satin-chrome
scale background;
main scale
slightly set back for
wear protection



See page B-2



Hardened
stainless steel



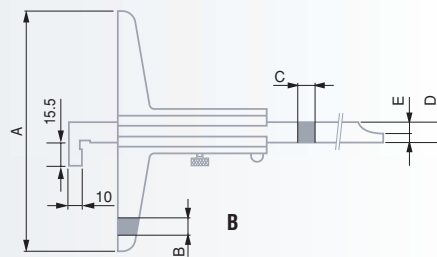
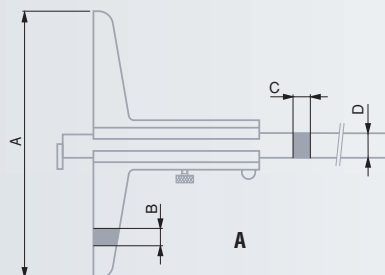
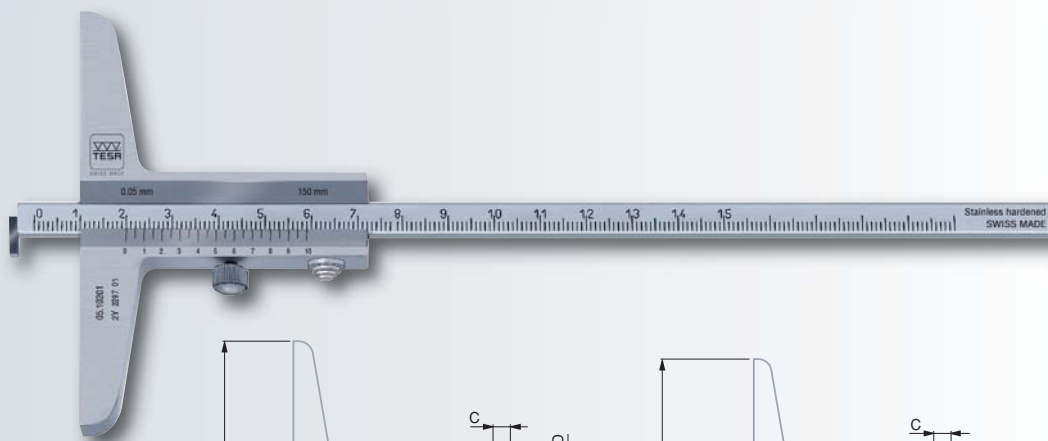
Plastic case



Identification
number



Inspection report
with a declaration
of conformity



mm

A

B

C

D

E

Models A with rotary stop plate

00510202	0 ÷ 150	0,02	130	8,5	4	12	—
00510201	0 ÷ 150	0,05	130	8,5	4	12	—
00510212	0 ÷ 250	0,02	130	8,5	4	12	—
00510211	0 ÷ 250	0,05	130	8,5	4	12	—
00510222	0 ÷ 500	0,02	130	8,5	4	12	—

Models B with both a fixed stop plate and short cut measuring face. Convertible models

00510175	0 ÷ 150	0,02	100	7,5	3	8	3,5
00510177	0 ÷ 250	0,02	130	8,5	4	12	4
00510179	0 ÷ 300	0,02	150	8,5	4	12	4
00510181	0 ÷ 500	0,02	150	8,5	4	12	4

Optional Accessories

0051610365	Magnetic magnifying glass, 3x magnification 200, 300 or 400 mm removable bridge (see the table below)
------------	--



Factory
standard



See table



Suited
carrying case



Identification
number



Inspection report
with a declaration
of conformity

Removable Bridge



A mm

B mm

C mm



mm



mm



μm

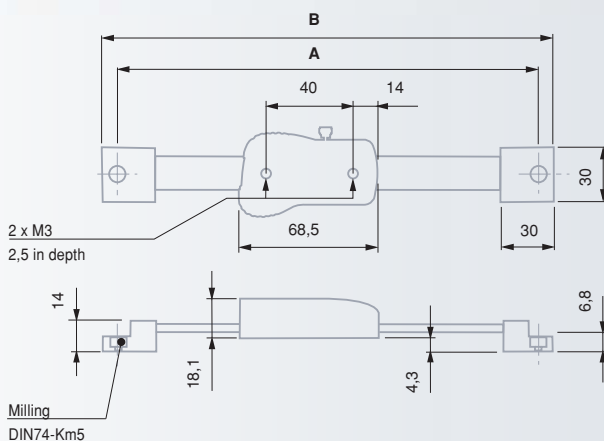
00560103	Removable bridge	200	8	10	± 0,005	0,02	8
00560104	Removable bridge	300	8	16	± 0,005	0,02	10
00560105	Removable bridge	400	8	16	± 0,005	0,03	10

Each bridge comes with suited attachment.

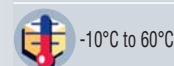


Horizontal or Vertical Scale Unit

Lets you measure and position any assembly on fixtures, presetting devices for tooling or machines. Flexible mounting for use in any position.



No	mm	in	A mm	B mm
00530271	0 ÷ 150	0 ÷ 6	265	278
00530273	0 ÷ 300	0 ÷ 12	415	428
00530274	0 ÷ 600	0 ÷ 24	725	738
00530275	0 ÷ 1000	0 ÷ 40	1135	1148
<i>Optional Accessory</i>				
01961000	3V lithium battery, 190 mAh, type CR 2032			
	For connecting cables, see section A			





Factory standard



Satin-chrome scale background; main scale slightly set back for wear protection.



Hardened stainless steel



Wooden case



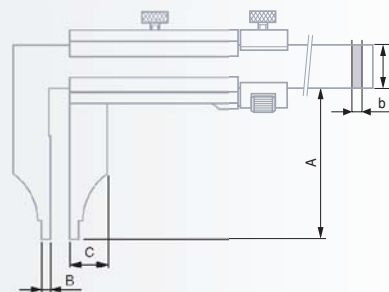
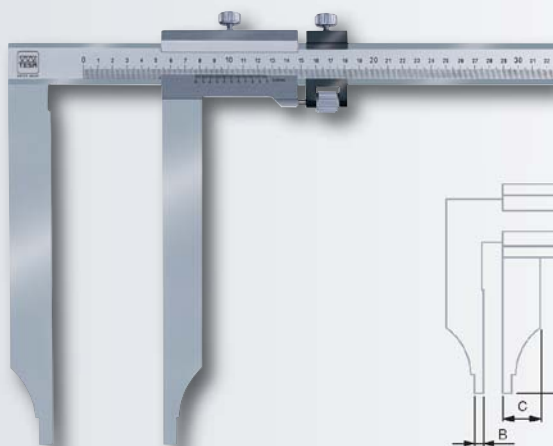
Identification number



Inspection report with a declaration of conformity

TESA Calipers

– With extra long jaws and fine adjust device



mm

	mm	mm	a	b	A	B	C
00510921	0 ÷ 500	0,02	28	6	250	10	30
00510922	0 ÷ 500	0,05	28	6	250	10	30
00510941	0 ÷ 1000	0,02	32	8	300	10	30
00510942	0 ÷ 1000	0,05	32	8	300	10	30

Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification



NF E 11-096



Satin-chrome scale background; main scale slightly set back for wear protection.



Hardened stainless steel



Wooden case

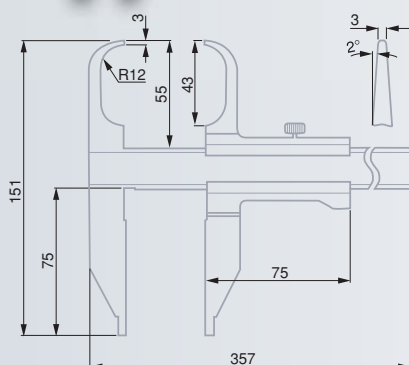
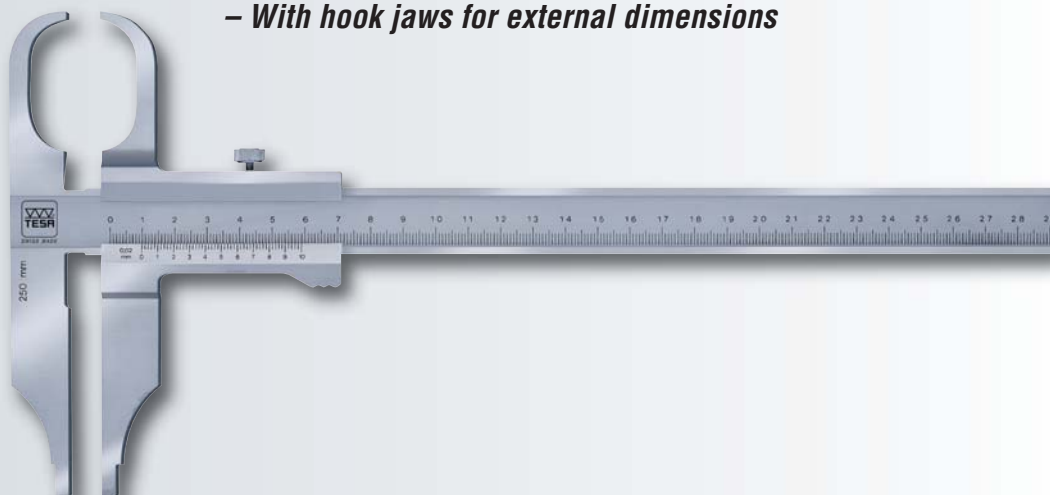


Identification number



Declaration of conformity

– With hook jaws for external dimensions



mm

mm

00510911

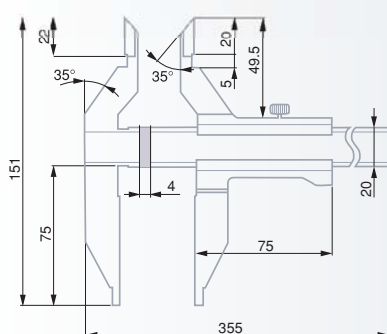
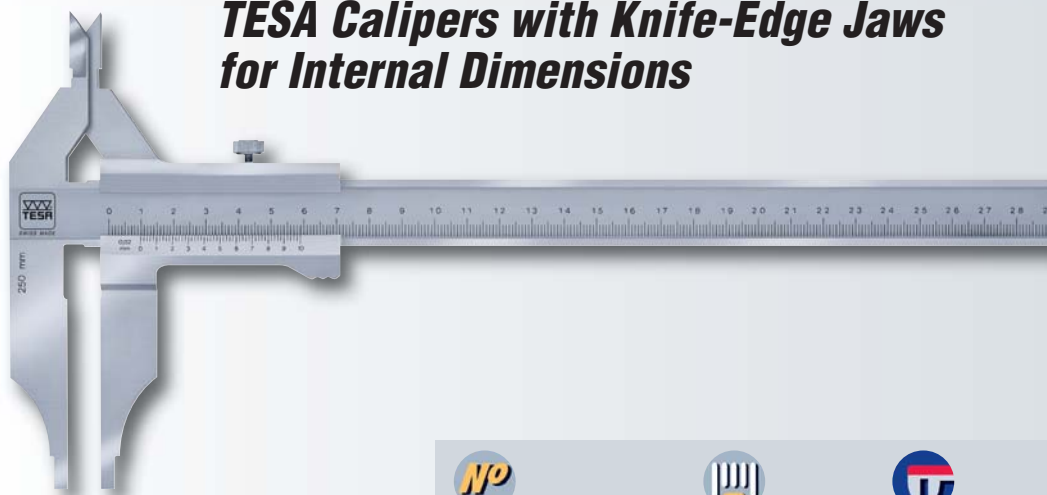
0 ÷ 250

0,02

Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification

TESA Calipers with Knife-Edge Jaws for Internal Dimensions



00510915



mm
0 ÷ 250



mm
0,02

Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification



DIN 862
(Style DN-2)
NF E 11-091



Satin-chrome
scale background;
main scale
slightly set back for wear
protection.



Hardened
stainless steel



Wooden case



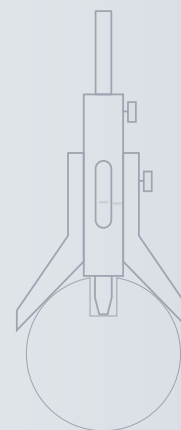
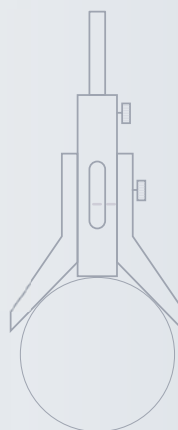
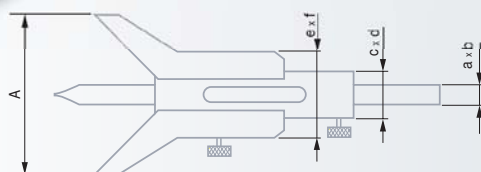
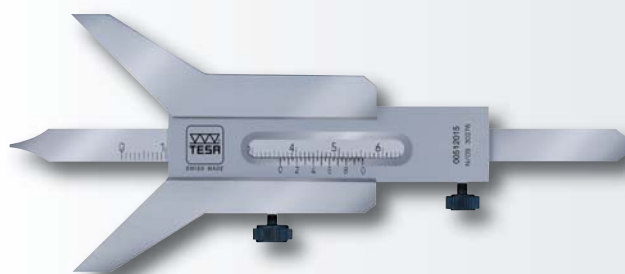
Identification
number



Inspection report
with a declaration
of conformity

TESA Calipers with Vee Bridge

Made to measure groove and slot depths on cylindrical shafts.



NF E 11-091



Satin-chrome
scale background;
main scale
slightly set back for wear
protection.



Hardened
stainless steel



Wooden case



Identification
number



Inspection report
with a declaration
of conformity



00512015



mm



mm



mm

a

b

c

d

e

f

A

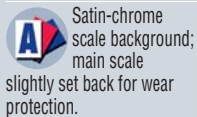
00512015 5 ÷ 80 0,05 8 2 18 5 32 10 60

00512016 6 ÷ 120 0,05 8 2 18 5 34 10 90

00512017 7 ÷ 160 0,05 10 2 21,5 5 42 10 120

Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification



TESA Calipers for Turned Grooves

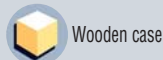
Specially designed for measuring groove or slot diameters, e.g. on safety rings.



No	mm	mm	mm	mm	A	B	C
00510371	10 ÷ 160	0,05	16	3	0,9	3	25
00510375	20 ÷ 160	0,05	16	3	2	5	40
00510383	26 ÷ 200	0,02	16	3	3	7	60
00510385	26 ÷ 200	0,05	16	3	3	7	60
00510387	30 ÷ 250	0,02	20	4	4	8,5	80
00510393	35 ÷ 300	0,02	20	4	5	10	100

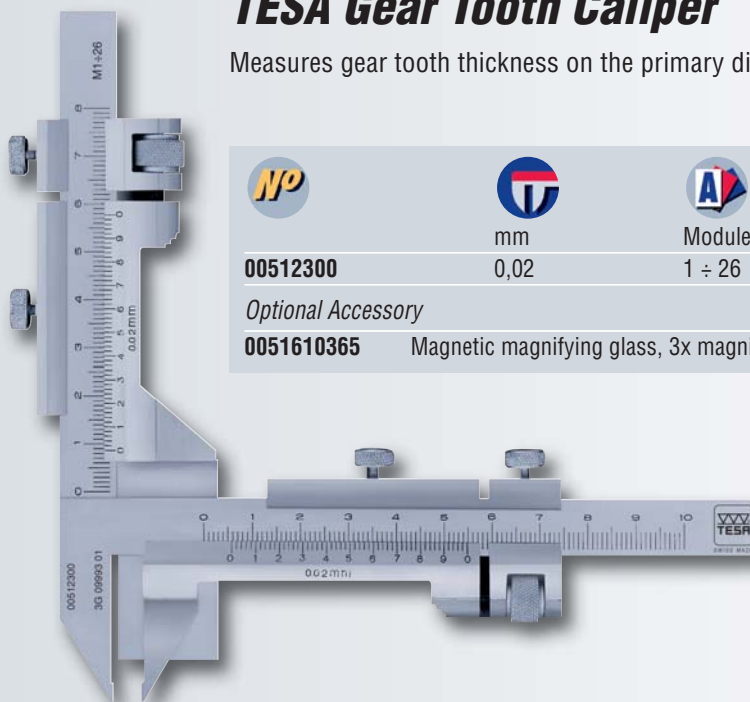
Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification



TESA Gear Tooth Caliper

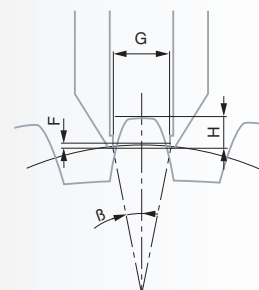
Measures gear tooth thickness on the primary diameter.



No	mm	Module
00512300	0,02	1 ÷ 26

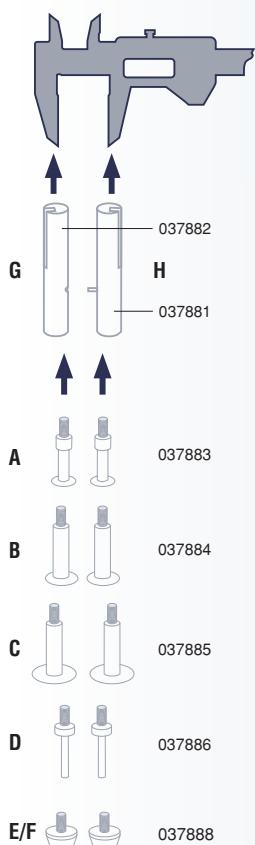
Optional Accessory

0051610365 Magnetic magnifying glass, 3x magnification



Brown & Sharpe Accessory Sets CENTERLINE

Each set includes practical accessories for measuring undercuts, grooves, slots, centre distances of bores, etc. – Fits all calipers with analogue or digital indication covering the measuring range 0 to 150 mm or 0 to 6 in.



CENTERLINE Accessory Sets

- 06769001** Full accessory set provided in a custom wooden case
- 06739000** Full accessory set provided in a fitted wooden case including one TESA Shop-Cal mit capa μ system (No. 00530090)
- 06769008** Full accessory set in a fitted wooden case. Includes a free space arranging for a caliper covering the measuring range 0 to 150 mm / 0 to 6 in to be stored (must be ordered separately).

Complete Sets Including:

A	1 Pair of disc-shaped measuring inserts	6	0,8
B	1 Pair of disc-shaped measuring inserts	10	0,8
C	1 Pair of disc-shaped measuring insert	12,5	0,8
D	1 Pair of cylindrical measuring inserts	1,5	9,5
E	1 Pair of cone-shaped measuring inserts	9	60°
F	1 Pair of cone-shaped measuring inserts	12,5	60°
G	1 Insert-holder (left)		
H	1 Insert-holder (right)		
	1 Socket head key		1,2



Steel with black oxide plating



Inserts with M2,5 threaded coupling.

Lowest centre distance of the mounted insert holder: 10 mm.

Depth Measuring Foot

For use with TESA or ETALON universal calipers with measuring ranges from 0 to 150 mm/0 to 6 in as listed on pages B-3 to B-8.



00560013

75 x 6



Factory standard



Hardened stainless steel



Ground measuring face

External Measurement



PRECISION MEASUREMENT

Precision measurement requires the use of micrometers. In 1848, the first measuring tool of this type was patented by the French inventor Jean Laurent Palmer as «calibre à vis et à vernier circulaire» (screw calliper with a circular vernier). Today, we continue to make external micrometers with these typical features.

The introduction of the micrometer to the mechanical world came about by the visit of the two american engineers Joseph R. Brown and Lucian Sharpe to the Paris Exhibition in 1867. At that time, their attention was called to the Palmer's invention, which greatly interested them. After some improvements of the Palmer design, the product was manufactured on a large scale and marketed successfully by the two partners.

The story repeated in the past as TESA SA decided to manufacture external micrometers making them the first products produced by the company.

Yet no matter what you measure – internal or external dimensions – all TESA and ETALON micrometers are world-class products in design and quality.

With a very few exceptions (e.g. external micrometers for gear tooth measurements), our micrometers respect the Abbe principle, i.e. the comparator's one (also read in the General Information). Their spindle are ground on modern grinding machines and the profile of the screw is accurately restored with negligible pitch deviations. Such manufacturing conditions are the guarantee for very low measurement uncertainties.

The micrometers of both TESA and ETALON premium brands are robust with ergonomic design.

Besides external micrometers in standard or special versions, we also offer micrometer heads, depth micrometers, full micrometer sets as well as a wide number of accessories plus all what you need for your calibrations. Each model provides either an analogue or a digital indication according to the execution. The models with electrical measuring system also include an RS 232 digital interface.



Max. permissible errors

			
Measuring range/mm	Max. perm. errors*/ μm	Number of interference fringes or rings	μm
0 ÷ 25	4	6	2
25 ÷ 50	4	6	2
50 ÷ 75	5	10	3
75 ÷ 100	5	10	3
100 ÷ 125	6		3
125 ÷ 150	6		3
150 ÷ 175	7		4
175 ÷ 200	7		4
200 ÷ 225	8		4
225 ÷ 250	8		4
250 ÷ 275	9		5
275 ÷ 300	9		5
300 ÷ 325	10		5
325 ÷ 350	10		5
350 ÷ 375	11		6
375 ÷ 400	11		6
400 ÷ 425	12		6
425 ÷ 450	12		6
450 ÷ 475	13		7
475 ÷ 500	13		7

* The max. perm. errors include the errors of the measuring element as well as any deviations in flatness and parallelism of the measuring faces plus the errors due to the flexure of the frame.



DIN 863 T1

0,001 mm
0.00005 inMetric/Inch
conversionTungsten carbide
tipped≤100 mm:
Ø 6,5 mm
> 100 mm:
Ø 8 mm

0,5 mm



Max. 10 N

LCD, digit height:
7 mm

Floating zero

Display lock
(except for model
EASY)RS 232
interface,
opto-coupled3V lithium
battery1 to 2 a
(≈ 2000 h/a)Automatic
shut-down after
10 min. Display
setting is maintained as long
as power supply remains
stable.

10°C to 40°C



-10°C to 60°C

80%, non-
condensingProtection
as per
IEC 60529):
IP40 (also valid with used
RS data output) or IP54

Plastic case

Identification
numberMeasuring range
0 to 100: with
SCS calibration
certificateMeasuring range
over 100 mm:
inspection report
along with a declaration of
conformity

TESA MICROMASTER

Electronic Micrometers with Digital Display



With patented TESA capa μ system

- Measuring span of 30 mm or 25 mm.
- Large easy-to-read digital display.
- Models:
 - EASY with a single function key.
 - IP54 with water spray protection as well as IP54 RS with added RS 232 interface.



mm



mm



in



in



MICROMASTER EASY

06030010	0 ÷ 30	0 ÷ 30	0 ÷ 1.2	0 ÷ 1.2	IP40	–
-----------------	--------	--------	---------	---------	------	---

MICROMASTER IP54

06030020	0 ÷ 30	0 ÷ 30	0 ÷ 1.2	0 ÷ 1.2	IP54	–
06030021	25 ÷ 50	23 ÷ 53	1 ÷ 2	0.9 ÷ 2.1	IP54	–
06030022	50 ÷ 75	48 ÷ 78	2 ÷ 3	1.9 ÷ 3.1	IP54	–
06030023	75 ÷ 100	74 ÷ 104	3 ÷ 4	2.9 ÷ 4.1	IP54	–

MICROMASTER IP54 RS

06030030	0 ÷ 30	0 ÷ 30	0 ÷ 1.2	0 ÷ 1.2	IP54	RS 232
06030031	25 ÷ 50	23 ÷ 53	1 ÷ 2	0.9 ÷ 2.1	IP54	RS 232
06030032	50 ÷ 75	48 ÷ 78	2 ÷ 3	1.9 ÷ 3.1	IP54	RS 232
06030033	75 ÷ 100	74 ÷ 104	3 ÷ 4	2.9 ÷ 4.1	IP54	RS 232
06030071	100 ÷ 125	98 ÷ 127	4 ÷ 5	3.9 ÷ 5.01	IP54	RS 232
06030072	125 ÷ 150	123 ÷ 152	5 ÷ 6	4.9 ÷ 6.01	IP54	RS 232
06030073	150 ÷ 175	149 ÷ 178	6 ÷ 7	5.9 ÷ 7.01	IP54	RS 232
06030074	175 ÷ 200	174 ÷ 203	7 ÷ 8	6.9 ÷ 8.01	IP54	RS 232
06030075	200 ÷ 225	199 ÷ 229	8 ÷ 9	7.9 ÷ 9.01	IP54	RS 232
06030076	225 ÷ 250	224 ÷ 254	9 ÷ 10	8.9 ÷ 10.01	IP54	RS 232
06030077	250 ÷ 275	250 ÷ 279	10 ÷ 11	9.9 ÷ 11.01	IP54	RS 232
06030078	275 ÷ 300	275 ÷ 304	11 ÷ 12	10.9 ÷ 12.01	IP54	RS 232

MICROMASTER Set



06030029	Micromaster Set IP54 RS	0 ÷ 75
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Consisting of:



mm



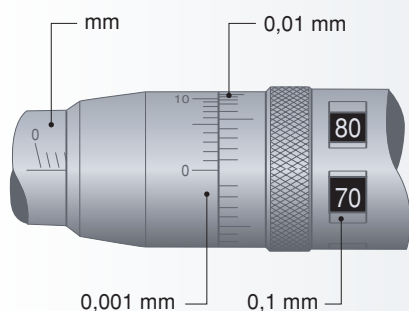
06030030	Micromaster IP54, RS	0 ÷ 30	IP54	RS232
06030031	Micromaster IP54, RS	25 ÷ 50	IP54	RS232
06030032	Micromaster IP54, RS	50 ÷ 75	IP54	RS232
02119021	Setting standard, 50 mm			

Optional Accessory

01961000	1 Lithium battery 3 V, 190 mAh, type CR 2032 – Connecting cables etc., see chapter A.
-----------------	---

TESAMASTER Precision Micrometers with Digital Counter to 0,1 mm

Analogue indication of the full millimetres, hundredths and fractions of hundredth – Accurate, fast reading of the tenths of millimetres – Parallax-free reading of the thousandths of millimetres on vernier.



No	mm	µm	µm
00310001	0 ÷ 25	2	1
00310002	25 ÷ 50	2	1,5
00310003	50 ÷ 75	3	1,5
00310004	75 ÷ 100	3	1,5
00310005	100 ÷ 125	4	2
00310006	125 ÷ 150	4	2,5
00310007	150 ÷ 175	5	3
00310008	175 ÷ 200	5	3
00310009	200 ÷ 225	6	3,5
00310010	225 ÷ 250	6	3,5
No	in	µm	µm
00320001	0 ÷ 1	2	1



DIN 863 T1
NF E 11-095



Vernier reading
to 0,001 mm or
0.0001 in



Scale
division: 0,1 mm
or 0.005 in



Tungsten carbide
tipped



≤ 100 mm:
Ø 6,5 mm
> 100 mm:
Ø 8 mm



0,5 mm



Max. 10 N



Plastic case



Identification
number



Measuring
range
0 to 100 mm
with inspection report and
declaration of conformity



Measuring range
smaller than
100 mm with
a declaration of conformity

ETALON MICRORAPID 226 with 1 mm Revolution

High precision micrometers – Fast, accurate reading – No reading error of the half millimetres – Barrel with pitch to 1 mm – Thimble with 100 graduations – Vernier reading to 0,001 mm.



No	mm	µm	µm
072116406	0 ÷ 25	2	1
072116407	25 ÷ 50	2	1,5
072116408	50 ÷ 75	3	1,5
072116409	75 ÷ 100	3	1,5



DIN 863 T1
NF E 11-095



Parallax-free
vernier reading
to 0,001 mm



Tungsten carbide
tipped



Ø 6,5 mm



1 mm



Max. 10 N



Plastic case



Identification
number



Inspection report
with a declaration
of conformity



DIN 863 T1
NF E 11-095

0 to 100 mm
resp. 0 to 4 in
with vernier

Tungsten carbide
tipped

≤ 100 mm:
Ø 6,5 mm,
> 100 ≤ 200 mm:
Ø 8 mm

0,5 mm

Max. 10 N

Plastic case

Identification
number

Measuring
range
0 to 100 mm
with inspection report and
declaration of conformity

Measuring
range smaller
than 100 mm
with a declaration of
conformity



DIN 863 T1
NF E 11-095

0,01 mm

Tungsten carbide
tipped

Ø 6,5 mm

0,5 mm

Max. 10 N

Plastic case

Identification
number

Inspection report
with a declaration
of conformity

ETALON 260

Standard Models with Analogue Indication

The knurled sleeve only needs to be reversed to render the friction drive built into the thimble inactive.



No	mm	mm	µm	µm
071115887	0 ÷ 25	0,002	2	2
071115888	25 ÷ 50	0,002	2	2
071115889	50 ÷ 75	0,002	3	3
071115890	75 ÷ 100	0,002	3	3
071115891	100 ÷ 125	0,01	4	3
071115892	125 ÷ 150	0,01	4	3
071115893	150 ÷ 175	0,01	5	4
071115894	175 ÷ 200	0,01	5	4

No	in	in	µm	µm
071115899	0 ÷ 1	0.0001	2	2
071115900	1 ÷ 2	0.0001	2	2
071115901	2 ÷ 3	0.0001	3	3
071115902	3 ÷ 4	0.0001	3	3

ETALON Basic to 0,01 mm



No	mm
00119046	0 ÷ 25
00119047	25 ÷ 50
00119048	50 ÷ 75
00119049	75 ÷ 100

Set of 4 ETALON Basic to 0,01 mm

No	mm
00119050	0 ÷ 100

TESA ISOMASTER Standard Models with Analogue Indication

Slanted full millimetres on the barrel are set apart from the straight half millimetres to virtually eliminate reading errors.

The knurled sleeve needs only be reversed to render the friction drive built into the thimble inactive.



No		
	mm	mm
00110101	0 ÷ 25	0,01
00110102	25 ÷ 50	0,01
00110103	50 ÷ 75	0,01
00110104	75 ÷ 100	0,01
00110105	100 ÷ 125	0,01
00110106	125 ÷ 150	0,01
00110107	150 ÷ 175	0,01
00110108	175 ÷ 200	0,01
00110109	200 ÷ 225	0,01
00110110	225 ÷ 250	0,01
00110111	250 ÷ 275	0,01
00110112	275 ÷ 300	0,01
	in	in
00120101	0 ÷ 1	0.0001



DIN 863 T1
NF E 11-095



Tungsten carbide
tipped



≤ 100 mm:
Ø 6,5 mm
> 100 ≤ 300 mm:
Ø 8 mm



0,5 mm



Max. 10 N



Plastic case



Identification
number



Measuring
range
0 to 100 mm
with inspection report and
declaration of conformity



Measuring
range smaller
than 100 mm
with a declaration of
conformity

Set of 4 TESA ISOMASTER

Same execution as above.

The models covering the application range 0 to 100 mm provide the quality that you need at competitive prices.



Plastic case



00110113

mm
0 ÷ 100



 DIN 863 T3
(Style D16)

 0,001 mm
0.00005 in

 Metric/Inch
conversion

 30 mm
measuring span

 0 ≤ 500 mm:
malleable
cast iron.

> 500 ≤ 1000 mm:
steel tube with insulating
grips. Max. flexure of the
frame under a measuring
force of 10 N: see the table
opposite

 Tungsten carbide
tipped

 Ø 8 mm

 0,5 mm

 Max. 10 N

 LCD, digit height:
7 mm

 RS 232

 Additional
technical data:
see page C-3

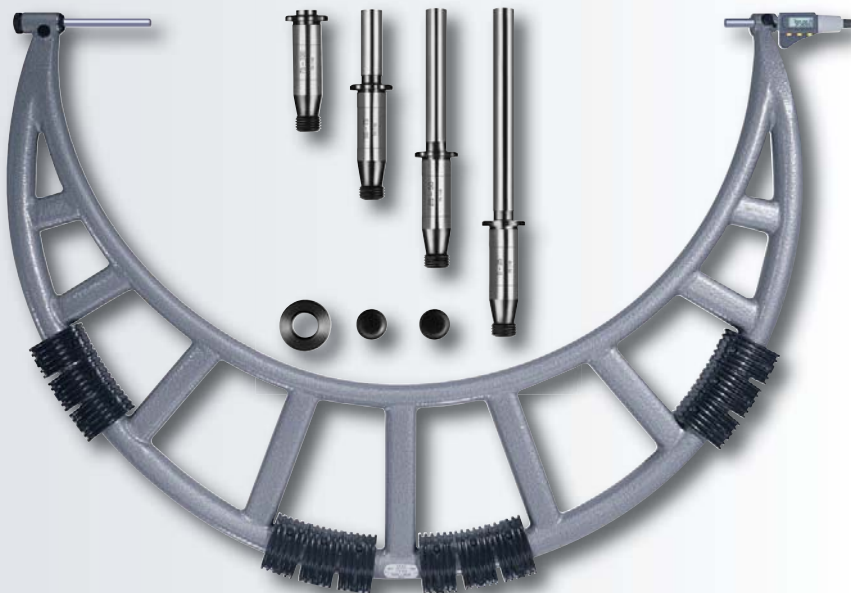
 Wooden case

 Identification
number

 Inspection report
with a declaration
of conformity

MICROMASTER with interchangeable Anvils

All sets include 4 interchangeable anvils with increasing length in steps of 25 mm. Anvils are adjusted (and numbered) in sets, thus rendering the correction of the indication unnecessary whenever an anvil is exchanged.



				
	mm	in	µm	µm
06030047	0 ÷ 100	0 ÷ 3.94	6	3
06030048	100 ÷ 200	3.94 ÷ 7.87	7	4,5
06030049	200 ÷ 300	7.87 ÷ 11.81	8	7
06030050	300 ÷ 400	11.81 ÷ 15.75	9	9
06030051	400 ÷ 500	15.75 ÷ 19.69	10	9
06030052	500 ÷ 600	19.69 ÷ 23.62	11	9
06030053	600 ÷ 700	23.62 ÷ 27.56	12	10
06030054	700 ÷ 800	27.56 ÷ 31.50	13	12
06030055	800 ÷ 900	31.50 ÷ 35.43	14	12
06030056	900 ÷ 1000	35.43 ÷ 39.37	15	16

Measuring range up to 1500 mm also available upon request.

Dial Gauge Element for MICROMASTER

Can replace the interchangeable anvils on AB series micrometers. Make finding the culmination point easier. Ensures a constant measuring force.

Supplied as standard accessory with the ABY series micrometers.



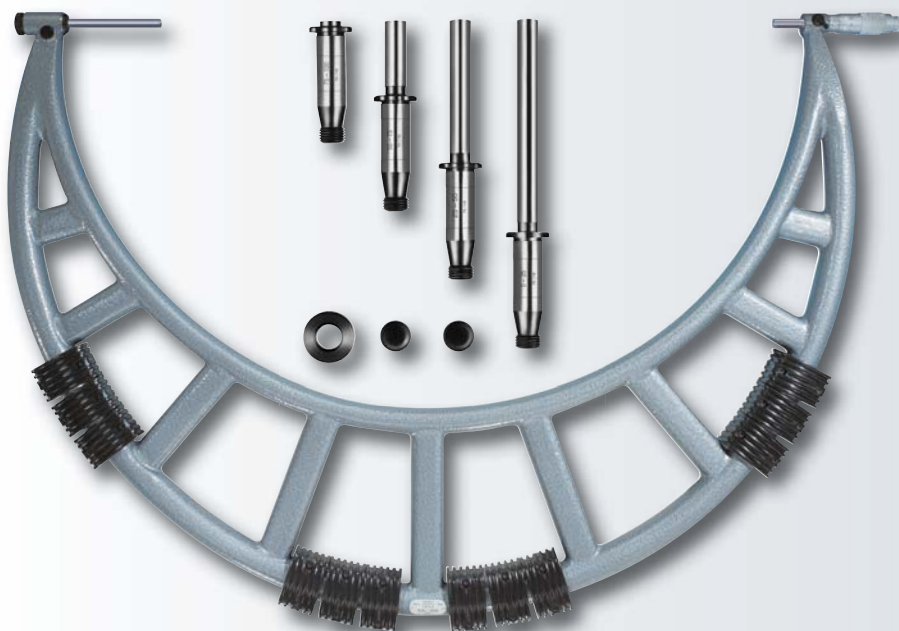
 See next page

 00140301



ISOMASTER AB with interchangeable Anvils

Lightweight, but rugged anvil micrometers. Set No. 00140101 includes 4 interchangeable anvils with increasing length in steps of 25 mm. Anvils are adjusted (and numbered) in pairs, thus rendering any correction of the indication unnecessary whenever an anvil is exchanged.

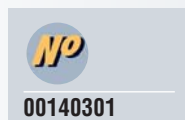


No				
		mm	μm	μm
00111901		0 ÷ 100	6	3
00111902		100 ÷ 200	7	4,5
00111903		200 ÷ 300	8	7
00111904		300 ÷ 400	9	9
00111905		400 ÷ 500	10	9
00111906		500 ÷ 600	11	9
00111907		600 ÷ 700	12	10
00111908		700 ÷ 800	13	12
00111909		800 ÷ 900	14	12
00111910		900 ÷ 1000	15	16

Measuring range up to 1500 mm also available upon request.

Dial Gauge Element for AB Series Micrometers

Can replace the interchangeable anvils on these micrometers. Make finding the culmination point easier. Ensures a constant measuring force. Supplied as standard accessory with the ABY series micrometers.



DIN 863 T3
(Style D16)
NF E 11-090



0,01 mm



0 ≤ 500 mm:
malleable
cast iron;
500 ≤ 1000 mm: steel tube
with insulating grips.
Max. flexure of the frame
under a measuring force
of 10 N: see the table
opposite



Tungsten carbide
tipped



8 mm dia.



0,5 mm



Max. 10 N



Wooden case



Identification
number



Declaration
of conformity



± 1,5 mm



0,01 mm



Tungsten carbide
tipped



8 mm dia.



Max. 10 N



Meas. element:
11 mm dia.,
100 mm long.
Dial gauge No. 01410211:
40 mm dial diameter,
two-way dial reading.



Identification
number



With dial gauge
and clamp



Declaration
of conformity



DIN 863 T3
(Style D15)
NF E 11-090

0,01 mm

0 ≤ 500 mm:
malleable
cast iron;
> 500 ≤ 800 mm: steel
tube with insulating grips.
Max. flexure of the frame
under a measuring force
of 10 N: see the table
opposite

Tungsten carbide
tipped

8 mm dia.

0,5 mm

Max. 10 N

Dial gauge:
see on
page C-8

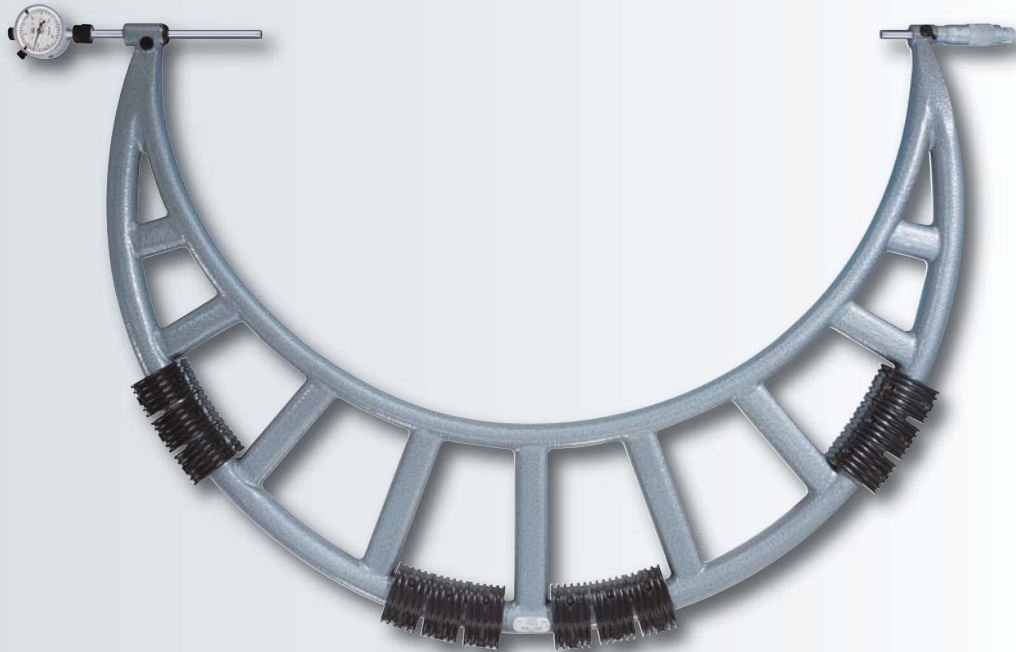
Wooden case

Identification
number

Declaration
of conformity

Series ABY ISOMASTER with Adjustable Dial Gauge Element

Similar to the AB series micrometers, but equipped with the adjustable dial gauge element No. 00140301 that helps you to find the culmination point easier with a constant measuring force.



No	mm	μm	μm
00112001	0 ÷ 100	6	3
00112002	100 ÷ 200	7	4,5
00112003	200 ÷ 300	8	7
00112004	300 ÷ 400	9	9
00112005	400 ÷ 500	10	9
00112006	500 ÷ 600	11	9
00112007	600 ÷ 700	12	10
00112008	700 ÷ 800	13	12

Measuring range up to 1500 mm also available upon request.



DIN 863 T3
(Style D16)
NF E 11-090

Tungsten carbide
tipped

8 mm dia.

Set includes
2 guard plates for
the frame as well
as 1 clamping nut

Identification
number

Interchangeable Anvils for ABY Series ISOMASTER

Set of 4 interchangeable anvils with increasing length in steps of 25 mm. The anvils are adjusted and numbered in pairs, thus eliminating the need for resetting the indication when exchanging either of them.

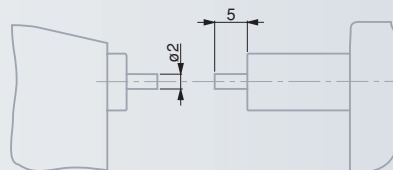
Supplied as standard accessories with the AB series micrometers.

No
00140101



MICRO-ETALON 225 Micrometers with a Dial Indicator

Feature a mobile anvil along with a built-in dial indicator – Ideal for comparative measurements on small part series – Nominal dimension is set on the micrometer while deviations are read on the dial indicator – Retractable anvil by means of a push-button – Rotating dial for fine adjustment, also with adjustable tolerance markers.



DIN 863 T3
(Style D13)



Tungsten carbide
tipped



6,5 mm dia.
Model
with small
measuring faces:
2 mm dia., 5 mm long.



0,5 mm



Anvil:
4,5 to 5,5 N



Micrometer with
vernier reading
to 0,002 mm.
Dial indicator: 0,001 mm.



Dial indicator:
± 0,025 mm



Micrometer:
max. perm.
error of 2 µm.
Dial indicator: 1 µm.



Dial indicator:
repeatability
limit of 0,5 µm.



Plastic case



Declaration
of conformity



Dial indicators to 0,001 mm

072108669

072108691

Model with small measuring faces

072108722



mm

0 ÷ 25

25 ÷ 50

0 ÷ 20

Protective Cover

Made in transparent plastic – Can be mounted on the bezel – Protects the indicator against dust particles and liquids – Prevents both tolerance markers from being accidentally displaced.



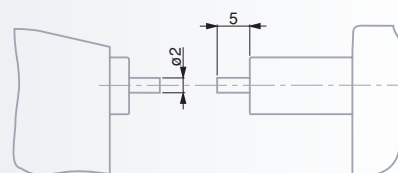
072110978



ETALON MICROSPEL 280

These micrometers have a mobile anvil along with a 8 mm diameter clamping bore for mounting a sensor with linear action such as the TESA GT 21/22 electronic probe (also refer to section O).

Specially designed for batch inspection of small precision parts.



DIN 863 T3
(Style D14)
NF E 11-090



Vernier reading
to 0,002 mm



Tungsten carbide
tipped



6,5 mm dia.
Models
with small
measuring faces:
2 mm dia., 5 mm long.



0,5 mm



Anvil:
2 up to 8 N,
adjustable



Meas. element:
max. perm. error
of 2 μm



Mobile anvil:
repeatability
limit of
0,5 μm.



Adjustable part
support (except
model with small
measuring faces).



Plastic case



Declaration
of conformity



mm

072110816

0 ÷ 25

Model with small measuring faces

072110853

0 ÷ 20

Important

Electronic probe and micrometer stand
are not part of the delivery scope and
must be ordered separately.

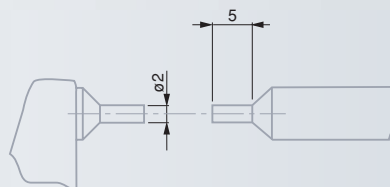
Micrometers with Small Measuring Faces

For measuring grooves, feather grooves, splines and other difficult to reach locations – Small measuring faces specially made to check precision workpieces.

Models MICROMASTER



No	mm	in
06030034	0 ÷ 30	0 ÷ 1.2
06030035	30 ÷ 60	1.2 ÷ 2.3
06030036	60 ÷ 90	2.3 ÷ 3.5
06030037	90 ÷ 120	3.5 ÷ 4.7
<i>Optional Accessory</i>		
01961000	1 Lithium battery 3 V, 190 mAh, type CR 2032. For information on cables etc., see section A.	



DIN 863 T3
(Style D3)

0,001 mm
0.00005 in

Metric/Inch
conversion

Fixed measuring
faces:
tungsten carbide.

Max. 10 N

RS 232
interface,
opto-coupled.

Degree of
protection
(IEC 60529):
IP54 or IP40 with use of
the digital output

For additional
technical data:
see page C-3.

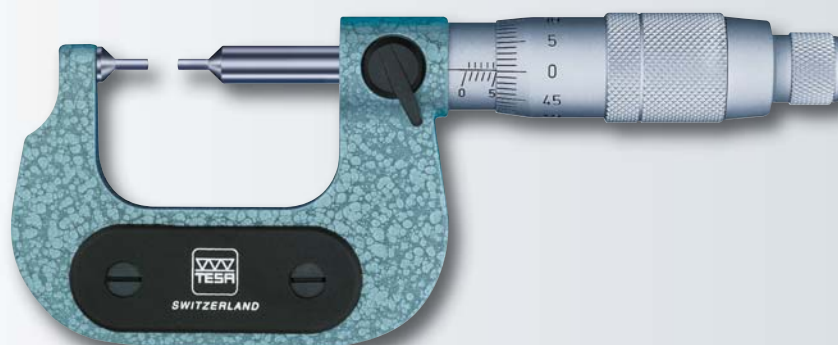
Plastic case

Identification
number

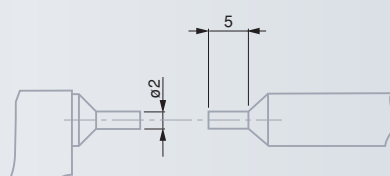
Measuring range
0 to 100: with a
SCS calibration
certificate.

Measuring range
> 100 mm:
inspection report
with a declaration of
conformity.

Models ISOMASTER AD



No	mm
00210101	0 ÷ 25
00210102	25 ÷ 50



DIN 863 T3
(Style D3)
NF E 11-090

0,01 mm

Fixed measuring
faces:
tungsten carbide.

Max. 10 N

Plastic case

Identification
number

Inspection report
with a declaration of
conformity



DIN 863 T3
(Style D3)
NF E 11-090

Vernier reading
to 0,001 mm

Scale division
0,1 mm

Fixed measuring
faces:
tungsten carbide

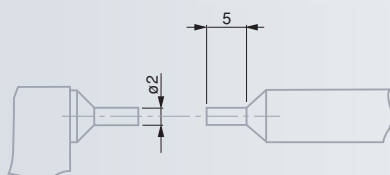
Max. 10 N

Plastic case

Identification
number

Inspection report
with a declaration
of conformity

Model TESAMASTER AD



No



00311301

mm

0 ÷ 25



DIN 863 T3
(Style D3)
NF E 11-090

0,001 mm.
Parallax-free
reading on vernier

100 divisions

Fixed measuring
faces:
tungsten carbide.

1 mm

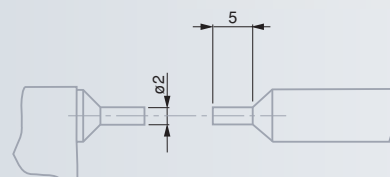
Max. 10 N

Plastic case

Identification
number

Inspection report
with a declaration
of conformity

Model MICRORAPID



No



072116410

mm

0 ÷ 20

Micrometers with One Spherical Measuring Face

Measure wall thickness of tubing.

Models MICROMASTER



	mm	in
06030079	0 ÷ 30	0 ÷ 1.2
06030080	25 ÷ 50	1 ÷ 2

Model ETALON



	mm
071115940	0 ÷ 25

Micrometers with Two Spherical Measuring Faces

Rounded Measuring faces on anvil and spindle for measuring concave surfaces of workpieces, e.g. ball-bearing guides or walls of tubing.

Models MICROMASTER



	mm	in
06030081	0 ÷ 25	0 ÷ 1
06030082	20 ÷ 50	0.8 ÷ 1.9
06030083	45 ÷ 75	1.8 ÷ 2.9
06030084	70 ÷ 100	2.8 ÷ 3.9



DIN 863 T3
(Style D1)



MICROMASTER:
0.001 mm or
0.00005 in



ETALON:
0.002 mm



Anvil:
tungsten carbide
(MICROMASTER)
or titanium carbide hard-
coating (ETALON).
Tungsten carbide spindle.



Anvil with a
3.5 mm
spherical face
(MICROMASTER) or a
3.25 mm one (ETALON).
Spindle with a flat measuring
face.



Max. 10 N



RS 232 on
MICROMASTER



Other technical
data on
MICROMASTER:
see page C-3.



Plastic case



Identification
number



Inspection report
with a declaration
of conformity



DIN 863 T3
(Style D1)



0.001 mm
0.00005 in



Tungsten
carbide



Spherical,
3.5 mm radius.



Max. 10 N



Additional
technical data:
see page C-3.



Plastic case



Identification
number



Inspection report
with a declaration
of conformity



DIN 863 T3
(Style D1)
NF E 11-090

0,01 mm

Measuring
faces rounded
to 3,25 mm

Titanium
carbide
coated

for model
No. 00112106.
Hardened steel for
other models.

0,5 mm

Max. 10 N

Plastic case

Identification
number

Inspection report
with a declaration
of conformity



Steel ball tip,
hardened and
lapped.
Dull-chrome brass retainer.

Series AAS ISOMASTER

Rounded measuring faces for checking concave surfaces such as ball-bearing guides and tubing walls.



No

mm

00112106	0 ÷ 25 (TiC)
00110901	0 ÷ 25
00110902	25 ÷ 50
00110903	50 ÷ 75
00110904	75 ÷ 100

Spherical Element for External Micrometers

Holder with a ball tip that fits on measuring faces having a 6,5 mm diameter – Serve to measure tubing wall thickness or workpieces with concave surfaces and the like.



No

Ball tip

072103522

5 mm

Micrometers for Soft Materials

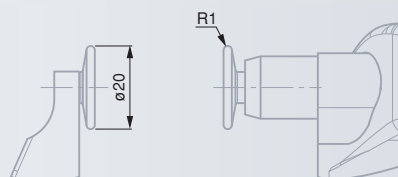
With two large, round-edge measuring faces – Measure the thickness of materials such as paper and plastic sheets, felt, cloth and other soft materials.

Model MICROMASTER

Non-rotating measuring spindle – Without spindle lock.



06030085	0 ÷ 30	0 ÷ 1.2



Model ISOMASTER AF



00210301	0 ÷ 25



Micrometers for Gear Pitch Measurement

Flanges with ring-shaped measuring faces for root tangent lengths W_k on gear pitches, distance between grooves and slots as well as other hard-to-reach locations.

Models MICROMASTER

Non-rotating measuring spindle – Without spindle lock.



No	mm	in
06030041	0 ÷ 30	0 ÷ 1.2
06030042	25 ÷ 55	1 ÷ 2.1
06030043	55 ÷ 85	2.1 ÷ 3.35
06030044	85 ÷ 115	3.35 ÷ 4.5

Models ISOMASTER AE



No	mm
00210201	0 ÷ 25
00210202	25 ÷ 50
00210203	50 ÷ 75
00210204	75 ÷ 100
00210205	100 ÷ 125
00210206	125 ÷ 150

Micrometers for Gear Tooth Measurement

	Max. perm. error* with partial contact of the measuring face μm	Max. perm. error with full contact of the meas- uring face (DIN 863-T1) μm	Flatness μm	Parallelism μm	Max. flexure of the frame μm
0 ÷ 30	10	4	2	5	2
25 ÷ 55	10	4	2	5	2
55 ÷ 85	11	5	2	5	3
85 ÷ 115	12	5	2	6	4

* Disregarding a rim of 1 mm as the measuring faces are being inspected.
For enhanced accuracy, the micrometer should be calibrated in the position of use.



DIN 863 T3
(Style D7)

0,001 mm
0.00005 in

Metric/Inch
conversion

Hardened
steel

Non-rotating
spindle ≤ 85 mm:
25 mm dia.
> 85 ≤ 115 mm: 30 mm dia.

Suitable from
module 0,5

Max. 10 N

RS 232

Additional
technical data:
see page C-3.

Plastic case

Identification
number

Inspection report
with a declaration
of conformity



DIN 863 T3
(Style D7)
NF E 11-090

0,01 mm

Hardened
steel

≤ 100 mm:
25 mm dia.
> 100 ≤ 150 mm:
32 mm dia.

Suitable from
module 0,6

Max. 10 N

Plastic case

Identification
number

Inspection report
with a declaration
of conformity

MICROMASTER with 7 Pairs of Interchangeable Measuring Inserts

Non-rotating spindle – Without spindle lock.



		
06030045	0 ÷ 30	0 ÷ 1.2



0,001 mm
0.00005 in



Metric/Inch
conversion



Micrometer
element with a
max. perm. error
of 4 µm



7,5 mm dia.,
non-rotating
spindle.

With a fixing bore for a
measuring insert.
Adjustable attachment on
anvil for a measuring insert,
with lock.



Hardened
steel



Max. 10 N



RS 232



Additional
technical data
on page C-3



Plastic case



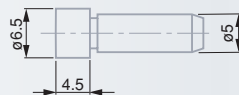
Identification
number



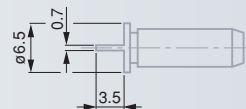
Inspection report
with a declaration
of conformity

Components of a Full Micrometer

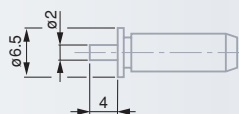
		
Single Micrometer		
06030099	0 ÷ 30	0 ÷ 1.2
Full set of measuring inserts		
00269027		
Includes one pair of the following inserts		
		
00269020	flat	Ø 6,5
00269021	small, flat	Ø 2
00269022	spherical	R = 5
00269023	large, flat	Ø 12
00269024	narrow, flat	0,7
00269025	cone-shaped	Ø 0,3/60°
00269026	knife-edged	0,3/60°
Specially designed measuring faces also available upon request.		



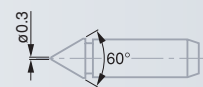
00269020



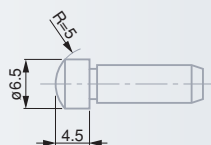
00269024



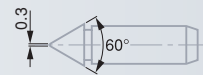
00269021



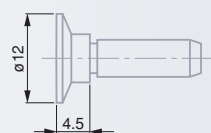
00269025



00269022



00269026



00269023



DIN 863 T3
(Style D12)
NF E 11-090

0,01 mm

Hardened steel
anvil.
Tungsten carbide
spindle

5 mm dia.
on anvil.
6,5 mm dia.
on spindle

0,5 mm

Max. 10 N

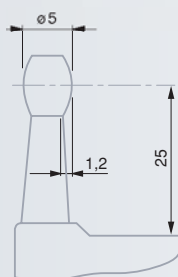
Plastic case

Identification
number

Inspection report
with a declaration
of conformity

ETALON Basic for Tube Wall Thickness Measurement

Barrel-shaped anvil for measuring the tube wall thickness and other curved workpieces.



No



00219066

mm
0 ÷ 25



Vernier reading
to 0,002 mm

Hardened steel
anvils.
Tungsten carbide
spindle.

Anvils:
see drawing.
Spindle:
6,5 mm dia.

0,5 mm

Max. 10 N

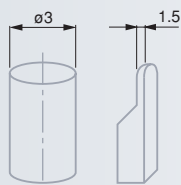
Plastic case

Identification
number

Inspection report
with a declaration
of conformity

ETALON Basic with Two Interchangeable Anvils

Universal micrometer for assembly – Anvils have either a flat or a cylindrical measuring face.



No



00219067

mm
0 ÷ 25

Micrometers with Prismatic Measuring Faces

Measure test pieces with uneven number of grooves such as milling cutters, taps, drills and spline shafts as well as odd polygons. Determine roundness errors on cylindrical surfaces. Angle of the prism aperture is designed for workpieces having a number of 3 or 5 flutes.

Models MICROMASTER



mm

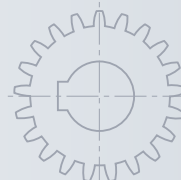
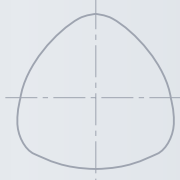
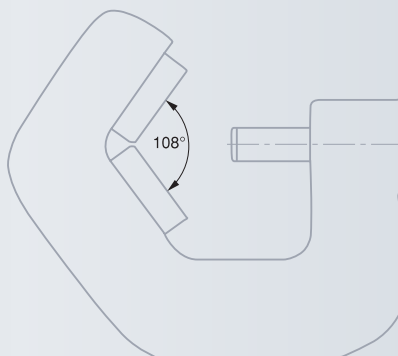
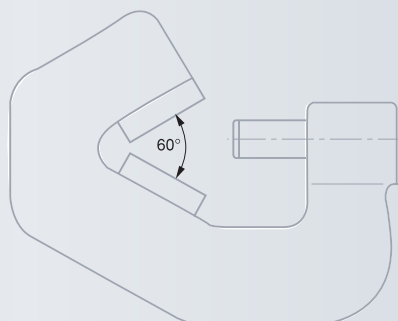
in

3-flute test pieces (60°)

06030087	1 ÷ 7	0.04 ÷ 0.27
06030088	5 ÷ 20	0.20 ÷ 0.80
06030089	20 ÷ 35	0.80 ÷ 1.38
06030090	35 ÷ 50	1.38 ÷ 1.97
06030091	50 ÷ 65	1.97 ÷ 2.56
06030092	65 ÷ 80	2.56 ÷ 3.15

5-flute test pieces (108°)

06030093	1 ÷ 7	0.04 ÷ 0.27
06030094	5 ÷ 25	0.20 ÷ 0.98
06030095	25 ÷ 45	0.98 ÷ 1.77
06030096	45 ÷ 65	1.77 ÷ 2.56
06030097	65 ÷ 85	2.56 ÷ 3.35



DIN 863 T3
(Style D 10)



0,001 mm
0.00005 in



Metric/Inch
conversion



Tungsten carbide
tipped



Angle of the
prism aperture:
60° for 3-flute test
pieces or 108° for 5-flute test
pieces.



0,75 mm for
3-flute test pieces
or 0,559 mm for
5-flute test pieces.



Max. 10 N



RS 232



Additional
technical data
on page C-3



Plastic case



Identification
number



Inspection report
with a declaration
of conformity

Models ISOMASTER AS



DIN 863 T3
(Style D 10)
NF E 11-090

0,01 mm

Tungsten carbide
tipped

Angle of the
prism aperture:
60° for 3-flute test
pieces or 108° for 5-flute test
pieces.

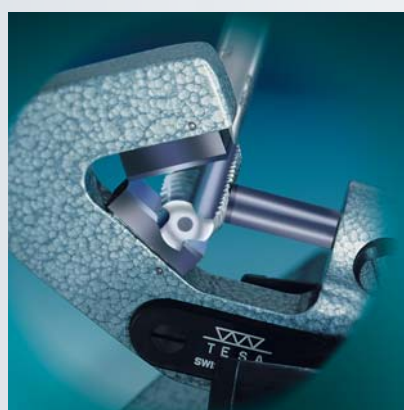
0,75 mm for
3-flute test pieces
or 0,559 mm for
5-flute test pieces.

Max. 10 N

Plastic case

Identification
number

Declaration
of conformity



No



mm

3-flute test pieces (60°)

00410001	1 ÷ 7
00410002	5 ÷ 20
00410003	20 ÷ 35
00410004	35 ÷ 50
00410005	50 ÷ 65

5-flute test pieces (108°)

00410102	5 ÷ 25
-----------------	--------



Hardened steel

Fitted with plastic
guard plates from
nominal dimension
of 20 mm.
Actual size engraved
on the top face

Identification
number

Declaration
of conformity

Cylindrical Setting Standards



No



mm



µm



µm

00440001	5	0,5	—
00440002	20	0,7	1
00440003	25	0,7	1
00440004	35	1	1
00440005	45	1,2	1,5
00440006	50	1,2	1,5
00440007	65	1,5	1,5

Micrometers for Thread Measurement

Used for pitch diameter inspection – Anvil with adjustable holder for mounting a measuring insert with prismatic faces – Fine screw adjustment and locking device – Spindle has a fixing bore for a cone-shaped measuring insert.

Models MICROMASTER AC



No		
	mm	in
06030062	0 ÷ 25	0 ÷ 1
06030063	25 ÷ 50	1 ÷ 2
06030064	50 ÷ 75	2 ÷ 3
06030065	75 ÷ 100	3 ÷ 4
06030066	100 ÷ 125	4 ÷ 5
06030067	125 ÷ 150	5 ÷ 6

Important

Measuring Inserts and setting standards must be ordered separately.

Models ISOMASTER AC



No	
	mm
00210001	0 ÷ 25
00210002	25 ÷ 50
00210003	50 ÷ 75
00210004	75 ÷ 100

Important

Measuring Inserts and setting standards must be ordered separately.



DIN 863 T3
(Style D18)



0,001 mm
0.00005 in



Metric/Inch
conversion



30 mm
measuring span



Max. 10 N



RS 232



Additional
technical data
on page C-3



Plastic case



Identification
number



Inspection report
with a declaration
of conformity



DIN 863 T3
(Style D 18)
NF E 11-090



0,01 mm



0,5 mm



Max. 10 N



Plastic case



Identification
number



Declaration
of conformity

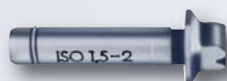


Hardened steel

Fixing rod:
3,5 mm dia.,
15,5 mm longSupplied in sets
or pairs

Interchangeable Thread Inserts for TESA Micrometers Series AC

With measuring faces specially designed for checking pitch diameters.



Pitch in mm

ISO metric threads
60° flank angle

00240000	0,4 ÷ 0,5
00240001	0,5 ÷ 0,6
00240002	0,6 ÷ 0,8
00240003	0,8 ÷ 1,0
00240004	1,0 ÷ 1,25
00240005	1,25 ÷ 1,5
00240006	1,5 ÷ 2,0
00240007	2,0 ÷ 2,5
00240008	2,5 ÷ 3,0
00240009	3,0 ÷ 4,0
00240010	4,0 ÷ 5,0
00240011	5,0 ÷ 6,0

Set of 12 pairs

00240015	0,4 ÷ 6,0
----------	-----------



Threads per in

Whitworth threads
55° flank angle

00250100	60 ÷ 48
00250101	48 ÷ 40
00250102	40 ÷ 32
00250103	32 ÷ 24
00250104	24 ÷ 18
00250105	18 ÷ 14
00250106	14 ÷ 10
00250107	10 ÷ 7
00250108	7 ÷ 4.5
00250109	4.5 ÷ 3

Set of 10 pairs

00250115	60 ÷ 3
----------	--------



Threads per in

Unified inch-threads UN, UNC, UNF...
60° flank angle

00250000	64 ÷ 42
00250001	42 ÷ 25
00250002	25 ÷ 17
00250003	17 ÷ 10
00250004	10 ÷ 6.5
00250005	6.5 ÷ 4
00250006	4 ÷ 2.5

Set of 7 pairs

00250015	64 ÷ 2.5
----------	----------



Hardened steel

Insulating
sleeve marked
with actual sizeIdentification
numberDeclaration
of conformity

Setting Standards for Screw Thread Micrometers



mm



in

60° flank angle

00240501	25	00250501	1
00240502	50	00250502	2
00240503	75	00250503	3
00240504	100	00250504	4
00240505	125	00250505	5

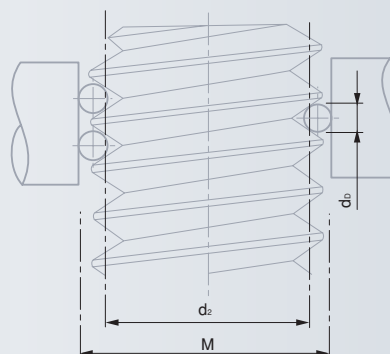
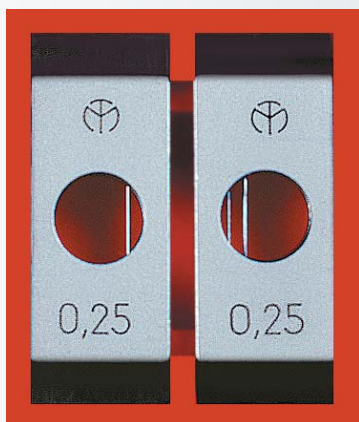
55° flank angle

00240601	25
00240602	50
00240603	75



XB Wires for Screw Threads

For measuring pitch diameter of threads using the three-wire method. Actual flank diameter d_2 can either be determined arithmetically or with the aid of the relevant tables based on the measured actual size M – Suitable for all standard micrometers with a measuring insert having a 6,5 mm diameter.



Steel wires, hardened



Wires are mounted on holders:

2-wire holder rests on anvil while the single wire holder is used on spindle side



Single pairs are supplied in a plastic box, full set in a wooden case



Declaration of conformity



Wires diameter

d_0 mm



ISO metric threads

Pitch in mm



Whitworth threads

Number of threads per in



Unified inch-threads UN, UNC, UNF ...

Number of threads per in

	d_0 mm	Pitch in mm	Number of threads per in	Number of threads per in
00240701	0,17	0,25/0,3	–	–
00240702	0,22	0,35	–	72
00240703	0,25	0,4	60	64
00240704	0,29	0,45/0,5	–	56
00240705	0,335	0,6	48/40	48/44
00240706	0,455	0,7 ÷ 0,8	–	32
00240707	0,53	0,9	32/28	28
00240708	0,62	1,0	26/24	24
00240709	0,725	1,25	22 ÷ 19	20
00240710	0,895	1,5	18/16	18/16
00240711	1,10	1,75	14	14/13
00240712	1,35	2,0	12/11	12/11
00240713	1,65	2,5	10/9	10/9
00240714	2,05	3,0/3,5	8/7	8/7
00240715	2,55	4,0/4,5	6	6
00240716	3,20	5,0/5,5	5/4.5	5/4.5

Set of 16 pairs

00240700 0,17 ÷ 3,20

Micrometer Stands

For micrometers up to 300 mm as well as many other hand-held tools.



TESA

00160201

ETALON

072110123



Clamp aperture: 16 mm (TESA) or 20 mm (ETALON)

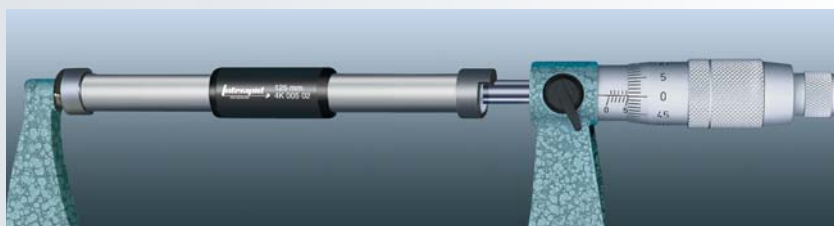


Lacquered cast iron base



Tilt can be locked using a single bolt.

INTERAPID Setting Standards



Hardened
steel



Two flat and
parallel
measuring faces



Cylindrical
gauge block
with plastic
insulating grip and dull-
chrome shaft



With lengths:
 $\leq 175 \text{ mm} = 10 \text{ mm.}$
 $\geq 200 \text{ mm} = 13 \text{ mm.}$



Max. perm.
error over
the length:
 $\pm (1 + L/100) \mu\text{m}, L \text{ in mm}$



Identification
number



Inspection
report
with actual
measured length



Declaration
of conformity

No	mm	No	mm
02140001	25	02140021	525
02140002	50	02140022	550
02140003	75	02140023	575
02140004	100	02140024	600
02140005	125	02140025	625
02140006	150	02140026	650
02140007	175	02140027	675
02140008	200	02140028	700
02140009	225	02140029	725
02140010	250	02140030	750
02140011	275	02140031	775
02140012	300	02140032	800
02140013	325	02140033	825
02140014	350	02140034	850
02140015	375	02140035	875
02140016	400	02140036	900
02140017	425	02140037	925
02140018	450	02140038	950
02140019	475	02140039	975
02140020	500	02140040	1000

Guide Collars

Make the positioning of INTERAPID setting standards fast and easy.



No	mm	mm
02140103	100 ÷ 175	8
02140108	200 ÷ 1475	8

ETALON Cylindrical Step Gauges

For display setting and calibration.



072112020

mm

5 ÷ 100

072112021

5 ÷ 150



Alloyed steel,
hardened



Diameters
in step of
5 mm (≤ 50 mm)
or 10 mm (> 50 mm).



Max. perm.
errors for nominal
diameters:
 ≤ 80 mm = 1,5 μ m
 $\geq 90 \leq 120$ mm = 2,0 μ m
 ≥ 130 mm = 2,5 μ m



Mounted on a wood
base. Supplied with
dust cover.



Declaration
of conformity

Optical Flats with Two Parallel Faces

Used for examining the flatness and parallelism of the measuring faces on external micrometers as well as other similar measuring instruments.

The difference in length of the optical flats within a set matches a quarter or a third of the spindle pitch of 0,5 mm.



31 mm



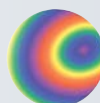
Length tolerance
with reference
to the nominal
dimension: ± 100 μ m



Flatness
tolerances for
optical parallels
with lengths:
 $\leq 27,335$ mm = 0,15 μ m
 $\geq 52,00 \div 77,335$ mm =
0,2 μ m



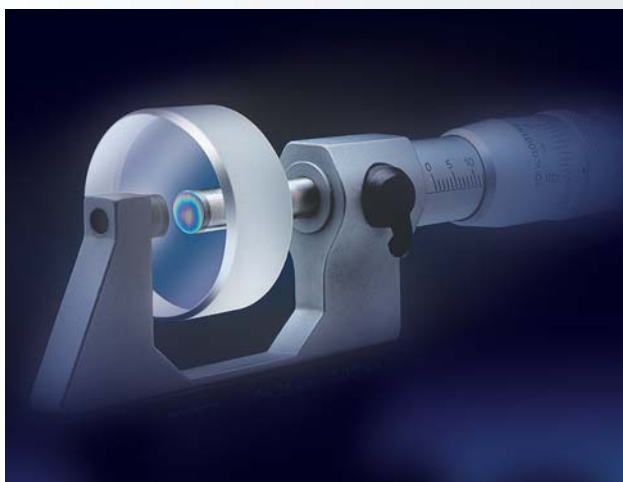
Tolerances
in parallelism for
optical parallels
with lengths:
 $\leq 27,335$ mm = 0,4 μ m
 $\geq 52,00 \div 77,335$ mm =
0,5 μ m



Each set
is supplied in
a wooden case



Declaration
of conformity



mm

02510001

12,00

02510000

12,00 ÷ 12,375

02510101

27,00

02510100

27,00 ÷ 27,335

02510200

52,00 ÷ 52,335

02510300

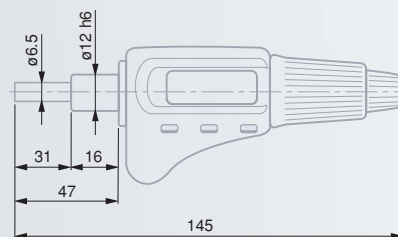
77,00 ÷ 77,335

Micrometer Heads

Components commonly used for checking the various displacements on measuring fixtures, coordinate tables, microscopes, machines as well as other special appliances. Mounted on the cylindrical coupling shaft.

Models MICROMASTER

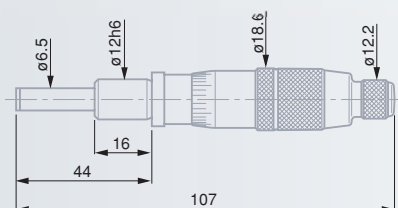
Without spindle lock.



No	 mm	 mm
06030038	0 ÷ 30	12h6
06030039	30 ÷ 0	12h6
06030040	30 ÷ 0	12h6

Model ISOMASTER AR

Without spindle lock.



No	 mm	 mm
00211201	0 ÷ 25	12h6



DIN 863 T2
(Style E)



0.001 mm
0.00005 in



Metric/Inch
conversion



Tungsten carbide
tipped



6,5 mm dia.



0,5 mm



Max. perm.
error of 4 µm



Max. 10 N



Additional
technical data
on page C-3



RS 232
interface,
opto-coupled



Identification
number



Inspection report
with a declaration
of conformity



DIN 863 T2
(Style E)
NF E 11-090



0,01 mm



Tungsten carbide
tipped



6,5 mm dia.



0,5 mm



Max. perm.
error of 3 µm



Max. 10 N



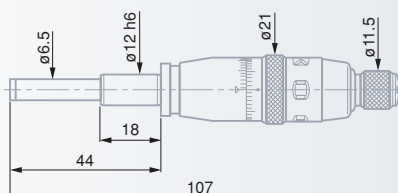
Identification
number



Declaration
of conformity

Model TESAMASTER AR

Without spindle lock.



00312301	0 ÷ 25	12h6



DIN 863 T2
(Style E)



Vernier
reading to
0,001 mm



Scale
division to
0,1 mm



Tungsten
carbide
tipped



6,5 mm dia



0,5 mm



Max. perm.
error of 2 µm



Max. 10 N



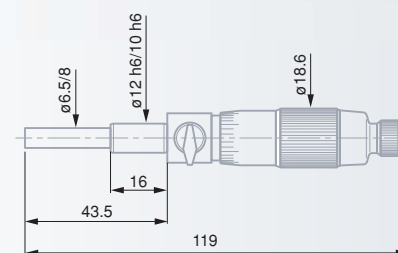
Identification
number



Declaration
of conformity

ETALON 266 Micrometer Heads

With or without spindle lock.



	mm	D mm	mm	Spindle lock
072115942	0 ÷ 25	Ø 6,5	12h6	—
072115943	0 ÷ 25	Ø 8	12h6	●
072116258	0 ÷ 25	Ø 6,5	10h6	●



DIN 863 T2
(Style E)
NF E 11-090



Vernier reading
to 0,002 mm



Tungsten carbide
tipped



0,5 mm



Max. perm.
error of 3 µm



Identification
number



Declaration
of conformity

Depth Micrometers

With interchangeable measuring rods provided in sets. The rods are adjusted in steps, each with a step length of 30 or 25 mm, thus eliminating the need for a new display setting when rods are exchanged.

Models MICROMASTER

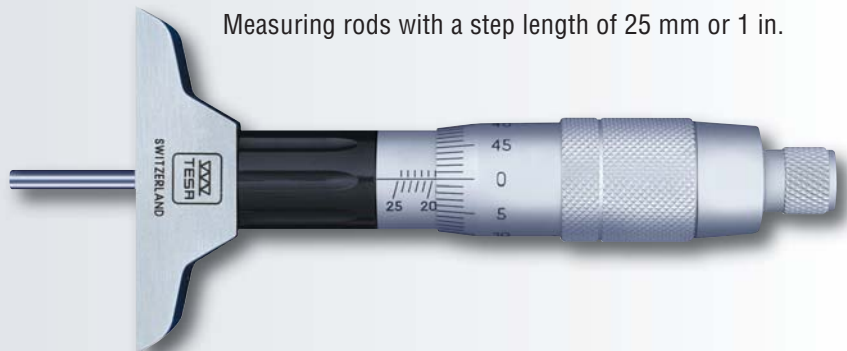
Non-rotating measuring rod. Sets with a step length of 30 mm.



			
	mm	in	mm
06030069	0 ÷ 90	0 ÷ 3.5	50 x 15
06030070	0 ÷ 180	0 ÷ 7	100 x 15
<i>Optional Accessories</i>			
06060021	6 pieces rod set	0 ÷ 180 mm	

Models ISOMASTER AQ

Measuring rods with a step length of 25 mm or 1 in.



		
	mm	mm
00211002	0 ÷ 75	50 x 15
00211003	0 ÷ 150	50 x 15
00211004	0 ÷ 75	100 x 15
00211005	0 ÷ 150	100 x 15



 DIN 863 T2
(Style T)

 0,001 mm
0.00005 in

 Metric/Inch
conversion

 Non-rotating
spindle

 Measuring rods
with hardened steel
ends

 3 mm dia.
measuring rods

 30 mm

 RS 232
data output

 0,5 mm

 Max. perm. error
(meas. element):
3 µm

 Plastic case

 Identification
number

 Inspection report
with a declaration
of conformity



 DIN 863 T2
(Style T)
NF E 11-097

 0,01 mm

 Measuring rods
with hardened
steel ends

 3 mm dia.
measuring rods.
Measuring
face on the base:
see table

 0,5 mm

 Max. perm. error
of the measuring
element: 3 µm

 Plastic case

 Identification
number

 Declaration
of conformity

Tool Sets



TESA Swiss Tool Set



00510033



TESA Swiss Tool Set

Consisting of:



mm



mm

00510041

1 Vernier caliper
TESA SWISSCAL 2

0 ÷ 150 0,02

00560013

1 Depth foot

00110101

1 External micrometer
TESA ISOMASTER

0 ÷ 25 0,01

00560031

1 Suited plastic case



Caliper



DIN 862



Stainless steel,
hardened



Technical data
on page B-8

Depth foot



Stainless steel,
hardened.



75 x 6 mm
measuring faces

Micrometer



DIN 863 T1
NF E-11095



Tungsten carbide
tipped



Technical data
on page C-6

Additional data



Inspection report
with a declaration
of conformity



Caliper



DIN 862



Stainless steel,
hardened



Technical data
on page B-5

Depth foot



Stainless steel,
hardened



75 x 6 mm
measuring face

Micrometer



DIN 863 T1
NF E 11-095



Tungsten carbide
tipped



Technical data
on page C-6

Additional data



Inspection report
with a declaration
of conformity



TESA Duo-Set 1



00530020



TESA Duo-Set 1

Consisting of:



mm

mm

00510008 1 Dial caliper
TESA CCMA-M 0 ÷ 150 0,02

00560013 1 Depth foot

00110101 1 External micrometer
TESA ISOMASTER 0 ÷ 25 0,01

00560031 1 Suited plastic case



Caliper



DIN 862



Stainless steel,
hardened



Technical data
on page B-5

Depth foot



Stainless steel,
hardened



75 x 6 mm
measuring face

Micrometer



DIN 863 T1
NF E 11-095



Tungsten
carbide tipped



Technical data
on page C-4

Additional data



Inspection report
with a declaration
of conformity



TESA Duo-Set 2



00530021



TESA Duo-Set 2

Consisting of:



mm

mm

00510008 1 Dial caliper
TESA CCMA-M 0 ÷ 150 0,02

00560013 1 Depth foot

00310001 1 External micrometer
TESAMASTER 0 ÷ 25 0,001

00560031 1 Suited plastic case



TESA Duo-Set 8



00531101 TESA Duo-Set 8

Consisting of:



mm mm

00530090 1 Caliper
TESA Shop-Cal capa μ system 0 ÷ 150 0,01

00560013 1 Depth foot

00110101 1 External micrometer
TESA ISOMASTER 0 ÷ 25 0,01

00560031 1 Suited plastic case



Caliper

DIN 862



Stainless steel,
hardened



Technical data
on page B-4

Depth foot



Stainless steel,
hardened.



75 x 6 mm
measuring face

Micrometer



DIN 863 T1
NF E 11-095



Tungsten
carbide tipped



Technical data
on page C-6

Additional data



Inspection report
with a declaration
of conformity



TESA Duo-Set 9



00531102 TESA Duo-Set 9

Consisting of:



mm mm

00530090 1 Caliper TESA
TESA Shop-Cal capa μ system 0 ÷ 150 0,01

00560013 1 Depth foot

00310001 1 External micrometer
TESAMASTER 0 ÷ 25 0,001

00560031 1 Suited plastic case



Caliper

DIN 862



Stainless steel,
hardened



Technical data
on page B-4

Depth foot



Stainless steel,
hardened



75 x 6 mm
measuring face

Micrometer



DIN 863 T1
NF E 11-095



Tungsten
carbide tipped



Technical data
on page C-4

Additional data



Inspection report
with a declaration
of conformity



Caliper



Depth foot



Micrometer



Caliper



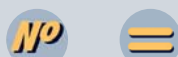
Depth foot



Micrometer



TESA Duo-Set 16



00531007 TESA Duo-Set 16

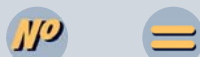
Consisting of:



00530090	1 Caliper TESA Shop-Cal capa μ system	0 ÷ 150	0,01
00560013	1 Depth foot		
06030010	1 External micrometer TESA MICROMASTER EASY	0 ÷ 30	0,001
00560090	1 Suited plastic case		

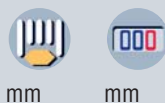
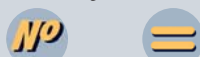


TESA Duo-Set 13



00531004 TESA Duo-Set 13

Consisting of:



00530300	1 Caliper TESA-Cal IP67	0 ÷ 150	0,01
00560013	1 Depth foot		
06030020	1 External micrometer TESA MICROMASTER IP54	0 ÷ 30	0,001
00560090	1 Suited plastic case		



TESA Duo-Set 14

Nº

=

00531005

TESA Duo-Set 14

Consisting of:

Nº

=

mm

mm

00530300

1 Caliper
TESA-Cal IP67

0 ÷ 150

0,01

00560013

1 Depth foot

06030010

1 External micrometer
TESA MICROMASTER EASY 0 ÷ 30

0,001

00560090

1 Suited plastic case



Caliper

N DIN 862

Stainless steel,
hardened.

Technical data
listed on page B-4

Inspection report
with a declaration
of conformity

Depth foot

Stainless steel,
hardened.

75 x 6 mm
measuring face

Micrometer

N DIN 863 T1,
NF E 11-095

Tungsten
carbide tipped

Technical data
listed on page C-3

SCS calibration
certificate



TESA Duo-Set 15

Nº

=

00531006

TESA Duo-Set 15

Consisting of:

Nº

=

mm

mm

00530311

1 Caliper
TESA-Cal IP67, RS

0 ÷ 150

0,01

00560013

1 Depth foot

06030030

1 External micrometer
MICROMASTER IP54, RS

0 ÷ 30

0,001

00560090

1 Suited plastic case



Caliper

N DIN 862

Stainless steel,
hardened.

Technical data
listed on page B-3

Inspection report
with a declaration
of conformity

Depth foot

Stainless steel,
hardened.

75 x 6 mm
measuring face

Micrometer

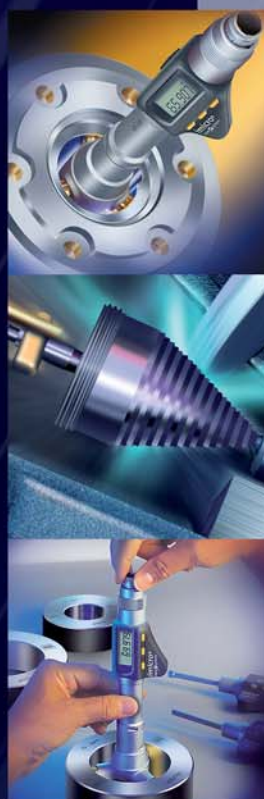
N DIN 863 T1,
NF E 11-095

Tungsten
carbide tipped

Technical data
listed on page C-3

SCS calibration
certificate

Internal Measurement

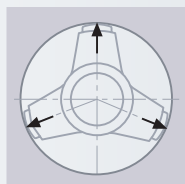


INTERNAL MEASUREMENT AND REQUIREMENTS

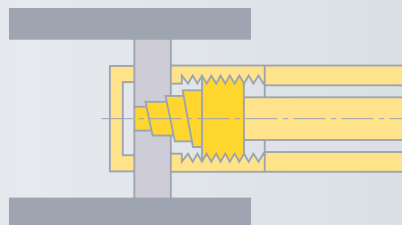
Bore measurement is more demanding than external measurement of workpieces. Besides the tight tolerances specified for the current application, all measuring components having a direct influence on the uncertainty of measurement must be designed in such a way that they can go into the bore to be checked.

Benefit of the 3-Line contact

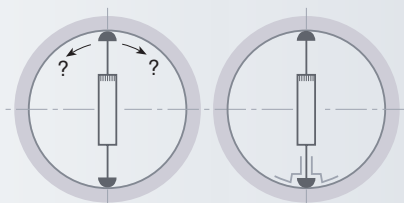
TESA IMICRO, TESA TRI-O-BOR, ALESOMETER as well as ETALON INTALOMETER are self-centring and self-aligning handtools that make bore measurement reliable, regardless of the operator's sensitivity.



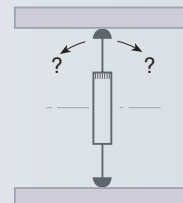
The three measuring bolts are spaced 120° apart, thus providing optimum self-centring.



The measuring bolts with 3-line contact allows the micrometer to align itself parallel to the contact surfaces.



2-point contact measuring instruments are not self-centring. To make bore measurement easier, auxiliary means need additionally be used.

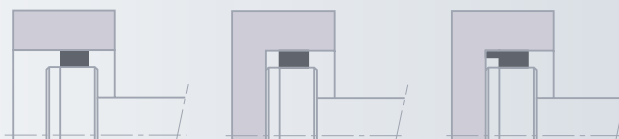


2-point contact does not permit the tool to align itself in relation to the bore axis.

A single tool can replace hundreds of plug gauges

Unlike plug gauges that check only one toleranced size, a single tool can measure many diameters.

Depending on the model that is being used, through holes and blind bores along with short centring shoulders can be inspected, reliably.

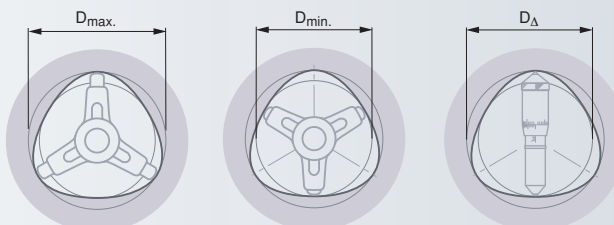
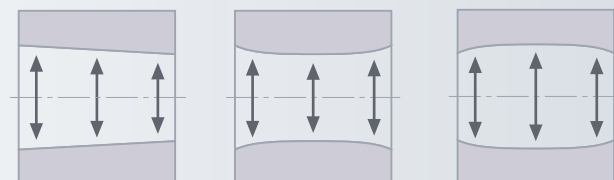


Establishing form errors

Form errors are established through measurements taken at several points within a bore.

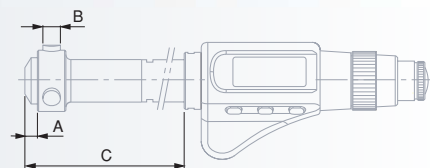
Micrometers with 3-line contact determine run-out errors in a triangular way.

Micrometers with 2-point contact measure medium-size diameters only. They do not allow Users to see what makes diameters measured at various points different.



TESA IMICRO capa μ system with Digital Display

A successful combination of the patented TESA capacitive system with the IMICRO unique cone.



DIN 863 T4
(Style C1)

0,001 mm
0.0005 in

Metric/inch
Conversion

LCD, 7 mm
digit height

Floating zero

Display lock

Measuring faces
for application
ranges

3,5 to 12 mm:
hardened steel (HV30 770)
11 to 100 mm:
TiN hard-coating (HV5 2300)
100 to 300 mm:
carbide tipped (HV5 1300)

RS 232
opto-coupled,
bidirectional

3 V lithium battery

1 to 2 a
(≈ 2000 h/a)

Automatic
shut down after
10 min.

Display setting is retained
as long as power supply
remains stable.

10 °C to 40 °C

-10 °C to 60 °C

80%,
non condensing



Measuring
element IP54
(IEC 60529) or
IP40 with active data
output

Plastic case

Identification
number

TESA's
calibration
certificate

Declaration
of conformity

06130101	3,5 ÷ 4	0.1377 ÷ 0.1574	4	4	2	1,5	20
06130102	4 ÷ 4,5	0.1574 ÷ 0.1771	4	4	2	1,5	20
06130103	4,5 ÷ 5,5	0.1771 ÷ 0.2165	4	4	2	1,5	25
06130104	5,5 ÷ 6,5	0.2165 ÷ 0.2559	4	4	2	1,5	25
06130105	6 ÷ 8	0.2362 ÷ 0.3150	4	4	2,5	2,5	79
06130106	8 ÷ 10	0.3150 ÷ 0.3970	4	4	2,5	2,5	79
06130107	10 ÷ 12	0.3970 ÷ 0.4724	4	4	2,5	2,5	79
06130108	11 ÷ 14	0.4330 ÷ 0.5512	4	4	3,5	4	93
06130109	14 ÷ 17	0.5512 ÷ 0.6693	4	4	3,5	4	93
06130110	17 ÷ 20	0.6693 ÷ 0.7874	4	4	3,5	4	93
06130111	20 ÷ 25	0.7874 ÷ 0.9843	4	4	7	7	91
06130112	25 ÷ 30	0.9843 ÷ 1.1811	4	4	7	7	91
06130113	30 ÷ 35	1.1811 ÷ 1.3780	4	4	7	7	91
06130114	35 ÷ 40	1.3780 ÷ 1.5748	4	4	7	7	91
06130115	40 ÷ 50	1.5748 ÷ 1.9685	4	4	11	12	104
06130116	50 ÷ 60	1.9685 ÷ 2.3622	5	5	11	12	104
06130117	60 ÷ 70	2.3622 ÷ 2.7560	5	5	11	12	104
06130118	70 ÷ 80	2.7560 ÷ 3.1496	5	5	11	12	104
06130119	80 ÷ 90	3.1496 ÷ 3.5433	5	5	11	12	104
06130120	90 ÷ 100	3.5433 ÷ 3.9370	5	5	11	12	104
06130121	100 ÷ 125	3.9370 ÷ 4.9212	6	6	26	18	100
06130122	125 ÷ 150	4.9212 ÷ 5.9055	6	6	26	18	100
06130123	150 ÷ 175	5.9055 ÷ 6.8897	7	7	26	18	100
06130124	175 ÷ 200	6.8897 ÷ 7.8740	7	7	26	18	100
06130125	200 ÷ 225	7.8740 ÷ 8.8582	8	8	26	18	100
06130126	225 ÷ 250	8.8582 ÷ 9.8425	8	8	26	18	100
06130127	250 ÷ 275	9.8425 ÷ 10.8267	8	8	26	18	100
06130128	275 ÷ 300	10.8267 ÷ 11.8110	8	8	26	18	100

Optional Accessory

01961000 1 Lithium battery - 3 V, 190 mAh, type CR 203

For ordering information on cables etc., see section A.

Suited carrying cases on page D-8.

TESA IMICRO capa μ system with Digital Display – Partial Sets

 A successful combination of the TESA patented capacitive measuring system with the IMICRO unique cone.



								
Partial sets including	Elements	Measuring heads		Setting rings		Extensions		
06130230	3,5 ÷ 6,5	06130010	06140020	3,5 ÷ 4	00843200	4	–	
			06140021	4 ÷ 4,5	00843201	5,5		
			06140022	4,5 ÷ 5,5				
			06140023	5,5 ÷ 6,5				
06130231	6 ÷ 12	06130011	06140024	6 ÷ 8	00840101	8	00840001	100
			06140025	8 ÷ 10	00840102	10		
			06140026	10 ÷ 12				
06130232	11 ÷ 20	06130011	06140027	11 ÷ 14	00840103	11	00840301	150
			06140028	14 ÷ 17	00840105	17		
			06140029	17 ÷ 20				
06130233	20 ÷ 40	06130011	06140030	20 ÷ 25	00840106	25	00841100	150
			06140031	25 ÷ 30	00840107	35		
			06140032	30 ÷ 35				
			06140033	35 ÷ 40				
06130234	40 ÷ 100	06130011	06140034	40 ÷ 50	00840108	50	00841800	150
			06140035	50 ÷ 60	00840109	70		
			06140036	60 ÷ 70	00840110	90		
			06140037	70 ÷ 80				
			06140038	80 ÷ 90				
			06140039	90 ÷ 100				
06130235	100 ÷ 200	06130012	06140040	100 ÷ 125	00840112	125	00842600	150
			06140041	125 ÷ 150	00840113	175		
			06140042	150 ÷ 175				
			06140043	175 ÷ 200				

Set composition for the application range from 200 to 300 mm available upon request

		
Measuring Element	Measuring heads	mm
06130012	06140044	200 ÷ 225
	06140045	225 ÷ 250
	06140046	250 ÷ 275
	06140047	275 ÷ 300



 DIN 863 T4
(Style C1)

 0,001 mm
0.0005 in

 Metric/inch
Conversion

 LCD, 7 mm
digit height

 Floating zero

 Display lock

 Measuring faces
for application
ranges

3,5 to 12 mm:
hardened steel (HV30 770)
11 to 100 mm:
TiN hard-coating (HV5 2300)
100 to 300 mm:
carbide tipped (HV5 1300)

 RS 232
opto-coupled,
bidirectional

 3 V lithium battery

 1 to 2 a
(≈ 2000 h/a)

 Automatic
shut down after
10 min.
Display setting is retained
as long as power supply
remains stable.

 10 °C to 40 °C

 -10 °C to 60 °C

 80%,
non condensing



 Measuring
element IP54
(IEC 60529) or
IP40 with active data
output

 Plastic case

 Identification
number

 TESA's
calibration
certificate

 Declaration
of conformity

TESA IMICRO capa μ system with Digital Display – Full Sets

 A successful combination of the TESA patented capacitive measuring system with the IMICRO unique cone.



 DIN 863 T4
(Style C1)

 0,001 mm
0.0005 in

 Metric/inch
Conversion

 LCD, 7 mm
digit height

 Floating zero

 Display lock

 Measuring faces
for application
ranges

3,5 to 12 mm:
hardened steel (HV30 770)
11 to 100 mm:
TiN hard-coating (HV5 2300)
100 to 300 mm:
carbide tipped (HV5 1300)

 RS 232
opto-coupled,
bidirectional

 3 V lithium battery

 1 to 2 a
(≈ 2000 h/a)

 Automatic
shut down after
10 min.
Display setting is retained
as long as power supply
remains stable.

 10 °C to 40 °C

 -10 °C to 60 °C

 80%,
non condensing



 Measuring
element IP54
(IEC 60529) or
IP40 with active data
output

 Plastic case

 Identification
number

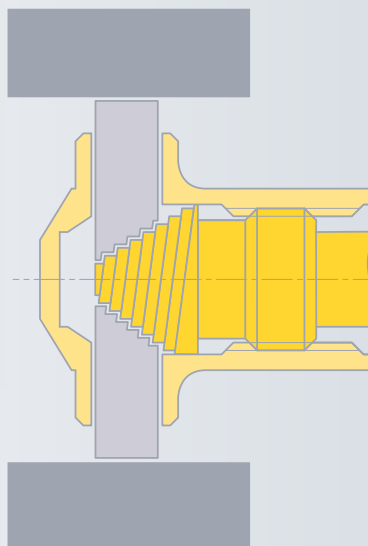
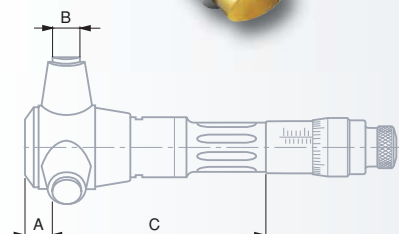
 TESA's
calibration
certificate

 Declaration
of conformity

							
Full sets including		Single micrometers		Setting rings		Extensions	
06130220	3,5 ÷ 6,5	06130101	3,5 ÷ 4	00843200	4	–	
		06130102	4 ÷ 4,5	00843201	5,5		
		06130103	4,5 ÷ 5,5				
		06130104	5,5 ÷ 6,5				
06130221	6 ÷ 12	06130105	6 ÷ 8	00840101	8	00840001	100
		06130106	8 ÷ 10	00840102	10		
		06130107	10 ÷ 12				
06130222	11 ÷ 20	06130108	11 ÷ 14	00840103	11	00840301	150
		06130109	14 ÷ 17	00840105	17		
		06130110	17 ÷ 20				
06130223	20 ÷ 40	06130111	20 ÷ 25	00840106	25	00841100	150
		06130112	25 ÷ 30	00840107	35		
		06130113	30 ÷ 35				
		06130114	35 ÷ 40				
06130224	40 ÷ 100	06130115	40 ÷ 50	00840108	50	00841800	150
		06130116	50 ÷ 60	00840109	70		
		06130117	60 ÷ 70	00840110	90		
		06130118	70 ÷ 80				
		06130119	80 ÷ 90				
		06130120	90 ÷ 100				
06130225	100 ÷ 200	06130121	100 ÷ 125	00840112	125	00842600	150
		06130122	125 ÷ 150	00840113	175		
		06130123	150 ÷ 175				
		06130124	175 ÷ 200				

TESA IMICRO with Analogue Indication – Metric

Self-centring and self-aligning internal micrometers. The high-precision thread machined into the measuring cone, combined with the measuring bolts specially arranged to provide 3-line contact, make them the only micrometers in the world that respect the ABBE principle. Measure depth, reliably.



DIN 863 T4
(Style C1)
NF E 11-099



Measuring
faces for
application

ranges from
3,5 to 12 mm:
hardened steel (HV30 770)
11 to 100 mm:
TiN hard-coating (HV5 2300)
100 to 300 mm:
carbide tipped (HV5 1300)



Application
ranges from
3,5 to 200 mm
in a shipping box
200 to 300 mm in a wooden
case with 1 extension of
150 mm (No. 00842600)



Identification
number



Inspection report
with a declaration
of conformity

No						A mm	B mm	C mm
00813410	3,5 ÷ 4	0,001	4	4		2	1,5	20
00813411	4 ÷ 4,5	0,001	4	4		2	1,5	20
00813412	4,5 ÷ 5,5	0,001	4	4		2	1,5	25
00813413	5,5 ÷ 6,5	0,001	4	4		2	1,5	25
00810001	6 ÷ 8	0,001	4	4		2,5	2,5	52
00810002	8 ÷ 10	0,001	4	4		2,5	2,5	52
00810003	10 ÷ 12	0,001	4	4		2,5	2,5	52
00810801	11 ÷ 14	0,005	4	4		3,5	4	77
00810802	14 ÷ 17	0,005	4	4		3,5	4	77
00810803	17 ÷ 20	0,005	4	4		3,5	4	77
00811501	20 ÷ 25	0,005	4	4		7	7	78
00811502	25 ÷ 30	0,005	4	4		7	7	78
00811503	30 ÷ 35	0,005	4	4		7	7	78
00811504	35 ÷ 40	0,005	4	4		7	7	78
00812301	40 ÷ 50	0,005	4	4		11	12	84
00812302	50 ÷ 60	0,005	5	5		11	12	84
00812303	60 ÷ 70	0,005	5	5		11	12	84
00812304	70 ÷ 80	0,005	5	5		11	12	84
00812305	80 ÷ 90	0,005	5	5		11	12	84
00812306	90 ÷ 100	0,005	5	5		11	12	84
00812601	100 ÷ 125	0,01	6	6		26	18	81
00812602	125 ÷ 150	0,01	6	6		26	18	81
00812603	150 ÷ 175	0,01	7	7		26	18	81
00812604	175 ÷ 200	0,01	7	7		26	18	81
00813101	200 ÷ 225	0,01	8	8		26	18	81
00813102	225 ÷ 250	0,01	8	8		26	18	81
00813103	250 ÷ 275	0,01	8	8		26	18	81
00813104	275 ÷ 300	0,01	8	8		26	18	81



DIN 863 T4
(Style C1)
NF E 11-099

Measuring faces
on models from
3,5 to 12 mm:
hardened steel, HV30 770;
11 to 100 mm: titanium
nitride (TiN) hard-coating
to HV5 2300.
100 to 200 mm: tungsten
carbide tipped to HV5 1300.

Additional
technical data:
see on the
previous page.
Setting rings on
page D-17.

Plastic case
or suitcase

Identification
number

Inspection report
with a declaration
of conformity

TESA IMICRO with Analogue Indication – Full Metric Sets



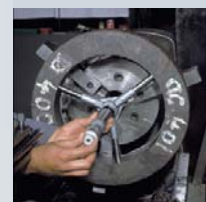
No			No		No		No	
	mm		mm		mm		mm	
Full sets including			Single micrometers		Setting rings		Extensions	
00813409	BAE	3,5 ÷ 6,5	00813410	3,5 ÷ 4	00843200	4	—	
			00813411	4 ÷ 4,5	00843201	5,5		
			00813412	4,5 ÷ 5,5				
			00813413	5,5 ÷ 6,5				
00810000	BAF	6 ÷ 12	00810001	6 ÷ 8	00840101	8	00840001	100
			00810002	8 ÷ 10	00840102	10		
			00810003	10 ÷ 12				
00810800	BAG	11 ÷ 20	00810801	11 ÷ 14	00840103	11	00840301	150
			00810802	14 ÷ 17	00840105	17		
			00810803	17 ÷ 20				
00811500	BAH	20 ÷ 40	00811501	20 ÷ 25	00840106	25	00841100	150
			00811502	25 ÷ 30	00840107	35		
			00811503	30 ÷ 35				
			00811504	35 ÷ 40				
00812300	BAJ	40 ÷ 100	00812301	40 ÷ 50	00840108	50	00841800	150
			00812302	50 ÷ 60	00840109	70		
			00812303	60 ÷ 70	00840110	90		
			00812304	70 ÷ 80				
			00812305	80 ÷ 90				
			00812306	90 ÷ 100				
00812600	BAK	100 ÷ 200	00812601	100 ÷ 125	00840112	125	00842600	150
			00812602	125 ÷ 150	00840113	175		
			00812603	150 ÷ 175				
			00812604	175 ÷ 200				

Accessories for both TESA IMICRO and TESA IMICRO capa μ system

Extensions for Deep Hole Measurement



Nº		mm	Nº		mm
00840001		6 ÷ 12	00841800		40 ÷ 100
00840301		11 ÷ 20	00841801		500
00840302		500	00841802		1000
00841100		20 ÷ 40	00842600		100 ÷ 300
00841101		500	00842601		500
00841102		1000	00842602		1000



DIN 863 T4
(Style C1)

Centring Devices for TESA IMICRO



Nº		mm		mm
00860001		40 ÷ 100		150
00862601		100 ÷ 200		200



Moulded Cases for Single Micrometers, Full Sets and Partial Sets

Nº		mm
<i>Single micrometers</i>		
00860007	06160002	3,5 ÷ 12
00860011	06160002	11 ÷ 20
00860015	06160002	20 ÷ 40
00860016	06160003	40 ÷ 70
00860016	06160003	70 ÷ 100
00863016	00863016	100 ÷ 300

Nº		mm	Nº		mm
<i>Micrometer sets</i>			<i>Full and partial micrometer sets</i>		
00863035			06160006		3,5 ÷ 6,5
00863005			06160005		6 ÷ 12
00860008			06160005		11 ÷ 20
00860012			06160006		20 ÷ 40
00860017			06160007		40 ÷ 100
00863017			00863017		100 ÷ 200

IMICRO Adapter

Every TESA IMICRO (SM versions or models with analogue indication) can easily be updated by means of the adapter used for coupling the measuring head with the new capa μ system element.



		 mm
Capa μ system element	Adapter	Application range
06130011		6 ÷ 100
	06140048	6 ÷ 12
	06140049	11 ÷ 20
	06140050	20 ÷ 40
	06140051	40 ÷ 100

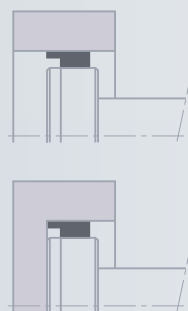
Note: To ensure accuracy, the micrometer needs to be recalibrated.

TESA ALESOMETER capa μ system with Digital Display

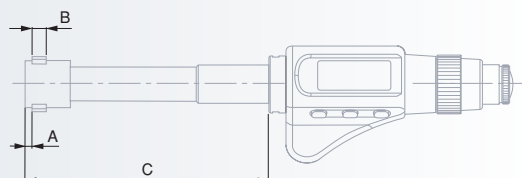


Fitted with a TESA patented capacitive measuring system

Bore gauges with 3-line contact. All TESA ALESOMETER are made to measure through and blind bores as well as short centring shoulders, except for the models covering the application range from 6 to 10 mm.



Measuring head



Single Bore Gauges, Complete

No	mm	in	μm	μm	A mm*	B mm	C mm
06230051	6 ÷ 8	0.2362 ÷ 0.3150	4	4	1,2	3	55
06230052	8 ÷ 10	0.3150 ÷ 0.3970	4	4	1,2	3	55
06230023	10 ÷ 12,5	0.3970 ÷ 0.4921	4	4	0,3	6,5	65
06230024	12,5 ÷ 15	0.4921 ÷ 0.5905	4	4	0,3	6,5	65
06230025	15 ÷ 17,5	0.5905 ÷ 0.6890	4	4	0,3	6,8	65
06230026	17,5 ÷ 20	0.6890 ÷ 0.7874	4	4	0,3	6,8	95
06230027	20 ÷ 25	0.7874 ÷ 0.9843	4	4	0,3	8,5	100
06230028	25 ÷ 30	0.9843 ÷ 1.1811	4	4	0,3	8,5	100
06230029	30 ÷ 35	1.1811 ÷ 1.3780	4	4	0,3	8,5	100
06230030	35 ÷ 40	1.3780 ÷ 1.5748	4	4	0,3	8,5	100
06230031	40 ÷ 50	1.5748 ÷ 1.9685	4	4	0,3	14,5	140
06230032	50 ÷ 60	1.9685 ÷ 2.3622	5	5	0,3	14,5	140
06230033	60 ÷ 70	2.3622 ÷ 2.7560	5	5	0,3	14,5	140
06230034	70 ÷ 85	2.7560 ÷ 3.3465	5	5	0,3	14,5	140
06230035	85 ÷ 100	3.3465 ÷ 3.9370	5	5	0,3	14,5	140
06230036	100 ÷ 125	3.9370 ÷ 4.9212	6	6	0,3	30	175
06230037	125 ÷ 150	4.9212 ÷ 5.9055	6	6	0,3	30	175
06230038	150 ÷ 175	5.9055 ÷ 6.8897	7	7	0,3	30	175
06230039	175 ÷ 200	6.8897 ÷ 7.8740	7	7	0,3	30	175
06230040	200 ÷ 225	7.8740 ÷ 8.8582	8	8	0,3	30	175
06230041	225 ÷ 250	8.8582 ÷ 9.8425	8	8	0,3	30	175
06230042	250 ÷ 275	9.8425 ÷ 10.8267	8	8	0,3	30	175
06230043	275 ÷ 300	10.8267 ÷ 11.8110	8	8	0,3	30	175

Optional Accessory

01961000 1 Lithium battery 3 V, 190 mAh, type CR 2032

* Not applicable for models from 10 mm since the measuring inserts are close to the micrometer front face.
For ordering information on setting rings, see both pages D-12 and D-17, or report to page D-10 for storage cases or to section A for connecting cables and the like.



DIN 863 T4.
Style C1
for models
6 to 10 mm or style C2 for
all other models



0,001 mm
0.00005 in



Metric/inch
conversion



LCD, digit height
7 mm



Floating zero



Display lock



Measuring
inserts for
application range
6 to 10 mm: steel,
hardened to HV30 550.
10 to 300: tungsten carbide
tipped, HRC $\geq$ 70.



RS 232
opto-coupled,
bidirectional



3 V lithium battery



1 to 2 a
($\approx$ 2000 h/a)



Automatic
shut down
after 10 min.

Display setting is retained
as long as power supply
remains stable.



10 °C to 40 °C



-10 °C to 60 °C



80%,
non condensing



✓



For the measuring
element IP54
(IEC 60529) or
IP40 with active data
output



≤ 100 mm in
a plastic case
> 100 mm in
a wooden case



Identification
number



Inspection report
with a declaration
of conformity

TESA ALESOMETER capa μ system with Digital Display

Partial Sets plus Components



Fitted with TESA patented capacitive measuring system

Models that cover the application range from 6 to 10 mm can only measure through bores – All other partial sets also allow blind bores as well as short centring shoulders to be inspected.



DIN 863 T4.
Style C1
for models
6 to 10 mm or C2 for
all other models



0,001 mm
0.00005 in



Measuring inserts
for application
range
6 to 10 mm: steel,
hardened to HV30 550.
10 to 300: tungsten carbide
tipped to HRC $\geq$ 70.



For additional
technical data,
see on page D-9
or D-12 for setting rings.



$\leq$ 100 mm in a
plastic case,
> 100 mm in a
wooden case



Identification
number



Inspection report
with a declaration
of conformity

No		mm	No		mm	No	No	No		mm	No	No
Partial sets including		Measuring heads		Connectors		Measuring elements		Setting rings		Storage cases		
06230100	6 $\div$ 10	0081720351	6 $\div$ 8	0081620491	06230020	0211625101	8	06260001				
		0081720353	8 $\div$ 10									
06230110	10 $\div$ 20	0081720356	10 $\div$ 12,5	0081620492	06230020	0211625102	12,5	06260001				
		0081720358	12,5 $\div$ 15			0211625103	17,5					
		0081720360	15 $\div$ 17,5									
		0081720362	17,5 $\div$ 20									
06230111	20 $\div$ 40	0081720364	20 $\div$ 25	0081620493	06230020	0211625104	25	06260001				
		0081720366	25 $\div$ 30			0211625105	35					
		0081720368	30 $\div$ 35									
		0081720370	35 $\div$ 40									
06230112	40 $\div$ 100	0081720372	40 $\div$ 50	0081620494	06230020	0211625106	45	0081629525				
		0081720374	50 $\div$ 60			0211625107	60					
		0081720376	60 $\div$ 70			0211625109	85					
		0081720378	70 $\div$ 85									
		0081720380	85 $\div$ 100									
Set composition for application range from 100 to 300 mm available upon request												
		Measuring heads		Connectors	Measuring element	Setting rings		Storage cases				
		0081720382	100 $\div$ 125	0081620495	06230020	0211625111	125	00863016				
		0081720384	125 $\div$ 150			0211625112	150					
		0081720386	150 $\div$ 175			0211625112	150					
		0081720388	175 $\div$ 200			0211625113	175					
		0081720390	200 $\div$ 225			0211625114	200					
		0081720392	225 $\div$ 250			0211625115	225					
		0081720394	250 $\div$ 275			0211625116	250					
		0081720396	275 $\div$ 300			0211625117	275					

Each storage case can contain a single measuring head only.



NF E 11-099.
Type 1
for models
6 to 10 mm or type 2 for
all other models

Measuring inserts
for application
range
6 to 10 mm: steel,
hardened to HV30 550.
10 to 300 mm:
tungsten carbide tipped to
HRC $\geq$ 70.

Wooden case

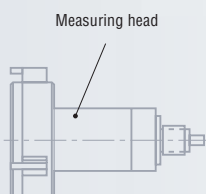
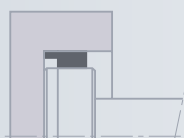
Identification
number

Declaration
of conformity

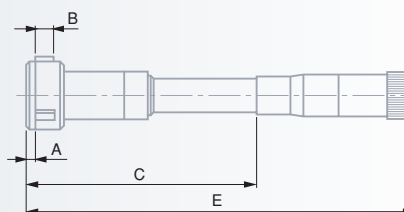
Calibration
certificate
upon request

ROCH ALESOMETER with Analogue Indication, Metric

Bore gauges with 3-line contact. All ROCH ALESOMETER let you measure not only through bores, but also blind bores as well as centring shoulders, except for the models covering the application range 6 to 10 mm.



Measuring head



Single Bore Gauges, complete

							
	mm	mm	μ m	A mm*	B mm	C mm	E mm
0081725001	6 ÷ 8	0,001	4	1,2	3	54,5	107
0081725003	8 ÷ 10	0,001	4	1,2	3	54,5	107
0081725006	10 ÷ 12,5	0,001	4	0,3	6,5	64,5	117
0081725008	12,5 ÷ 15	0,001	4	0,3	6,5	64,5	117
0081725010	15 ÷ 17,5	0,001	4	0,3	6,8	64,5	117
0081725012	17,5 ÷ 20	0,001	4	0,3	6,8	64,5	117
0081725014	20 ÷ 25	0,001	4	0,3	8,5	70	122,5
0081725016	25 ÷ 30	0,001	4	0,3	8,5	70	122,5
0081725018	30 ÷ 35	0,001	4	0,3	8,5	70	122,5
0081725020	35 ÷ 40	0,001	4	0,3	8,5	70	122,5
0081725022	40 ÷ 50	0,001	4	0,3	14,5	108,7	188,7
0081725024	50 ÷ 60	0,001	5	0,3	14,5	108,7	188,7
0081725026	60 ÷ 70	0,001	5	0,3	14,5	108,7	188,7
0081725028	70 ÷ 85	0,001	5	0,3	14,5	126,7	206,7
0081725030	85 ÷ 100	0,001	5	0,3	14,5	126,7	206,7
0081725032	100 ÷ 125	0,01	7	0,3	30	153,7	233,5
0081725034	125 ÷ 150	0,01	7	0,3	30	153,7	233,5
0081725036	150 ÷ 175	0,01	8	0,3	30	153,7	233,5
0081725038	175 ÷ 200	0,01	8	0,3	30	153,7	233,5
0081725040	200 ÷ 225	0,01	9	0,3	30	153,7	233,5
0081725042	225 ÷ 250	0,01	9	0,3	30	153,7	233,5
0081725044	250 ÷ 275	0,01	9	0,3	30	153,7	233,5
0081725046	275 ÷ 300	0,01	9	0,3	30	153,7	233,5

* Not applicable for models from 10 mm since the measuring inserts are close to the micrometer front face.

ROCH ALESOMETER with Analogue Indication – Full Metric Sets



							
Full sets including		Single bore gauges		Setting rings		Extensions	
0081725063	6 ÷ 10	0081725001	6 ÷ 8	0211625101	8	0081625081	100
		0081725003	8 ÷ 10				
0081725066	10 ÷ 20	0081725006	10 ÷ 12,5	0211625102	12,5	0081625082	100
		0081725008	12,5 ÷ 15	0211625103	17,5		
		0081725010	15 ÷ 17,5				
		0081725012	17,5 ÷ 20				
0081725068	20 ÷ 40	0081725014	20 ÷ 25	0211625104	25	0081625083	150
		0081725016	25 ÷ 30	0211625105	35		
		0081725018	30 ÷ 35				
		0081725020	35 ÷ 40				
0081725070	40 ÷ 100	0081725022	40 ÷ 50	0211625106	45	0081625084	150
		0081725024	50 ÷ 60	0211625107	60		
		0081725026	60 ÷ 70	0211625109	85		
		0081725028	70 ÷ 85				
		0081725030	85 ÷ 100				
0081725072	100 ÷ 150	0081725032	100 ÷ 125	0211625111	125	0081625085	200
		0081725034	125 ÷ 150				

Extensions for Depth Increase

		
	mm	mm
0081625081	6 ÷ 10	100
0081625082	10 ÷ 20	100
0081625083	20 ÷ 40	150
0081625084	40 ÷ 100	150
0081625085	100 ÷ 300	200

ROCH Setting Rings

			
	mm		mm
0211625101	8	0211625110	90
0211625102	12,5	0211625111	125
0211625103	17,5	0211625112	150
0211625104	25	0211625113	175
0211625105	35	0211625114	200
0211625106	45	0211625115	225
0211625107	60	0211625116	250
0211625109	85	0211625117	275



NF E 11-099.
Type 1
for models
6 to 10 mm or type 2 for
all other models.



Measuring inserts
for application
range
6 to 10 mm: steel,
hardened to HV30 550.
10 to 300 mm:
tungsten carbide tipped to
HRC ≥ 70.



For any additional
data, see
on page D-11



Wooden case



Identification
number



Declaration
of conformity



Calibration
certificate
upon request

Extensions



Hardened steel.
Insulated body
against hand
warmth.



Identification
number



Declaration
of conformity

Setting rings



NF E 11-011,
type A2



Steel, hardened
to 60 HRC



Bore related
tolerance
 $\pm (3 \mu\text{m} + 10 \cdot 10^{-6} D) \mu\text{m}$



D = Nominal
diameter in mm
 $(1 \mu\text{m} + 5 \cdot 10^{-6} D) \mu\text{m}$



Shipping box



Identification
number



Calibration
certificate
upon request



DIN 863 T4
(Style C2)
NF E 11-099

0,002 mm

0,01 mm

Tungsten carbide
tipped measuring
bolts and cone

Supplied
with 1 heat
insulating
sleeve (No. 00940020),
2 keys (No. 00940001),
1 screwdriver
(No. 00862801).

Shipping box

Identification
number

Inspection report
with a declaration
of conformity

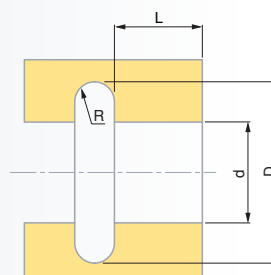
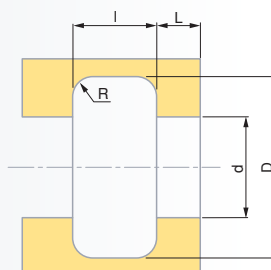
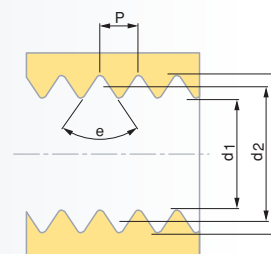
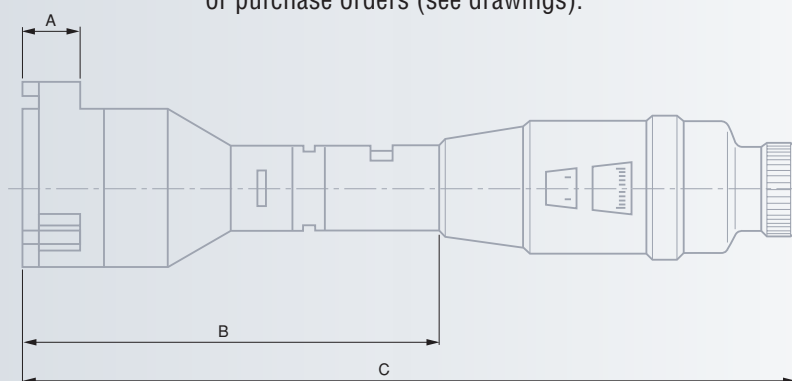
TESA TRI-O-BOR

Self-centring and self-aligning internal micrometers with 3-line contact with the part being inspected. These micrometers measure trough holes, blind bores and short centring shoulders.



Measuring Bolts with Special Design

Used for ISO metric threads (M16 x 0,5 to M150 x 6), UN, UNC or UNF unified imperial threads (60°) and Whitworth threads (55°). Measuring bolts with special profiles can also be made available. Both the size and type of the thread or the workpiece to be measured must be specified in your inquiries or purchase orders (see drawings).



No	mm	µm	µm	A mm	B mm	C mm
00910005	15 ÷ 20	4	4	6	≥ 66	≤ 132
00910006	20 ÷ 25	4	4	6	≥ 66	≤ 132
00910007	25 ÷ 30	4	4	6	≥ 66	≤ 132
00910405	30 ÷ 40	4	4	10	≥ 70	≤ 138
00910406	40 ÷ 50	4	4	10	≥ 70	≤ 138
00910407	50 ÷ 60	5	5	10	≥ 70	≤ 138
00910705	60 ÷ 70	5	5	18	≥ 78	≤ 147
00910706	70 ÷ 80	5	5	18	≥ 78	≤ 147
00910707	80 ÷ 90	5	5	18	≥ 78	≤ 147
00911105	90 ÷ 100	5	5	18	≥ 78	≤ 147
00911106	100 ÷ 110	6	6	18	≥ 78	≤ 147
00911107	110 ÷ 120	6	6	18	≥ 78	≤ 147

TESA TRI-O-BOR Full Sets



For technical data, see on page D-13.
For setting rings, report to page D-17.



Supplied with 1 extension for depth increase (150 mm) No. 00940000, 1 heat insulating sleeve No. 00940020, 2 keys No. 00940001, 1 screwdriver No. 00862801.



Protective case or carrying case



Inspection report with a declaration of conformity

Metric Executions

								
mm			mm			mm		
Full sets including			Single micrometers		Setting rings		Extensions	
00910004	BSC	15 ÷ 30	00910005	15 ÷ 20	00840104	15	00940000	150
			00910006	20 ÷ 25	00840105	25		
			00910007	25 ÷ 30				
00910404	BSD	30 ÷ 60	00910405	30 ÷ 40	00840107	35	00940000	150
			00910406	40 ÷ 50	00840108	50		
			00910407	50 ÷ 60				
00910704	BSF	60 ÷ 90	00910705	60 ÷ 70	00840109	70	00940000	150
			00910706	70 ÷ 80	00840110	90		
			00910707	80 ÷ 90				
00911104	BSG	90 ÷ 120	00911105	90 ÷ 100	00840110	90	00940000	150
			00911106	100 ÷ 110	00840111	110		
			00911107	110 ÷ 120				

TESA TRI-O-BOR Accessories

Extension for Depth Increase

No	mm
00940000	150



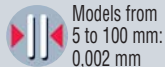
Protective or Plastic Carrying Cases for TESA TRI-O-BOR

No	No	mm	in
Single micrometers		Full micrometer sets	
00960023	00960024	15 ÷ 30	0.6 ÷ 1.2
00960025	00960026	30 ÷ 60	1.2 ÷ 2.4
00960027	00960028	60 ÷ 90	2.4 ÷ 3.6
00960004	00960008	90 ÷ 120	3.6 ÷ 4.8

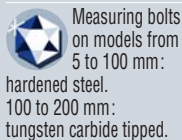




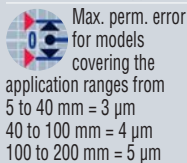
Models from
10 to 100 mm:
DIN 863 T4
(Style C2) NF E 11-099



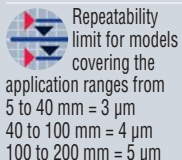
Models from
5 to 100 mm:
0,002 mm
Models 100 to 200 mm
with vernier reading:
0,01 mm.



Measuring bolts
on models from
5 to 100 mm:
hardened steel.
100 to 200 mm:
tungsten carbide tipped.



Max. perm. error
for models
covering the
application ranges from
5 to 40 mm = 3 μ m
40 to 100 mm = 4 μ m
100 to 200 mm = 5 μ m



Repeatability
limit for models
covering the
application ranges from
5 to 40 mm = 3 μ m
40 to 100 mm = 4 μ m
100 to 200 mm = 5 μ m



Protective case
or carrying case



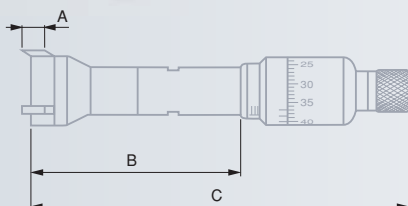
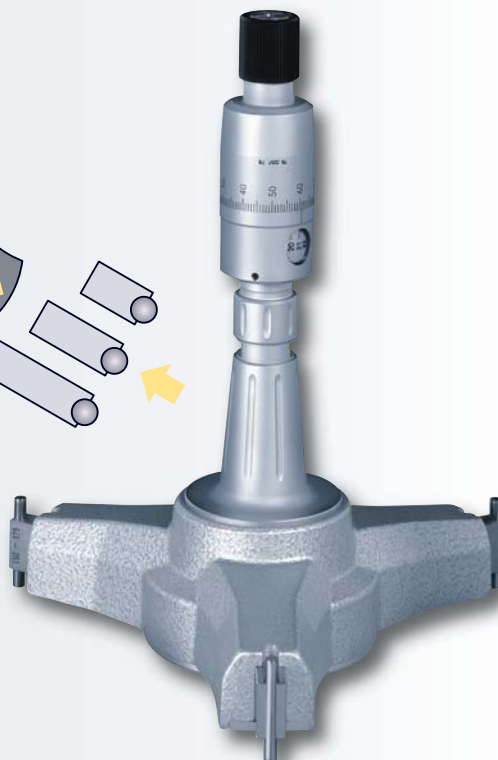
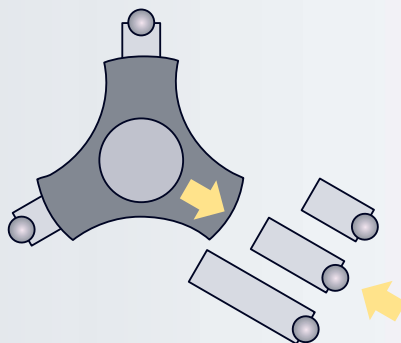
Identification
number



Inspection report
with a declaration
of conformity

ETALON INTALOMETER 531

Made to check through holes, blind bores and short centring shoulders.
All models covering the application range up to 100 mm have sloped bolts
extending beyond the front face of the measuring head.



						
	mm			A mm	B mm	C mm
078112356	5 ÷ 6	2 x 180°		3	≥ 32	≤ 109
078112357	6 ÷ 7	2 x 180°		3	≥ 33	≤ 111
078112358	7 ÷ 8,5	2 x 180°		4	≥ 60	≤ 130
078112359	8,5 ÷ 10	2 x 180°		4	≥ 72	≤ 133
078112360	10 ÷ 12,5	3 x 120°		3	≥ 60	≤ 118
078112361	12,5 ÷ 15	3 x 120°		3	≥ 63	≤ 120
078112362	15 ÷ 17,5	3 x 120°		3	≥ 65	≤ 122
078112363	17,5 ÷ 20	3 x 120°		3	≥ 68	≤ 125
078112364	20 ÷ 25	90°-135°-135°		7	≥ 75	≤ 132
078112365	25 ÷ 30	90°-135°-135°		7	≥ 80	≤ 138
078112366	30 ÷ 35	90°-135°-135°		7	≥ 90	≤ 142
078112367	35 ÷ 40	90°-135°-135°		7	≥ 90	≤ 148
078112368	40 ÷ 45	90°-135°-135°		10,5	≥ 110	≤ 167
078112369	45 ÷ 50	90°-135°-135°		10,5	≥ 113	≤ 170
078112370	50 ÷ 60	90°-135°-135°		15	≥ 123	≤ 187
078112371	60 ÷ 70	90°-135°-135°		15	≥ 130	≤ 193
078112372	70 ÷ 85	90°-135°-135°		15	≥ 145	≤ 213
078112373	85 ÷ 100	90°-135°-135°		15	≥ 155	≤ 224
078110733	100 ÷ 125	3 x 120°		27	≥ 105	≤ 194
078110735	125 ÷ 150	3 x 120°		27	≥ 105	≤ 194
078110737	150 ÷ 175	3 x 120°		27	≥ 105	≤ 194
078110739	175 ÷ 200	3 x 120°		27	≥ 105	≤ 194

Measuring range up to 300 mm available upon request.

ETALON INTALOMETER 531

Metric Tool Sets



For technical data, see page D-15. For setting rings, report to page D-17.



Protective case or carrying case



Inspection report with a declaration of conformity



mm



mm



mm



mm



mm

Full sets including

078110592 5 ÷ 10

Single micrometers

078112356 5 ÷ 6
078112357 6 ÷ 7
078112358 7 ÷ 8,5
078112359 8,5 ÷ 10

Extensions

078103613 100

Setting rings

00840114 6
00840115 8,5

078110594 10 ÷ 20

078112360 10 ÷ 12,5
078112361 12,5 ÷ 15
078112362 15 ÷ 17,5
078112363 17,5 ÷ 20

078103621 150

00840116 12,5
00840117 17,5

078110596 20 ÷ 40

078112364 20 ÷ 25
078112365 25 ÷ 30
078112366 30 ÷ 35
078112367 35 ÷ 40

078103624 150

00840106 25
00840107 35

078110598 40 ÷ 100

078112368 40 ÷ 45
078112369 45 ÷ 50
078112370 50 ÷ 60
078112371 60 ÷ 70
078112372 70 ÷ 85
078112373 85 ÷ 100

078104940 150

00843230 45
00843239 60
00840118 85

Partial sets including

078110749 100 ÷ 150

Single micrometers

078110733

Measuring bolts

078111003* 100 ÷ 125
078111004 125 ÷ 150

Extensions

078104940 150

* Bolt set provided with the single micrometer No. 078110733.

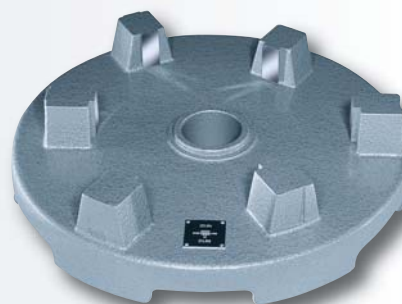


Shipping
box



Identification
number

TESA Setting Rings and Setting Masters



			
	mm	µm*	µm**
<i>Setting rings</i>			
00843200	4	1,5	1,5
00843201	5,5	1,5	1,5
00840114	6	1,5	1,5
00840101	8	1,5	1,5
00840115	8,5	1,5	1,5
00840102	10	1,5	1,5
00840103	11	1,5	1,5
00840116	12,5	1,5	1,5
00840104	15	1,5	1,5
00840105	17	1,5	1,5
00840117	17,5	1,5	1,5
00840106	25	1,5	1,5
00840107	35	2	2
00843230	45	2	2
00840108	50	2	2
00843239	60	2	2
00840109	70	2	2
00840118	85	2	2
00840110	90	2	2
00840111	110	2,5	2,5
00840112	125	2,5	2,5
00840113	175	2,5	4
<i>Setting master</i>			
00843101	225, 275	—	6

* Making no allowance for a rim of 1 mm.

** All listed values are determined through a 2-point measurement taken at half-height of the setting ring. The measuring direction is marked with 2 strokes. The measured actual dimension is engraved on every setting master.



Measuring Instruments for Large Dimensions



TESA – THE SPECIALISTS FOR LONG LENGTHS

Large sizes in mechanical engineering mean dimensions in excess of 500 mm.

Besides various measurement procedures like those that apply to large internal or external micrometers with two-point contact, tape rules (wrapping round the outside diameter), V-bases, rotating measuring disks (rolling-contact) and optical systems (triangulation with theodolite), resort is often to make use of simple testing means like fixed gauges (inside caliper gauges), gauge blocks combinations or adjustable telescopic gauges.

For large dimensions from 250 mm up to several meters, TESA offers various types of measuring instruments that have long proven their value in practical use.

Here's an example of a proportional relationship. With a bore of 1200 H7, the tolerance area matches 0,1 mm. Reducing both values by a factor of 100 would give a manufacturing tolerance as low as 1 μm . Of course, things are not as simple, but this example gives some ideas about the proportions.

Whatever the sizes, from a simple distance between two surfaces parallel one another to large diameters, their measurement is always a challenge. Apart from the usual influences, which are proportional to the size whilst adding to your contributions in the uncertainty budget, those due to gravity play a key role in distortion.





DIN 863 T4
(Style B)

Measuring element

Micrometer
and dial gauge
to 0,01 mm

Micrometer:
0,1 mm

Micrometer:
25 mm

0,5 mm

Dial gauge:
± 0,22 mm

0,7 to 1 N

8 µm

Measuring bolts

Spherical end
for measuring
in the micrometer
axis. All inserts are inter-
changeable.

Tungsten
carbide tipped

Extensions

26 mm dia.
steel tube
with snap-ring
system. Also with built-in
gauge rods.

Tungsten
carbide tipped

One spherical
and one flat
measuring faces

Additional data

Wooden case

Setting standard
with identification
number

Declaration of
conformity

TESA UNITEST Internal Micrometer

Measures internal dimensions in the micrometer's axis with 2-point contact with the workpiece to be checked – Optional accessories are available for inspecting centring shoulders and blind bores along with auxiliary means for external measuring.

Extensions with built-in gauge rods can be mounted on the measuring element, thus allowing any dimension within the application range to be measured, directly.

Precise, easy-to-handle micrometer – Horizontal or vertical position of use – Constant measuring force – Integrated dial gauge to show you the culmination point.



mm

TESA UNITEST complete set



mm

01110700

int. dimensions

200 ÷ 1400

Consisting of:



mm



mm



µm

01110901	Meas. element for int. dimensions	200 ÷ 225		
01141001	Setting standard for internal/external dimensions	200		
01110801	Extension	25	0,7	
01110802	Extension	50	1	
01110804	Extension	100	1,5	
01110808	Extension	200	2,5	
01110812	Extension	300	3,5	
01110820	Extension	500	5,5	
01160901	Special screwdriver			
01162302	Wooden case for complete set			

Optional Accessories

01141101	Extension	1000	10	
01160701	Pair of tungsten carbide tipped measuring bolts for blind bores			
01162301	Auxiliary elements for external measurement			
		Measuring depth:	≤ 10	
01140801	Suspension device, complete	Measuring depth:	≤ 100	

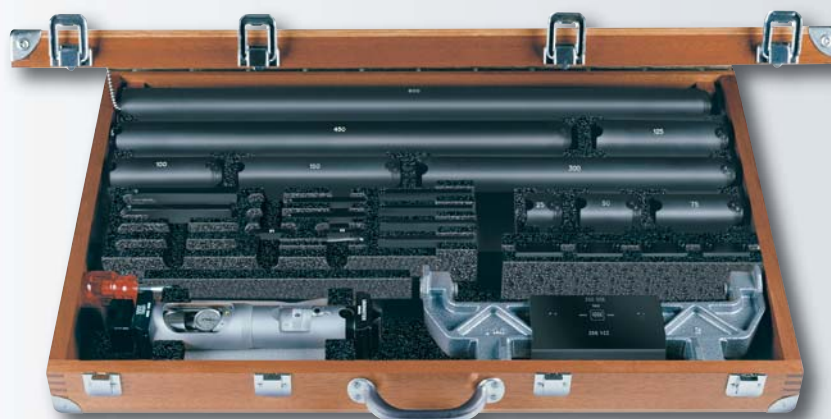
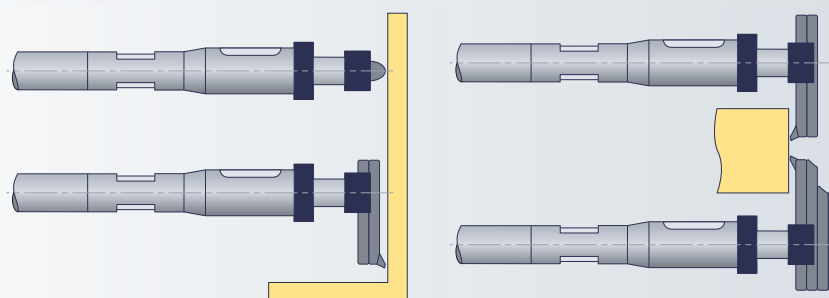


TESA UNIMASTER Universal Measuring Instrument

Provides the features necessary for direct measurement of specially large internal and external dimensions.

TESA UNIMASTER is similar to internal micrometers with two-point contact with the workpiece being measured. Measures any dimension within the extended application range directly by simply adding the needed extensions with built-in gauge blocks to the measuring element.

Accurate, robust and easy-to-handle – Can be used either vertically or horizontally with a constant measuring force – Incorporates a lever-type dial test indicator that clearly shows the culmination point – Ensures stable measuring owing to both a negligible deflection and thermal protection on each extension.



DIN 863 T4
(Style B)

Measuring element

Micrometer and dial test indicator:
0,01 mm

Micrometer:
25 mm

1 mm

Dial test indicator:
 $\pm 0,4$ mm

15 to 20 N.
Mobile ball-bearing anvil under spring pressure.

Reversible probing direction to allow both internal and external measuring.

5 μ m

Measuring bolts

Tungsten carbide tipped

Measuring bolts supplied in pairs:

- No. 01110203 for internal measuring in the micrometer axis.
- No. 01110205 for internal/external measuring, meas. depth up to 60 mm from the lower edge of the micrometer.
- No. 01110208, extra-rigid for external measuring, meas. depth up to 75 mm from the lower edge of the micrometer.

Extensions

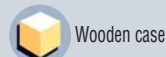
38 mm dia. diameter steel tube with snap ring system. Built-in gauge rod.

Tungsten carbide tipped

One spherical and one flat measuring faces



Additional Data



Wooden case



Measuring element and setting standard with identification number



Declaration of conformity



mm

TESA UNIMASTER complete set



mm

01110000

Internal dim. 250 ÷ 1475*

External dim. 225 ÷ 1450*

Consisting of:



mm

mm

µm

01110300

Measuring element

internal dim. 250 ÷ 275

external dim. 225 ÷ 250

01110203

Pair of measuring bolts for internal measuring

01110205

Pair of measuring bolts for internal/external

measuring, with length to

75

01110208

Pair of measuring bolts for extern. measuring, length 100

01110501

Setting standard

internal dimension

250

external dimension

225

01110101

Extension

25

0,7

01110102

Extension

50

1

01110103

Extension

75

1,2

01110104

Extension

100

1,5

01110105

Extension

125

1,5

01110106

Extension

150

2

01110112

Extension

300

3,5

01110118

Extension

450

4,5

01110124

Extension

600

6,5

01130001

Special screwdriver for extensions

01110401

Set of suspension accessories

(4 brackets together with 4 clamps)

01112401

Wooden case for complete set

Optional Accessories

01110140

Extension

1000

10

01162001

Pair of measuring bolts for internal/external

dimensions and grooves

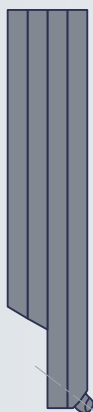
Measuring depth ≤ 20

Tungsten carbide inserts Ø 4 x 7

01160001

Support roller supplied individually (2 items are needed)

* Using 3 extensions at the very most.



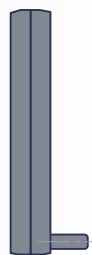
01110208



01110205



01110203



01162001

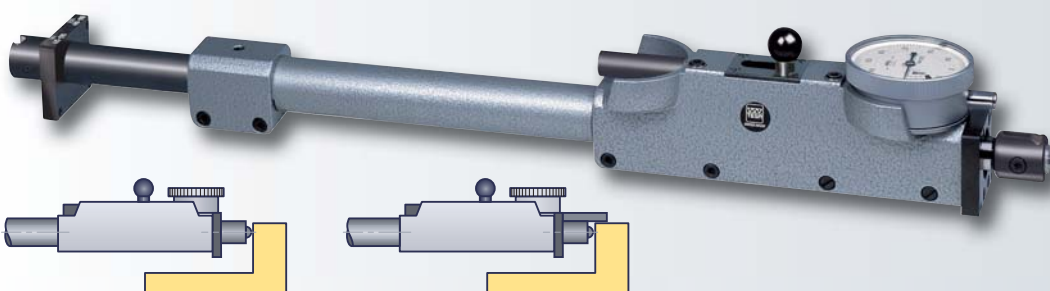
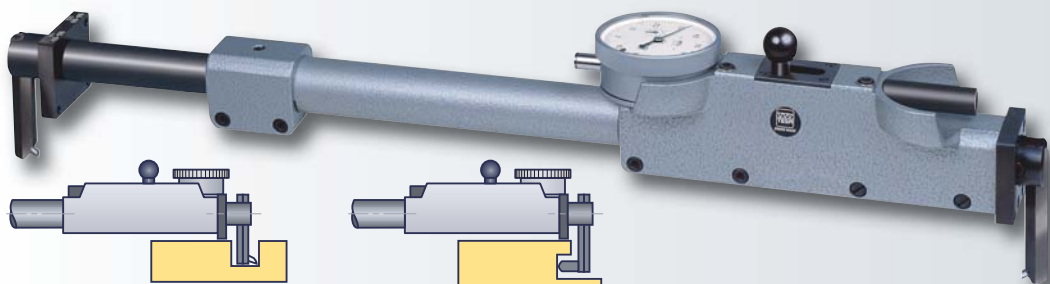
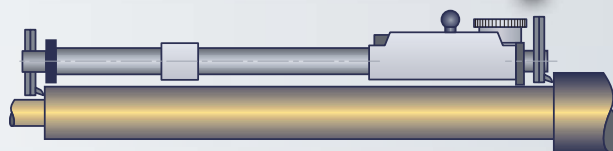


TESA INOTEST Comparative Measuring Instrument

Allows for comparative measurement of large internal or external dimensions.

Consists of a measuring element with interchangeable inserts as well as a set of extensions. Since there is no material measure, the indication is set using a separate standard that can either be a gauge block, setting ring or horizontal measuring bench.

Measuring inserts for inspection in the tool axis, or offset inserts – Vertical or horizontal position of use – Integrated dial gauge to show the culmination point – Constant measuring force – Extensions with heat insulating grip.



Measuring element

-  Mobile ball-bearing anvil, 10 mm measuring travel.
-  Watertight dial gauges 01470104 and 01480100
-  0,01 mm
-  10 mm
-  For additional technical data, see section F.
-  4 to 7 N. Reversible probing direction to allow both internal and external measuring.

Measuring bolts

-  Tungsten carbide tipped
-  Measuring bolts supplied in pairs:
 - No. 01131901 for internal measuring in the instrument axis.
 - No. 01131902 for internal/external measurement, measuring depth up to 30 mm from the lower edge of the tool.

Extensions

-  25 mm dia. steel tube, 19 mm dia. telescopic tube that can be clamped.

Additional data

-  Plastic case
-  Dial gauge with serial number
-  Dial gauge with inspection report
-  Declaration of conformity



mm

TESA INOTEST complete set



mm

01111900

Internal dimensions 275 ÷ 1025

External dimensions 250 ÷ 1010

Consisting of:



mm



mm

01112301 Measuring element with dial gauge

01131901 Pair of measuring bolts for internal measuring

01131902 Pair of measuring bolts for internal/external measuring with length to 60

01132001 4 resting rods Ø 7 x 40

00160101 3 insulating grips (order number for 1 item)

01112001 Extension internal dimensions 275 ÷ 335

external dimensions 250 ÷ 310

01112002 Extension internal dimensions 325 ÷ 435

external dimensions 300 ÷ 410

01112003 Extension internal dimensions 425 ÷ 635

external dimensions 400 ÷ 610

01112004 Extension internal dimensions 625 ÷ 1035

external dimensions 600 ÷ 1010

01162303 Plastic case for complete set

Optional Accessories

01141901 Extension for extending the application range by 500

01141902 Extension for extending the application range by 1000

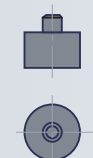
01162001 Pair of tungsten carbide measuring bolts for internal/external dimensions Ø 4 x 7

01162002 Pair of tungsten carbide measuring bolts for grooves Ø 4 x 7

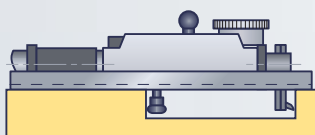
01161900 Measuring device for small
- internal dimensions 35 ÷ 280
- external dimensions 15 ÷ 255



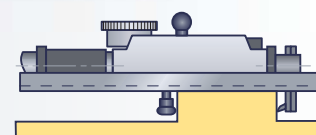
01162001



01131901



01161900



ETALON 532 Internal Micrometer

This micrometer is designed for measurements with 2-point contact. Extensions with built-in gauge rods can be used to increase the measuring range – Stiff screw coupling.



Micrometer element



Extensions



Additional data



Complete sets



072109101

072109107

072109108

072109117

072109128



50 ÷ 170

50 ÷ 290

50 ÷ 530

50 ÷ 1010

50 ÷ 1510

Consisting of:



mm

mm

µm

No.		mm	mm	µm	072109101	072109107	072109108	072109117	072109128
072103576	Micrometer element	50 ÷ 65		3	•	•	•	•	•
072103585	Extension		15	1,5	•	•	•	•	•
072105462	Extension		30	1,5	•	•	•	•	•
072109030	Extension		60	2	•	•	•	•	•
072103586	Extension		120	2		•	•	•	•
072109055	Extension		240	3			•	•	•
072109066	Extension		480	3,5				•	•
072109089	Extension		500	3,5					•

ROCH Periphery Tapes

Steel tapes with a dual graduation for measuring external circumferences and diameters of cylindrical parts on machines and other fittings – Suitable for malleable parts such as plastic tubing – Used for inspecting tanks or boilers – Also designed for checking steel or concrete pipes, rims, tires etc.



Diameter
mm

Circumference
mm

mm

No.	Diameter mm	Circumference mm	mm
0951750222	20 ÷ 300	60 ÷ 950	0,15
0951750223	300 ÷ 700	940 ÷ 2200	0,20
0951750224	700 ÷ 1100	2190 ÷ 3460	0,20
0951750225	1100 ÷ 1500	3450 ÷ 4720	0,25
0951750226	1500 ÷ 1900	4710 ÷ 5980	0,30
0951750227	1900 ÷ 2300	5960 ÷ 7230	0,35

Electronic indicators, Dial Gauges, Precision Indicators



EASY-TO-USE AND VERSATILE

As manufacturer of a full range of precision dial gauges for more than 50 years, we are able to provide you with a wide variety of models.

- Electronic indicators featuring a combined analogue/digital indication with the most up-to-date technology.
- Mechanical dial gauges with high-precision movement and smooth pointer revolution, double-action shockproof mechanisms as well as measuring spans up to 100 mm.



Which Style Do you Need?

- Digital indication provides error-free readout of the measured values as the fractions of the scale divisions need not be estimated, visually.
- Analogue indication has the advantage to change smoothly according to the size of the workpiece feature to be measured. This type of indication is best suited for dynamic measurements, e.g. when determining axial and radial runout errors.
- Electronic indicators provide many additional functions compared to the mechanical models. For more information, also read the pages F-4 to F-11.
- Electronic indicators, precision dial gauges as well as dial test indicators have the capability to measure with the lowest possible hysteresis. Therefore, they are ideally suited for runout inspection where this capability is required.
- In order to significantly reduce the effects of the systematic errors, we recommend to carry out a number of comparative measurements because only the actual size of each related nominal length will be read out. This means that electronic indicators, dial gauges with limited range of indication and precision indicators are best suited for this purpose.
- These hand-held tools also permit to avoid rough reading errors of the metric range.



Standards and Definitions

From now on, the international ISO 463:2006 standard replaces the national ones dealing with dial gauges. Newly applicable definitions and requirements also imply some changes of the so-called design and metrological characteristics, which could not be entirely reported in this issue.

This standard, which is part of the matrix «Product Specification (GPS) – Dimensional measuring equipment», states the requirements that affect the most significant characteristics mentioned above. Therefore, all values indicated in this catalogue as limit values for the metrological characteristics only are based on internal standards proper to our factory.

Electronic indicators

Precision indicators

Definitions used in this section:



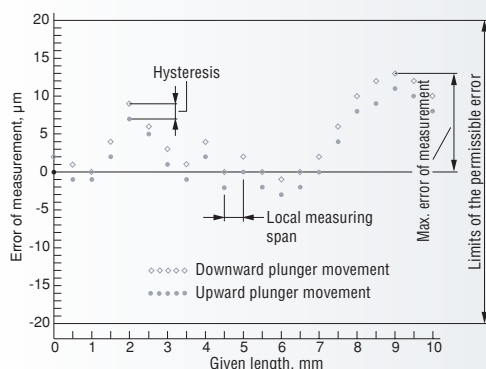
Max. perm. errors in one measuring direction over the whole measuring range within the local measuring range in both measuring directions



Repeatability limit



Max. hysteresis



Mechanical dial gauges

Definitions used in this section for the maximum permissible errors of a metrological characteristic (MPE):



Deviation span (Error of indication within the measuring range)

Deviation span (error of indication) within the local measuring span

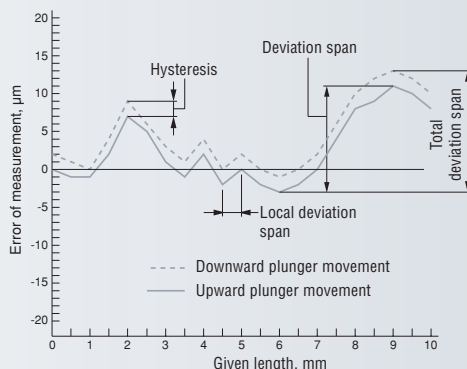
Total deviation span (Error of indication within the measuring range)



Repeatability limit of indication



Hysteresis of indication



DIAL GAUGES

INDICATORS				
NUMERICAL	Digico 200 - 300 - 400 - 500 - 600 - 700			12,5 ÷ 25 F-4 - F-7
	Digico 1			30 ÷ 60 F-8 - F-9
	Digico 12			5 ÷ 12,5 F-10 - F-11
ANALOGUE, TYPE HI-FI		0,001		0,1 F-12 - F-13

ANALOGUE	mm	0,1	40 ÷ 58 ÷ 80		10 ÷ 20 ÷ 30 F-14
		0,01	40		0,4 ÷ 3 ÷ 5 F-15 - F-17
			58		0,8 ÷ 1 ÷ 10 ÷ 30 ÷ 50 ÷ 100 F-18 - F-23
			82		10 ÷ 30 ÷ 50 ÷ 100 F-24 - F-26
		0,002	40		0,16 ÷ 3 F-27
			58		0,16 ÷ 5 F-28
		0,001	40		0,08 ÷ 1 F-29 - F-30
			58		1 ÷ 5 F-31 - F-33
			82		1 ÷ 5 F-34
	in	0.001	40 ÷ 58		0.2 ÷ 0.4 ÷ 1 F-35
		0.0005	40 ÷ 58		0.2 ÷ 0.4 ÷ 1 F-36
		0.0001	40 ÷ 58		0.12 ÷ 0.2 F-37
ANALOGUE with small bezel (mm/inch)			29 mm - 1 1/8 in		0,2 ÷ 1 mm - 0.01 ÷ 0.04 in F-38
ANALOGUE with back mounted plunger			38 ÷ 40 ÷ 58		0,16 ÷ 0,8 ÷ 1 ÷ 3 mm 0.05 in F-39 - F-41
ACCESSORIES				Measuring inserts Retraction devices Backs for precision dial gauges	F-42 - F-44 F-45 F-46



TESA DIGICO 205 and 305

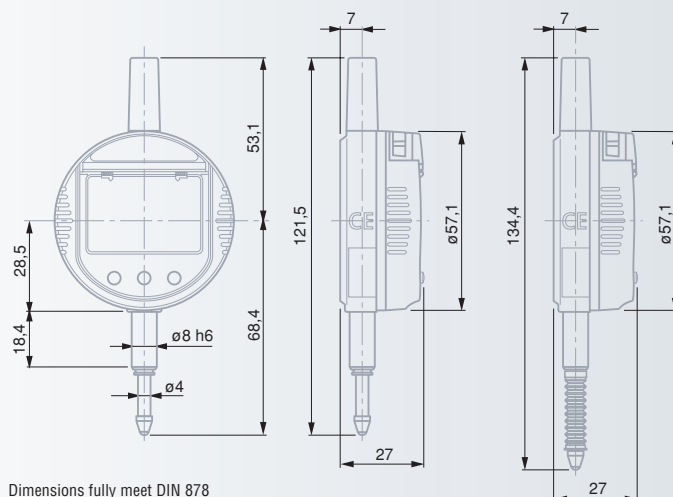
- Dual LC Display.
- Mechanical tolerance marks.
- Dimensions according to DIN 878.

Main functions

ON/Auto OFF – Data output – Counting sense reversal – Keypad lock.



No	=	mm / in	mm / in	μm	μm
TESA DIGICO 205					
01910230	DIGICO 205 M	12,5 / –	0,01 / –	20	10
01930230	DIGICO 205 MI	12,5 / 0.5	0,01 / 0.0005	20	10
TESA DIGICO 305					
01910231	DIGICO 305 M	12,5 / –	0,001 / –	8	2
01930231	DIGICO 305 MI	12,5 / 0.5	0,001 / 0.00005	8	2
TESA DIGICO 305 IP54					
01930232	DIGICO 305 MIE	12,5 / 0.5	0,001 / 0.00005	8	2



Dimensions fully meet DIN 878



Combined analogue and numerical display

6-decade LC display field plus minus sign

10 x 5 mm Digit size (H x L)

Resolution to 0,01 mm = ±0,25 mm
Resolution to 0,001 mm = ±0,025 mm

MI or MIE type: metric/inch conversion

Glass scale with incremental divisions, capacitive

≤ 2 m/s

Full-metal housing with front face in polyamide.
Stainless steel plunger.
M2,5 mounting thread for the measuring insert.

≤ 2N

RS232, opto-coupled

3V lithium battery, type CR2032

1 year to 2 years

10°C to 40°C

–10°C to 60°C

80%

EN 50081-1
EN 50082-1

150 g

Shipping case including a lithium battery 01961000

Identification number

Inspection report with a declaration of conformity

TESA DIGICO 400 and 500

- Measuring modes **ABS/REL**.
- Dual LC Display.
- Display rotation through 270°. Same goes for the key functions.
- Mechanical tolerance marks.
- Symbols for both limit values.

Measuring functions and modes

ON – Auto OFF – PRESET mode – Tolerance mode – Data output – Counting sense reversal – Keypad lock – Metric/Inch units – Full RESET.



Combined analogue and numerical display

6-decade LC display field plus minus sign

10 x 5 mm Digit size (H x L)

Resolution to 0,01 mm = ±0,25 mm
Resolution to 0,001 mm = ±0,025 mm

MI or MIE type: metric/inch conversion

Glass scale with incremental divisions, capacitive

≤ 2 m/s

Full-metal housing with front face in polyamide.
Stainless steel plunger.
M2,5 mounting thread for the measuring insert.

RS232, opto-coupled

3V lithium battery, type CR2032

1 year to 2 years

10°C to 40°C

-10°C to 60°C

80%

EN 50081-1
EN 50082-1

Shipping case including one lithium battery 01961000

Identification number

Inspection report with a declaration of conformity



TESA DIGICO 400

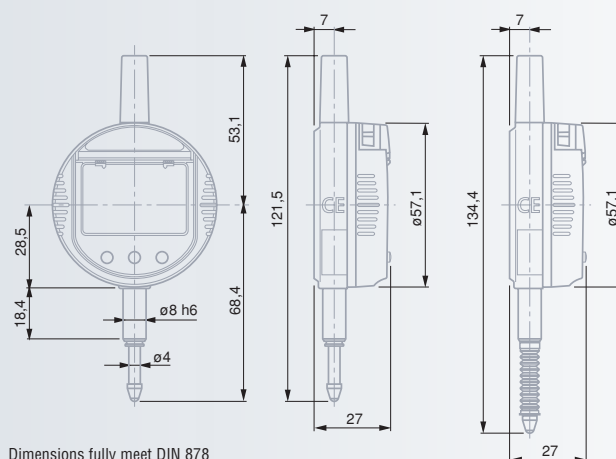
01930240	Digico 405 MI	12,5 / 0.5	0,01 / 0.0005	20	10	< 2	150
01930241	Digico 410 MI	25 / 1	0,01 / 0.0005	20	10	< 2	162

TESA DIGICO 500

01930250	Digico 505 MI	12,5 / 0.5	0,001 / 0.00005	4	2	< 2	150
01930251	Digico 510 MI	25 / 1	0,001 / 0.00005	5	2	< 2	162

TESA DIGICO 505 IP54

01930255	Digico 505 MIE	12,5 / 0.5	0,001 / 0.00005	4	2	< 2	150
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Dimensions fully meet DIN 878



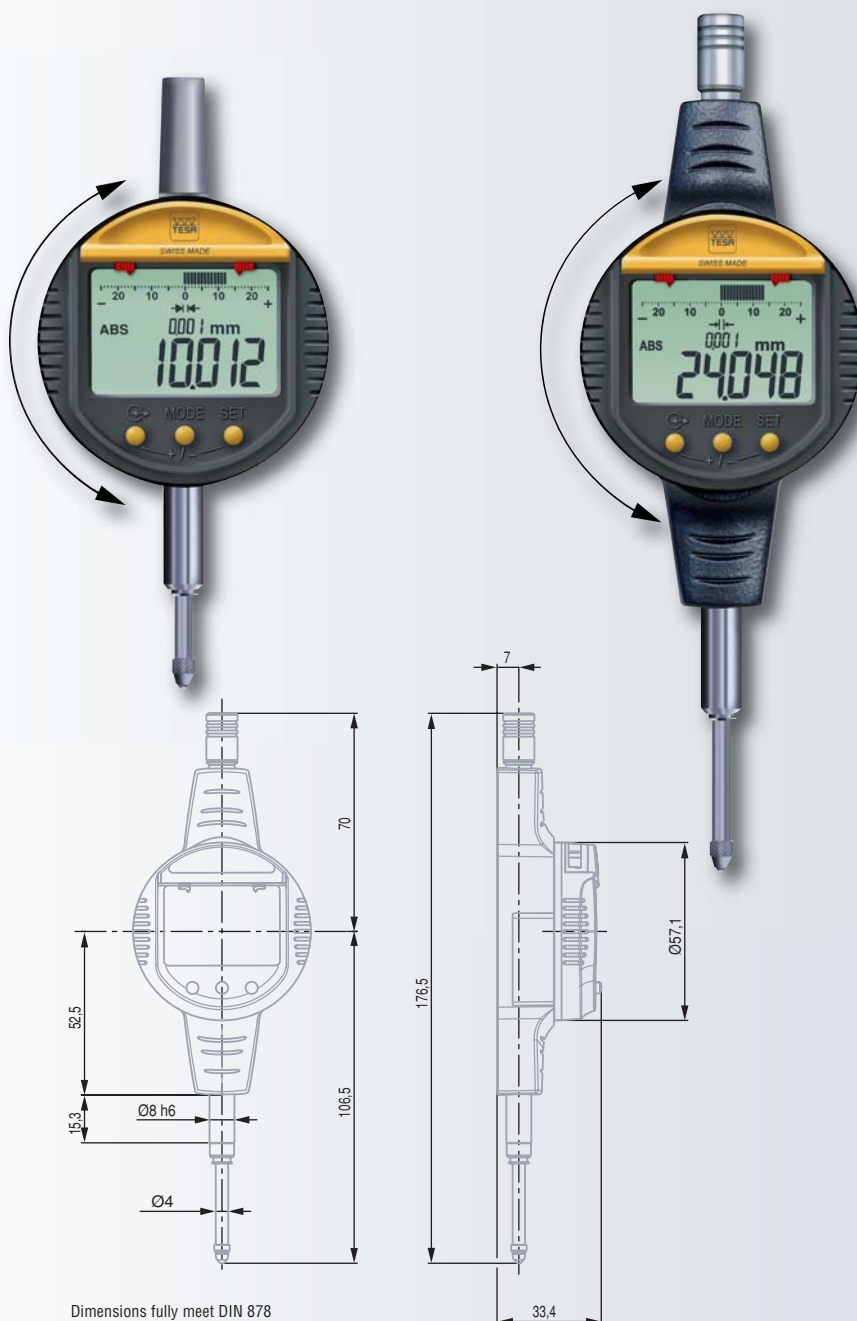
TESA DIGICO 600

- Measuring modes **ABS/REL**.
- Dual LC Display.
- Display rotation through 270°. Same goes for the key functions.
- Mechanical tolerance marks.
- Symbols for both limit values.

Measuring functions and modes

ON – Auto OFF – PRESET mode – Tolerance mode – Value storage mode

- Max • Min • Max-Min (TIR) – Data output – Counting sense reversal – Keypad lock – Metric/Inch units – Full RESET.



Dimensions fully meet DIN 878



Combined analogue and numerical display



6-decade LC display field plus minus sign



10 x 5 mm Digit size (H x L)



Resolution to 0,01 mm = ±0,25 mm



MI or MIE type with metric/inch conversion



Glass scale with incremental divisions, capacitive



≤ 2 m/s



Full-metal housing with front face in polyamide. Stainless steel plunger. M2,5 mounting thread for the measuring insert.



RS232, opto-coupled



3V lithium battery, type CR2032



1 year to 2 years



10°C to 40°C



−10°C to 60°C



80%



EN 50081-1
EN 50082-1



Shipping case including a lithium battery 01961000



Identification number



Inspection report with a declaration of conformity



mm / in



mm / in



µm



µm



N



g

TESA DIGICO 600

		mm / in	mm / in	µm	µm	N	g
01930256	Digico 605 MI	12,5 / 0.5	0,001 / 0.00005	4	2	< 2	150
01930257	Digico 610 MI	25 / 1	0,001 / 0.00005	5	2	< 2	162



Combined
analogue and
numerical display

6-decade LC
display field plus
minus sign

10 x 5 mm
Digit size (H x L)

Resolution to
0,01 mm =
±0,25 mm
Resolution to 0,001 mm =
±0,025 mm

MI or MIE type
with metric/inch
conversion

Glass scale with
incremental divi-
sions, capacitive

≤ 2 m/s

Full-metal housing
with front face in
polyamide.
Stainless steel plunger.
M2,5 mounting thread for
the measuring insert.

RS232,
opto-coupled

3V lithium battery,
type CR2032

1 year to 2 years

10°C to 40°C

-10°C to 60°C

80%

EN 50081-1
EN 50082-1

Shipping case
including a
lithium battery
01961000

Identification
number

Inspection report
with a declaration
of conformity

TESA DIGICO 705

Use in conjunction with bore gauges with 2-point contact. Allows setting of the dial gauge on the smallest setting ring value.

- Same functions as DIGICO 600.



No

=

mm / in

mm / in

μm

μm

N

g

TESA DIGICO 705

01930258

Digico 705 MI

12,5 / 0.5

0,001 / 0.00005

4

2

< 2

150

Optional accessories available for all TESA DIGICO 200 to 700

No

=

01961000 Lithium battery, type CR2032, 3V, 190 mAh

01962002 External power supply

04761054 Mains adapter

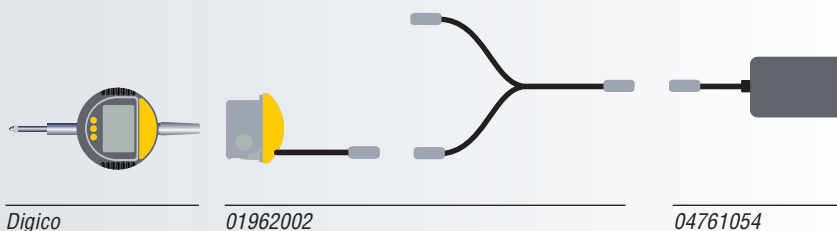
04761055 Cable EU for mains adapter

04761056 Cable US for mains adapter

Measuring inserts listed on page F-42

Backs and retraction devices detailed on page F-45

For information on connecting cables, refer to chapter A



Digico

01962002

04761054

TESA DIGICO 1 and 2

Both models are remarkable for their versatile functions, long measuring travel, high accuracy.

- Analogue and digital display; the latter can be displaced for easy reading in any position.
- Zero setting at any point within the measuring span.
- Data input through the keyboard.
- Counting sense reversal.
- Entry of limit values for classification through displayed symbols.
- Additional green, red or amber coloured background whenever the tool is connected to the mains.
- Value storage through the functions «Highest value», «Lowest value» or «Highest value minus lowest value».



✓
LC display
with coloured
background



6 decades plus
minus sign



9 x 4,5 mm digit
size (H x W)



See table
opposite



Metric/inch
conversion



40 mm
scale length



25 scale divisions



According
to selected
tolerances



30,4 mm
(DIGICO 1) or
60,4 mm
(DIGICO 2)



Incremental
glass scale



Max. 1 m/s for
(DIGICO 1) or
max. 2 m/s for
DIGICO 2



Plunger
guided on a
plain bearing
M2,5 mounting thread for
the measuring insert.



2 µm for DIGICO 1
3 µm for DIGICO 2



1 µm



1 µm



See table
on page F-9



RS232



3,6 V
lithium battery
or mains adapter



mm



mm



in



in

TESA electronic indicators

01930000	DIGICO 1	30	0,001 / 0,01	1.18	0.00005 / 0.0005
01930001	DIGICO 2	60	0,001 / 0,01	3.36	0.00005 / 0.0005

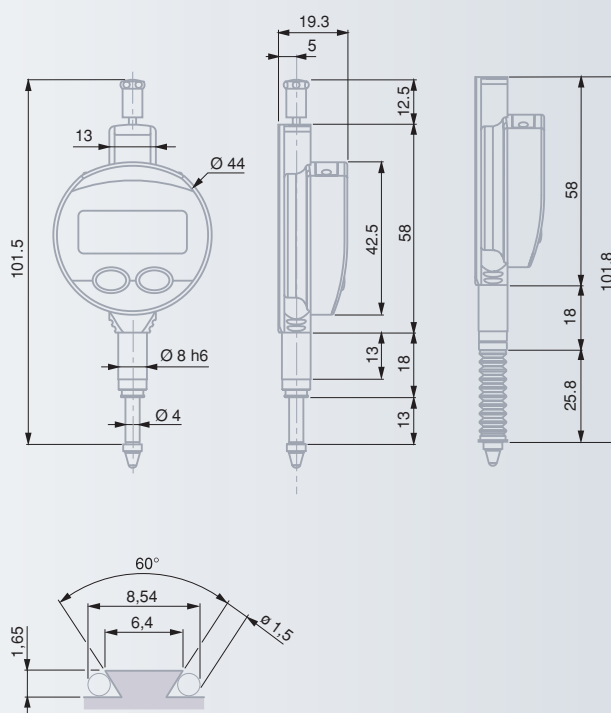
TESA DIGICO 12

Made to measure in extreme workshop conditions – Water and coolant resistant (IP65) – 44 mm dial diameter – Lets you take advantage of the mechanics combined with digital reading.



TESA DIGICO 12 – Standard

- 44 mm dial casing diameter.
- Water and coolant resistant (IP65).
- RS 232 SIMPLEX data output combined with external power supply.
- Inductive measuring system, patented.
- Choice between absolute («ABS») and relative («REL») measuring modes.
- Numerical display.
- Possible setting of PRESET value to ± 130 mm.
- Inverse measuring direction.
- Direct conversion of the metric/inch units.
- Automatic shut down.



5-digit LC display + sign



6 mm digit height



Zero-setting of display



20 μ m



5 μ m



0.5 to 0.9 N (± 0.15 N)



Max. 2 m/s



Number of measurements per second: 7



Working temperature range: +5°C to +40°C



3V lithium battery, type CR 2032



Battery life > 3500 hours



RS232



70 g



EN 61326-1



IP65 (IEC 529)



Shipping case including 1 lithium battery, type CR 2032 (order No. 01961000).



Identification number



Declaration of conformity



Models 0.01 mm with report. Models 0.001 mm without report.



mm/in



mm



in



Module

IP65 indicators with electronic module protected against the penetration of liquids

01930130 12,5/0.5 0,01 0.0005 IP65

01930132 12,5/0.5 0,001 / 0,01 0.00005 / 0.0005 IP65

IP65 indicators with mechanics and electronics protected against the penetration of liquids

01930131 12,5/0.5 0,01 0.0005 IP65

01930133 12,5/0.5 0,001 / 0,01 0.00005 / 0.0005 IP65



LCD,
5 digits + sign

6 mm
digit height

Zero-setting
of display

4 μ m

2 μ m

0,4 to 0,75 N
($\pm 0,15$ N)

Max. 2 m/s

Number of
measurements
per second: 9

Working tempera-
ture range:
+5°C to +40°C

3V lithium
battery,
type CR 2032

Battery life
> 4000 hours

RS232

70 g

EN 61326-1

IP65 (IEC 529)

1 lithium battery,
type CR 2032.
Order number:
01961000.

Identification
number

Inspection report
with a declaration
of conformity

TESA DIGICO 12 – HP

- High-precision measuring system.
- Water and coolant resistant (IP65).
- Combined analogue/digital display.
- Analogue readout from $\pm 0,025$ to $\pm 1,25$ mm.
- NOR/MIN/MAX/MAX-MIN measuring modes.
- 44 mm dial casing diameter.
- RS232 data output, combined with external power supply.
- Inductive measuring system, patented.
- Zero-setting of display.
- Direct conversion of the metric/inch units.
- Automatic shut down. Can also be locked.



mm/in

mm

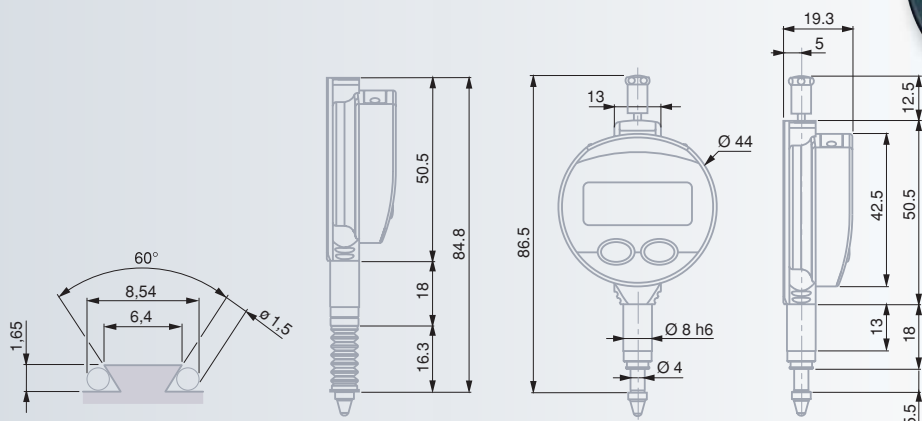
in

IP65 indicator HP with electronic module protected against the penetration of liquids

01930134 5/0.210 0,001 / 0,01 0.00005 / 0.0005 IP65

IP65 indicator HP with mechanics and electronics protected against the penetration of liquids

01930135 5/0.210 0,001 / 0,01 0.00005 / 0.0005 IP65



Accessories



03238013 Clamping lug

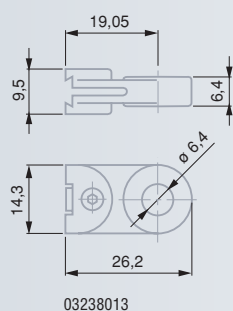
01961012 Upper lift lever

01960005 Lower lift lever

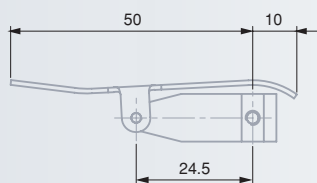
04761060 RS232 connecting cable along with external power supply

01961000 3 V lithium battery, type CR 2032, 190 mAh

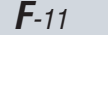
For information on connecting cables, refer to chapter A



03238013



01961012

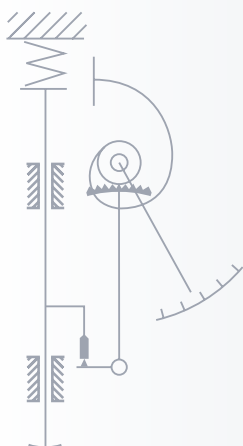


TESA CARY Microcomparators MCA-8

The absolute high precision

Specially designed for high precision measurement by comparison ($0,8 \mu\text{m}$) – Ideal for checking axial and radial runouts with a very low hysteresis ($0,3 \mu\text{m}$).

- TESA CARY precision mechanism mounted parallel to the measuring axis in compliance with the Abbe principle.
- Streamlined steel case for high rigidity.
- High precision throughout the measuring travel.
- Very low measuring force (from 150 mN).
- Non-rotating dial. Quickly set to zero by moving the pointer with just a thumb grip.
- Low sensitivity to temperature variations.



DIN 879



Non-rotating dial



Fine setting when moving the pointer



Full-metal dial casing. Stainless steel plunger, hardened.



Adjustable tolerance marks



M2,5 mounting thread for the measuring insert



Mounted insert with a 3 mm dia. steel ball tip



110 g



Plastic case



Identification number



Inspection report with a declaration of conformity



mm



mm



mN



mm



Range for zero-setting mm

Regular models

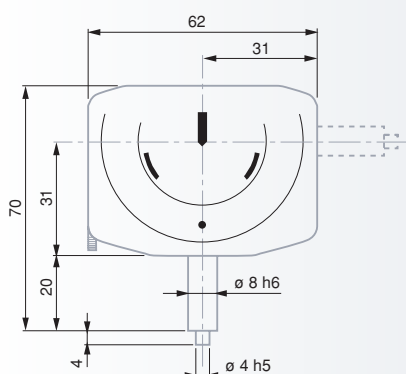
01410423	MCA8-2-500	0,001	0,1	3	500	50 ÷ 0 ÷ 50	± 0,006
01410425	MCA8-2-150	0,001	0,1	3	150	50 ÷ 0 ÷ 50	± 0,006
01410426	MCA8-2-300	0,001	0,1	3	300	50 ÷ 0 ÷ 50	± 0,006

Lateral model

01410424	MCA8-2-L	0,001	0,1	3	500	50 ÷ 0 ÷ 50	± 0,006
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Accessory

On request Sealing bellow (to be specified when ordering)



Precision



0,001 mm



Max. perm. errors, G_{ges}

0,8 μm



Repeatability limit, r

0,3 μm



Max. hysteresis, f_u

0,3 μm



DIN 879-1.
All sizes to
EN ISO 463

Ball-bearing
plunger

Full-metal
dial
casing.
Stainless steel plunger,
hardened.

Adjustable
tolerance
marks.
Coupling thread for the
lifting cable.
M2,5 mounting thread for
the measuring insert.

≈ 1 N

Mounted insert
with a 3,175 mm
dia. steel ball tip.
Also with lifting
cable.

Suited
plastic case

Declaration
of conformity

ETALON Basic Precision Indicators

The absolute high precision

Remarkably reliable, even when constantly used for series inspection – Specially made for comparative measurements demanding a very low measurement uncertainty – Measure axial and radial runouts with the lowest hysteresis.

- Shockproof movement with gear-lever transmission and long dead travel.
- Large, non-dazzling dial for easy readout.
- No coarse reading errors as the measuring travel is limited to less than one revolution.
- Fine adjustment and protective knob to prevent unintentional pointer displacement.



Regular model

01419051 0,001 0,1 3,0 62 ● 50 ÷ 0 ÷ 50

Model to IP54, protected against the penetration of liquids

01419052 0,001 0,1 3,0 62 ● 50 ÷ 0 ÷ 50

Precision



0,001 mm



Max. perm. errors
in one direction throughout
the measuring range, G_e
over any local
measuring range including
10 scale divisions, G_l

1 μ m

0,7 μ m



in both measuring directions
throughout the measuring
range, G_{ges}

1,2 μ m



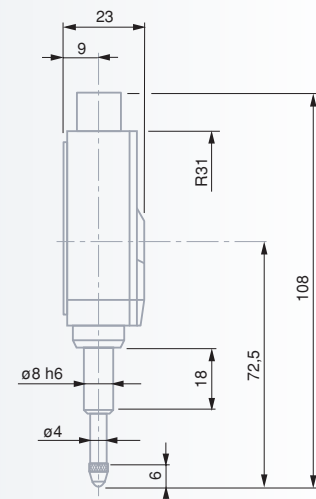
Repeatability limit, r_w

0,5 μ m



Max. hysteresis, f_u

0,5 μ m



Precision Dial Gauges

0,1 mm dial readout / 40, 58 or 80 mm dial diameter



EN ISO 463
Factory standard



0,1 mm



1,1 mm (40 mm dia.)
1,5 mm (58 mm dia.)
2,2 mm (80 mm dia.)



Rotating dial



Full-metal
dial casing.
Stainless steel
fixing shank and
plunger, hardened.



Without
shockproof
mechanism



M2,5 mounting
thread for the
measuring insert



See table
opposite



Mounted insert
with a 3,175 mm
dia. steel ball tip



Suited
plastic case

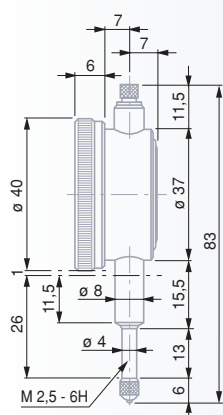


Identification
number

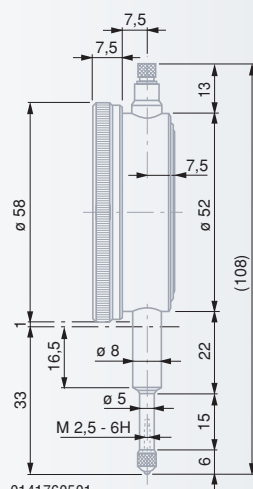


Declaration
of conformity

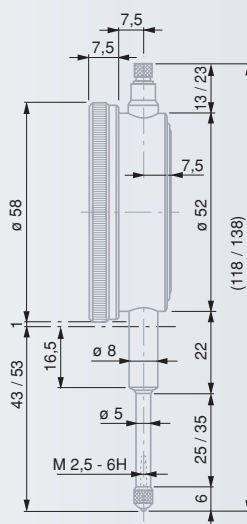
No	mm	mm	mm	mm	mm	mm	N
<i>ROCH dial gauges</i>							
0141760500	40	0,1	10	10,5	—	10	0 ÷ 5 ÷ 10 ≤ 1,0
0141760501	58	0,1	10	10,5	—	10	0 ÷ 5 ÷ 10 ≤ 1,0
0141760502	58	0,1	20	20,5	—	10	0 ÷ 5 ÷ 10 ≤ 1,0
0141760503	58	0,1	30	30,5	—	10	0 ÷ 5 ÷ 10 ≤ 1,5
0141760513	80	0,1	30	30,5	—	10	0 ÷ 5 ÷ 10 ≤ 2,0



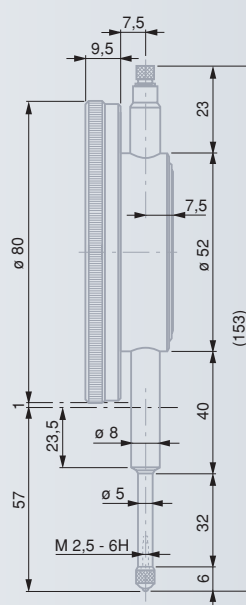
0141760500



0141760501



0141760503
Similar model:
0141760502



0141760513

Maximum permissible
errors for a metrological characteristic (MPE)



0,1 mm



10 mm



Deviation span

40 µm



Deviation span within the local
measuring span of 1 mm

25 µm

Total deviation span

55 µm



Repeatability limit

15 µm



Max. hysteresis

15 µm



EN ISO 463
Factory standard

0,01 mm

2,2 mm

Rotating dial.
Regular models
with or without dial lock.

Full-metal casing.
Fixing shank and
plunger in hardened stainless steel.

With or without
shockproof mechanism

Adjustable tolerance marks. M2,5 mounting thread for the measuring insert.

3 mm dia. ball tip, already mounted.

Cardboard box

Identification number

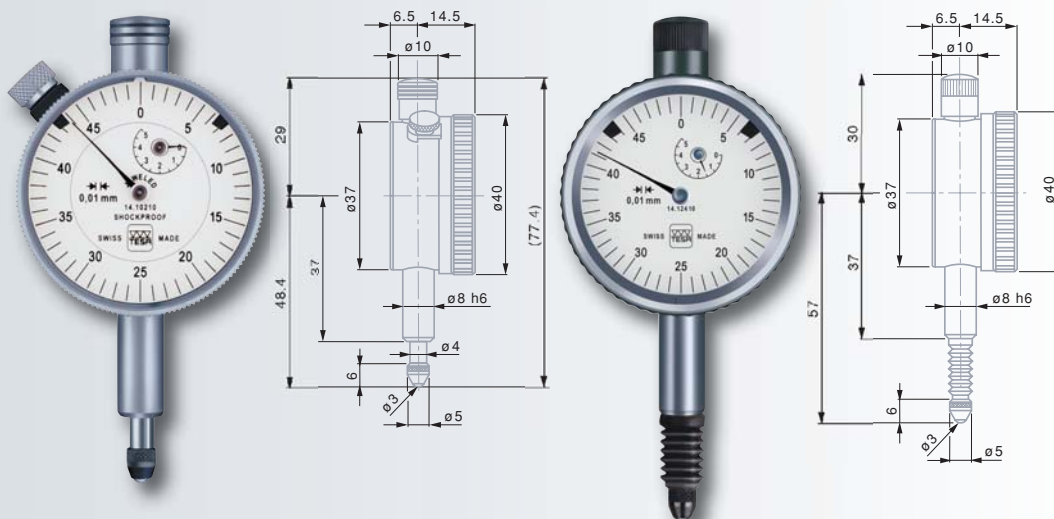
Inspection report with a declaration of conformity

Precision Dial Gauges

0,01 mm dial readout/ 40 mm dial diameter

These precision dial gauges combine excellent metrological properties with extra-long life.

- Smooth full-jewelled movement with rubies.
- Full-metal dial casing and bezel.
- Fully shockproof mechanism.
- Non-dazzling dial.
- Swiss Made.



TESA dial gauges

01410210	YR	0,01	5	5,4	●	0,5	0 ÷ 25 ÷ 50	●
01410211	YR	0,01	5	5,4	●	0,5	0 ÷ 25 ÷ 0	●
01410212	YR	0,01	5	5,4	●	0,5	0 ÷ 25 ÷ 50	–
01412010	YE	0,01	5	5,4	–	0,5	0 ÷ 25 ÷ 50	–

MERCER dial gauges

01416013	X185-1	0,01	5	5,4	–	0,5	0 ÷ 25 ÷ 0	●
01416014	186-1	0,01	5	5,4	–	0,5	0 ÷ 25 ÷ 50	●

TESA IP54 dial gauge, protected against the penetration of liquids

01412410	YE	0,01	5	5,4	–	0,5	0 ÷ 25 ÷ 50	–
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Permissible limits of a metrological characteristic (MPE/MPL)

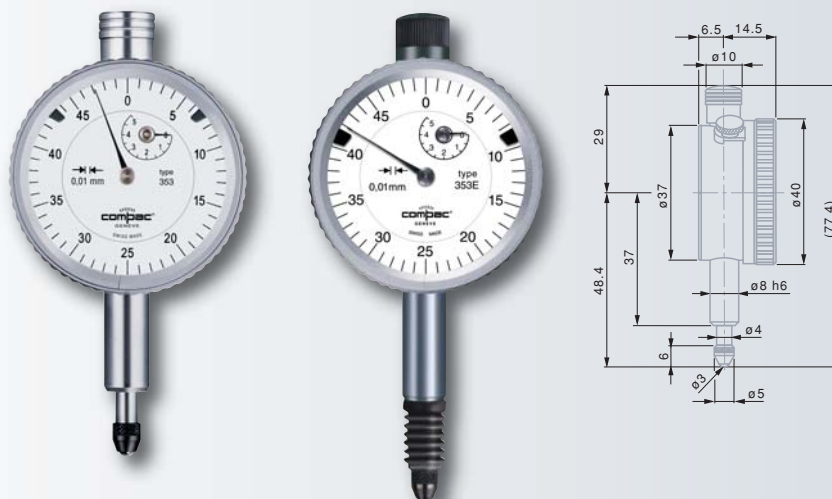
		0,01 mm
	Deviation span	12 µm
	Deviation span within the local measuring span 0,10 mm	6 µm
	Total deviation span	14 µm
	Repeatability limit	3 µm
	Max. hysteresis	3 µm
	Measuring force	≤ 1,4 N
	– Model IP54	≤ 2 N

Precision Dial Gauges

0,01 mm dial readout / 40 mm dial diameter

Remarkable for their robustness, these precision dial gauges are essential for the workshop.

- Smooth jewelled movement with rubies.
- Full-metal dial casing.
- Optimum protection against shocks.
- Swiss Made.



EN ISO 463
Factory
standard



0,01 mm



2,2 mm



Rotating dial



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



Adjustable tolerance
marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity



mm



mm



mm



mm



COMPAC dial gauge

353 0,01 5 5,4 ● — 0,5 0 ÷ 25 ÷ 50

COMPAC IP54 dial gauge, protected against the penetration of liquids

353E 0,01 5 5,4 ● — 0,5 0 ÷ 25 ÷ 50

COMPAC dial gauge with limited reading range

353S 0,01 ±0,2 3,3 ● — 0,5 20 ÷ 0 ÷ 20

Permissible limits of a metrological characteristic (MPE/MPL)

	± 0,2 mm	5 mm
Deviation span	7 µm	12 µm
Deviation span within the local measuring span 0,10 mm	5 µm	6 µm
Total deviation span	9 µm	14 µm
Repeatability limit	3 µm	3 µm
Max. hysteresis	3 µm	3 µm
Measuring force	≤ 1,4 N	≤ 1,4 N
– Model IP54	–	≤ 2 N

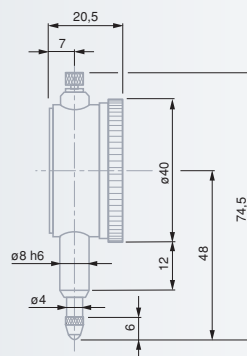


0,01 mm dial readout / 40 mm dial diameter

The model 0141760560 is specially advantageous whilst the other model 0141760561 is particularly robust.



* With extra red tinted reverse numbering.



01419047

Maximum permissible errors for a metrological characteristic (MPE)



Max. hysteresis

3 μm

Precision Dial Gauges

0,01 mm dial readout / 57 or 58 mm dial diameter



EN ISO 463
Factory standard



0,01 mm



1,5 mm



Rotating dial.
Regular models
with or without dial lock.



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



With or without
shockproof
mechanism



Adjustable tolerance
marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted



Cardboard box



Identification
number

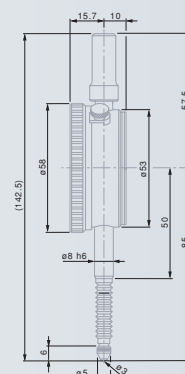


Inspection report
with a declaration
of conformity

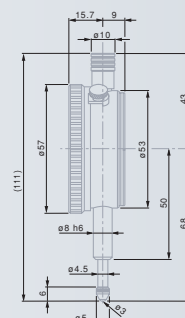
No		mm	mm	mm			mm	
<i>TESA dial gauges</i>								
01410610	YR	0,01	10	10,5	●	●	1	0 ÷ 50 ÷ 100
01410611	YR	0,01	10	10,5	●	●	1	0 ÷ 50 ÷ 0
01412310	YE	0,01	10	10,5	—	—	1	0 ÷ 50 ÷ 100
<i>MERCER dial gauges</i>								
01416020	250-1	0,01	10	10,5	—	●	1	0 ÷ 50 ÷ 0
01416021	251-1	0,01	10	10,5	—	●	1	0 ÷ 50 ÷ 100
<i>TESA IP54 dial gauges, protected against the penetration of liquids</i>								
01410721	YR	0,01	10	10,5	●	—	1	0 ÷ 50 ÷ 0
01412411	YE	0,01	10	10,5	—	—	1	0 ÷ 50 ÷ 100
<i>TESA dial gauge with limited reading range</i>								
01412211	YE	0,01	± 0,4	4	●	—	1,27	40 ÷ 0 ÷ 40

Permissible limits of a metrological characteristic (MPE/MPL)

	± 0,4	10 mm
Deviation span	7 µm	15 µm
Deviation span within the local measuring span 0,10 mm	5 µm	8 µm
Total deviation span	9 µm	17 µm
Repeatability limit	3 µm	3 µm
Max. hysteresis	3 µm	3 µm
Measuring force – Models IP54	≤ 1 N	≤ 1,5 N
	—	≤ 2,2 N



01410721 – 01412411



01410610 – 01410611



EN ISO 463
Factory
standard

0,01 mm

1,5 mm

Rotating dial
with or without
dial lock

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.

3 mm dia.
ball tip, already
mounted.

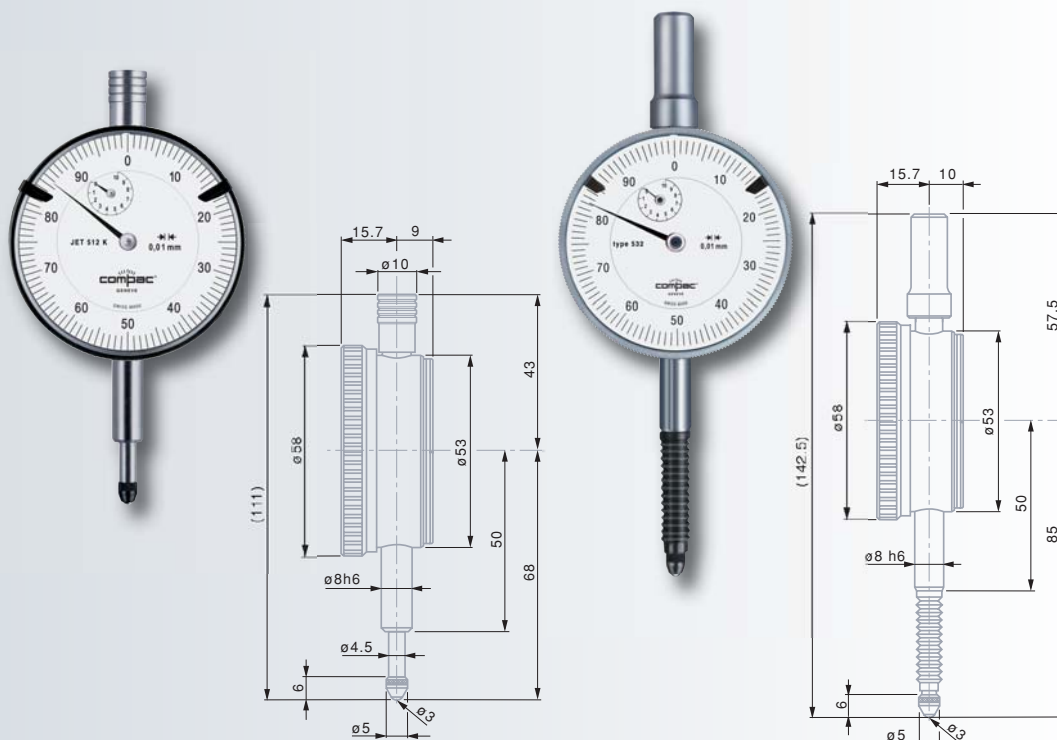
Cardboard box

Identification
number

Inspection report
with a declaration
of conformity

Precision Dial Gauges

0,01 mm dial readout / 58 mm dial diameter



mm

mm

mm

mm

COMPAC dial gauges

512K	0,01	10	10,5	—	—	1	0 ÷ 50 ÷ 100
532	0,01	10	10,5	●	—	1	0 ÷ 50 ÷ 100

COMPAC IP 54 dial gauge, protected against the penetration of liquids

532E	0,01	10	10,5	●	—	1	0 ÷ 50 ÷ 100
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COMPAC dial gauges with limited reading range

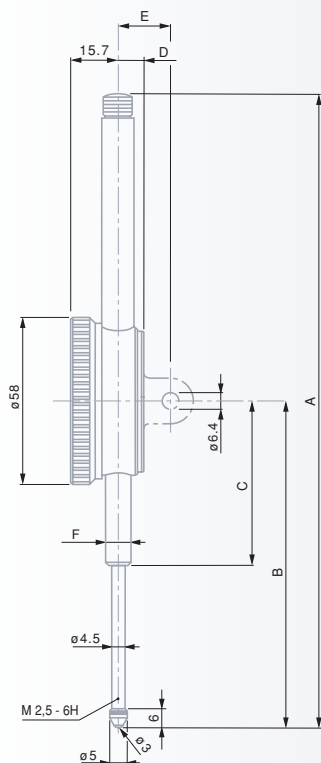
532S	0,01	± 0,4	4	●	●	1,27	40 ÷ 0 ÷ 40
533S	0,01	± 0,5	4	●	—	1,27	50 ÷ 0 ÷ 50

Permissible limits of a metrological characteristic (MPE/MPL)

	±0,4 / ±0,5 mm	10 mm
Deviation span	7 µm	15 µm
Deviation span within the local measuring span 0,10 mm	5 µm	8 µm
Total deviation span	9 µm	17 µm
Repeatability limit	3 µm	3 µm
Max. hysteresis	3 µm	3 µm
Measuring force — Model IP54	≤ 1 N —	≤ 1,5 N ≤ 2,2 N

Long Range Precision Dial Gauges

0,01 mm dial readout / 58 mm dial diameter



	30 mm	50 mm	100 mm
A	148	228	390
B	88	117,2	211,6
C	50	60	103,6
D	10	9	9
E	20	19	19
F	Ø 8h6	Ø 8h6	Ø 8h6

	mm	mm	mm	mm	mm	mm	mm
COMPAC dial gauges							
712	0,01	30	30,5	●	—	1	0 ÷ 50 ÷ 100
722	0,01	50	50,5	●	—	1	0 ÷ 50 ÷ 100
732	0,01	100	100,5	●	—	1	0 ÷ 50 ÷ 100
MERCER dial gauge							
01416039 252-1	0,01	30	30,5	●	●	1	0 ÷ 50 ÷ 100

Permissible limits of a metrological characteristic (MPE/MPL)

	30 mm	50 mm	100 mm
Deviation span	20 µm	25 µm	30 µm
Total deviation span	25 µm	30 µm	35 µm
Repeatability limit	3 µm	3 µm	3 µm
Max. hysteresis	5 µm	5 µm	8 µm
Measuring force	≤ 2,2 N	≤ 2,5 N	≤ 3,2 N



EN ISO 463
Factory
standard



0,01 mm



1,5 mm



Rotating dial
with or without
dial lock



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted.



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity

Long Range Precision Dial Gauges

0,01 mm dial readout / 58 mm dial diameter

Both models 0141760635 and 0141760636 are particularly profitable.



EN ISO 463
Factory
standard

0,01 mm

1,5 mm

Rotating dial

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

With or without
shockproof
mechanism

Adjustable
tolerance
marks.

Model No. 0141760640
with fine adjust mounted
under the protective cap
for dial reading.
M2,5 mounting thread for
the measuring insert.

For accuracy,
see table on
page F-22

See table
opposite

Mounted insert
with a 3,175 mm
dia. steel ball tip.

Exception:
Each model No. 0141760631
has a ruby ball tip.

Plastic case or
cardboard box

Identification
number

Declaration
of conformity



ROCH dial gauges

	mm	mm	mm	mm	mm	N
0141760631	0,01	10	10,5	—	1	0 ÷ 50 ÷ 100* ≤ 1,4
0141760635	0,01	10	10,5	—	1	0 ÷ 50 ÷ 100* ≤ 1,4
0141760636****	0,01	10	10,5	—	1	0 ÷ 50 ÷ 100* ≤ 1,4
0141760640	0,01	10	10,5	●	1	0 ÷ 50 ÷ 100* ≤ 1,4
0141761213***	0,01	15	15,5	●	1	0 ÷ 50 ÷ 100* ≤ 1,6
0141760651	0,01	30	30,5	—	1	0 ÷ 50 ÷ 100 ≤ 1,6
0141760653	0,01	30	30,5	●	1	0 ÷ 50 ÷ 100 ≤ 1,6
0141760661	0,01	50	51	—	1	0 ÷ 50 ÷ 100 ≤ 2,2
0141760662**	0,01	50	51	—	1	0 ÷ 50 ÷ 100 ≤ 2,2
0141760663	0,01	50	51	●	1	0 ÷ 50 ÷ 100 ≤ 2,2
0141760671	0,01	80	81	—	1	0 ÷ 50 ÷ 100 ≤ 3,0

ROCH IP54 dial gauge, protected against the penetration of liquids

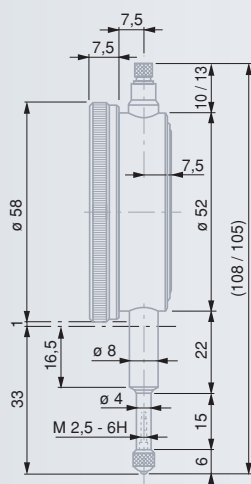
0141760624	0,01	10	10,5	●	1	0 ÷ 50 ÷ 100* ≤ 2
------------	------	----	------	---	---	-------------------

* With extra red tinted reverse numbering.

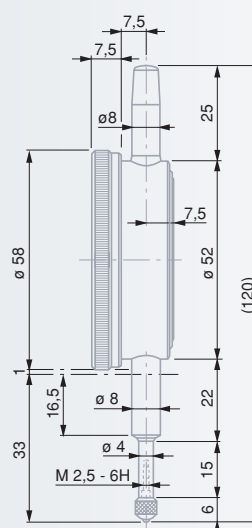
** Counterclockwise numbering.

*** 60,4 mm dial diameter.

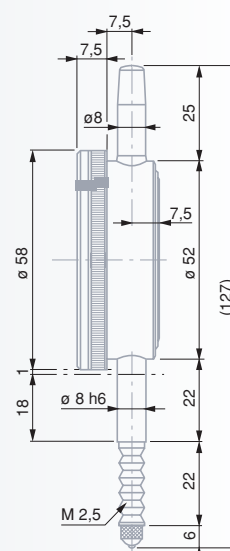
**** With mounted central lug back.



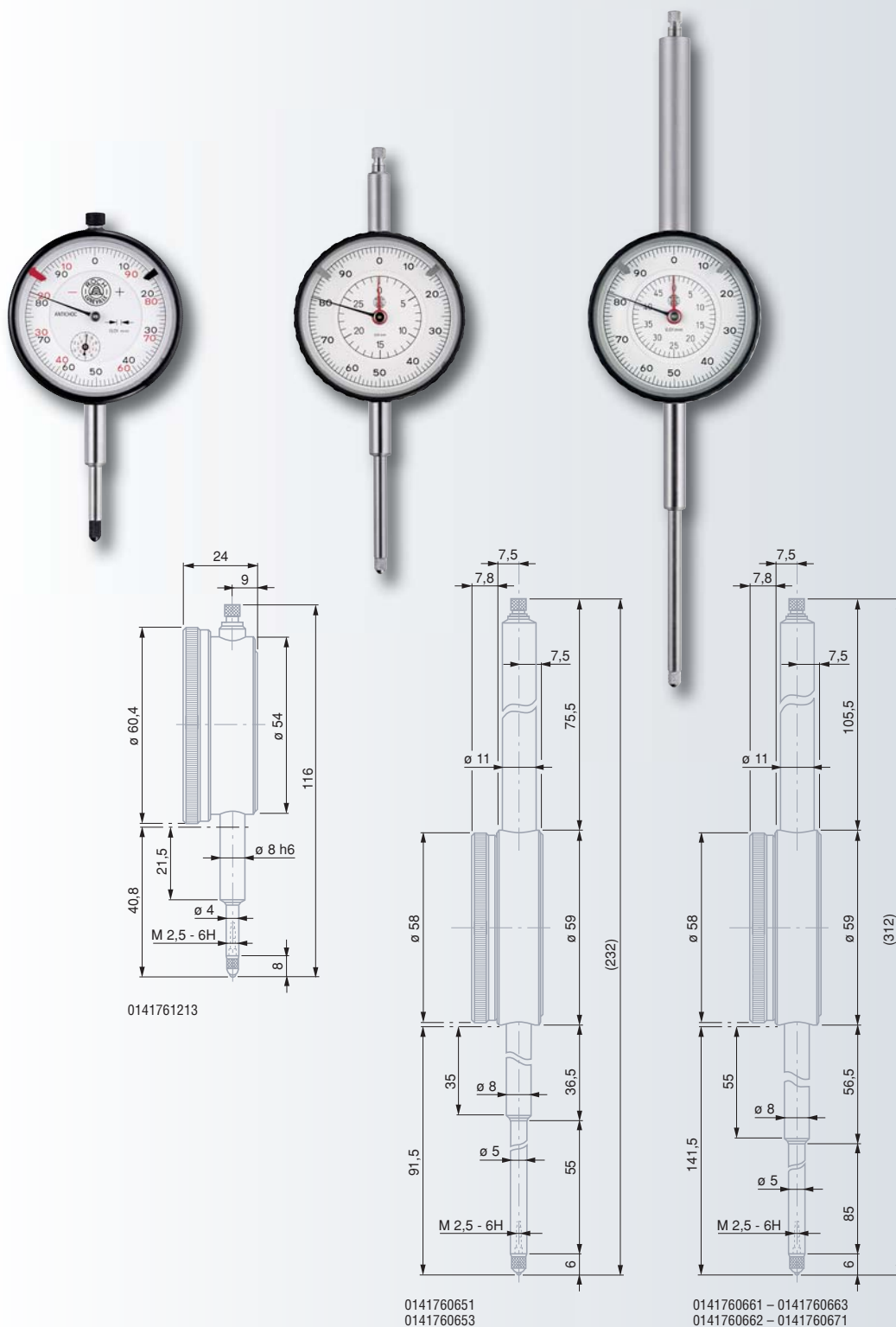
0141760631
0141760635
0141760636



0141760640



0141760624



EN ISO 463
Factory standard



0,01 mm



1,5 mm



Rotating dial



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



With or without
shockproof
mechanism



Adjustable toler-
ance marks.
M2,5 mounting
thread for the measuring
insert.



In order
to eliminate
any hysteresis
when measuring with
the plunger moving
downward, this feature
has to be coupled on
the measuring points,
directly.



See table
on the previous
page F-21



Mounted insert
with a 3,175 mm
dia. steel ball tip.

Exception:
Each model No. 0141761213
has a ruby ball tip



Plastic case or
cardboard box



Identification
number



Declaration
of conformity

Maximum permissible errors for a metrological characteristic (MPE)

	0,01 mm	10 mm	15 mm	30 mm	50 mm	80 mm
Deviation span		15 µm	20 µm	20 µm	25 µm	30 µm
Deviation span within the local measuring span of 0,1 mm		5 µm	5 µm	5 µm	5 µm	5 µm
Repeatability limit		3 µm	3 µm	3 µm	3 µm	3 µm

Precision Dial Gauges

0,01 mm dial readout / 58 mm dial diameter

Regular and long range models



EN ISO 463
Factory
standard

0,01 mm

1,5 mm

Rotating dial

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

With or without
shockproof
mechanism

Adjustable toler-
ance marks.
M2,5 mounting
thread for the measuring
insert.

See table
opposite

Mounted insert
with a 3,175 mm
dia. steel ball tip

Plastic case or
cardboard box

Identification
number

Declaration
of conformity



ETALON dial gauges

01419048	0,01	10	58	—	1	0 ÷ 50 ÷ 100	≈ 1
01419049	0,01	30	58	●	1	0 ÷ 50 ÷ 100	1,5 ÷ 2
01419050	0,01	50	58	●	1	0 ÷ 50 ÷ 100	1,5 ÷ 2

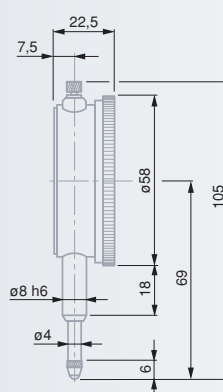
Plunger retraction device

01462003 Lift lever

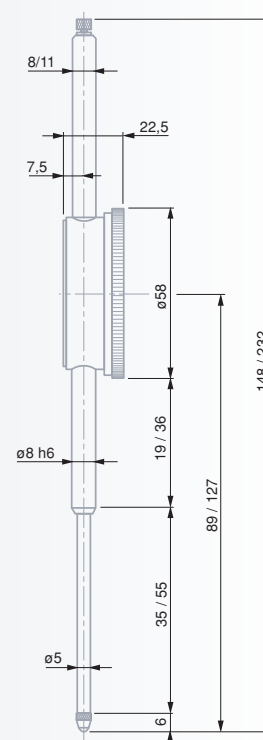
Backs with permanent magnet or central lug, see page F-45.

Maximum permissible errors for a metrological characteristic (MPE)

	mm	10	30	50
	µm	15	20	25
	µm	8	9	12
	µm	3	3	3



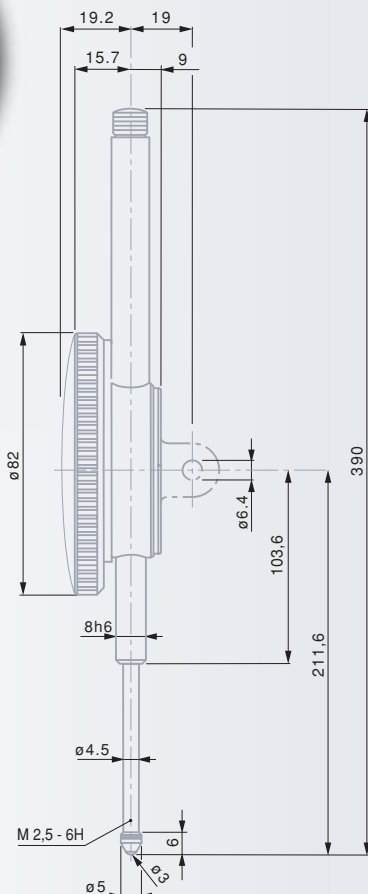
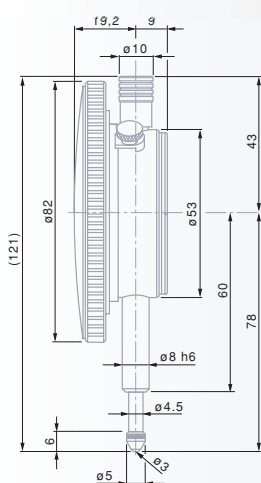
01419048



01419049 - 01419050

Precision Dial Gauges

0,01 mm dial readout / 82 mm dial diameter



EN ISO 463
Factory
standard



0,01 mm



2,3 mm



Rotating dial
with or without
dial lock



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



High performance
shock proof system
in both directions



Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity



mm



mm



mm



mm



mm



mm

TESA dial gauge with dial lock

01410910 YR 0,01 10 10,5 ● 0,1 0 ÷ 50 ÷ 100

TESA dial gauge with a long range

01412014 YE 0,01 100 100,5 ● 1 0 ÷ 50 ÷ 100

Permissible limits of a metrological characteristic (MPE/MPL)

	10 mm	100 mm
Deviation span	15 µm	30 µm
Deviation span within the local measuring span 0,10 mm	8 µm	–
Total deviation span	17 µm	35 µm
Repeatability limit	3 µm	3 µm
Max. hysteresis	3 µm	8 µm
Measuring force	≤ 1,4 N	≤ 3,2 N

Precision Dial Gauges

0,01 mm dial readout / 82 mm dial diameter



EN ISO 463
Factory
standard

0,01 mm

2,2 mm

Rotating dial
with or without
dial lock

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

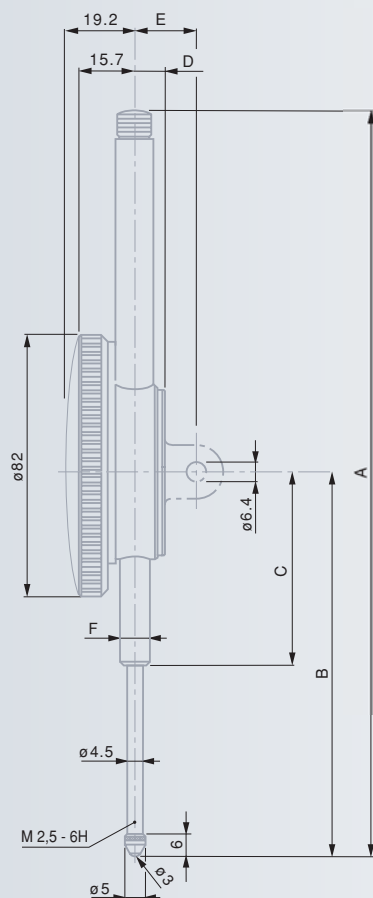
M2,5 thread
for the
measuring insert

3 mm dia.
ball tip, already
mounted.

Cardboard box

Identification
number

Inspection report
with a declaration
of conformity



mm



30 mm



50 mm



100 mm

	30 mm	50 mm	100 mm
A	158	228	390
B	98	117,2	211,6
C	60	60	103,6
D	10	9	9
E	20	19	19
F	Ø 8h6	Ø 8h6	Ø 8h6



mm



mm



mm



mm



COMPAC dial gauges with a long range

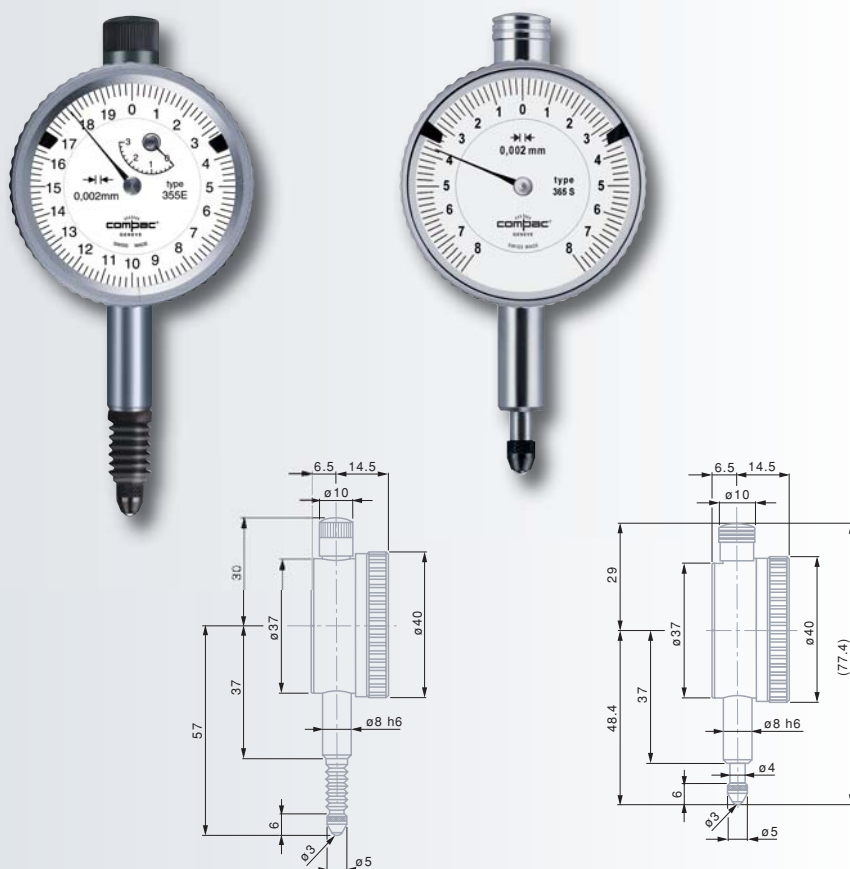
	0,01	30	30,5	●	—	1	0 ÷ 50 ÷ 100
712G	0,01	30	30,5	●	—	1	0 ÷ 50 ÷ 100
722G	0,01	50	50,5	●	—	1	0 ÷ 50 ÷ 100
732G	0,01	100	100,5	●	—	1	0 ÷ 50 ÷ 100
732GB	0,01	100	100,5	●	●	1	0 ÷ 50 ÷ 100

Permissible limits of a metrological characteristic (MPE/MPL)

	30 mm	50 mm	100 mm
Deviation span	20 µm	25 µm	30 µm
Total deviation span	25 µm	30 µm	35 µm
Repeatability limit	3 µm	3 µm	3 µm
Max. hysteresis	5 µm	5 µm	8 µm
Measuring force	≤ 2,2 N	≤ 2,5 N	≤ 3,2 N

Precision Dial Gauges

0,002 mm dial readout / 40 mm dial diameter



EN ISO 463
Factory
standard

0,002 mm

1,1 mm

Rotating dial

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.

3 mm dia.
ball tip, already
mounted

Cardboard box

Identification
number

Inspection report
with a declaration
of conformity



mm



mm



mm



mm



COMPAC dial gauge

355	0,002	3	3,3	●	—	0,2	0 ÷ 10 ÷ 20
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COMPAC dial gauge IP54, protected against the penetration of liquids

355E	0,002	3	3,3	●	—	0,2	0 ÷ 10 ÷ 20
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COMPAC dial gauge with limited reading range

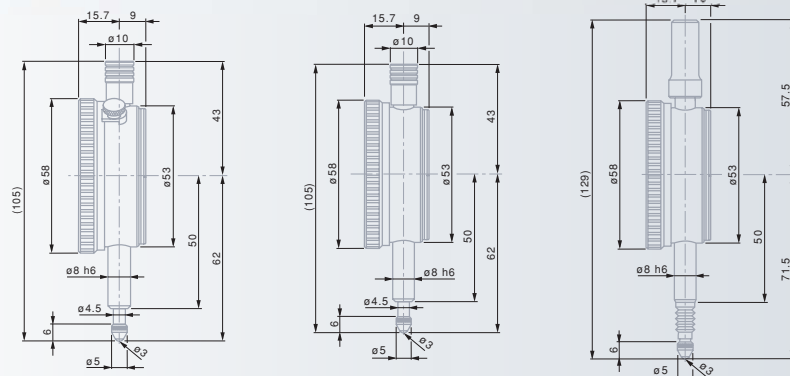
365S	0,002	±0,08	1,5	●	—	0,2	8 ÷ 0 ÷ 8
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Permissible limits of a metrological characteristic (MPE/MPL)

	±0,08 mm	3 mm
Deviation span	2 µm	10 µm
Deviation span within the local measuring span 0,10 mm	2 µm	6 µm
Total deviation span	4 µm	12 µm
Repeatability limit	1 µm	1,5 µm
Max. hysteresis	1 µm	2 µm
Measuring force — Model IP54	≤ 1,4 N —	≤ 1,4 N ≤ 1,7 N

Precision Dial Gauges

0,002 mm dial readout / 58 mm dial diameter



EN ISO 463
Factory
standard



0,002 mm



1,5 mm



Rotating dial
with or without
dial lock



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted.



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity



mm



mm



mm



mm



MERCER dial gauges

01416034	253-1	0,002	5	5,3	—	●	0,2	0 ÷ 10 ÷ 0
01416035	254-1	0,002	5	5,3	—	●	0,2	0 ÷ 10 ÷ 20

COMPAC dial gauge

555		0,002	5	5,3	●	—	0,2	0 ÷ 10 ÷ 20
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COMPAC dial gauge IP54, protected against the penetration of liquids

555E		0,002	5	5,3	●	—	0,2	0 ÷ 10 ÷ 20
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COMPAC dial gauge with limited reading range

565S		0,002	±0,08	3,3	●	—	0,2	8 ÷ 0 ÷ 8
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Permissible limits of a metrological characteristic (MPE/MPL)

		
Deviation span	±0,08 mm	5 mm
Total deviation span	4 µm	12 µm
Repeatability limit	1 µm	2 µm
Max. hysteresis	1 µm	2 µm
Measuring force — Model IP54	≤ 1,5 N —	≤ 1,5 N ≤ 1,7 N

Precision Dial Gauges

0,001 mm dial readout / 40 mm dial diameter



EN ISO 463
Factory
standard

0,001 mm

1,1 mm

Rotating dial,
With or without
dial lock.

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

High performance
shock proof system
in both directions

Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.

3 mm dia.
ball tip, already
mounted.

Cardboard box

Identification
number

Inspection report
with a declaration
of conformity



TESA dial gauges

01410010	YR	0,001	1	1,5	●	●	0,1	0 ÷ 50 ÷ 100
01410011	YR	0,001	1	1,5	●	●	0,1	0 ÷ 50 ÷ 0
01412510	YE	0,001	1	1,5	●	—	0,1	0 ÷ 50 ÷ 100

TESA dial gauges IP54, protected against the penetration of liquids

01410120	YR	0,001	1	1,5	●	—	0,1	0 ÷ 50 ÷ 100
01410121	YR	0,001	1	1,5	●	—	0,1	0 ÷ 50 ÷ 0
01412710	YE	0,001	1	1,5	●	—	0,1	0 ÷ 50 ÷ 100

COMPAC dial gauge

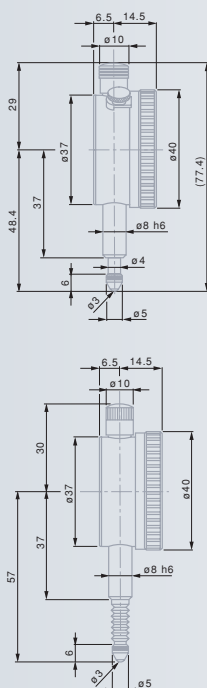
367		0,001	1	1,5	●	—	0,1	0 ÷ 5 ÷ 10
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COMPAC dial gauge IP54, protected against the penetration of liquids

367E		0,001	1	1,5	●	—	0,1	0 ÷ 5 ÷ 10
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COMPAC dial gauge with limited reading range

367S		0,001	±0,04	1,5	●	—	0,1	4 ÷ 0 ÷ 4
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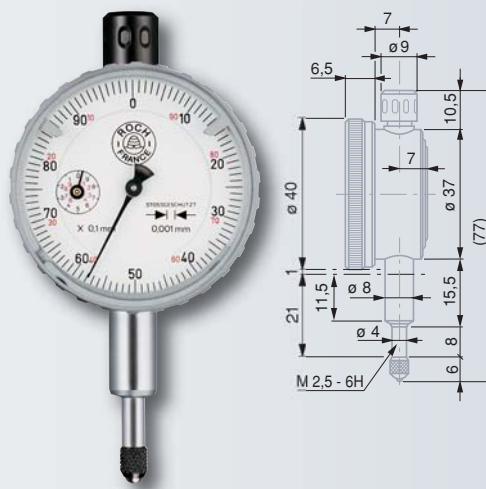
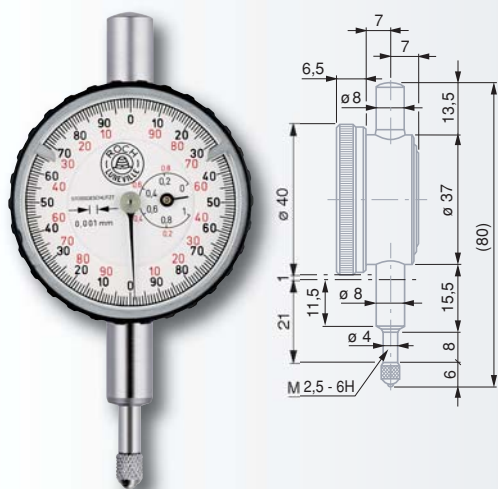


Permissible limits of a metrological characteristic (MPE/MPL)

	±0,04 mm	1 mm
Deviation span	2 µm	4 µm
Deviation span within the local measuring span 0,10 mm	2 µm	4 µm
Total deviation span	4 µm	5 µm
Repeatability limit	1 µm	1 µm
Max. hysteresis	1 µm	1 µm
Measuring force	≤ 1,4 N	≤ 1,7 N
— Models IP54	—	≤ 2 N

Precision Dial Gauges

0,001 mm dial reading / 40 mm dial diameter



EN ISO 463
Factory
standard



0,001 mm



1,1 mm
(0141761261)
2,2 mm
(0141761262)



Rotating dial



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



With shockproof
mechanism



Adjustable
tolerance marks.
M2,5 mounting
thread for the measuring
insert.



See table
opposite



Mounted insert
with a 3,175 mm
dia. steel ball tip



Suited
plastic case



Identification
number



Declaration
of conformity



mm



mm



mm



mm



mm



mm



N

ROCH dial gauges

0141761261	0,001	1	1,1	●	0,2	0 ÷ 100/0 ÷ 100*	≤ 1,5
0141761262	0,001	1	1,1	●	0,1	0 ÷ 50 ÷ 100*	≤ 1,2

* With extra red tinted reverse numbering.

Maximum permissible errors for a metrological characteristic (MPE)



0,001 mm



1 mm



Deviation span

5 µm



Deviation span within the local
measuring span of 0,01 mm

3 µm

Total deviation span

7 µm



Repeatability limit

3 µm



Max. hysteresis max.

3 µm

Precision Dial Gauges

0,001 mm dial readout / 58 mm dial diameter



EN ISO 463
Factory
standard



0,001 mm



1,5 mm



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



High performance
shockproof system
in both directions



Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity



mm



mm



mm



mm



TESA dial gauges

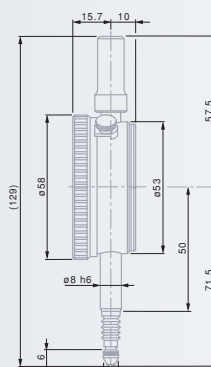
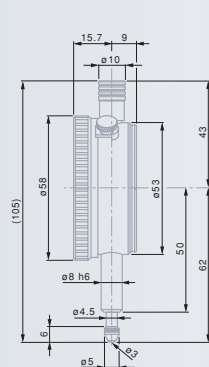
01412511	YE	0,001	1	1,5	●	—	0,1	0 ÷ 50 ÷ 100
01410410	YR	0,001	1	3,3	●	—	0,1	0 ÷ 50 ÷ 100
01410411	YR	0,001	1	3,3	●	—	0,1	0 ÷ 50 ÷ 0
01412611	YE	0,001	5	5,3	●	—	0,2	0 ÷ 100 ÷ 200

COMPAC dial gauges IP54, protected against the penetration of liquids

01412711	YE	0,001	1	1,5	●	—	0,1	0 ÷ 50 ÷ 100
01410520	YR	0,001	1	3,3	●	—	0,1	0 ÷ 50 ÷ 100

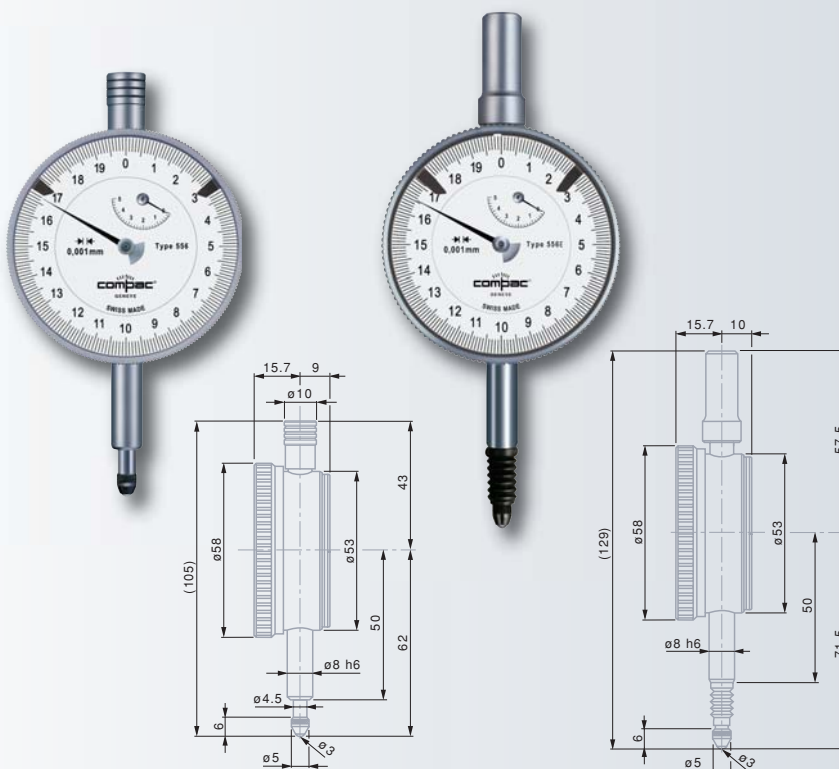
Permissible limits of a metrological characteristic (MPE/MPL)

	1 mm	5 mm
	4 µm	12 µm
Deviation span within the local measuring span 0,10 mm	4 µm	
Total deviation span	5 µm	14 µm
	1 µm	2 µm
	1 µm	2 µm
	≤ 1,7 N	≤ 1,5 N
— Models IP54	—	≤ 1,7 N



Precision Dial Gauges

0,001 mm dial readout / 58 mm dial diameter



EN ISO 463
Factory
standard



0,001 mm



1,5 mm



Rotating dial



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



Adjustable toler-
ance marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted.



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity



mm



mm



mm



mm



COMPAC dial gauges

556	0,001	5	5,3	●	—	0,2	0 ÷ 10 ÷ 20
567	0,001	1	3,3	●	—	0,1	0 ÷ 5 ÷ 10

COMPAC dial gauges IP54, protected against the penetration of liquids

556E	0,001	5	5,3	●	—	0,2	0 ÷ 10 ÷ 20
567E	0,001	1	3,3	●	—	0,1	0 ÷ 5 ÷ 10

Permissible limits of a metrological characteristic (MPE/MPL)

	1 mm	5 mm
Deviation span	4 µm	12 µm
Total deviation span	5 µm	14 µm
Repeatability limit	1 µm	2 µm
Max. hysteresis	1 µm	2 µm
Measuring force – Models IP54	≤ 1,5 N ≤ 1,7 N	≤ 1,5 N ≤ 1,7 N

Precision Dial Gauges

0,001 mm dial readout / 58 mm dial diameter



EN ISO 463
Factory
standard

0,001 mm

0,8 mm
(No. 0141761281,
0141761282
and 0141761283)
1,5 mm (No. 0141761284)

Rotating dial

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

With or without
shockproof
mechanism

Adjustable toler-
ance marks.
M2,5 mounting
thread for
the measuring insert.

For accuracy,
see the table
on page F-30

See table
opposite

Mounted insert
with a 3,175 mm
dia. steel ball tip

Suited plastic case

Identification
number

Declaration
of conformity



mm

mm

mm

mm

mm

N

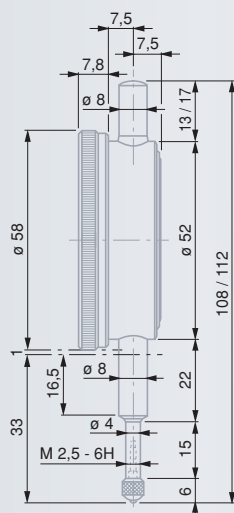
ROCH dial gauges

0141761282	58	0,001	1	1,1	—	0,2	0 ÷ 100/0 ÷ 100*	≤ 1,5
0141761283	58	0,001	1	1,1	●	0,2	0 ÷ 100/0 ÷ 100*	≤ 1,5
0141761284	58	0,001	1	1,1	●	0,1	0 ÷ 50 ÷ 100*	≤ 1,5

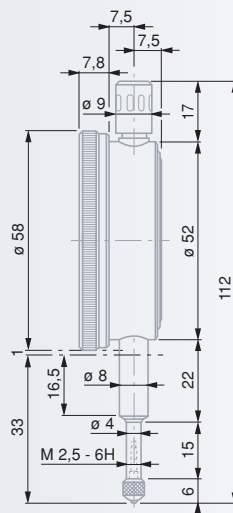
ROCH dial gauge IP54, protected against the penetration of liquids

0141761281	58	0,001	1	1,1	●	0,2	0 ÷ 100/0 ÷ 100*	≤ 2,0
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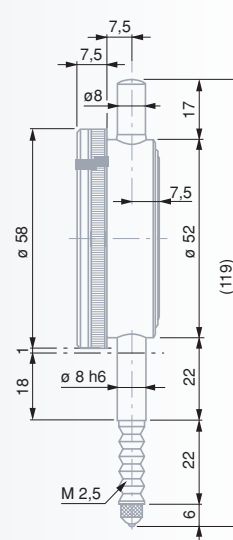
* With extra red tinted reverse numbering.



0141761282
0141761283



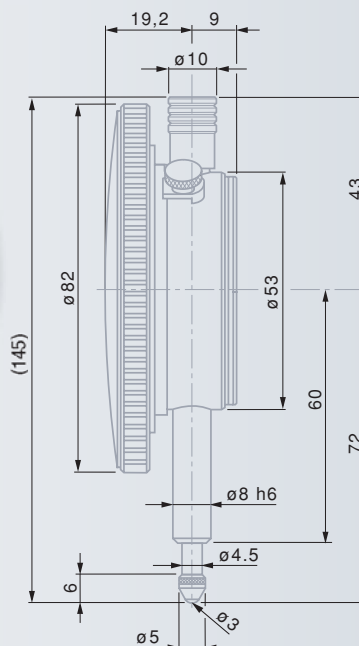
0141761284



0141761281

Precision Dial Gauges

0,001 mm dial readout / 82 mm dial diameter



EN ISO 463
Factory
standard



0,001 mm



2,3 mm



Rotating dial.
With or without
dial lock.



Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.



High performance
shockproof system
in both directions



Adjustable tole-
rance marks. M2,5
mounting thread
for the measuring insert.



3 mm dia.
ball tip, already
mounted



Cardboard box



Identification
number



Inspection report
with a declaration
of conformity



TESA dial gauges

01410810	YR	0,001	1	3,3	●	●	0,1	0 ÷ 50 ÷ 100
01410811	YR	0,001	1	3,3	●	●	0,1	0 ÷ 50 ÷ 0

COMPAC dial gauge

556G		0,001	5	5,3	●	—	0,2	0 ÷ 10 ÷ 20
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Permissible limits of a metrological characteristic (MPE/MPL)

	1 mm	5 mm
Deviation span	4 µm	12 µm
Deviation span within the local measuring span 0,10 mm	4 µm	—
Total deviation span	5 µm	14 µm
	1 µm	2 µm
Repeatability limit	1 µm	2 µm
	1 µm	2 µm
Max. hysteresis	1 µm	2 µm
	≤ 1,7 N	≤ 1,5 N
Measuring force	≤ 1,7 N	≤ 1,5 N

Precision Dial Gauges

0.001 in dial readout / 40 or 58 mm dial diameter



Factory standard

0.001 in

2,2 mm

Rotating dial with dial lock

Full-metal dial casing. Stainless steel fixing shank and plunger, hardened.

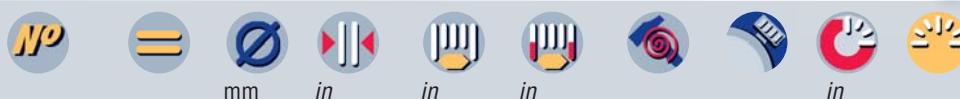
Adjustable tolerance marks. M2,5 mounting thread for the measuring insert.

Mounted insert with a 3 mm dia. steel ball tip

Cardboard box

Identification number

Inspection report with a declaration of conformity

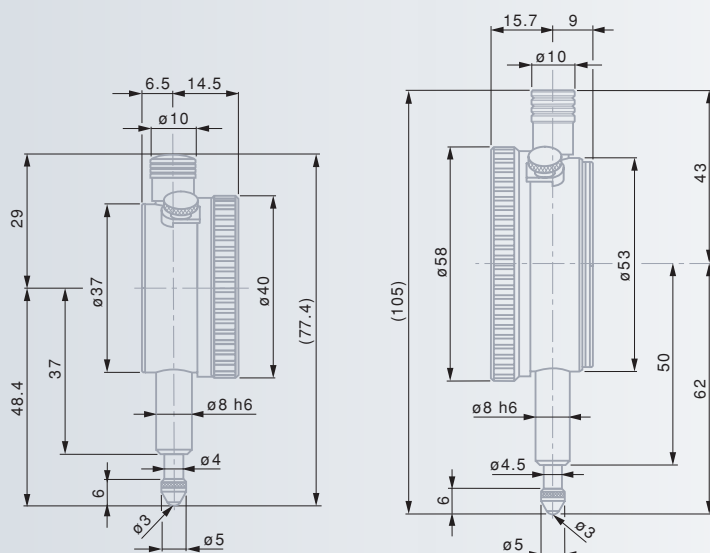


MERCER dial gauges

01426010	181-1	40	0.001	0.200	0.212	—	●	0.1	0 ÷ 50 ÷ 0
01426011	182-1	40	0.001	0.200	0.212	—	●	0.1	0 ÷ 50 ÷ 100
01426026	210-1	58	0.001	0.400	0.420	—	●	0.1	0 ÷ 50 ÷ 0
01426027	211-1	58	0.001	0.400	0.420	—	●	0.1	0 ÷ 50 ÷ 100
01426031	216-1	58	0.001	1	1.2	●	●	0.1	0 ÷ 50 ÷ 100

Permissible limits of a metrological characteristic (MPE/MPL)

	0.2 in	0.4 in	1 in
Deviation span	0.0005 in	0.0006 in	0.0008 in
Total deviation span	0.0006 in	0.0007 in	0.001 in
Repeatability limit	0.00015	0.0002	0.00015
Max. hysteresis	0.00015 in	0.0002 in	0.0002 in
Measuring force	≤ 1,4 N	≤ 1,4 N	≤ 2,2 N



Precision Dial Gauges

0.0005 in dial readout / 40 or 58 mm dial diameter



Factory standard



0.0005 in



3,1 mm



Rotating dial with or without dial lock



Full-metal dial casing. Stainless steel fixing shank and plunger, hardened.



Adjustable tolerance marks. M2,5 mounting thread for the measuring insert.



Mounted insert with a 3 mm dia. steel ball tip



Cardboard box



Identification number



Inspection report with a declaration of conformity



mm



in



in



in



in



in



in



in

MERCER dial gauges

01426012	183-1	40	0.0005	0.200	0.212	●	●	0.05	0 ÷ 25 ÷ 0
01426013	184-1	40	0.0005	0.200	0.212	●	●	0.05	0 ÷ 25 ÷ 50
01426020	212-1	58	0.0005	0.400	0.420	—	●	0.05	0 ÷ 25 ÷ 0
01426021	213-1	58	0.0005	0.400	0.420	—	●	0.05	0 ÷ 25 ÷ 50
01426032	217-1	58	0.0005	1	1.2	●	●	0.05	0 ÷ 25 ÷ 50

COMPAC dial gauge

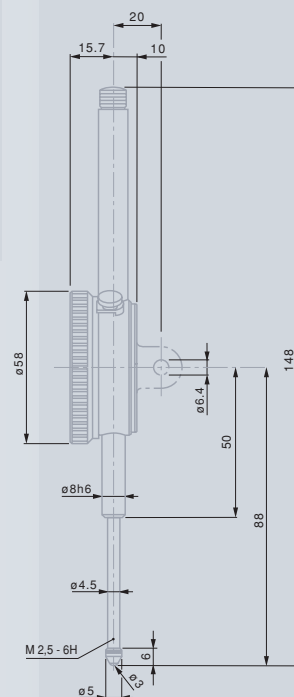
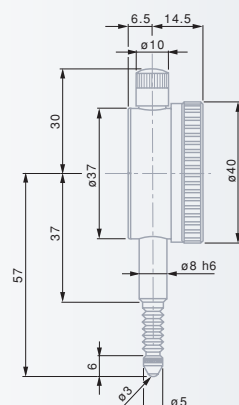
354A		40	0.0005	0.200	0.212	●	—	0.02	0 ÷ 10 ÷ 20
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COMPAC dial gauge IP54, protected against the penetration of liquids

354AE		40	0.0005	0.200	0.212	●	—	0.02	0 ÷ 10 ÷ 20
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Permissible limits of a metrological characteristic (MPE/MPL)

			
 Deviation span	0.0005 in	0.0006 in	0.0008 in
 Total deviation span	0.0006 in	0.0007 in	0.001 in
 Repeatability limit	0.00015 in	0.0002 in	0.0015 in
 Max. hysteresis	0.00015 in	0.0002 in	0.0002 in
 Measuring force — Model IP54	≤ 1,4 N ≤ 1,7 N	≤ 1,4 N —	≤ 2,2 N —



Precision Dial Gauges

0.0001 in dial readout / 40 or 58 mm dial diameter



Factory standard

0.0001 in

1,1 mm

Rotating dial with or without dial lock

Full-metal dial casing. Stainless steel fixing shank and plunger, hardened.

Adjustable tolerance marks. M2,5 mounting thread for the measuring insert.

Mounted insert with a 3 mm dia. steel ball tip

Cardboard box

Identification number

Inspection report with a declaration of conformity



mm



in



in



in



in



COMPAC dial gauge IP54, protected against the penetration of liquids

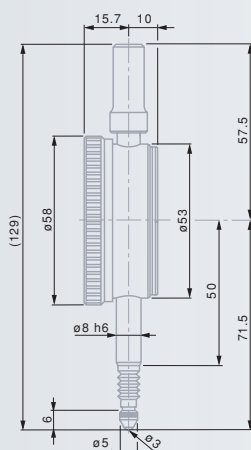
355AE	40	0.0001	0.120	0.130	●	—	0.01	0 ÷ 5 ÷ 10
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MERCER dial gauges

01426028 240-1	58	0.0001	0.200	0.210	—	●	0.01	0 ÷ 50 ÷ 0
01426029 241-1	58	0.0001	0.200	0.210	—	●	0.01	0 ÷ 50 ÷ 100

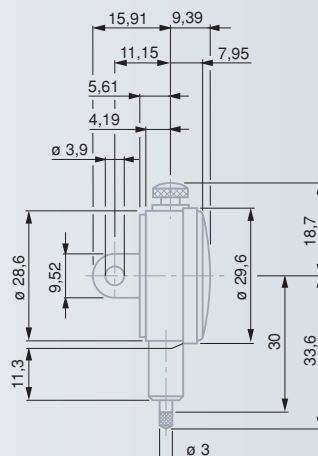
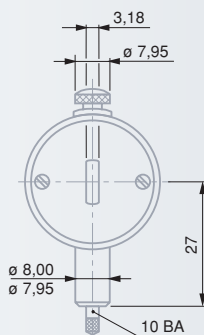
Maximum permissible errors for a metrological characteristic (MPE)

		
	0.12 in	0.2 in
 Deviation span	0.0004	0.0005
 Total deviation span	0.0005	0.00055
 Repeatability limit	0.00006	0.00006
 Max. hysteresis	0.00008	0.00008
 Measuring force	≤ 2 N	≤ 2.2 N



Small Dial Gauges

MERCER Series 70, 1 1/8 in or 29 mm dial diameter



Models to 0.001 or 0.0001 in

Standard models			in	in	in	in	in		N
01426050	71	0.001	0.04	0.05	—	0.04	0 ÷ 20 ÷ 0	≤ 1,5	
01426051	73	0.0001	0.01	0.05	—	0.01	0 ÷ 5 ÷ 0	≤ 1,5	

Models to 0,01 or 0,002 mm

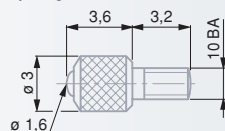
Standard models			mm	mm	mm	mm	mm		N
01416050	72	0,01	1	1,2	—	1	0 ÷ 50 ÷ 0	≤ 1,5	
01416051	74	0,002	0,2	1,2	—	0,2	0 ÷ 10 ÷ 0	≤ 1,5	

Permissible limits of a metrological characteristic (MPE/MPL)

	0.001 in	0.0001 in	0,01 mm	0,002 mm
Deviation span	0.0005 in	0.0005 in	10 µm	6 µm
Total deviation span	0.0008 in	0.0007 in	13 µm	9 µm
Repeatability limit	0.0003 in	0.0002 in	3 µm	2 µm
Max. hysteresis	0.0003 in	0.0002 in	3 µm	3 µm

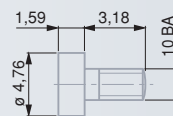
Accessories for MERCER dial gauges, series 70

10 BA coupling thread



Standard insert with spherical measuring faces.

				mm
03560072	Steel			1,6
03560073	Carbide			1,6



Measuring insert with a flat measuring face.

				mm
03560074	Steel			4,76



Factory standard or EN ISO 463 for metric models



See table opposite



2,25 mm or 0,9 mm



Rotating dial



Full-metal dial casing. Stainless steel fixing shank and plunger, hardened.



Without shockproof mechanism



Back with central lug. Measuring insert with a 10BA coupling thread.



See in the table opposite



Mounted insert with a 3 mm dia. steel ball tip



Cardboard box



Identification number



Inspection report with a declaration of conformity



EN ISO 463.
Factory
standard.

Rotating dial

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

Shockproof
system protecting
the movement

Adjustable
tolerance marks.
M2,5 mounting
thread for the measuring
insert.
Fastening sleeve with a
8h6 or 25h6 stem diameter.

Mounted insert
with a 3 mm
ball tip dia.

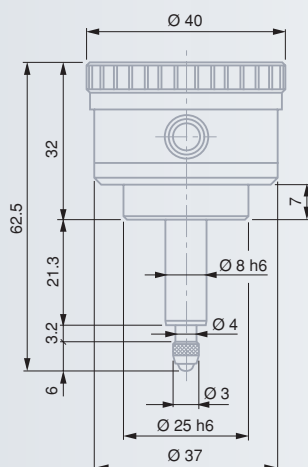
Cardboard box

Serial number

Inspection report
with a declaration
of conformity

Dial Gauges with Back Mounted Plunger

0,01 or 0,002 mm dial readout / 40 mm dial diameter



COMPAC dial gauges

CP 352	0,01	3	3,2	1	0 ÷ 50 ÷ 100	14	3	3	0,9
CP 353	0,01	3	3,2	0,5	0 ÷ 25 ÷ 50	14	3	3	0,9
CP 355	0,002	3	3,2	0,2	0 ÷ 10 ÷ 20	14	2	2,5	0,9

COMPAC dial gauges with a limited reading range

CP 352S	0,01	± 0,4	3,2	(1)	40 ÷ 0 ÷ 40	9	3	3	0,9
CP 355S	0,002	± 0,08	3,2	(0,2)	8 ÷ 0 ÷ 8	9	2	2,5	0,9

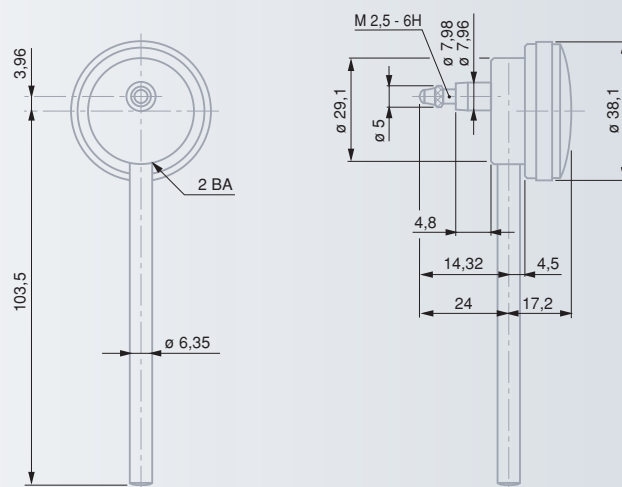
S: Models with a restricted reading range.

Since the pointer travels less than one revolution, all reading errors due to the revolution counter are eliminated.



Dial Gauges with Back Mounted Plunger

MERCER Serie 90, 38 mm dial diameter



Factory standard or EN ISO 463 for metric models



0.001 in and 0.01 mm



2.4 mm or 1.2 mm



Rotating dial



Full-metal dial casing. Stainless steel fixing shank and plunger, hardened.



Without shockproof mechanism



Measuring insert with a M2,5 thread. Also with a 6,35 mm dia. holding rod that can be unscrewed.



See table opposite



Mounted insert with a 3 mm dia. steel ball tip



Cardboard box



Identification number



Inspection report with a declaration of conformity

Models to 0,01 mm

No	=	mm	mm	mm	mm	mm	N
01416060	93	0,01	1	3,5	—	1	0 ÷ 50 ÷ 0 ≤1,5
01416061	94	0,01	1	3,5	—	1	0 ÷ 50 ÷ 100 ≤1,5

Models to 0.001 in

No	=	in	in	in	in	in	N
01426060	91	0.001	0.05	0.14	—	0.05	0 ÷ 25 ÷ 0 ≤1,5
01426061	92	0.001	0.05	0.14	—	0.05	0 ÷ 25 ÷ 50 ≤1,5

Maximum permissible errors for a metrological characteristic (MPE)

	0,01 mm	0.001 in
Deviation span	25 µm	0.0010 in
Total deviation span	40 µm	0.0015 in
Repeatability limit	12 µm	0.0005 in
Max. hysteresis	12 µm	0.0005 in

Accessories for MERCER dial gauges, series 90

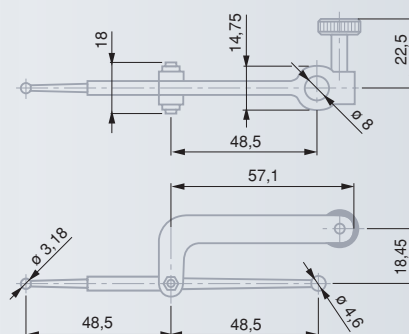
Swivelling arm



Amplification

03560078

1:1



Dial Gauges with Back Mounted Plunger

0,01 mm dial readout / 40 or 58 mm dial diameter



EN ISO 463
Factory
standard

0,01 mm

2,2 mm (Ø 40)
1,5 mm (Ø 58)

Rotating dial

Full-metal
dial casing.
Stainless steel
fixing shank and plunger,
hardened.

Without shock-
proof mechanism

Adjustable toler-
ance marks.
M2,5 mounting
thread for the measuring
insert.

See table
opposite

Mounted insert
with a 3,175 mm
dia. steel ball tip

Cardboard box

Identification
number

Declaration
of conformity



mm



mm



mm



mm



mm



mm



mm

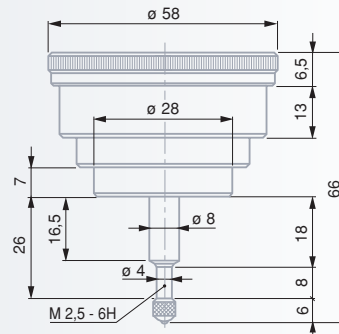
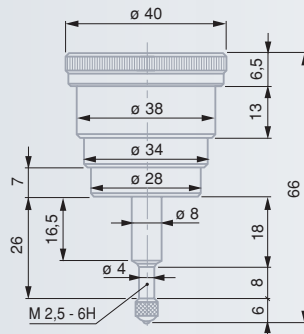


N

ROCH dial gauges

0141760566	40	0,01	3	3,5	—	0,5	0 ÷ 25 ÷ 50*	≤1,2
0141760611	58	0,01	3	3,5	—	1	0 ÷ 50 ÷ 100*	≤1,5

* With extra red tinted reverse numbering.

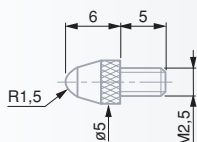


Maximum permissible errors for a metrological characteristic (MPE)

		3 mm
	Deviation span	12 µm
	Deviation span with the local measuring span of 0,1 mm	5 µm
	Total deviation span	15 µm
	Repeatability limit	5 µm
	Max. hysteresis	15 µm

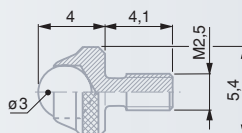
Measuring Inserts for Dial Gauges, Axial Probes and other Handtools

Executions with a M2,5 coupling thread



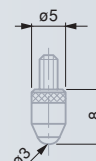
Standard spherical measuring inserts.

No		L mm
03510001	Steel	6
03510002	Carbide	6
03560001	Sapphire	6



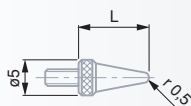
Short spherical measuring insert.

No		L mm
03560007	Carbide	4



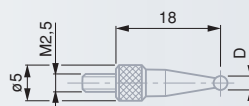
Long spherical measuring inserts.

No		L mm
03560019	Steel	8
03560020	Carbide	8
03560021	Sapphire	8



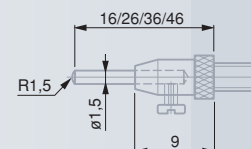
Spherical measuring inserts,
R = 0,5 mm.

No		L mm
03560035	Steel	5
03560036	Steel	10
03560037	Steel	15
03560038	Steel	20
03560039	Steel	30
03560040	Steel	40



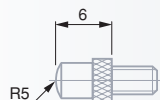
Spherical measuring inserts.

No		mm
03560051	Carbide	1
03560052	Carbide	2
03560053	Carbide	3
03560054	Carbide	4
03560055	Carbide	5
03560056	Carbide	6
03560057	Carbide	7
03560058	Carbide	8
03560059	Carbide	9
03560060	Steel	10
03560061	Steel	11
03560062	Steel	12



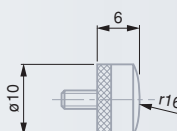
Spherical measuring insert with
4 interchangeable pins, R = 1,5 mm.

No		L mm
03510201	Steel	16, 26, 36, 46



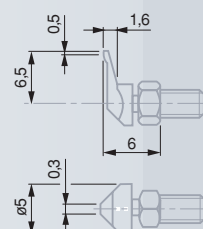
Spherical measuring inserts.

No		R mm
03510101	Steel	5
03510102	Carbide	5



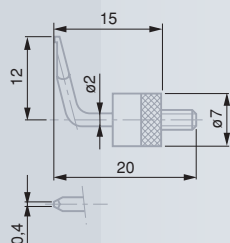
Spherical measuring inserts

No		R mm
03560017	Steel	16
03560018	Carbide	16



Measuring insert with offset (A)
contact point and lock nut for radial
alignment.

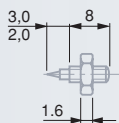
No		A mm
03510401	Steel	6,5



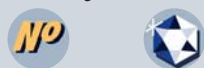
Measuring insert with offset (A) contact point and lock nut for radial alignment.



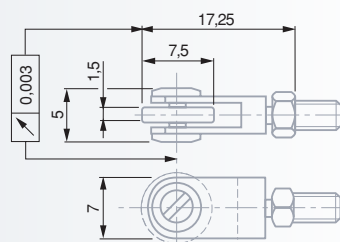
	Material	Size (A mm)
03560063	Steel	12



Measuring insert with needle contact point.



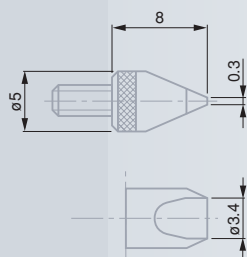
	Material	Size (A mm)
03560030	Steel	



Measuring inserts with ball-bearing rollers. Lock nut for radial alignment.



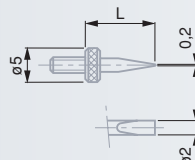
	Material	Size (A mm)
03560010	Steel	cylindrical
03560011	Steel	ball-shaped



Inserts with a blade-shaped measuring face. Lock nut for radial alignment.



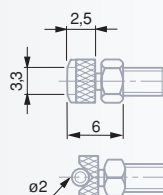
	Material	Size (B mm)
03560024	Steel	0,3
03560025	Carbide	0,3



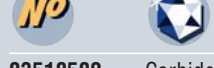
Inserts with a blade-shaped steel face. Lock nut for radial alignment.



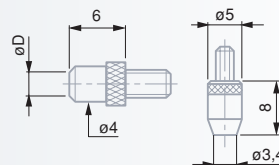
	Material	Size (B mm)
03560031	Steel	5
03560032	Steel	10
03560033	Steel	15
03560034	Steel	20



Insert with a cylindrical measuring face. Lock nut for radial alignment.



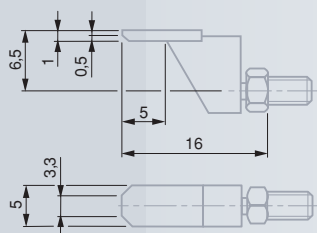
	Material	Size (B mm)
03510502	Carbide	



Inserts with a flat measuring face.



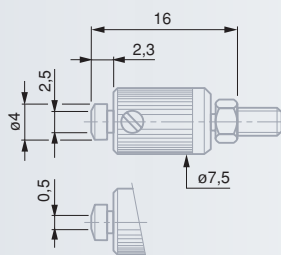
	Material	Size (B mm)
03510801	Steel	2,5
03510802	Carbide	2,5
03560022	Steel	3,4
03560023	Carbide	3,4



Insert with a narrow, off-centre measuring face. Lock nut for radial alignment.



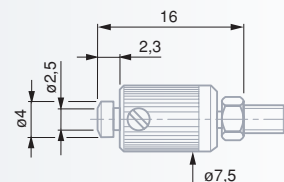
	Material	Size (B mm)
03510602	Carbide	0,5



Insert with a narrow, parallel measuring face, adjustable. Lock nut for radial alignment.



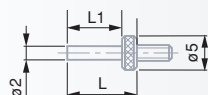
	Material	Size (B mm)
03510702	Carbide	0,5



Insert with a flat, parallel measuring face., adjustable. Lock nut for radial alignment.

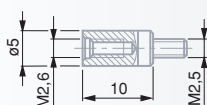


	Material	Size (B mm)
03510902	Carbide	2,5



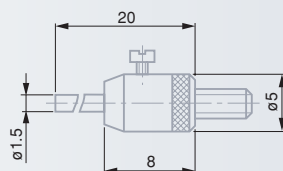
Steel inserts with a flat measuring face.

Nº	L mm	L1 mm	mm
03560026	5	2,8	2
03560027	10	7,8	2
03560028	15	12,8	2
03560029	20	17,8	2



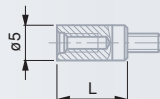
Connectors for measuring inserts.

Nº	Outside	Inside
03560092	M2,5	M2
03560066	M2,5	M2,6
03560067	M2,5	M3
03560064	M2,6	M2,5
03560065	M3	M2,5



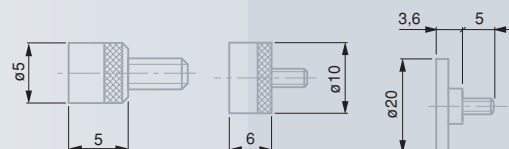
Inserts with a flat measuring face as well as interchangeable pin.

Nº	Material	mm
03560008	Steel	1,5
03560009	Carbide	1,5



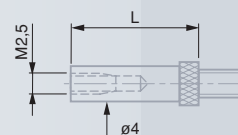
Extensions for measuring inserts.

Nº	L mm
03560042	10
03560043	15
03560044	20
03560045	25
03560046	30
03560047	35
03560048	40
03560049	45
03560050	50



Inserts with a flat measuring face.

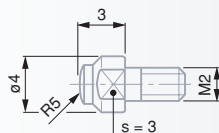
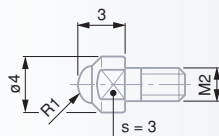
Nº	Material	mm
03560012	Steel	5
03560013	Carbide	5
03560014	Steel	10
03560015	Carbide	10
03560016	Steel	20



Extensions for measuring inserts.

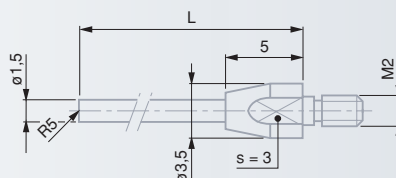
Nº	L mm
03540501	10
03540502	15
03540503	20
03540504	40

Executions with a M2 Coupling Thread



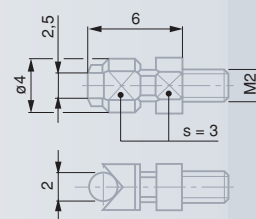
Spherical measuring inserts. M2 thread.

Nº	Material	R mm
03510204	Carbide	R 1
03510103	Carbide	R 5



Spherical measuring inserts, R = 5 mm. M2 thread.

Nº	Material	L mm
03510202	Carbide	16
03510203	Carbide	26

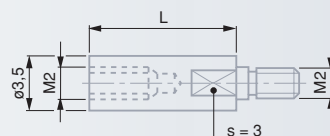


Measuring insert with cylindrical measuring face. Lock nut for radial alignment. M2 thread.

Nº	Material
03510503	Carbide

Extensions for measuring inserts, M2.

Nº	L mm
03540505	10
03540506	15





Devices for Plunger Retraction

Top mounted retraction devices.



mm

03560004	Retraction device	Ø 40
03560005	Retraction device	Ø 58

Each consisting of:

Lift lever
Head screw



Bottom mounted retraction device.



03540104	Retraction device
-----------------	-------------------

Consisting of:

03540101	Lift lever
03540102	Washer



Bottom mounted lift lever.



01960005



90° Angle Probe



03560006	90° angle probe used for the transmission of the plunger movement up to 10 mm. Suited for dial gauges with a 0,01 mm scale division.
-----------------	--

Furnished with:

03560012	Measuring insert with a 5 mm diameter flat face
-----------------	---



Backs for ROCH or ETALON Dial Gauges



Bezel diameter

Back diameter

Magnetic face

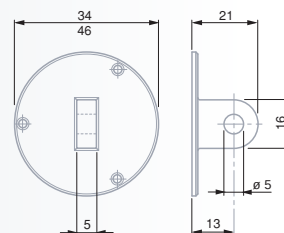
L mm

Central lug backs

01462004	40 mm	34 mm
01462005	58, 60, 80 mm	46 mm

Magnetic back with permanent magnets

01462001	58, 60, 80 mm	46 mm	46 mm	17 mm
-----------------	---------------	-------	-------	-------



Backs for dial gauges

TESA YR, TESA YE, MERCER, COMPAC,
40, 58 or 82 mm dial diameter

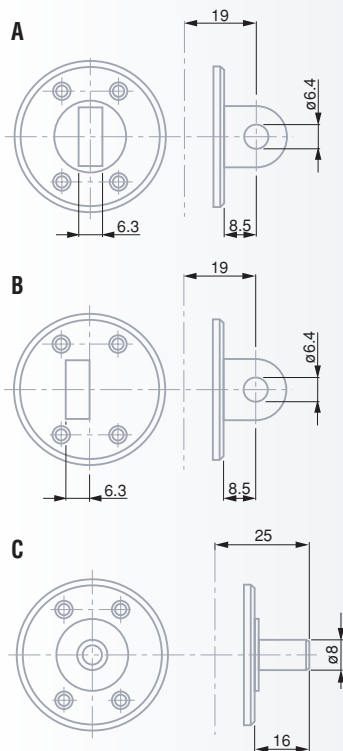
DIGICO 205-705, 58 mm dial diameter



Dull-chrome
plated, except
for models
No. 01460010,
01460011, 01460016 and
01460017



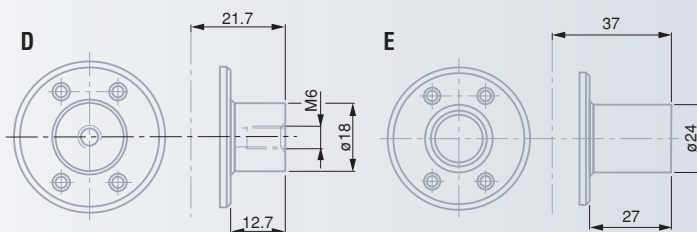
Holding force
= 150 N



Executions for dial gauges with a 40 mm dial diameter



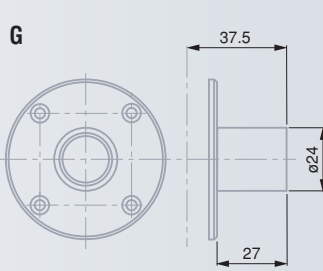
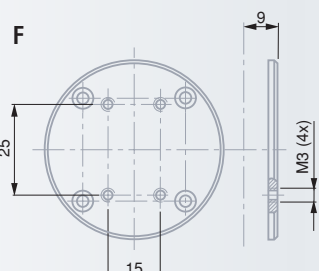
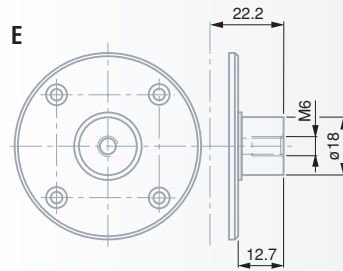
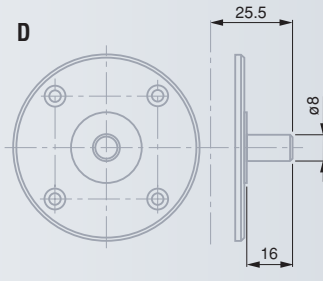
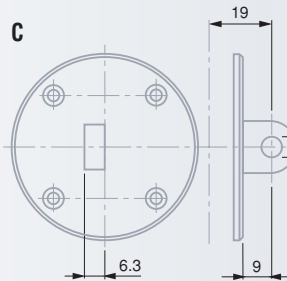
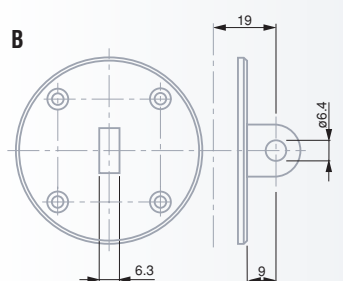
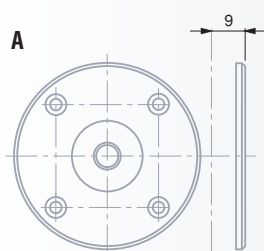
01460008	A	Back with central lug
01460009	B	Back with offset lug
01460010	C	Back with a 8 mm dia. fixing shank
01460011	D	Back with M6 inner thread
01460012	E	Back with permanent magnet



Executions for dial gauges with a 58 or 82 mm dial diameter



01460013	A	Flat back
01460014	B	Flat back with central lug
01460015	C	Flat back with offset lug
01460016	D	Back with a 8 mm dia. fixing shank
01460017	E	Back with a M6 inner thread
01460018	F	Back with 4 clamping bores as per CNOMO French standard
01460019	G	Back with permanent magnet



Dial Test Indicators (Lever-type)

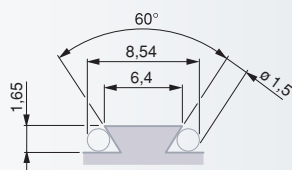
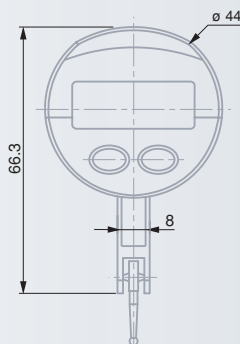
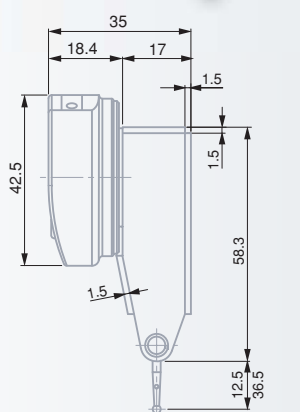


TESA IP65 Electronic Dial Test Indicators

Provide the advantages of mechanics combined with electronics – All in one.



- Inductive measuring system, patented.
- Analogue and numerical indication.
- Numerical interval to 0,01/0,001 mm.
- Selectable scale division: 10, 20, 50 $\mu\text{m}/1, 2, 5 \mu\text{m}$.
- Water and coolant resistant (IP65).
- Metric/inch conversion.
- RS 232 data output combined with external power supply.
- Displayed measuring modes (NOR/MIN/MAX/MAX-MIN).
- Automatic shut-down.
- Compatible with all TESATAST accessories.



	mm	in	mm	Insert mm	N ($\pm 15\%$)
01830001	0,01/0,001	0.0005/0.00005	0,8	12,5	0,13
01830002	0,01/0,001	0.0005/0.00005	0,5	36,5	0,07

Accessories

		01961000	3V lithium battery, 190 mAh, type CR 2032
		04761060	RS 232 connecting cable with external power supply
Compatible with all TESATAST measuring inserts and accessories			



LCD,
5 digits + sign

Digit height
6 mm

Resolution to
0,01/0,001 mm;
.0005/.00005 in

Zero-setting

Max. perm. errors:
 $f_e = 10 \mu\text{m}$
 $f_{ps} = 13 \mu\text{m}$
Pre-span = 0,05 mm

Repeatability:
 $f_r = 1 \mu\text{m}$

Hysteresis:
 $f_h = 3 \mu\text{m}$

L = 12,5 mm;
max. 0,05 m/s
L = 36,5 mm;
max. 0,15 m/s

Number of
measurements
per second: 9

Operating
temperature range:
+5°C to +40°C

3 V lithium battery,
type CR 2032

> 4000 hours

RS 232

73 g (L = 12,5 mm)
75 g (L = 36,5 mm)

EN 61326-1

Degree of
protection
IP65 (IEC 529)

Supplied
in a plastic case
along with:
1 Insert with a 2 mm dia.
(No. 01860202)
1 Wrench (No. 01860307)
1 Mounting rod with a 8 mm
dia. (No. 01840105)

Identification
number

Declaration of
conformity



DIN 2270
NF E 11-053

TESATAST Dial Test Indicators

These lever-type dial test indicators are especially intended for use on the shop floor or in the inspection room – Ideally suited for comparative measurements on a surface plate, for instance – Determine form, shape and position deviations as well as axial and runout errors.

- Bidirectional measuring with automatic reversal inside the movement.
- Continuous clockwise pointer rotation providing error-free reading.
- Insensitive to magnetic fields.
- Jewelled movement with 7 rubies.
- Ball-bearing lever system with measuring insert swivelling through to 240°.
- Very low measuring force.
- Full-metal construction giving exceptional robustness.
- Monobloc housing with 3 countersunk dovetail attachments.

Standard Models

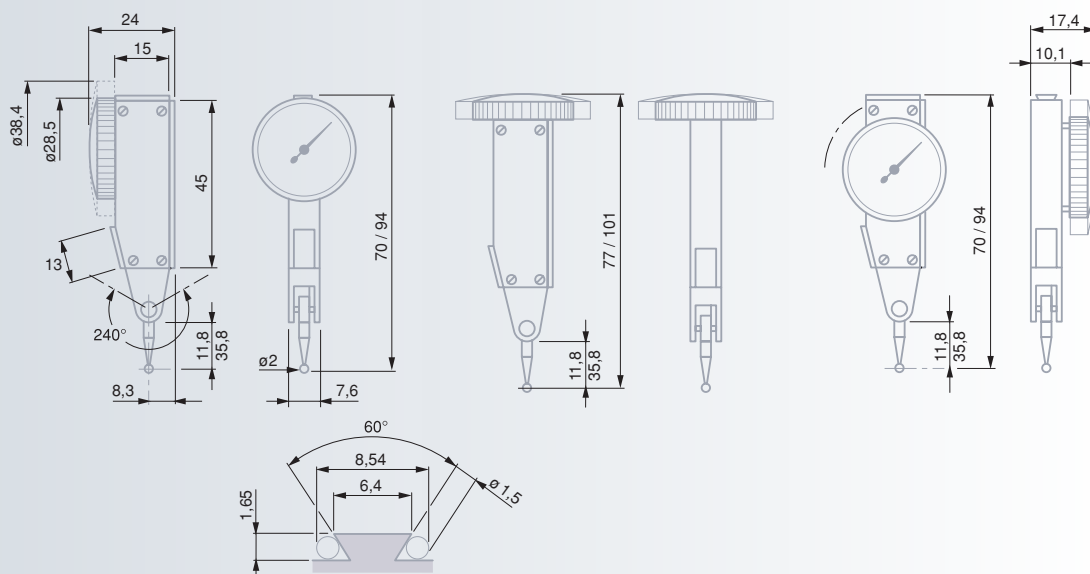
Well-proven dial test indicators with dial face mounted parallel to the insert's axis.

Perpendicular Models

Dial test indicators with dial face mounted at right angle to the insert's axis.

Lateral Models

Dial test indicators with dial face mounted parallel to the insert's axis, but on the flat side of the dial housing.



Permissible limits of a metrological characteristic (MPE/MPL)

		0,02 mm	0,01 mm	0,002 mm
	Deviation span, f_e	27 μm	10 μm	2 μm
	Deviation span within the local measuring span, f_l	0,20 mm	12 μm	
		0,10 mm	5 μm	
		0,02 mm		1 μm
	Total deviation span, f_{ges}	31 μm	13 μm	3,5 μm
	Repeatability limit, f_w	4 μm	3 μm	1 μm
	Max. hysteresis, f_h	4 μm	3 μm	1,5 μm
	Measuring force with insert lengths	12,53 mm	0,15 N	0,15 N
		36,53 mm	0,06 N	

TESATAST Standard Models



mm

01810005	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
01810006	0,01	0,8	38	0 ÷ 0,4 ÷ 0	12,53
01810007	0,01	0,5	28	0 ÷ 0,25 ÷ 0	36,53
01810008	0,01	0,5	38	0 ÷ 0,25 ÷ 0	36,53
01810009	0,002	0,2	28	0 ÷ 100 ÷ 0	12,53
01810010	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53
S18001695	0,001	0,2	38	0 ÷ 100 ÷ 0	12,53



in

01820006	0.0005	0.030	1.1	0 ÷ 15 ÷ 0	1/2
01820007	0.0005	0.030	1.5	0 ÷ 15 ÷ 0	1/2
01820008	0.0005	0.020	1.1	0 ÷ 10 ÷ 0	1 7/16
01820009	0.0005	0.020	1.5	0 ÷ 10 ÷ 0	1 7/16
01820010	0.001	0.030	1.1	0 ÷ 15 ÷ 0	1/2
01820011	0.0001	0.008	1.1	0 ÷ 4 ÷ 0	1/2
01820012	0.0001	0.008	1.5	0 ÷ 4 ÷ 0	1/2
01820013	0.00005	0.008	1.5	0 ÷ 4 ÷ 0	1/2

SWISSTAST Standard Models



mm

01811000	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
01811001	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53

* Same technical data as standard models, but equipped with a 2 mm dia. ruby ball tip No. 01860302.

TESATAST Perpendicular Models



mm

01810204	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
01810205	0,01	0,5	28	0 ÷ 0,25 ÷ 0	36,53
01810304	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53



in

01820204	0.0005	0.030	1.1	0 ÷ 15 ÷ 0	1/2
01820304	0.0001	0.008	1.5	0 ÷ 4 ÷ 0	1/2



DIN 2270
NF E 11-053



Rotating dial



Very low
measuring force
see table
on page G-3



Movement with
patented shock
proof system



Lever system
with friction
drive to prevent
overload



Accuracy:
see table on
page G-3



Supplied in
a plastic case
along with:
1 Insert with a 2 mm dia.
1 Wrench (No. 01860307)
1 Mounting rod with a 8 mm
dia. (No. 01840105)



Identification
number

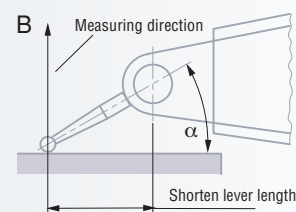
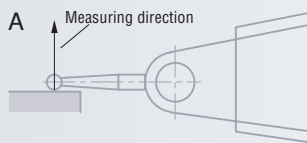


Declaration
of conformity

TESATAST Lateral Models



No	mm	mm	mm	mm	mm
01810011	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
01810012	0,02	2	38	0 ÷ 1,0 ÷ 0	36,53
01810013	0,002	0,2	28	0 ÷ 100 ÷ 0	12,53
No	in	in	in	in	in
01820014	0.0005	0.030	1.1	0 ÷ 15 ÷ 0	1/2



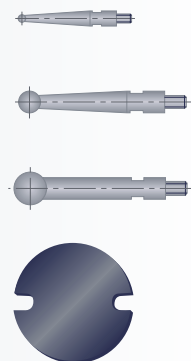
Note on the use of TESATAST dial test indicators

With the measuring insert lying parallel to the workpiece surface (Fig. A), these indicators give true reading due to the amplification factor to 1:1.

In another measuring position (angle α in Fig. B), the effective lever length changes so that the read value needs to be corrected. With respect to this, also refer to the instruction manual.

Measuring inserts

No	No	mm
Carbide ball tips	Ruby ball tips	mm
01860201	01860301	1
01860202	01860302	2
01860203	01860303	3
01860211	01860304	1
01860212	01860305	2
01860213	01860309	3
01860307	Wrench for measuring inserts	



Note

The original measuring insert mounted on every TESATAST as well as any other insert with same nominal length but having a different ball tip diameter are fully interchangeable.

Indicator Sets with Small Support

No	
01630003	Indicator sets with small support
consisting of:	
01810005	Dial test indicator (lever-type)
01810010	Dial test indicator (lever-type)
01860203	Measuring insert
01840104	Mounting rod
01840105	Mounting rod
01860307	Wrench for measuring inserts
01639007	INTERAPID small support UJ 15



Tungsten carbide or ruby ball tip

M1.4 coupling thread



DIN 2270
NF E 11-053

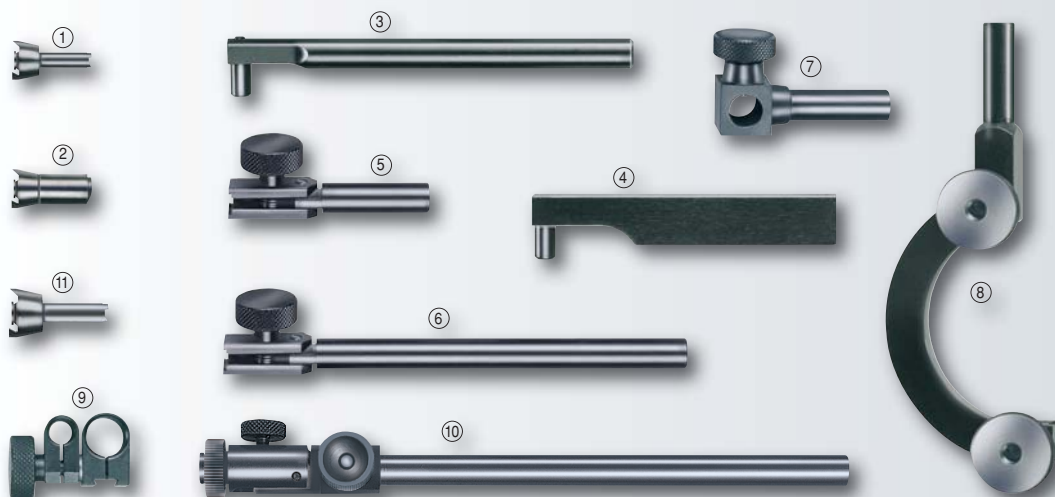
Technical data are listed under each single product

Plastic case

Identification number

Declaration of conformity

TESATAST Accessories



Nº	=		mm
01840104	①	Mounting rod with dovetail clamp	Ø 4
01840105	②	Mounting rod with dovetail clamp	Ø 8
01840202	③	Mounting rod with cylindrical body and clamping tenon	Ø 8 x 80 Ø 5,6
01840203	④	Mounting rod with right-angle body and clamping tenon	13 x 6 x 50 Ø 5,6
01840404	⑤	Short swivel holder with mounting rod and dovetail clamp	Ø 8 x 25
01840405	⑥	Long swivel holder with mounting rod and dovetail clamp	Ø 8 x 90
01840406	⑦	Angle holder with mounting rod Clamping bore	Ø 8 x 25 Ø 8
01840501	⑧	Centring shoulder for TESATAST Perpendicular with cylindrical rod Clamping point for mounting rod and dovetail clamp	Ø 8 x 25 Ø 4
01860401	⑨	Dovetail clamp with tightening point	Ø 5,6 Ø 9,5
01840407	⑩	Long swivel holder with cylindrical rod and dovetail clamp as well as fine setting device	Ø 8 x 125
01860008	⑪	Mounting rod with dovetail clamp	Ø 6

Sets of Accessories

Consisting of the following components:

Nº	mm	01840104	01840105	01840202	01840203	01840404	01840405	01840406	01840501	01860401
01840001*	Nº 1	●	●							
01840100**	Nº 2			●	●	●	●	●		●
01840703***	Nº 3			●	●	●	●	●	●	●

* Supplied with one single insert No. 01860201, 01860202 and 01860203, one wrench No. 01860307 as well as a suited case No. 01860308.

** Supplied in a suited case No. 01860608.

*** Supplied in a suited case No. 01860702.

INTERAPID 312 Dial Test Indicators

Very large measuring span – Ideal for inspecting all significant size variations, e.g. on the surface plate – Measure position, form and shape errors.

- Additional revolution counter for safe reading.
- Bidirectional measuring with automatic reversal inside the movement.
- Thereby pointer rotation is constant.
- Jewelled movement with rubies.
- Ball-bearing lever system with measuring insert swivelling through 210°.
- Full-metal construction giving outstanding robustness.
- Monobloc housing with mounted dovetail attachments as well as a 4 mm swivelling shank.

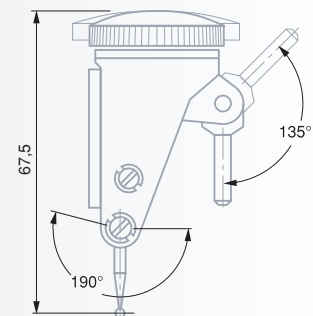
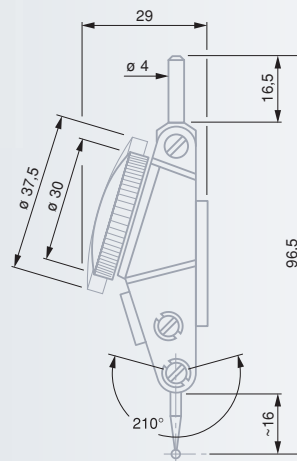


Regular Model

Time-tested dial test indicator with dial face mounted parallel to the insert's axis.

Perpendicular Model

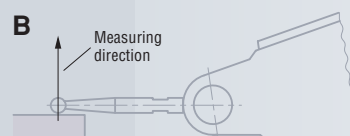
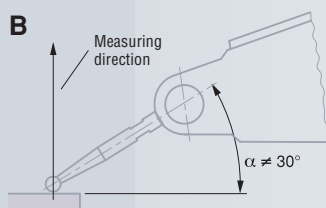
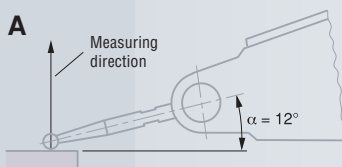
Dial test indicator with dial face mounted at right angle to insert's axis.



Stylus insert with angular position of 12°

All models INTERAPID 312 are designed to give a true reading when the angle between the stylus and the workpiece surface is 12° (Fig. A).

In any other measuring position, including parallel position of the stylus against the workpiece surface, read values have to be corrected accordingly (Fig. B). With regard to this, also read in the instruction manual.



Permissible limits of a metrological characteristic (MPE/MPL)

	0,01 mm		0,002 mm	
	Pointer Rev 1	Pointer Rev 2	Pointer Rev 1	Pointer Rev 2
Deviation range, f_e	10 μm	20 μm	4 μm	8 μm
Total deviation range, f_{ges}	13 μm	23 μm	6 μm	10 μm
Repeatability limit, f_w	3 μm		1 μm	
Max. hysteresis, f_u	3 μm		2 μm	
Measuring force	0,12 N		0,25 N	

INTERAPID 312 Regular Models

						
 mm						
074111366	0,01	1,6	37,5	0 ÷ 40 ÷ 0	16,5	
074111367	0,01	1,6	30	0 ÷ 40 ÷ 0	16,5	
074111368	0,002	0,4	37,5	0 ÷ 10 ÷ 0	15,2	
074111369	0,002	0,4	30	0 ÷ 10 ÷ 0	15,2	
 in						
074111370	0.0005	0.060	1.5	0 ÷ 15 ÷ 0	0.65	
074111371	0.0005	0.060	1.2	0 ÷ 15 ÷ 0	0.65	
074111965	0.0005	0.060	1.5	0 ÷ 15 ÷ 0	2.675	
074111374	0.001	0.060	1.2	0 ÷ 15 ÷ 0	0.65	
074111372	0.0001	0.016	1.5	0 ÷ 4 ÷ 0	0.65	
074111373	0.0001	0.016	1.2	0 ÷ 4 ÷ 0	0.65	



Rotating dial



Very low measuring force (see table on page G-7)



Lever system with friction drive to prevent overload



Accuracy: see table on page G-7



Supplied in a plastic case along with:
1 steel insert with a 2 mm diameter, hardened.
1 key No. 01860307



Declaration of conformity



INTERAPID 312 Perpendicular Models

						
 mm						
074111375	0,01	1,6	37,5	0 ÷ 40 ÷ 0	16,5	
074111376	0,01	1,6	30	0 ÷ 40 ÷ 0	16,5	
 in						
074111377	0.0005	0.060	1.5	0 ÷ 15 ÷ 0	0.65	
074111378	0.0005	0.060	1.2	0 ÷ 15 ÷ 0	0.65	
074111958	0.0005	0.060	1.5	0 ÷ 15 ÷ 0	2.675	
074111379	0.001	0.060	1.2	0 ÷ 15 ÷ 0	0.65	
074111957	0.0001	0.016	1.5	0 ÷ 4 ÷ 0	0.65	



074111366



074111367



074111368



074111369



Technical data
as listed under:
each single
product

Plastic case

Declaration
of conformity

Dial Test Indicator Sets, Complete with Accessories

Each full set consists of:



INTERAPID 312 as listed
in the tables below

074106331	Rectangular attachment
074108942	Reducing sleeve, metric or
074108943	Reducing sleeve, inch
074106026	Swivel holder, metric or
074106931	Swivel holder, inch
074111474	Storage case for measuring inserts
01860307	Wrench for measuring inserts



INTERAPID 312 Regular Models



mm

	074111366	074111367	074111368	074111369	074106331	074108942	074106026	074111474	01860307
074111502	●				●	●	●	●	●
074111503		●			●	●	●	●	●
074111504			●		●	●	●	●	●
074111505				●	●	●	●	●	●



in

	074111370	074111371	074111372	074111373	074106331	074108943	074106931	074111474	01860307
074111508	●				●	●	●	●	●
074111509		●			●	●	●	●	●
074111510			●		●	●	●	●	●
074111511				●	●	●	●	●	●

INTERAPID 312 Perpendicular Models



mm

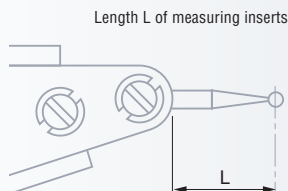
	074111375	074111376	074106331	074108942	074106026	074111474	01860307
074111506	●		●	●	●	●	●
074111507		●	●	●	●	●	●



in

	074111377	074111378	074106331	074108943	074106931	074111474	01860307
074111513	●		●	●	●	●	●
074111514		●	●	●	●	●	●

Measuring Inserts for INTERAPID 312



- * The length of the used insert changes the amplification factor of the lever system. Therefore, each read value must be doubled.
- ** Except for both models No. 074111965 and 074111958.
- *** Model No. 074111965 only.
- **** Model No. 074111958 only.

Note

The original measuring insert mounted on every INTERAPID 312 as well as any other insert with same nominal length but having different ball tip diameters are fully interchangeable.



Steel ball tips



Carbide ball tips



L



mm

074107893	074105993	0,01	2	16,5
074107895	074105994	0,01	1,5	16,5
074107897	074105995	0,01	0,8	16,5
	074106358	0,01	2	36,6*
	074106360	0,01	0,8	36,6*

074110481	074110482	0,002	2	15,2
074110492	074110491	0,002	1,5	15,2
074110493	074110507	0,002	0,8	15,2
	074110494	0,002	2	34*
	074110508	0,002	0,8	34*



in

074107899	074105996	all**	0.080	0.650
074107901	074105997	all**	0.060	0.650
074107903	074105998	all**	0.031	0.650
	074106361	all**	0.080	1.375*
	074106363	all**	0.031	1.375*

	074111913***	0.080	2.675
	074111912****	0.100	2.675



mm/in



01860307	Wrench for measuring inserts
074111474	Storage case for measuring inserts

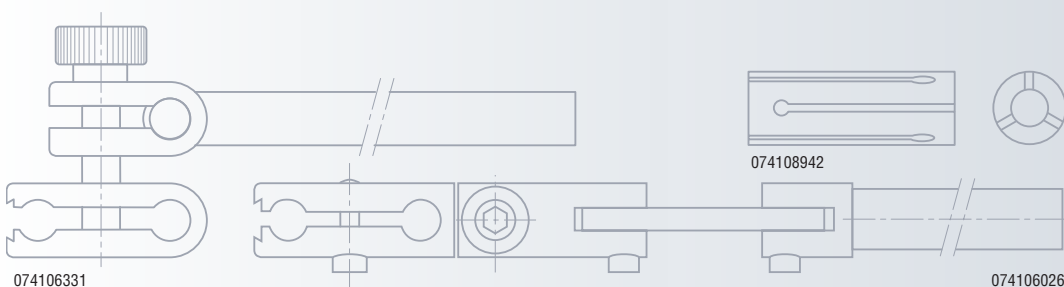


Ball tips in hardened steel or tungsten carbide



M1,7 coupling thread

Accessories for INTERAPID 312



mm

074106331	Rectangular clamping attachment, complete	
01840203	Rectangular attachment with clamp	13 x 6 x 50 Ø 5,6
074108603	Double attachment with clamping point and dovetail	Ø 4
074106026	Swivel holder with clamping points and dovetail	Ø 8 x 133 Ø 4
074108942	Reducing sleeve	Ø 8 / Ø 4

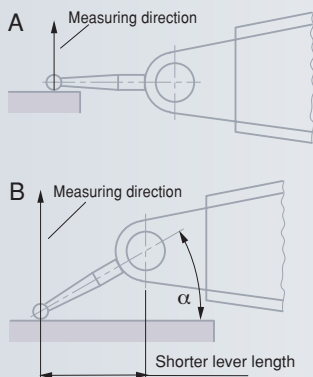


COMPAC Dial Test Indicators

Essential for the workshop, but also in the inspection room or measuring laboratory – Ideal for comparative measurement on a surface plate – Detect form and position errors – Measure axial and radial runouts, especially.

Technical features

- Long range up to 3 mm.
- Bidirectional measuring, without reversing lever.
- Continuous two-way clockwise rotation of the pointer.
- Swivelling probe through 180°.
- Main pivot on oversized, self-aligning angular bearings.
- Dovetail mounting machined in the indicator body.
- Dull-chrome plated bezel and housing.
- Rotating dial.
- Insensitive to magnetic fields generated in common precision mechanics.

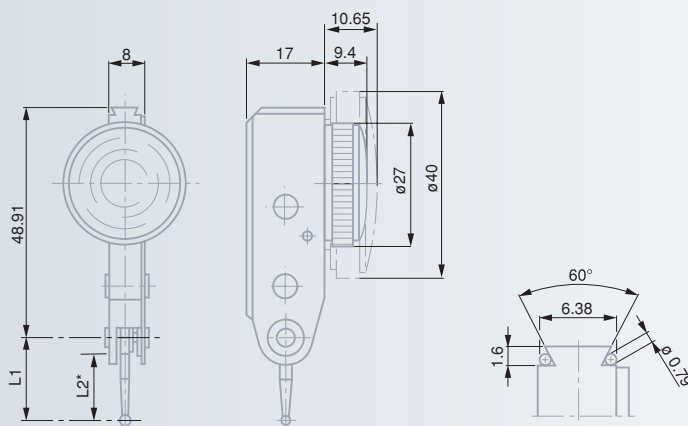


Note for use of COMPAC dial test indicators

With the measuring insert lying parallel to the workpiece surface (Fig. A), these dial test indicators give true reading due to the amplification factor to 1:1.

In any other measuring position (angle α in Fig. B), the effective lever length changes so that the read value need be corrected. With respect to this, also read in the instruction manual.

COMPAC Series 210 – Type Standard



*L2 see table page G-15



Metric Reading

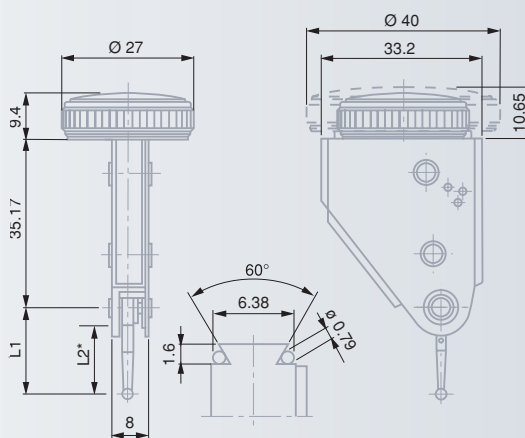
	mm	Whole travel mm	Travel/ revolution mm	$\emptyset$ mm		Contact point L1 mm	μ m	μ m	μ m	N	
213	0,01	1,5	0,5	27	0÷25÷ 50	18	13	3	3	≤ 0,35	
213G	0,01	1,5	0,5	40	0÷25÷ 50	18	13	3	3	≤ 0,35	
212L	0,01	3	1	27	0÷50÷100	36	26	3	6	≤ 0,20	
212GL	0,01	3	1	40	0÷50÷100	36	26	3	6	≤ 0,20	
215	0,002	0,6	0,1	27	0÷ 5÷ 10	18	13	1,5	2,5	≤ 0,30	
215G	0,002	0,6	0,1	40	0÷ 5÷ 10	18	13	1,5	2,5	≤ 0,30	
215GL	0,002	1,2	0,2	40	0÷10÷ 20	36	26	1,5	5	≤ 0,20	
216G	0,001	0,6	0,1	40	0÷ 5÷ 10	18	13	1,5	2,5	≤ 0,30	

DIAL TEST INDICATORS (LEVER-TYPE)

Inch Reading

No										
	in	Whole travel in	Travel/revolution in	Ø in		Contact point L 1 in	in	in	in	N
214A	0.0005	0.06	0.02	1.063	0÷10÷20	0.72	0.0005	0.00015	0.00015	≤ 0,35
214GA	0.0005	0.06	0.02	1.575	0÷10÷20	0.72	0.0005	0.00015	0.00015	≤ 0,35
213LA	0.0005	0.12	0.04	1.063	0÷20÷40	1.44	0.001	0.00015	0.00025	≤ 0,20
213GLA	0.0005	0.12	0.04	1.575	0÷20÷40	1.44	0.001	0.00015	0.00025	≤ 0,20
215A	0.0001	0.024	0.004	1.063	0÷20÷40	0.72	0.00005	0.00005	0.0001	≤ 0,30
215GA	0.0001	0.024	0.004	1.575	0÷20÷40	0.72	0.00005	0.00005	0.0001	≤ 0,30

COMPAC Series 220 – Type Perpendicular



*L2 see table page G-15

Metric Reading

No										
	mm	Whole travel mm	Travel/revolution mm	Ø mm		Contact point L1 mm	µm	µm	µm	N
223	0,01	1,5	0,5	27	0÷25÷ 50	18	13	3	3	≤ 0,35
223G	0,01	1,5	0,5	40	0÷25÷ 50	18	13	3	3	≤ 0,35
222L	0,01	3	1	27	0÷50÷100	36	26	3	6	≤ 0,20
222GL	0,01	3	1	40	0÷50÷100	36	26	3	6	≤ 0,20
225	0,002	0,6	0,1	27	0÷ 5÷ 10	18	13	1,5	2,5	≤ 0,30
225G	0,002	0,6	0,1	40	0÷ 5÷ 10	18	13	1,5	2,5	≤ 0,30

Inch Reading

No										
	in	Wole travel in	Travel/revolution in	Ø in		Contact point L1 in	in	in	in	N
224A	0.0005	0.06	0.02	1.063	0÷10÷20	0.72	0.0005	0.00015	0.00015	≤ 0,35
224GA	0.0005	0.06	0.02	1.575	0÷10÷20	0.72	0.0005	0.00015	0.00015	≤ 0,35
223GLA	0.0005	0.12	0.04	1.575	0÷20÷40	1.44	0.001	0.00015	0.00025	≤ 0,20
225GA	0.0001	0.024	0.004	1.575	0÷20÷40	0.72	0.0005	0.00005	0.0001	≤ 0,30

COMPAC Series 230 – Type Parallel



DIN 2270 and factory standard

Rotating dial

Friction lever system to preventing overload

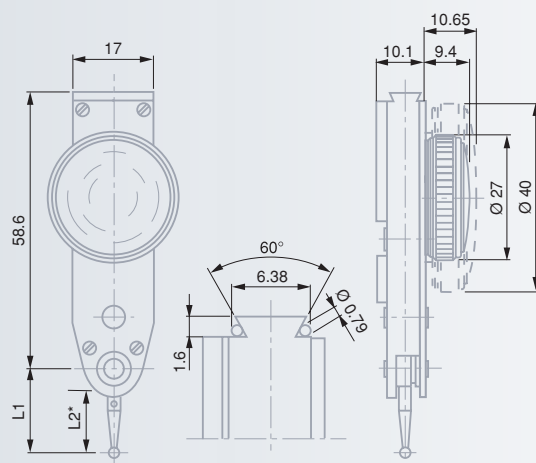
Contact points with tungsten carbide ball tips

Delivery in a suited plastic case

including:
1 contact point, 2 mm dia.,
L = 15 mm, No. 01840107
1 rigid stem with 4 mm dia.,
L = 15 mm, No. 01840109
(except for series 220).

Serial number

Inspection report with a declaration of conformity



*L2 see table page G-15



Metric Reading

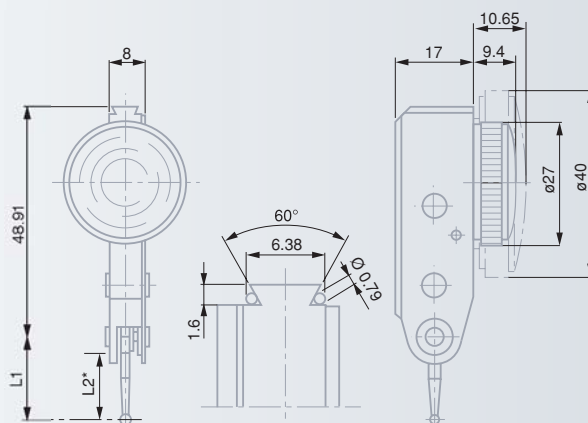


	mm	Whole travel mm	Travel/ revolution mm	Ø mm		Contact point L1 mm	µm	µm	µm	N
233	0,01	1,5	0,5	27	0÷25÷ 50	18	13	3	3	≤ 0,35
233G	0,01	1,5	0,5	40	0÷25÷ 50	18	13	3	3	≤ 0,35
232L	0,01	3	1	27	0÷50÷100	36	26	3	6	≤ 0,20
232GL	0,01	3	1	40	0÷50÷100	36	26	3	6	≤ 0,20
235G	0,002	0,6	0,1	40	0÷ 5÷ 10	18	13	1,5	2,5	≤ 0,30



COMPAC Series 240 – Reduced Range

One-revolution models



*L2 see table page G-15



DIN 2270 and
factory standard



Rotating dial

 Friction lever system to preventing overload

Contact points
with tungsten
carbide ball tips



 Delivery in a suited plastic case including:

- 1 contact point with a 2 mm diameter
- 1 rigid stem with 8 mm dia., L = 15 mm, No. 01840107
- 1 rigid stem with 4 mm dia., L = 15 mm, No. 01840109



Serial number



Inspection report
with a declaration
of conformity

Metric Reading

									
		Whole travel			Contact point				
	mm	mm	Ø mm		L1 mm	µm	µm	µm	N
242	0,01	0,8	27	0÷40÷0	18	13	3	3	≤ 0,25
242G	0,01	0,8	40	0÷40÷0	18	13	3	3	≤ 0,25
243L	0,01	0,5	27	0÷25÷0	45	13	3	3,5	≤ 0,10
243GL	0,01	0,5	40	0÷25÷0	45	13	3	3,5	≤ 0,10
245	0,002	0,2	27	0÷10÷0	18	4	1,5	2	≤ 0,25
245G	0,002	0,2	40	0÷10÷0	18	4	1,5	2	≤ 0,25

Inch Reading

									
	<i>in</i>	<i>Whole travel in</i>	<i>Ø in</i>	<i>0÷</i>	<i>Contact point L1 in</i>	<i>in</i>	<i>in</i>	<i>in</i>	<i>N</i>
244A	0.0005	0.030	1.063	0÷ 15÷0	0.6754	0.0005	0.0001	0.00015	≤ 0,25
245A	0.0001	0.008	1.063	0÷ 4÷0	0.7200	0.00015	0.00006	0.00008	≤ 0,25
245GA	0.0001	0.008	1.575	0÷ 4÷0	0.7200	0.00015	0.00006	0.00008	≤ 0,25

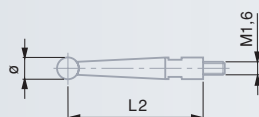


Stainless steel
with carbide
or ruby
contact points

M1.6 coupling
thread

Original inserts
mounted on every
indicators as well
as any other inserts with
same nominal length but hav-
ing different tip diameters are
fully interchangeable.

Contact Points for COMPAC Dial Test Indicators



Metric Models

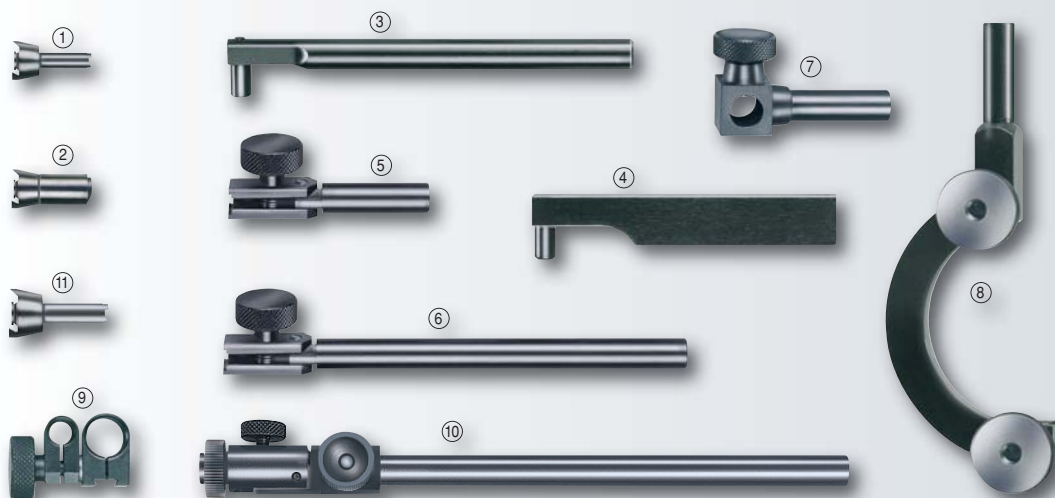
Carbide ball tips		Ruby ball tips			
No		No		mm	L1 mm L2 mm
01866014				0,8	18 14,26
01866003	01866026			2	18 14,26
01866021				3	18 14,26
01866016				0,8	36 32,26
01866004	01866027			2	36 32,26
01866023				3	36 32,26
01866015				0,8	45 41,26
01866006	01866028			2	45 41,26
01866022				3	45 41,26

Inch Models

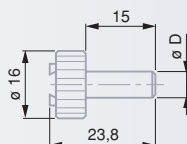
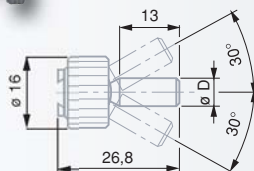
Ruby ball tips				
No		mm	L1 in	L2 in
01866010		0,8	0.6754	0.5278
01866007		2	0.6754	0.5278
01866011		0,8	0.72	0.5724
01866005		2	0.72	0.5724
01866024		0,8	1.44	1.2924
01866009		2	1.44	1.2924
01866025		3	1.44	1.2924
01866008		2	1.8	1.6527



Accessories for COMPAC Dial Test Indicators



Nº			mm
01840104	①	Fixing shank with dovetail clamp	Ø 4
01840105	②	Fixing shank with dovetail clamp	Ø 8
01840202	③	Cylindrical fixing shank with tightening tenon	Ø 8 x 80 Ø 5,6
01840203	④	Rectangular fixing shank with tightening tenon	13 x Ø 5,6
01840404	⑤	Short swivel holder with cylindrical shank and dovetail grip	Ø 8 x
01840405	⑥	Long swivel holder with cylindrical shank and dovetail grip	Ø 8 x 90
01840406	⑦	Angle holder with cylindrical shank Clamping bore	Ø 8 x 25 Ø 8
01840501	⑧	Centring holder for perpendicular model with cylindrical shank Clamping point for fixing shank and dovetail clamp	Ø 8 x 25 Ø 4
01860401	⑨	Double fixing clamp with clamping point and dovetail clamp	Ø 5,6
01840407	⑩	Long swivel holder, cylindrical shank with dovetail grip. Also with fine setting.	Ø 8 x 125
01860008	⑪	Fixing shank with dovetail clamp	Ø 6



		Stem	Clamping length
SPT	Rotating holder	8 mm	25 mm
SPTA	Rotating holder	1/4 in	1 in
SPTA-3/16	Rotating holder	3/16 in	1 in
SPTA-3/8	Rotating holder	3/8 in	1 in
SPTA-5/16	Rotating holder	5/16 in	1 in

Nº



D

Mounting rods with dovetail grip

01850106	Fixing shank swivelling through ± 30°	Ø 1/4 in
01850107	Rigid fixing shank	Ø 1/4 in
01840106	Fixing shank swivelling through ± 30°	Ø 8 mm
01840107	Rigid fixing shank	Ø 8 mm
01840108	Fixing shank swivelling through ± 30°	Ø 4 mm
01840109	Rigid fixing shank	Ø 4 mm

Comparative Measurement



TESA TPS 300 / 500 / 1000 Motorised Setting Benches

These motorised benches are specially made for display setting as well as for calibrating 2-point shop tools used to measure both internal and external dimensions up to 1000 mm.



Benefit

A single bench can replace a wide number of setting standards such as gauge blocks or setting rings.

Technical Data

					
		Internal mm/in	External mm/in	mm	kg
02130001	TPS 300	0,1 ÷ 305 (0.04 ÷ 12)	40 ÷ 345 (1.6 ÷ 13.5)	610 x 300 x 270	75
02130002	TPS 500	0,1 ÷ 508 (0.04 ÷ 20)	40 ÷ 548 (1.6 ÷ 21.5)	820 x 300 x 300	90
02130003	TPS 1000	0,1 ÷ 1016 (0.04 ÷ 40)	40 ÷ 1056 (1.6 ÷ 41.5)	1330 x 340 x 340	240
On request	TPS 1500 mm, 2000 mm, 3000 mm				
Provided with the following accessories:					
02160038	Power supply 80 – 240 V, 50 – 60 Hz				
	Rubber feet (3) acting as vibration inhibitors				
02160027	AL300003 adapter mounted on the mobile stop				

All given maximum permissible errors for a metrological characteristic (MPE) are valid for a temperature of 20° ± 0,5° C and relative humidity of 50 ± 5%.



0,001 mm



Linear
1,5 + L (mm)/
300 µm



1 µm



Holding
force
240 N



100/240 AC – 1,5 A
50/60 Hz



RS 232



+10 to +40°C



-10 to +40°C



Shipping
packaging



Identification
number



Inspection
report



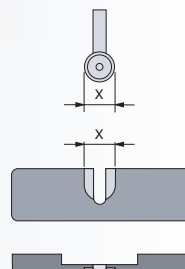
Declaration
of conformity

Optional Accessories For Bore Gauges – TESA Veribor

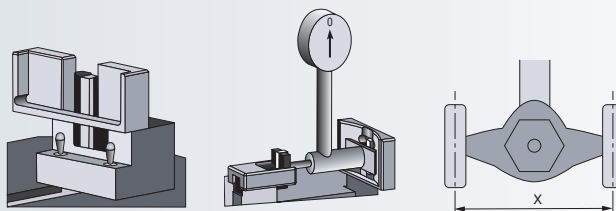


Application range 4,5 ÷ 50 mm

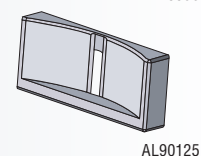
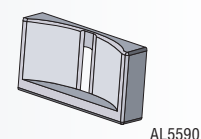
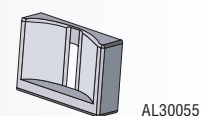
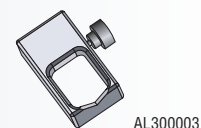
No	=	mm	x
02160020	A7547	4,5 ÷ 6	Ø 4,5
02160021	A7548	6 ÷ 12,5	Ø 5,8
S21050003	A7527	12 ÷ 25	Ø 9,5
02160023	A7559	25 ÷ 50	Ø 17,5



Application range 50 ÷ 550 mm



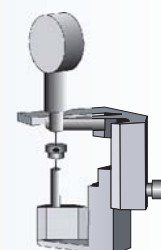
No	=	mm	x
02160024	AL30055	50 ÷ 150	30 ÷ 55
02160025	AL5590	150 ÷ 300	55 ÷ 90
02160026	AL90125	240 ÷ 550	90 ÷ 125
02160043	AL120-170		120 ÷ 170
02160044	AL170-220		170 ÷ 220



Each bench is supplied with AL300003 adapter.

– TESA YA

No	=	mm
02160028	A7750-A7751-A7752	6 ÷ 12,5



For IRA 2 and ETALON Caliper Gauges

Internal measuring



02160030

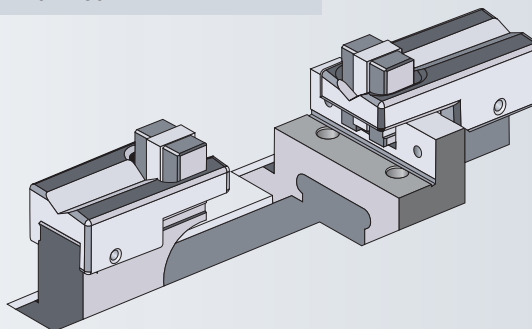


A300005



mm
10 ÷ 150

Requires 2 items.



For ETALON Caliper Gauges

External measuring



02160029

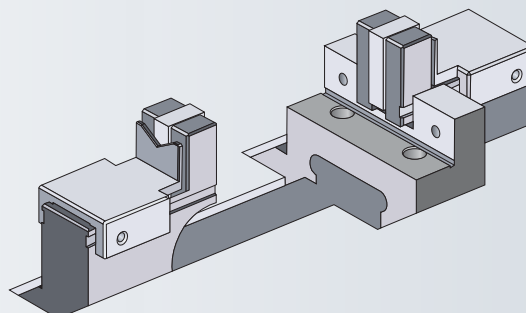


A300000



mm
40 ÷ 60

Requires 2 items.



For TESA INOTEST

Comparator gauges with 2-point contact for internal and external measuring



02160031

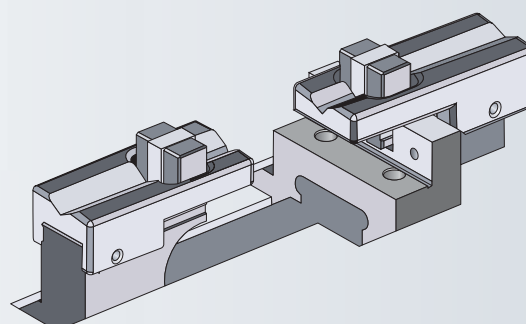
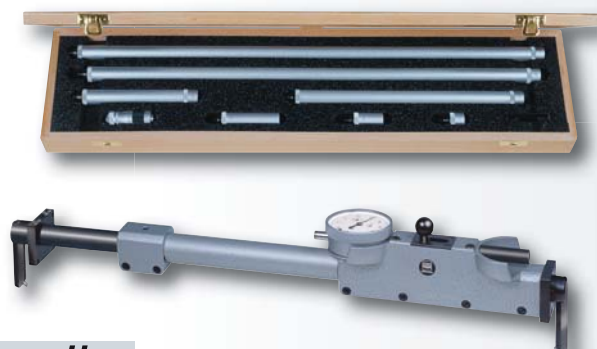


A300004



mm
50 ÷ 1500

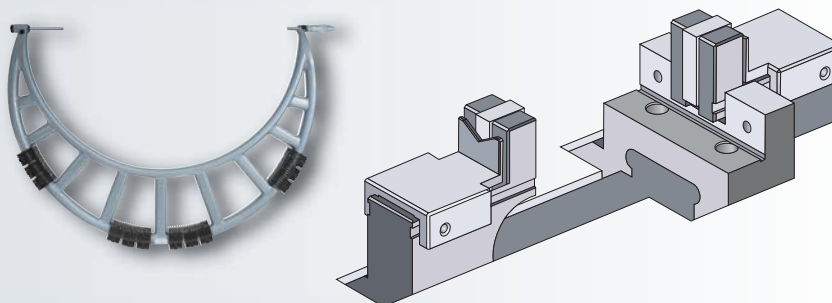
Requires 2 items



For External Micrometers

02160029	A300000	40 ÷ 1500 mm

TPS 300 requires 1 item, TPS 500 and 1000 need 2 items.



For Lever-Type Dial Test Indicators

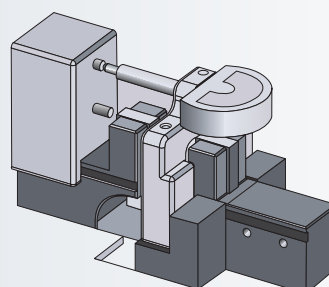
01639007	Measuring support with articulated arm	

For any other shop tool, please ask your local TESA sales representative.



For Dial Gauges

02160035	A300001-A300002	10 ÷ 150 mm

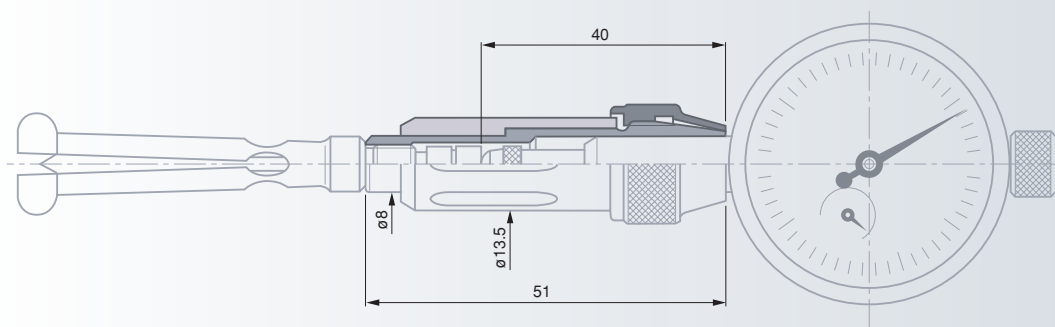
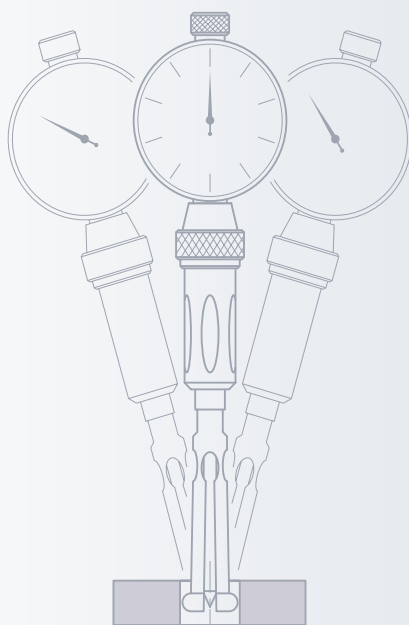


TESA YA Bore Gauges

Specially designed for small bores from 0,47 up to 12,20 mm – Check bore sizes as well as form and shape errors through 2-point measurements – Excellent repeatability.

These bore gauges have an interchangeable measuring head housing a needle as well as a clamping shank with a 8 mm diameter fixing bore for a dial gauge or any other sensor.

- Probing heads with spherical faces for through bores.
- Probing heads with faces forming a rounded edge on their front face. Used to check blind bores or short centring shoulder.
- Probing heads for deeper bores.



Handgrip



With mount for shop tools with a 8 h6 dia. clamping shank

Measuring heads



See tables



See tables



Dull-chrome plated steel, hardened to ≈ 1000 HV 25

Measuring needles



See tables



Steel hardened to ≈ 800 HV 25

Setting rings



Nominal diameter $\leq 1,5$ mm: with inserted ring in synthetic sapphire, $>1,5$ mm: steel, hardened to ≈ 780 HV 25



Reliability of the engraved size: $\pm 2s = 1 \mu m$



1 μm

Complete Sets for Through Holes Measurement



Technical data: see page H-6



Complete set includes: 1 handle

No. 01540201.

Measuring heads, needles and setting rings as shown in the table below.

1 TESA YR dial gauge

No. 01410212 (reading to 0,01 mm, 40 mm dial dia.).

1 Extension for a 10 mm measuring insert with order No. 03540501.



Suited plastic case



Declaration of conformity



mm

01510000	0,47 ÷ 0,97
01510100	0,95 ÷ 2,45
01510200	2,30 ÷ 6,20
01510300	6,00 ÷ 12,20



mm



Measuring depth
max. min.
mm mm



mm

Measuring heads

Needles

Setting rings

Set compositions:

Set 01510000	01540401	0,47 ÷ 0,53	1,5	0,25	01540001	01540601	0,50
	01540402	0,52 ÷ 0,58	1,8	0,27	01540001	01540602	0,55
	01540403	0,57 ÷ 0,67	2,0	0,29	01540002	01540603	0,60
	01540404	0,65 ÷ 0,77	2,5	0,31	01540002	01540604	0,70
	01540405	0,75 ÷ 0,87	2,8	0,33	01540002	01540605	0,80
	01540406	0,85 ÷ 0,97	3,0	0,35	01540002	01540606	0,90
Set 01510100	01540407	0,95 ÷ 1,15	11	0,6	01540003	01540607	1,00
	01540408	1,07 ÷ 1,25	11	0,6	01540003	01540608	1,10
	01540409	1,17 ÷ 1,35	11	0,6	01540003	01540609	1,20
	01540410	1,27 ÷ 1,45	11	0,6	01540003	01540610	1,30
	01540411	1,37 ÷ 1,55	11	0,6	01540003	01540611	1,40
						01540612	1,50
Set 01510200	01540412	1,50 ÷ 1,90	17	0,9	01540004	01540613	1,7
	01540413	1,70 ÷ 2,15	17	0,9	01540004	01540614	2,00
	01540414	2,05 ÷ 2,45	17	0,9	01540004	01540615	2,25
	01540415	2,30 ÷ 2,75	22	1,2	01540005	01540616	2,50
	01540416	2,65 ÷ 3,20	22	1,2	01540005	01540617	3,00
	01540417	3,05 ÷ 3,50	22	1,2	01540005	01540618	3,25
Set 01510300	01540418	3,35 ÷ 3,85	22	1,2	01540005	01540619	3,50
	01540419	3,80 ÷ 4,30	22	1,2	01540005	01540620	4,00
	01540420	4,20 ÷ 5,00	40	2,0	01540006	01540621	4,50
	01540421	4,70 ÷ 5,50	40	2,0	01540006	01540622	5,00
	01540422	5,30 ÷ 6,20	40	2,0	01540006	01540623	5,75
	01540423	6,00 ÷ 6,80	40	2,0	01540006	01540624	6,50
	01540424	6,60 ÷ 7,50	40	2,0	01540006	01540625	7,00
	01540425	7,30 ÷ 8,15	40	2,0	01540006	01540626	7,75
	01540426	8,00 ÷ 8,80	40	2,0	01540006	01540627	8,50
	01540427	8,50 ÷ 9,40	50	2,0	01540006	01540628	9,00
	01540428	9,15 ÷ 10,00	50	2,0	01540006	01540629	9,50
	01540429	9,60 ÷ 10,80	50	3,3	01540007	01540630	10,00
	01540430	10,65 ÷ 12,20	50	3,3	01540007	01540631	11,50



Complete Sets for Measuring Blind Bores and Short Centring Shoulders



No



mm

01510400	1,50 ÷ 2,45
01510500	2,30 ÷ 6,20
01510600	6,00 ÷ 12,20



Technical data: see page H-6



Complete set includes: 1 handle

No. 01540201.

Measuring heads, needles and setting rings as shown in the table below.

1 TESA YR dial gauge No. 01410212 (reading to 0,01 mm, 40 mm dial dia.).
1 Extension for a 10 mm measuring insert with order No. 03540501.



Suited plastic case



Declaration of conformity

No



mm



Measuring depth
max. min.
mm mm

No

No



mm

Measuring heads

Needles

Setting rings

Set compositions:

Set 01510400	01540501	1,50 ÷ 1,90	17	0,3	01540009	01540613	1,75
	01540502	1,70 ÷ 2,15	17	0,3	01540009	01540614	2,00
	01540503	2,05 ÷ 2,45	17	0,3	01540009	01540615	2,25
	01540504	2,30 ÷ 2,75	22	0,3	01540010	01540616	2,50
Set 01510500	01540505	2,65 ÷ 3,20	22	0,3	01540010	01540617	3,00
	01540506	3,05 ÷ 3,50	22	0,3	01540010	01540618	3,25
	01540507	3,35 ÷ 3,85	22	0,2	01540010	01540619	3,50
	01540508	3,80 ÷ 4,30	22	0,2	01540010	01540620	4,00
	01540509	4,20 ÷ 5,00	40	0,5	01540011	01540621	4,50
	01540510	4,70 ÷ 5,50	40	0,5	01540011	01540622	5,00
	01540511	5,30 ÷ 6,20	40	0,5	01540011	01540623	5,7
	01540512	6,00 ÷ 6,80	40	0,5	01540011	01540624	6,50
Set 01510600	01540513	6,60 ÷ 7,50	40	0,5	01540011	01540625	7,00
	01540514	7,30 ÷ 8,15	40	0,5	01540011	01540626	7,75
	01540515	8,00 ÷ 8,80	40	0,5	01540011	01540627	8,50
	01540516	8,50 ÷ 9,40	50	0,5	01540011	01540628	9,00
	01540517	9,15 ÷ 10,00	50	0,5	01540011	01540629	9,50
	01540518	9,60 ÷ 10,80	50	1,0	01540012	01540630	10,00
	01540519	10,65 ÷ 12,20	50	1,0	01540012	01540631	11,50

Special Executions

Available upon request:

- Measuring heads with tungsten carbide tipped measuring faces.
- Measuring heads for uncommon inspection job.
- Measuring heads for through holes and deeper bores covering other application ranges.
- Tungsten carbide measuring needles.
- 125, 250, 500, 750 and 1000 mm depth extensions.



Technical
data: see
page I-8



Declaration
of conformity

Optional Accessories for TESA YA Bore Gauges

Measuring stand for stationary use.



01639009

INTERAPID UA 30 measuring stand

Must be equipped with:

01610201

UK 25 sliding arm

01640000

UAZ 10 depth stop



TESA VERIBOR Light Bore Gauge

Two-point contact gauge made to measure bores and form errors –
Self-centring – Can equally be used with a dial gauge, precision indicator
or any other sensor type having a 8 h6 dia. clamping shaft.



Measuring bolts and anvils in steel, hardened to 60 HRC ± 2 and 63 HRC ± 3 , respectively.



Mount for a sensor having a 8h6 dia. clamping shaft



2 μ m



4 μ m



Set including 1 single TESA VERIBOR Light plus 1 set of interchangeable fixed inserts covering the whole application range.



Wooden case



Declaration of conformity

Nº

=



mm



Bolt travel, mm



Measuring depth, mm

Nº	=	mm	Bolt travel, mm	Measuring depth, mm
05710090	TESA Veribor Light	18 ÷ 35	1,30	176
05710091	TESA Veribor Light	35 ÷ 60	1,40	178
05710092	TESA Veribor Light	50 ÷ 150	1,40	178
05710093	TESA Veribor Light	18 ÷ 150	1,30 / 1,40	176 / 178

Dial gauge not included.



See tables



Measuring bolts and anvils fitted with tungsten carbide ball tips



Mount for a sensor having a 8 h6 dia. clamping shaft



2 µm (VERIBOR alone)



± 2s = 0,5 µm (VERIBOR alone)

TESA VERIBOR Bore Gauges

Proven construction and high reliability over decades – Able to take 2-point measurements on bores from 4,5 up to 550 mm – Detect form and shape errors – Gauge body with a 8 mm diameter clamping bore for a dial gauge, precision indicator or any other sensor.

- High repeatability through the circular reversing element inside the gauge, virtually free from clearance.
- Gauge body made of invar steel to prevent the measurement results from being affected by hand warmth transfer.
- Centring shoe ensuring a correct alignment of the gauge into the bore to be checked.
- Tungsten carbide ball tips for high resistance to wear.



Set including 1 single TESA VERIBOR Light plus 1 set of interchangeable fixed inserts covering the whole application range.



Wooden case



Declaration of conformity

TESA VERIBOR without dial gauge



mm

05710012	4,5 ÷ 6
05710013	6 ÷ 12,5
05710014	12 ÷ 25
05710015	25 ÷ 50
05710016	50 ÷ 150
05710018	50 ÷ 300
05710017	240 ÷ 550



TESA VERIBOR with dial gauge

				
05710054	05710061			mm
05710055	05710062			4,5 ÷ 6
05710056	05710063			6 ÷ 12,5
		05710057	05710064	12 ÷ 25
		05710058	05710065	25 ÷ 50
		05710059	05710066	50 ÷ 150
		05710060	05710067	50 ÷ 300
				240 ÷ 550

Provided with a TESA dial gauge

	01412010	01412510	01412310	01412511
 mm	40	40	58	58
 mm	0,01	0,001	0,01	0,001



Full set including 1 single

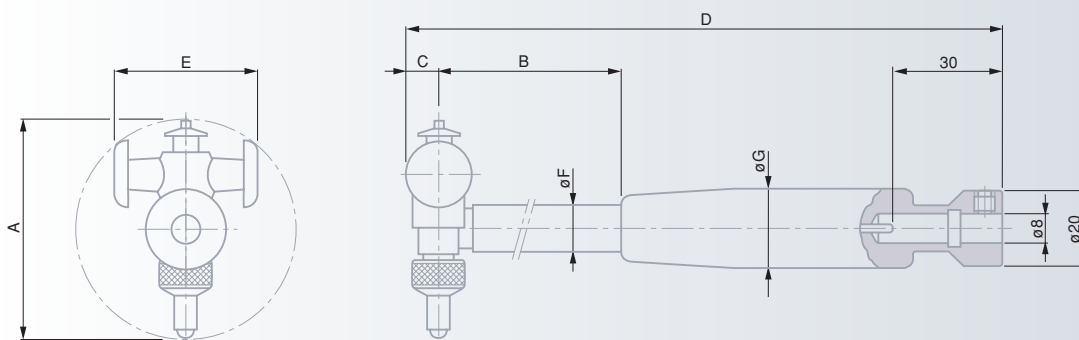
TESA VERIBOR Light plus
1 set of interchangeable fixed inserts covering the whole application range,
1 dial gauge as shown in the table opposite,
1 dial gauge guard.



Wooden case



Declaration of conformity



			A mm	mm	B mm	C mm	D mm	E mm	F mm	G mm
4,5 ÷ 6	0,35	74	2	138	3,3	3,8	16			
6 ÷ 12,5	0,5	93	2,6	156	4,3	4,9	16			
12 ÷ 25	0,9	106	4,5	194	7,8	7,9	19			
25 ÷ 50	1,3	140	6	228	16	8	19			
50 ÷ 150	1,4	173	10	279	36	12	23			
50 ÷ 300	1,4	173	10	279	36/66	12	23			
240 ÷ 550	1,6	227	14	347	112	18	28			

Special Versions

Available on request:

- TESA VERIBOR for blind bores and centring shoulders.
- TESA VERIBOR elbow-shaped for hard-to-reach bores.
- Handtools for measuring the distance between two plan-parallel surfaces.
- Handtools for inspecting gear pitch diameters.



Optional Accessories for TESA VERIBOR Bore Gauges

Set of extensions

For extending the application range of VERIBOR No. 05710016, 05710058 and 05710065 up to 300 mm dia.



mm

05740001

Consisting of:

1 Centring shoe

3 Extensions 50 mm



Depth extensions (not pictured)

To be mounted on each tool shaft from diameters ≥ 25 to ≤ 550 mm for depth increase (Size B – Drawing on page H-12).



mm

05760026 250

05760027 500

05760028 750

05760029 1000

Dial gauge guard

Protects the dial gauge against shocks. Also prevents the dial from being inadvertently rotated.



mm

05760012 Ø 40

05760013 Ø 58



Cable holder

Used for the probe cable. To be mounted at the end of the gauge shaft.



05760014



INTERAPID IRA 2

The finest precision gauge for measuring by comparison – Performs two- or three-point measurement depending on the used accessory – Suitable for verifying through holes, blind bores, grooves, undercuts or slots with plan-parallel faces, among others.

- Wide application range from 10 up to 150 mm.
- Ideal in design, light in weight, easy to handle.
- Built-in indicator to 0,01 mm with fine setting.
- Centring arm for 2-point measurement.



0,01 mm or
0.0005 in



10 ÷ 150 mm
0.375 ÷ 6 in



± 0,20 mm or
± 0.008 in



10 mm
arm clearance



Hardened steel
or tungsten
carbide tipped
measuring faces as listed
in the table



3,5 N



Suited
plastic case



Declaration
of conformity

No

=

No

mm

in

079105704

INTERAPID IRA 2

079108640

Supplied with the following standard accessories:

079105667 3 Steel inserts, hardened (order number for 1 item) 079105697

079105668 3 Short steel inserts, hardened (order number for 1 item) 079105698

079105669 3 Long steel inserts, hardened (order number for 1 item) 079105699

079112126 2 Adjustable contact arms for bores ≥ 6 mm 079112126

079110111 1 Small insert holder for 3-point measurement 079110113

079110110 1 Large insert holder for 3-point measurement 079110112

079108502 1 Centring arm for bores 15 ÷ 30 mm 079108504

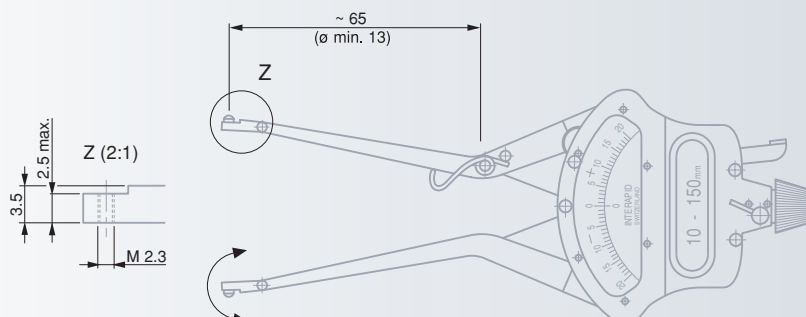
079108503 1 Centring arm for bores 30 ÷ 150 mm 079108505

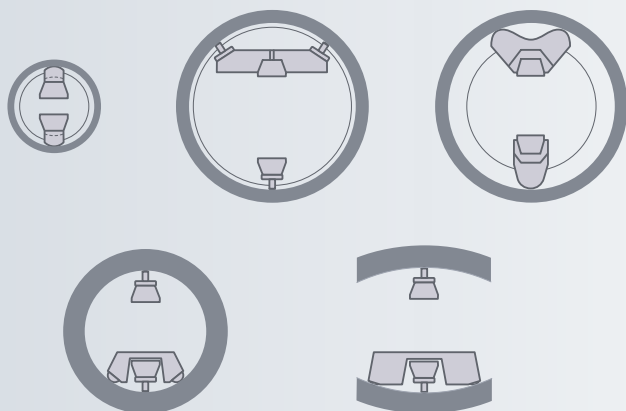
079105694 1 Screwdriver with special design 079105694

079111401 INTERAPID IRA 2 md 079111402

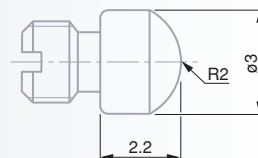
Same as INTERAPID IRA 2, but furnished with the measuring inserts listed below instead of those in steel with order No. 079105667 or 079105697.

079105756 3 Tungsten carbide inserts (order number for 1 item) 079105759

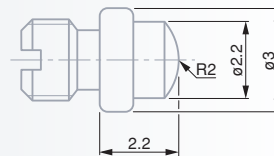




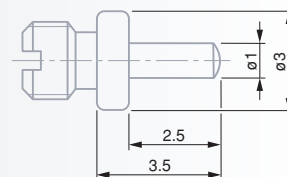
079105667



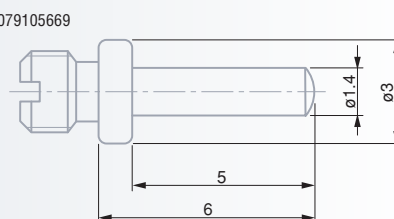
079105756



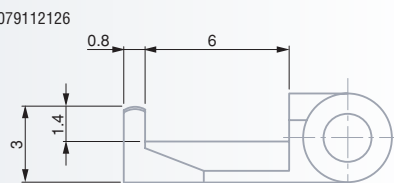
079105668



079105669



079112126



Chrome plated,
hardened steel

Optional Accessories

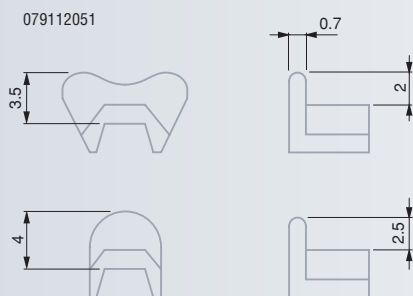


079112051 Set = 2 small inserts (1-point contact)
1 small insert (2-point contact)

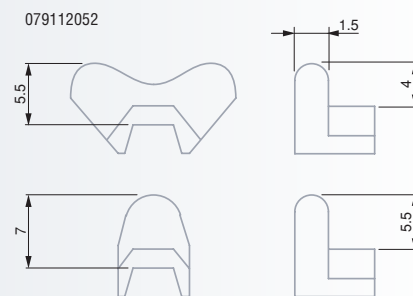
079112052 Set = 2 large inserts (1-point contact)
1 large insert (2-point contact)

079108830 Handle

079112051



079112052



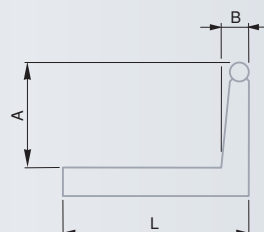
ETALON Caliper Gauges

**for Internal or External Dimensions –
Reading to 0,01 or 0,02 mm**

Long-lasting precision movement – No gear transmission – Tungsten carbide measuring faces for high wear-resistance – Concentric pointer for sure reading of the millimetres – Lifting lever for the gauge legs.

External Short Leg Caliper Gauges

No	mm	mm	A mm	B mm	L mm
07919000	0 ÷ 10	0,01	9,3	3,0	39,7



External Long Leg Caliper Gauges

No	mm	mm	A mm	B mm	L mm
07919009	0 ÷ 20	0,02	9,3	3,0	87



Internal Short Leg Caliper Gauges

No	mm	mm	A mm	B mm	L mm
07919015	5 ÷ 15	0,01	1,1	1,5	39,7
07919016	10 ÷ 20	0,01	3,3	1,5	39,7
07919017	15 ÷ 25	0,01	4,0	1,8	39,7



Internal Long Leg Caliper Gauges

No	mm	mm	A mm	B mm	L mm
07919023	10 ÷ 30	0,02	3,3	1,8	87
07919024	20 ÷ 40	0,02	7,0	2,5	87
07919025	30 ÷ 50	0,02	9,75	2,8	87
07919026	40 ÷ 60	0,02	9,75	2,8	87



0,01 mm or
0,02 mm



Tungsten carbide
measuring faces



Models with
reading to
0,01 mm = 30 µm
0,02 mm = 60 µm



Models with
reading to
0,01 mm = 20 µm
0,02 mm = 40 µm



Suited
plastic case



Identification
number



Inspection report
with a declaration
of conformity

INTERAPID Thickness Gauges

These gauges with a frame are specially made to measure the thickness of plastic parts as well as hard and soft materials such as glass, wood, paper, rubber, metal sheets etc. – All models have a dial that can be rotated for zero setting.



Small-size models, reading to 0,1 mm

With open inserts when not in use

				
	mm	mm	flat	mm
074115586	0 ÷ 10	0,1	flat	Ø 6,35
074115587	0 ÷ 10	0,1	flat	Ø 10

Small-size models, reading to 0,01 mm



							
	mm		mm	mm	mm	flat	mm
074115629	18	074115633	45	0 ÷ 10	0,01	flat	Ø 6,35
074115630	18	074115634	45	0 ÷ 10	0,01	flat	Ø 10

Models with roller-type measuring inserts, reading to 0,01 mm



					
	mm	mm	Ø mm	Length mm	Side discs
<i>Roller-type inserts</i>					
074115647	0 ÷ 5	0,01	8,4	8,7	●
074115648	0 ÷ 5	0,01	8,4	8,7	—



15 mm
throat depth

37 mm
dial diameter

10 mm

Non-interchangeable inserts

40 µm
(dial gauge)

Suited plastic case

Declaration of conformity



40 mm
dial diameter

1 mm

Non-interchangeable, retractable measuring inserts.

0,7 N

15 µm
(dial gauge)

Suited plastic case

Declaration of conformity



50 mm
throat depth

57 mm
dial diameter

1 mm

Non-interchangeable, retractable measuring inserts.

≈ 1,2 N

15 µm
(dial gauge)

Cardboard box

Declaration of conformity

Regular Models, reading to 0,01 mm



57 mm
dial diameter



1 mm



Interchangeable,
retractable
measuring
inserts



≈ 1 N



40 µm
(dial gauge)



Cardboard box



Declaration
of conformity



mm
50



mm
100



074115642



074115649



mm

0 ÷ 10



mm

0,01



flat



mm

Ø 30

074115643

074115650

0 ÷ 10

0,01

flat

Ø 20

074115644

074115651

0 ÷ 10

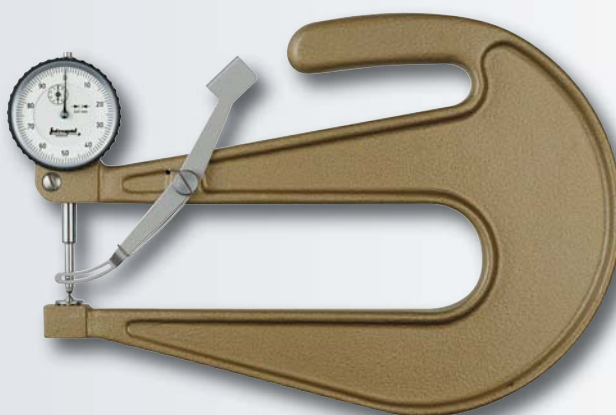
0,01

flat

Ø 10

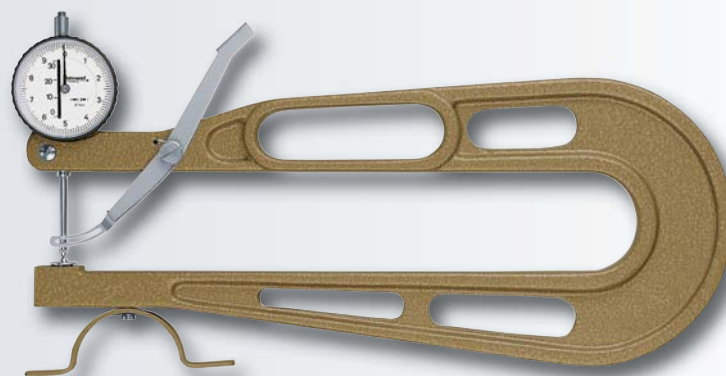
Measuring insert available upon request.

Models with deep throat, reading to 0,01 mm



						
mm	mm					
0 ÷ 10	0 ÷ 30					
						
		mm	mm		mm	Paired inserts
074115654	074115659	0,01	200	flat	Ø 30	074115734
074115655	074115660	0,01	200	flat	Ø 20	074115735

Models with deeper throat, reading to 0,1 mm



					
mm					
400					
					
	mm	mm		mm	Paired inserts
074115624	0 ÷ 30	0,1	flat	Ø 30	074115734
074115625	0 ÷ 30	0,1	flat	Ø 20	074115735
074115626	0 ÷ 30	0,1	flat	Ø 10	074115731
074115628	0 ÷ 30	0,1	spherical	Ø 5	074115733



57 mm
dial diameter

1 mm

Interchangeable,
retractable
measuring
inserts

≈ 2 N

15 µm
(dial gauge)

Cardboard box

Declaration
of conformity



57 mm
dial diameter

10 mm

With foot
for stationary
use

Interchangeable,
retractable
measuring
inserts

≈ 2 N

40 µm
(dial gauge)

Cardboard box

Declaration
of conformity



Model for laminated plies, reading to 0,001 mm



074115664	0 ÷ 1	0,001	flat	Ø 6,35



30 mm throat depth.
Highly stable frame with heat insulating handle.



57 mm dial diameter



0,2 mm



Non-interchangeable, retractable measuring inserts.



≈ 2 N



5 µm (dial gauge)



Cardboard box



Declaration of conformity

Models with reading to 0,1 mm

With open inserts when not in use



57 mm dial diameter



10 mm



Interchangeable measuring inserts



40 µm (dial gauge)



Cardboard box



Declaration of conformity



mm
0 ÷ 20



mm
0 ÷ 30



mm



mm



flat



mm



Paired inserts

074115599	074115604	0,1	50	flat	Ø 30	074115686
074115600	074115605	0,1	50	flat	Ø 20	074115687
074115601	074115606	0,1	50	flat	Ø 10	074115726
074115602	074115607	0,1	50	convex	Ø 10	074115727
074115603	074115608	0,1	50	spherical	Ø 5	074115728



Hardened steel



Finely lapped measuring faces.

Mount with clamp for a dial gauge or a probe.



Provided without dial gauge

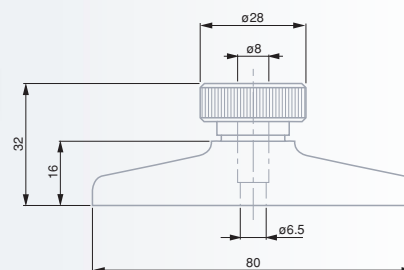


Cardboard box



Declaration of conformity

Dial Depth Gauges, Type PF1



01639046

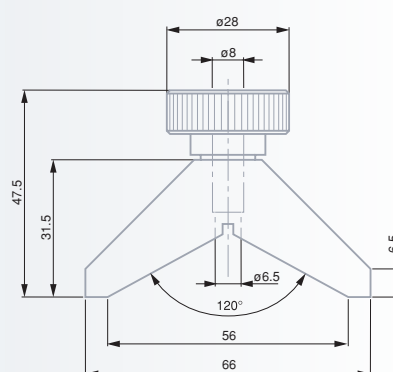
Flat base

mm

80 x 16

Mount
mm

Ø 8



01639047

V-base

mm

10 ÷ 100

Width
mm

120° 16

Mount
mm

Ø 8

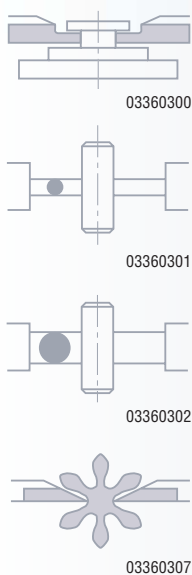


INTERAPID Small Bench SHE.30 or SHE.35

The ideal solution for precise inspection of small part series dedicated to watchmaking and precision mechanics – Fast in measuring and easily adaptable to changes from a workpiece-type to another – Wide choice of measuring inserts specially designed for the broadest variety of metrology applications.



**INTERAPID SHE.30
for External Dimensions**

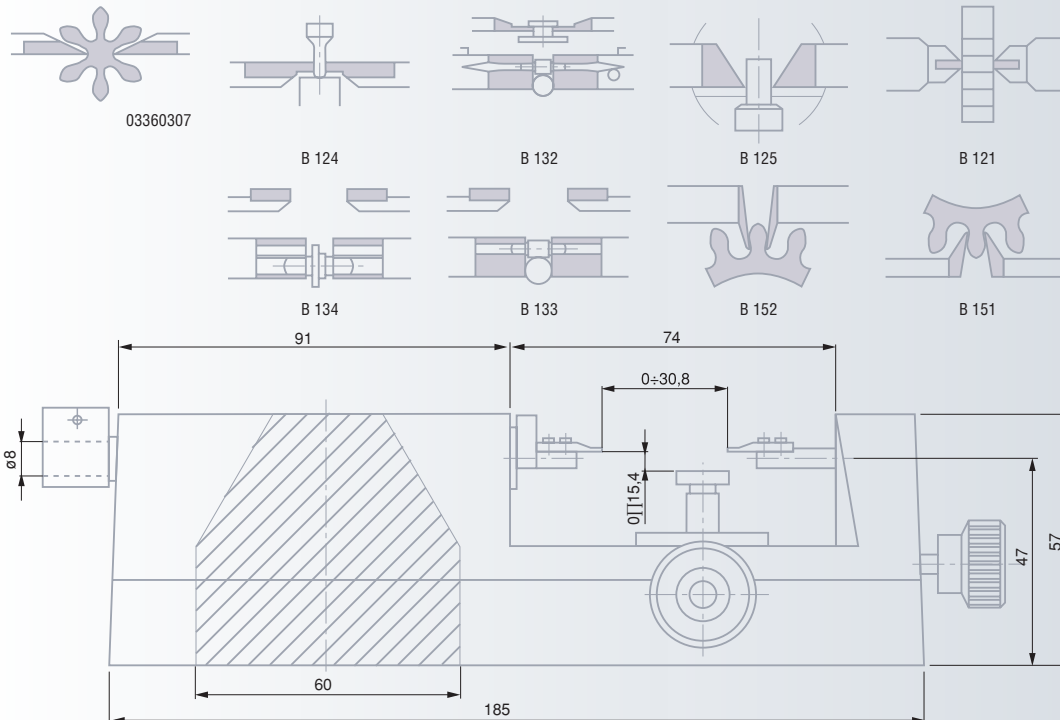


03360004 INTERAPID small measuring bench SHE.30 for external dimensions, without measuring inserts

Tungsten carbide tipped measuring inserts available in pairs

- 03360300** Flat measuring face, 3,5 mm long, 0,4 mm thick
- 03360301** Cylindrical insert with a flat measuring face, 1,2 mm diameter
- 03360302** Cylindrical insert with a flat measuring face, 2 mm diameter
- 03360307** Knife-edged measuring face, 3,5 mm long, 0,05 mm thick, 40°

Inserts with special design available upon request.



0 to 30 mm



Mobile measuring bolt mounted on a plain bearing, also fitted with a semi-circular releasing disc plate.

Measuring inserts supplied in pairs. One is tighten on the measuring bolt, the other on the fixed anvil using one indexing pin with 1 mm dia. and two M1,4 clamping screws.

Resting table with vertical and lengthwise adjustment facility
Table surface area: 24 x 9,5 mm.
Setting range: 15 mm upright, 14 mm lengthwise.
With tightening screws.

Sensor (must be ordered separately), e.g. dial gauge, electronic or precision indicator, analogue or digital probe with a 8 mm dia. shaft.



Main body in cast iron. Other parts in hardened and ground steel.



Produced by used sensor. The SH.30 model has no spring-loaded measuring force.



Accuracy is usually influenced by the measuring instrument as well as both flatness and parallelism of the measuring faces of used inserts.

Clamping precision
Tolerance in flatness of both clamping faces: 0,05 mm.
Tolerance for the axial position of both indexing pins against bolt axis: 0,05 mm.
Tolerance for the parallel position of the table surface against bolt axis: 0,05 mm.

Also see drawing



2,1 kg



Shipping packaging



Declaration of conformity

INTERAPID SHE.35 for Internal Dimensions



30 mm



8 up to 38 mm
(standard accessory)



Mobile measuring bolt
mounted on a plain bearing, also fitted with a retracting ball-shaped handle.

Measuring inserts
supplied in pairs. Can be exchanged. Provided with a 4 mm dia. fixing shaft.

Height adjustable resting table

Table surface area:
40 x 70 mm.
Setting range: 8 mm.
1 tightening screw.
Sensor (must be ordered separately), e.g. dial gauge, electronic or precision indicator, analogue or digital probe with a 8 mm dia. clamping shaft.



Main body in cast iron.
Other parts in hardened and ground steel.

Inserts with carbide measuring faces.



Produced by used sensor.
The bench has no spring-loaded measuring force.



Accuracy is usually influenced by the measuring instrument as well as the type of used inserts.



2,3 kg



Shipping packaging



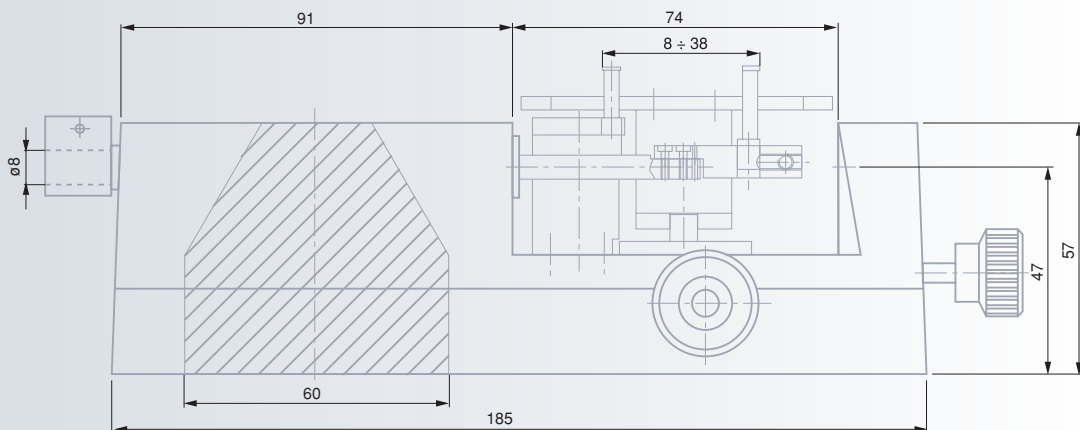
Declaration of conformity



03330006 INTERAPID small bench SHE.35 for internal dimensions, with measuring inserts included.

8 ÷ 38 mm

Inserts with special design also available on request



TESA QUICK-CONTROL C2 for Stationary Use

This versatile shop tool allows 2-point measurement of part series using one mobile insert coupled with the sensor plus another fixed one fitted with a clamp for mounting any dial gauge, precision indicator or axial probe having a 8 mm dia. clamping shaft.

- Quick, easy, dependable and precise measurement (repeatability to 2 µm without the use of the sensor).
- Robust construction, easy to mount and to use.
- Adjustable measuring force.
- Measures workpieces with plan-parallel, cone-shaped or cylindrical surfaces, grooves, through holes and blind bores, short centring shoulders and wall thickness. Also serves to check diameters on gear teeth.
- Detects form and positional errors, i.e. roundness, concentricity and coaxiality.



Hardened steel inserts



Lapped measuring faces



2 µm
(QUICK-CONTROL alone)



Adjustable from 0 up to 10 N.
Can be reversed from «neutral» to internal or external measuring



Suitable plastic case



Identification number



Declaration of conformity

TESA QUICK-CONTROL 160 C2

Main tool version within the C2 range. Measures mean to small or even very small dimensions (see below for details).



№

=



mm



in

Internal dimensions



mm



in

External dimensions

03330024 QUICK-CONTROL 160 C2

30 ÷ 120

1.19 ÷ 4.72

0 ÷ 90

0 ÷ 3.54

Provided with the following accessories:

03360022 1 Steady insert holder, short.

03360027 1 Pair of long inserts for internal/external diameters, through holes, blind bores, grooves and slots with max. depth to 3,7 mm, max. height to 25 mm.

03360026 1 additional insert, as above but short. For use instead of the long one when measuring at low height.

Option 1 – For small dimensions

03360065 1 Pair of long inserts with a 8 mm dia. clamping shaft, 6 mm dia. probing head.

22 ÷ 120

0.87 ÷ 4.72

0 ÷ 90

0 ÷ 3.54

Option 2 – For smaller dimensions

03360031 1 Pair of inserts for checking very small bores.

11.5 ÷ 60

0.46 ÷ 2.36

0 ÷ 90

0 ÷ 3.54

03360024 1 Pair of adapters for 5 mm dia. inserts. For use at probing points with a 8 mm dia.

03360032 1 Pair of raising blocks used to scale down the width of the slot lying in the middle of the upper tool table.



 Hardened steel inserts

 Lapped measuring faces

 2 µm (QUICK-CONTROL alone)

 Adjustable from 0 up to 10 N.
Can be reversed from «neutral» to internal or external measuring

 Suited plastic case

 Identification number

 Declaration of conformity

TESA QUICK-CONTROL C3 for Stationary Use

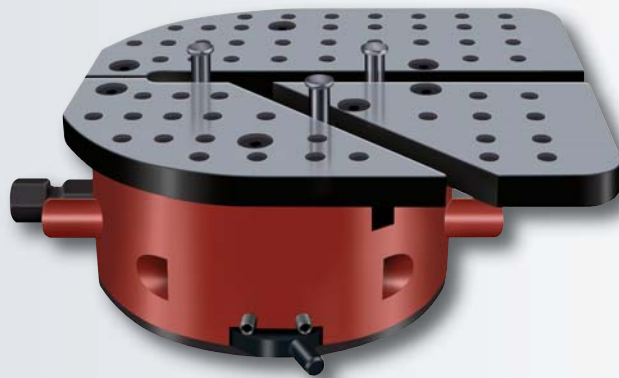
Having the same features and capabilities as TESA QUICK-CONTROL C2, this model also provides an extra transverse insert.

Both mobile and fitted inserts are used for 2-point measurements. The third one moves transversally, thus enabling a correct positioning of the workpiece, without the need for locating the culmination point. This insert also allows workpiece diameter and form errors to be measured at the same time.

TESA QUICK-CONTROL 160 C3 AL

Main version within the C3 tool range for mean to small dimensions.

With a mounted stop-like insert that can be moved in the 45° V-slot.



Nº



mm



in



mm



in

Internal dimensions

External dimensions

03330026 QUICK-CONTROL C3 AL

32 ÷ 120

1.26 ÷ 4.72

0 ÷ 90

0 ÷ 3.54

Provided with the following accessories:

03360067 1 Mobile standard insert,
10 mm dia. spherical probing head

03360068 Pair of standard inserts for fixed holder,
10 mm dia. spherical probing head,
L = 36 mm

03360069 1 Fixed insert holder

03360070 1 Fixed stop holder

Option 1 – For small dimensions

03360066 3 long inserts with a
8 mm clamping shaft,
6 mm dia. probing head.

25 ÷ 120

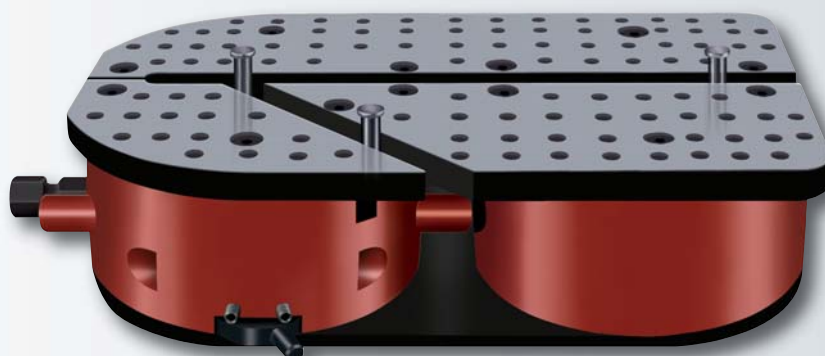
0.99 ÷ 4.72

0 ÷ 90

0 ÷ 3.54

TESA QUICK-CONTROL 160 C3 JS

Identical to TESA QUICK-CONTROL 160 C3 AI, but with extended application range.



Hardened steel inserts



Lapped measuring faces



2 µm
(QUICK-CONTROL alone)



Adjustable from 0 up to 10 N.
Can be reversed from «neutral» to internal or external measuring



Suitable plastic case



Identification number



Declaration of conformity



mm



in

Internal dimensions



mm



in

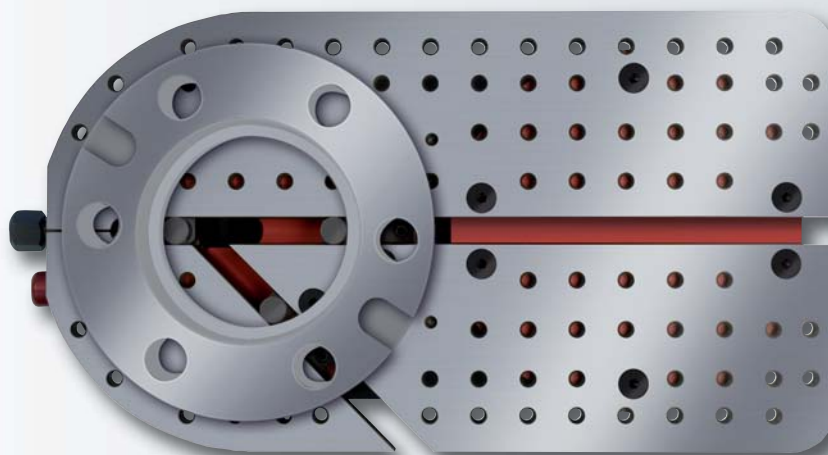
External dimensions

03330027 QUICK-CONTROL 160 C3 JS

Provided with the following standard accessories:

03360067	1 Mobile standard insert, long, 10 mm dia. spherical probing head	32 ÷ 190 (3 points)	1.26 ÷ 7.48 (3 points)	0 ÷ 170 (3 points)	0 ÷ 6.69 (3 points)
		32 ÷ 275 (2 points)	1.26 ÷ 10.8 (2 points)	0 ÷ 245 (2 points)	0 ÷ 9.65 (2 points)
03360068	Pair of standard inserts for fixed stop and support, 10 mm dia. spherical probing head, L = 36 mm				
03360069	1 Fixed insert holder				
03360070	1 Fixed stop holder				

The option 1 for small dimensions can also be used on the model 160 C3 JS.





Hardened steel inserts

Lapped measuring faces

2 µm (QUICK-CONTROL alone)

Adjustable from 0 up to 10 N.
Can be reversed from «neutral» to internal or external measuring

Suited plastic case

Identification number

Declaration of conformity



TESA QUICK-CONTROL 160 C3 90 ST2

Special model for small and very small dimensions. Features a mounted stop-like insert fitted in the 90° V-slot. Also adjustable.



mm



in



mm



in

Internal dimensions

External dimensions

03330028

QUICK-CONTROL 160 C3 90 ST2

10 ÷ 80

0.4 ÷ 3.14

0 ÷ 55

0 ÷ 2.16

Provided with the following standard accessories:

03360072 1 Fixed insert holder for adapter

03360073 1 Fixed insert holder for the third point and adapter

03360074 3 Adapters

03360075 3 Long inserts with as 5 mm dia. shaft

03360067 1 Mobile standard insert, 10 mm dia. probing head

03360068 1 Pair of standard inserts for fixed holder, 10 mm dia. spherical probing head, L = 36 mm



Hardened steel inserts

Lapped measuring faces

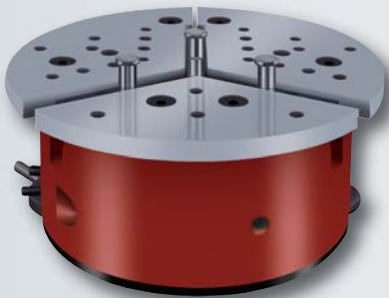
2 µm (QUICK-CONTROL alone)

Adjustable from 0 up to 10 N.
Can be reversed from «neutral» to internal or external measuring

Suited plastic case

Identification number

Declaration of conformity



TESA QUICK-CONTROL 160 C3 120

Measures internal and external dimensions with 2-point contact. Features one mobile and two fixed inserts lying 120° apart. Specially designed for bore measurement. Uses 2 setting rings matching both upper and lower limit values of the tolerated size for display setting and calibration. Recommended sensor: DIGICO 1 precision indicator with order No. 01930000.



Various pairs of inserts and accessories available upon request.



mm



in



mm



in

Internal dimensions

External dimensions

03330029

QUICK-CONTROL 160 C3 120

≥ 25

≥ 0.99

≤ 80

≤ 3.15

Provided with the following standard accessories:

03360067 1 Mobile standard insert, Ø 10 mm dia. spherical probing head

03360068 1 Pair of standard inserts for fixed holder, 10 mm dia. spherical probing head, L = 36 mm

03360022 2 Fixed insert holders, short



TESADIA Plug Gauge

Easy-to-handle plug gauge for 2-point or 3-point measurement on cylindrical bores – Ideal for blind bores and short centring shoulders with diameters ranging from 2,98 up to 250 mm.

- Features a built-in probe that can be connected to a TESA's electronic unit, e.g. TESATRONIC or TESA Interface Box BP 880.
- Specially suited for recurrent dimensional inspection of medium and large-sized batches of parts in the shop floor as well as for receiving and final inspection.
- Equipped with a guiding cylinder that renders unnecessary swinging the plug gauge to find the culmination point. Self-centring and self-aligning.



- | | |
|-----------------|---------------------------------------|
| 05560221 | Handle with built-in GT21 axial probe |
| 05560228 | Handle alone |

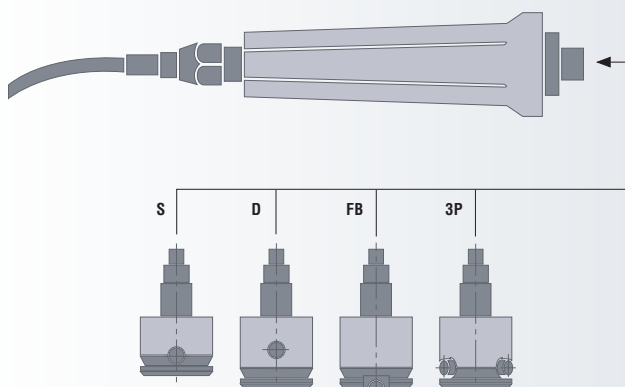


You may ask for a quotation for plug gauges with their own setting rings as well as for the electronic unit.

Specify nominal dimension along with both upper and lower limits of size as well as workpiece material.

Handle

- With built-in TESA GT 21 axial probe.
- Mechanical device for fine adjustment, stress-relieved probe cable.
- Possible connection of a TESA GT 21 compatible probe from another source.



- S** 2-point plug gauge in standard execution for through holes
D 2-point plug gauge with longer guiding cylinder for through holes
FB Plug gauge for blind bores
3P 3-point plug gauge for through holes

Plug Gauge

- Equipped with both a measuring head and guiding cylinder.
- Uses the measuring needle with reversal wedge at one end to transfer the sweeping movement of the measuring insert to the axial probe.
- Houses a guiding cylinder having a special profile for unrestrained introduction of the plug gauge into the bore to be measured. No locking, no tilting.
- Choice of gauging contacts offering optimum adaptation to the parts to be checked, i.e.:
 - tungsten carbide tipped (not suited for non-ferrous metal alloy);
 - hard-chrome plated (partially suited for non-ferrous metal alloy);
 - ruby contacts (suited for non-ferrous metal alloy);
 - diamond contacts (suited for soft light alloy);
 - synthetic contacts (suited for polished surfaces).



Measuring faces: see opposite



Plug gauges with built-in probe.

- 2-point model: 1%
 - 3-point model: 3%
- These percentages refer to the measuring span of each plug gauge



Plug gauges with built-in probe.

- 2-point model: $\leq 1 \mu\text{m}$
- 3-point model: $\leq 2 \mu\text{m}$



Plug gauges with built-in probe: $\leq 0,4 \mu\text{m}$



0,3 to 1,2 N according to relevant model



10° C to 35° C



-25° C to 55° C



Declaration of conformity

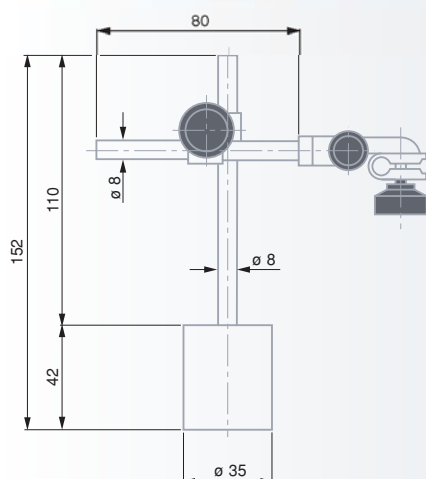
Measuring Stands and Auxiliary Fixtures



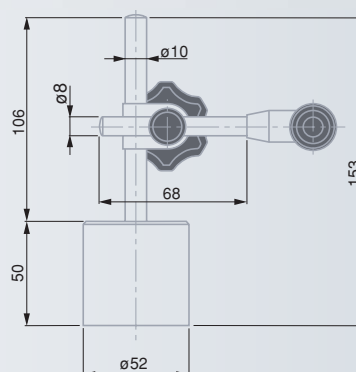
INTERAPID Small Magnetic Supports

Ideal for dial test indicators (lever-type) or dial gauges having a 40 mm dial diameter – Versatile due to 2 rigid joints and fine adjust option.

UJ 15 Model



UJ 15G Model



Rounded base with permanent magnet



Holding force on a flat surface:
≈ 220 N for UJ 15
≥ 350 N for UJ 15G



0,47 kg for UJ 15
0,93 kg for UJ 15G



Supplied without indicator



Suited carrying case



Declaration of conformity

Steel Base Plate



50 x 80 x 20 mm



0,60 kg

No

=

01639007

INTERAPID small magnetic support UJ15 with a 8 mm diameter clamping bore and dovetail clamp

01639016

INTERAPID small magnetic support UJ15G with both a 8 mm and 4 mm diameter clamping bore and dovetail clamp

Accessory

01640501

Steel base plate for use of UJ 15 as mobile support



Base has a vee recess and one magnetic flat face with disengageable magnet. Articulations made from duralumin.

Holding force on a flat surface ≈ 170 N

Dovetail clamp with a 8 mm diameter clamping bore

0,4 kg

Supplied without indicator

Suited carrying case

Declaration of conformity

Model with Articulated Arm



mm

01639025 INTERAPID small magnetic support with articulated arm

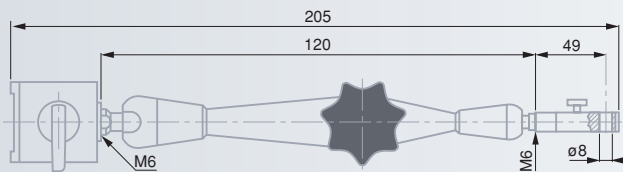
Full length 205

Consisting of:

1 Articulated arm Length 120

1 Dovetail clamp with fine adjustment

1 Magnetic base L x W x H 30 x 30 x 30



Model with a flat base has 2 rounded permanent magnets

72 x 38 x 11 mm for model with a flat base or 72 x 38 x 26 mm for model with a V-base

Holding force: ≈ 180 N for the flat base or ≈ 260 N for the V-base

Clamp with a 8 mm diameter clamping bore

Supplied without indicator

Suited carrying case

Declaration of conformity

Magnetic Supports with Flat or V-Base



01639011 INTERAPID magnetic support with a flat base

01639012 INTERAPID magnetic support with a V-base

INTERAPID Magnetic Supports

Standard Model and Models with Powerful Holding Force



Disengageable magnet.
Clamp with a
8 mm dia. clamping bore.



Supplied
without
indicator



Suited
carrying case



Declaration
of conformity



N

Fine
adjust

V-Base
for

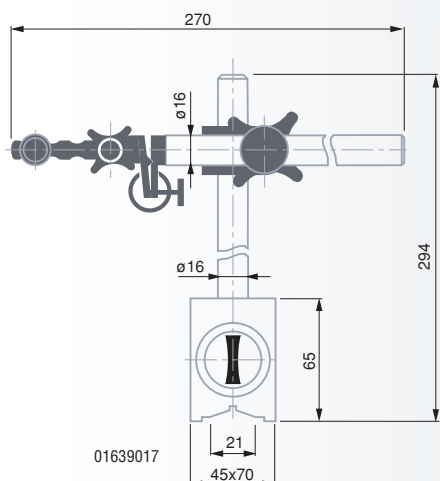
01639017	Standard model	≈ 600	●	70 ÷ 220
01639018	Powerful holding force	≈ 1000	—	70 ÷ 220
01639019	Powerful holding force	≈ 1000	●	70 ÷ 220



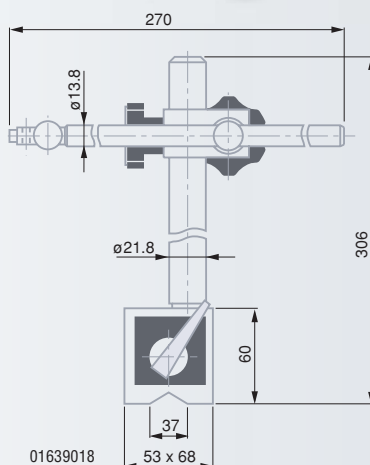
01639017



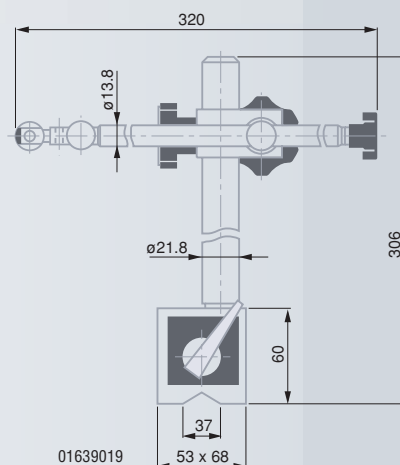
01639019



01639017



01639018



01639019



Magnetic base has 2 flat faces plus 1 prismatic one. Articulations made from duralumin. Disengageable permanent magnet. Dovetail clamp with a 8 mm diameter clamping bore.

Magnetic base (L x W x H) 60 x 50 x 55 mm

1,45 kg or 1,85 kg

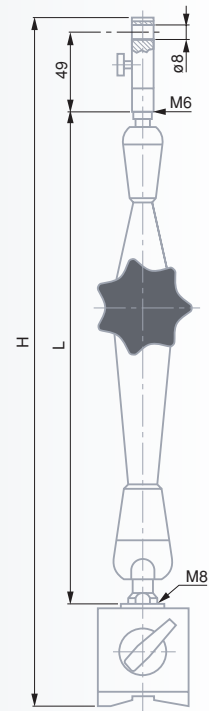
Supplied without indicator

Suited carrying case

Declaration of conformity

Models with Articulated Arm

Attach simply and securely using a single lobe knob – Solid arm with highly rigid articulations.



Nº



H mm

L mm



N



Fine adjust



V-Base for

01639022	Magnetic support	310		≈ 700	●	30 ÷ 150
01639023	Magnetic support	390		≈ 700	●	30 ÷ 150

Consisting of:

	Articulated arm	200				
	Articulated arm	280				
	Clamp					
	Magnetic base		≈ 700	●		30 ÷ 150



Magnetic base has 2 flat faces plus 1 prismatic one. Disengageable permanent magnet. Full length 350 mm. Dovetail clamp with a 8 mm diameter clamping bore.

Holding force on a flat surface ≈ 1000 N

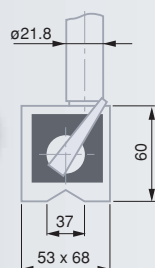
Supplied without indicator

Suited carrying case

Declaration of conformity

Model with Flexible Arm

For hard-to-reach locations – Lever controlled arm that holds securely on any surface.



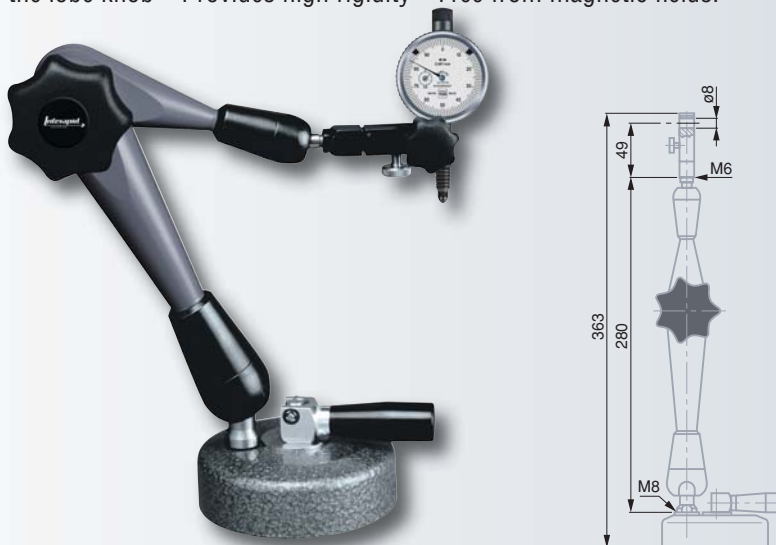
Nº



01639020 INTERAPID magnetic support with flexible arm

INTERAPID Measuring Support with Suction Base

Holds firmly on any plain, flat surface – Clamps easily and reliably over the lobe knob – Provides high rigidity – Free from magnetic fields.



Round suction base in duralumin (88 mm in diameter and 28 mm in height) with a flat face. Articulations in duralumin. Disengageable suction effect using the lever. Dovetail clamp with a 8 mm diameter clamping bore.



1,1 kg



Supplied without indicator



Suited carrying case



Declaration of conformity



H mm



L mm



N



Fine adjust

01639024	Support with suction base	363	280	≈ 400	●
consisting of:					
	Articulated arm		280		
	Clamp				●
	Round suction base			≈ 400	

INTERAPID Measuring Supports



Base with resting front face. Clamp for a 8 mm diameter mounting rod or a dial gauge with lug. Model No. 01639003 with added dovetail clamp



Cast iron base



1,3 kg or 4,35 kg



Supplied without indicator



Suited carrying case

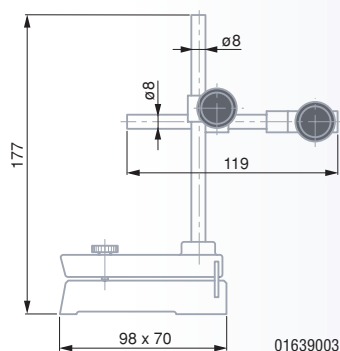


Declaration of conformity

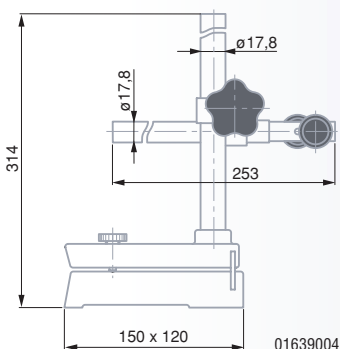


Used in conjunction with

01639003	INTERAPID small support	Dial test indicators, small dial gauges
01639004	INTERAPID small support	Dial test indicators, dial gauges, precision indicators, electronic probes etc.



01639003



01639004



Stand with lateral guiding faces. Vertical column that can be moved along the T-slot. Provided with 2 rigid articulations.

Cast iron base

3,3 kg

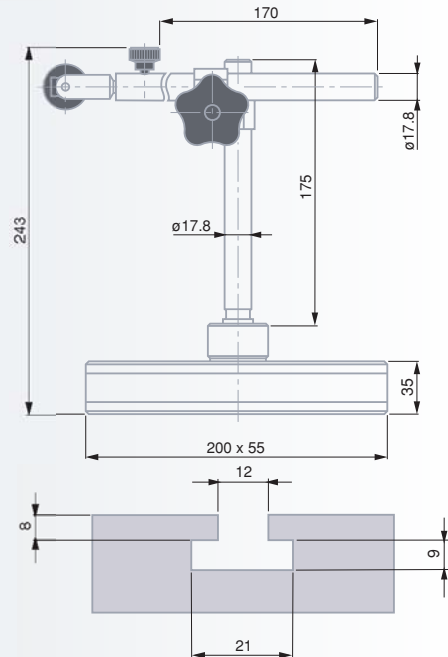
Supplied without indicator

Suited carrying case

Declaration of conformity

INTERAPID UD 12 Universal Stand

Medium-sized sliding support for dial test indicators (lever-type), dial gauges, electronic probes etc. – With fine adjust option.



No

=

01639000 INTERAPID UD 12 universal stand

Furnished with:

01640100 Clamp with a 8 mm dia. tightening

01840105 Clamping rod, 8 mm dia., with dovetail recess



Measuring table with ground measuring face. Dismountable column. Measuring arm with a 8 mm dia. tightening.

Cast iron table. Chrome-plated steel column. Spherical graphite cast iron arm.

3 kg

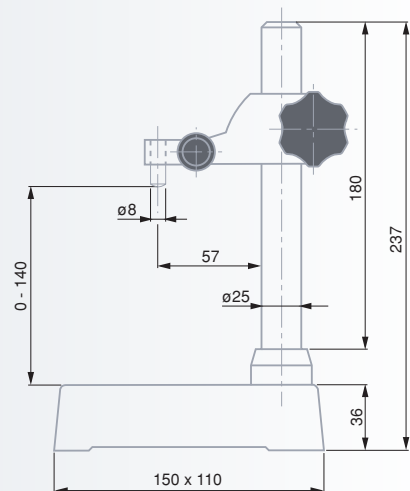
Supplied without indicator

Suited carrying case

Declaration of conformity

INTERAPID UA 1

Measuring stand without fine adjustment



No

=

01639008 INTERAPID UA 1 measuring stand



mm

0 ÷ 140



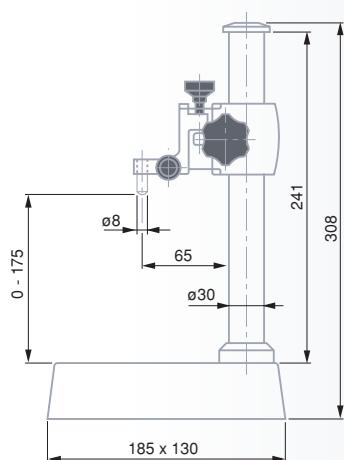
mm

100 x 100



INTERAPID UA 30

Basic component for mounting specific workpiece attachments for series inspection.



Basic stand

Ground measuring face.
2 T-slots.

Dismountable column

Cast iron table.
Chrome-plated steel column

Measuring arm

Fine adjustment within a range of 1 mm.

8 mm dia. clamping bore.

Sliding arm

Floating holder for TESA YA.

Adjustable swinging movement. 13 mm dia. clamping bore. 35, 57 or 80 mm travel length.

Measuring span 60 mm.

Depth stop plate

Dimensions:
115 x 35 x 3,5 mm.
120° vee recess
for diameters ≤ 120 mm.
Two tightening screws.

Additional data

4,85 kg (basic stand).
0,85 kg (measuring arm).
1,75 kg (sliding arm).

Supplied without indicator

Suited carrying case

Declaration of conformity



Measuring arm with a 8 mm dia. clamping bore, without fine adjustment. Measuring span 48 mm

Measuring table and column in hardened steel

2,7 kg

Supplied without indicator

Suited carrying case

Declaration of conformity

No



mm



mm

01639009 INTERAPID UA 30 basic stand (without measuring arm)

0 ÷ 175

125 x 115

Accessories

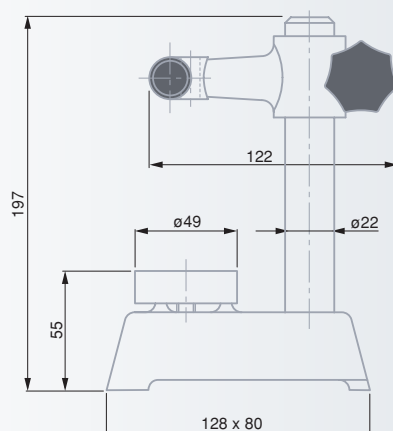
01610200 UK 20 measuring arm with fine adjustment

01610201 UK 25 sliding arm used in conjunction with TESA YA for stationary bore measurement (also see page H-6)

01640000 UAZ 10 depth stop plate

INTERAPID Small Measuring Stand

With round steel measuring table.



No



mm



mm

01639006 INTERAPID small measuring stand

0 ÷ 100

Ø 49



Supports



N° 01639035
black burnished
steel column with
a 8 mm dia. clamping bore.

N° 01639029

Chrome-plated column with
thread and setting ring for
height adjustable measuring
arm. 8 mm dia. clamping
bore. Measuring face with
dust grooves.

N° 01639030

Chrome-plated steel column.
Tilting measuring arm with
articulation.
4 or 8 mm dia. bore for a
dovetail clamp or lug.

N° 01639033

Chrome-plated steel
column. Sliding measuring
arm, horizontally.
4 or 8 mm dia. bore for a
dovetail clamp or lug.



3 µm as per
DIN 876 T1,
grade 00.



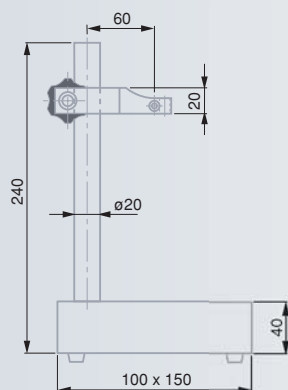
Supplied
without
indicator



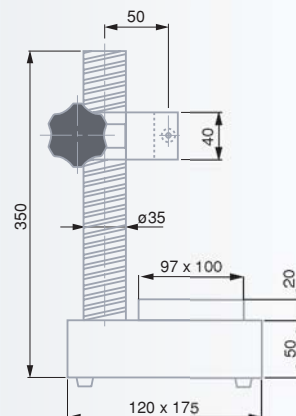
Suited
carrying case



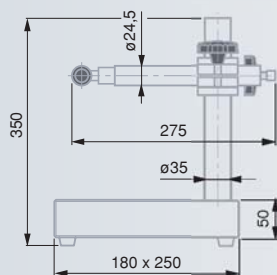
Declaration
of conformity



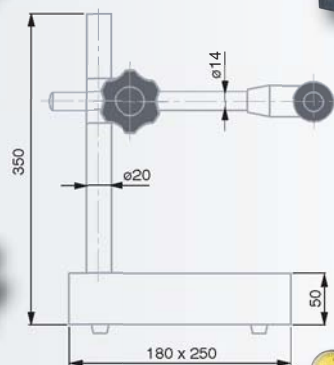
01639035



01639029



01639030



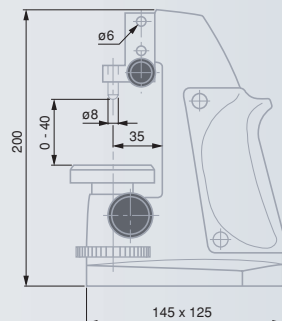
01639033



No	Measuring face	Measuring face mm	mm	Fine adjustment	Span mm
01639035	Granite	100 x 115	0 ÷ 170	—	50
01639029	Steel, hardened	100 x 100	0 ÷ 225	●	68,5
01639030	Granite	180 x 205	0 ÷ 240	●	adjustable
01639033	Granite	180 x 200	0 ÷ 260	●	adjustable
	Measuring table	Measuring table mm	Column mm	Column mm	kg
01639035	Granite	100 x 150 x 40	20	200	2,6
01639029	Granite	120 x 175 x 50	35	300	8,1
01639030	Granite	180 x 250 x 50	20	300	8,4
01639033	Granite	180 x 250 x 50	35	300	10,5

INTERAPID UM 20

Stable stand for measuring small parts accurately.



With a 8 mm dia. tightening plus two 6 mm dia. clamping bores for the UPZ 6 probe-holder. Measuring span 35 mm.



3 kg (measuring stand alone)



Supplied without indicator



Suited carrying case



Declaration of conformity

INTERAPID UM 20 measuring stand (without measuring table)

Height adjustable table mount with thread and fine adjustment.
Clamping groove for UMZ 12 depth stop (No. 01640300)



mm

Fine adjustment
mm

01639002

0 ÷ 40

15

UMZ 40 meas. table with dust grooves
Hardened steel, lapped measuring face.



mm

01640302

Ø 66 x 12



UMZ 41 plain measuring table
Hardened steel, finish ground measuring face.



mm

01640303

Ø 66 x 12



UPZ 6 double probe-holder
8 mm dia. mounting bore for 2 probes.
Clamped on the measuring stand with
2 shafts having a 6 mm dia.



Sideways
mm

01640401

13 ÷ 80



UMZ 12 depth stop

Clamp to be mounted in the T-slot of the
basic stand. Hardened and ground stop
plate.



Resting face
mm

01640300

55 x 11



UMZ 13 side stop

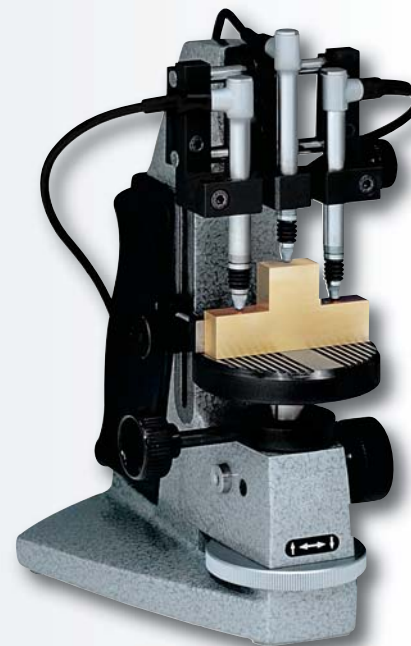
Hardened and ground. For use along
with UMZ 12.



Resting shoulder
mm

01640301

31,5 x 10 x 3



INTERAPID Universal Stands UP

These two universal stands provide different height levels along with a wide range of accessories that serve for setting up a variety of measuring configurations – High-precision components, also highly stable and extremely wear-resistant – Guaranteed lowest measurement uncertainty for the skilled manufacturing shop floor.

Besides dial gauges, precision indicators and dial test indicators (lever-type), both stands enable electronic probes to be mounted, especially to carry out direct, sum or comparative measurement (see section O).



A Heavy cast iron base with mounted ground steel column (50 mm dia.). Measuring arm with a 8 mm dia. tightening and 2 mounting bores having a 6 mm dia. for UPZ 6.

Fine adjust control using the protected knob. 1 mm travel length.



Base and measuring arm in cast iron. Dull-chrome plated steel column.



Supplied without indicator



Suited carrying case



Declaration of conformity



INTERAPID universal stands UP (without measuring table)

Heavy cast iron models. Measuring arm with locking device and brake stop. For additional technical data, see opposite.



mm



kg

01639041

UP 160 measuring stand

0 ÷ 155

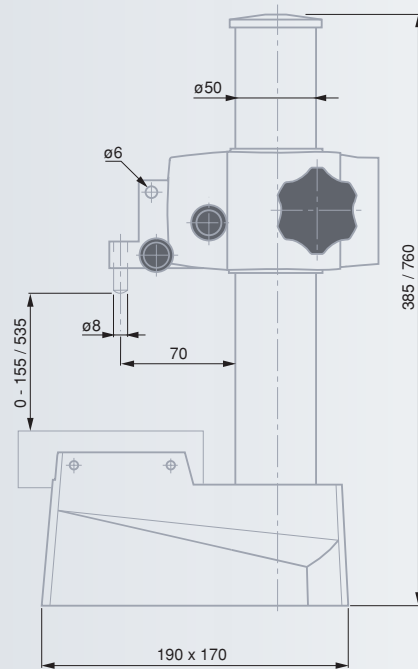
13,5

01639042

UP 200 measuring stand

0 ÷ 535

19



UPZ 40 standard measuring table

Hardened steel. Two measuring faces with dust grooves, lapped. One face has a 13 mm wide strip along the centre.



01640405

mm
45 x 95

µm
1



UPZ 46 A measuring table along with probe-holder

Feature a 8 mm dia. clamping bore for axial probes. Hardened and lapped measuring face with dust grooves as well as a 13 mm wide strip along the centre.



01640410

mm
45 x 95

µm
1



UPZ 20 side plates

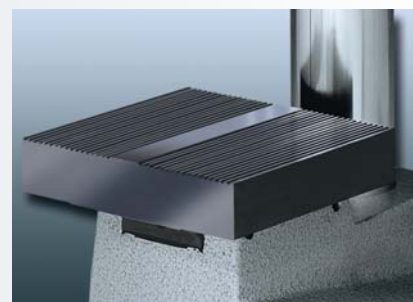
To be mounted sideways on both UPZ 40 and UPZ 46 A measuring tables. Made of black plastic. Supplied in pairs.



Resting face
mm

01640404

55 x 95



UPZ 47 large measuring table along with probe-holder

8 mm dia. clamping bore for axial probes. Hardened and lapped measuring face with dust grooves as well as a 18 mm wide strip along the centre.



01640411

mm
120 x 120

µm
1,5





UPZ 53 cross beam

For centre and vee supports. Made from cast iron and ground.



Length
mm

01640416

300



UPZ 51 centre supports

For axial and radial run-out inspection. Max. distance between points: 155 mm. Feature solid and spring-loaded hollow points, movable lengthwise but also lockable. Used with cross beam UPZ 53. Supplied in pairs.



Height of points
mm

01640414

50



UPZ 54 length stop

For use on the cross beam UPZ 53 with UPZ 52 resting blocks. A probe can be mounted instead of the stop rod.



01640417



UPZ 52 resting blocks

For cylindrical or conical components. Resting plates with tungsten carbide pins, adjustable to the part diameter. Distance between plates matches ≤ 300 mm. Used with cross beam UPZ 53. Supplied in pairs.



mm

01640415

≤ 30





UPZ 60 rack and pinion slide

For vertical adjustment of the measuring arm.



Travel length
mm

01640419 185



UPZ 15 limit stop

Mounted with clamp on the column.
Hardened, dull-chrome plated.



Stop face
mm

01640403 68 x 20

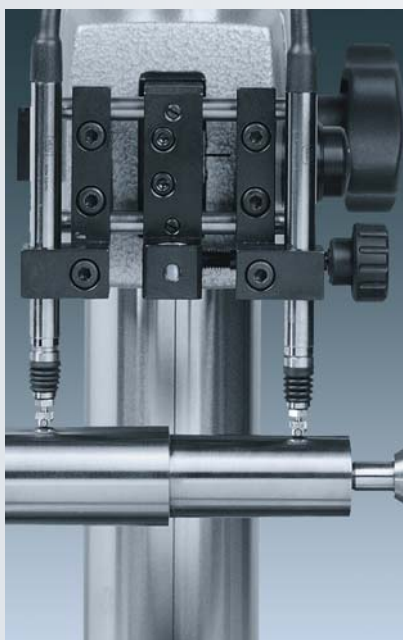
UPZ 14 stop plate

For use with limit stop UPZ 15.
Hardened, dull-chrome plated.



Vee angle

01640402 120°



UPZ 6 double probe-holder

Tightening collar, 8 mm dia., for 2 electronic probes. Mounted on the stand by means of 2 shafts having a 6 mm dia.



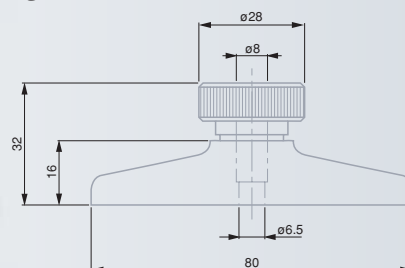
Lateral
mm

01640401 13 ÷ 80



INTERAPID Depth Feet

Model with a flat measuring face



No	mm	Clamp mm
01639046	80 x 16	Ø 8



Hardened steel



Finish lapped measuring faces. Clamp with lock for mounting a dial gauge or an electronic probe



Supplied without indicator



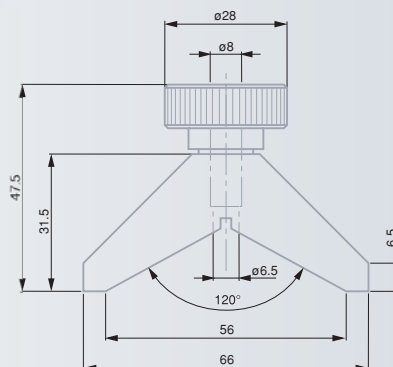
Suitable carrying case



Declaration of conformity

Model with a prismatic measuring face

For measuring groove depth on cylindrical shafts. Also for establishing circularity errors etc.



No	mm	Width mm	Clamp mm
01639047	10 ÷ 100	120° 16	Ø 8

Brown & Sharpe CENTER FINDER

Practical auxiliary support that helps Users to quickly align the centre of the bores against the spindle axis on a machine tool – Used without clamping shaft can also serve as small magnetic support – Designed for clamping a dial test indicator whether standard or perpendicular.



06769006



Brown & Sharpe CENTER FINDER



Center Finder includes the following components:

- cylindrical shank that can be clamped on the chuck of a machine tool.
- powerful permanent magnets.
- swivel joint along with a dovetail collar for clamping a lever-type dial test indicator.



Wooden case



Hardened steel



Ground for both resting and vee faces



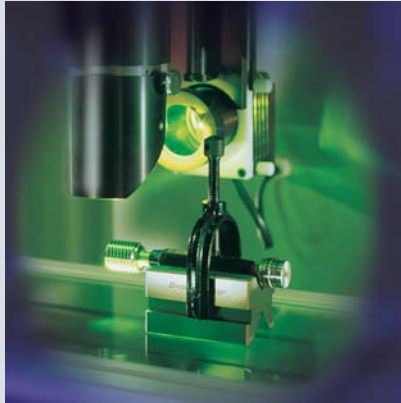
Not available as single components



Suited plastic case

Brown & Sharpe V-Blocks and Clamps

V-blocks have a frame for clamping cylindrical parts with diameters ranging from 0,7 to 40 mm – To be used for workpiece inspection or machining.


Clamping range
mm

06769007

Brown & Sharpe V-blocks and clamps

0,7 ÷ 40

Consisting of:

1 Pair of V-blocks

5 ÷ 40

1 Extra V-block

3 ÷ 8

1 Extra V-block

1,5 ÷ 5

5 Extra V-blocks

0,7 ÷ 3,5

2 In-between bridges

2 Large frames

1 Small frame



Each block has 18 through bores with a 9,53 mm dia. as well as 5 M10 threaded bores



Hardened steel, 55 to 60 HRC



7 µm for each pair



2,5 µm for all faces



Supplied with five M10 socket head screws as well as one 8 mm socket wrench



Suited plastic case

Brown & Sharpe Positioning Block Set

Pair of matched blocks convenient for positioning and holding workpieces or for use as stops on surface plates, metrology set-ups, machine-tools and the like – Blocks are precision ground.



mm

06769004

Brown & Sharpe positioning block set

75 x 50 x 25

Brown & Sharpe Adjustable Parallels

Available in a set including 6 adjustable parallels – Frequently used as parallel pads, setting standards for handheld tools or plug gauges for checking internal dimensions on parallel surfaces.

Each parallel consists of two tapered parts dovetailed together – Two tightening screws lock parallels to size.



Hardened steel



Supplied along with a PH 1 screwdriver



Plastic bag



Height
mm



Length
mm

Width
mm

06769010 Set of Brown & Sharpe Engineer's parallels, adjustable

Consisting of:

1 Parallel	10 ÷ 13	44	7
1 Parallel	13 ÷ 17	54	7
1 Parallel	17 ÷ 24	68	7
1 Parallel	24 ÷ 33	90	7
1 Parallel	33 ÷ 44	106	7
1 Parallel	44 ÷ 57	129	7

ROCH Flexible Steel Rules

Made from stainless steel – Scale divisions to 1 and 0,5 mm.



mm



Width
mm

Thickness
mm

0951750181	200	13	0,5
0951750182	300	13	0,5
0951750184	500	18	0,5
0951750187	1000	18	0,5
0951750188	1500	18	0,5
0951750189	2000	18	0,5



EG class II



Stainless spring-loaded steel



Suitable carrying case



Declaration of conformity

ROCH Thickness Gauges

No	Number of blades	Thickness mm	Stepping mm
0951753013	6	0,05 ÷ 0,3	0,05
	7	0,4 ÷ 1,0	0,1
0951753014	20	0,05 ÷ 1,0	0,05
0951753015	21	0,1 ÷ 2,0	0,1+1 x 0,05



ROCH Radius Gauges

Radius gauges with both concave and convex blades – Designed for visual assessment of radii.

No	Number of blades	Radii mm	Stepping mm	Radii mm
0951753001	2 x 17	1,0 ÷ 2,75	0,25	0,1
		3,0 ÷ 7,0	0,5	0,1
0951753002	2 x 16	7,5 ÷ 15,0	0,5	0,15
0951753003	2 x 15	15,5 ÷ 19,5	0,5	0,2
		20,0 ÷ 25,0	1,0	0,2



ROCH Screw Pitch Gauges

60° or 55° flank angles for ISO metric threads or Whitworth threads.

No		mm					
0951753045	ISO 60°	0,25	0,3	0,35	0,4	0,45	0,5
		0,6	0,7	0,75	0,8	0,9	1,0
		1,25	1,5	1,75	2,0	2,5	3,0
		3,5	4,0	4,5	5,0	5,5	6,0
No		Threads per inch					
0951753046	Whitworth 55°	62	60	48	40	36	32
		28	26	25	24	22	20
		18	16	14	13	12	11
		8	7	6	5	4,5	4



Alloyed steel

100 mm long blades with max. width of 13 mm

Blades are not supplied individually

Plastic bag

Declaration of conformity



Stainless steel

Blades are not supplied individually

Plastic bag

Declaration of conformity



Alloyed steel

Blades are not supplied individually

Plastic bag

Declaration of conformity

ROCH Hand-Held Magnifier

Folding handle with added small magnifier – Retractable support.



		Large model	Small model	
	mm		mm	
0951754511	80 x 45	3x	13	10x



Solid plastic



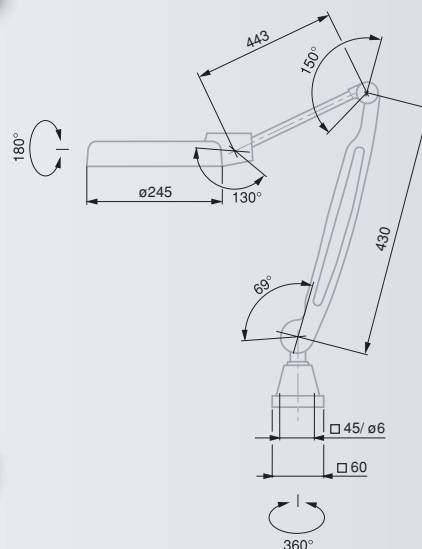
Cardboard box



Declaration of conformity

ROCH Magnifier with Ring Light

Table model ideal for sampling inspection, small part assembly etc. – Main plus extra magnifier with no distortion – Perfect illumination – Tilting magnifier head to any position – Easy and safe positioning through spring-loaded articulations.



120 mm dia. magnifying glass



Materials: glass with solid plastic for the magnifier head. Sturdy cast iron base.



230 Vac, 50 Hz



Supplied with ring light (22 W)



Suited carrying case



Declaration of conformity

		Large model	Small model
		2x	4x
0951754531	Magnifier with ring light		
Accessory			
0951654531	Spare lamp, 22 W		

Straightness, Angle and Inclination Measurement



LEVELS BASED ON A NATURAL REFERENCE

Irrespective of their type, all precision levels are based on long-time stabilisation and reliability, but also on a free measuring base – the centre of the earth. Due to the gravitation, the liquid with embedded bubble of gas or the gravity pendulum indicates the horizontal or vertical level based on this natural reference. Electronic inclinometers or spirit levels measure the position of the pendulum compared to the measuring faces fitted on the tool body.

From these perfect conditions, each level offers a wide number of possibilities for accurately measuring to the nearest degree.

The measuring faces lying horizontally and vertically enable any deviation of the geometrical elements being measured on the workpiece to be detected.

These deviations often result from straightness or flatness errors, but also from position errors like those from parallelism or squareness.

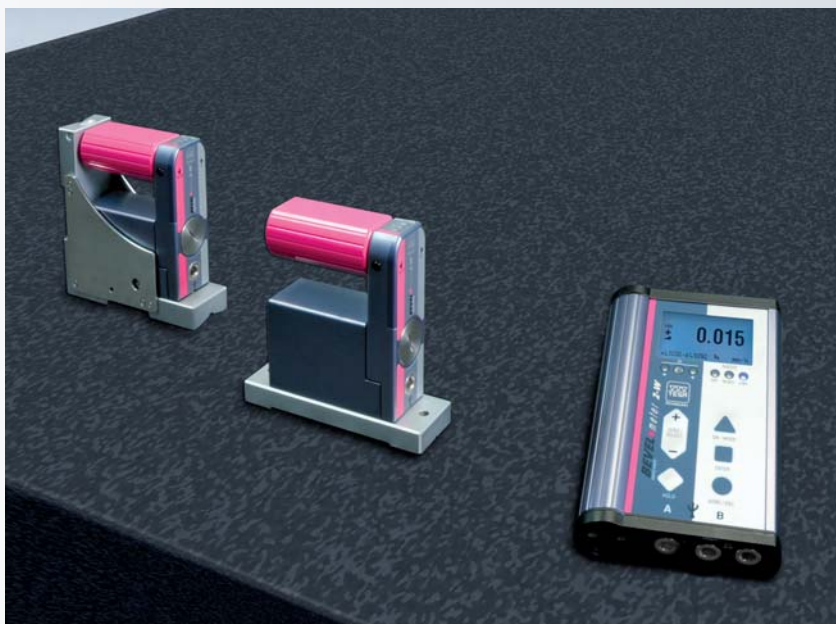
Value reading may vary, depending on the used level-type. Typical value outputs are:

- inclination in mm/m or in/10 in
- radian in mrad
- decimal angle, e.g. 12.37°
- sexagesimal angle in degrees (°), minutes (') and seconds (") – e.g. 15° 30' 45"



Calibration of a try square using ETALON RA.

Electronic dual-function clinometer that uses the difference mode for establishing flatness errors of a granite plate (example).





DIN 874 T2
NF E 11-104

Hardened steel to
≥ 650 HV 10

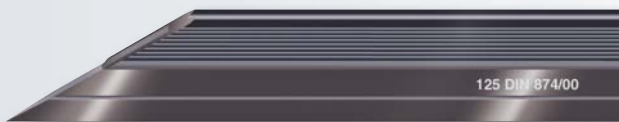
Models with length
up to 200 mm in a
plastic bag.
Models from 300 mm in a
wooden case.

Declaration
of conformity

ROCH Bevelled Straight Edges

Provided with 1 bevelled edge – Also with Heat insulating handle.

		
0951750002	75	2
0951750003	100	2
0951750004	125	3
0951750005	150	3
0951750006	200	3
0951750007	300	3
0951750008	400	4
0951750009	500	4
0951750010	600	5
0951750011	750	5



Factory
standard

Stainless steel
to 200 HRB
(not tempered)
or ≥ 550 HV 30 (tempered)

Accuracy class
0 or 1

Suited
carrying case

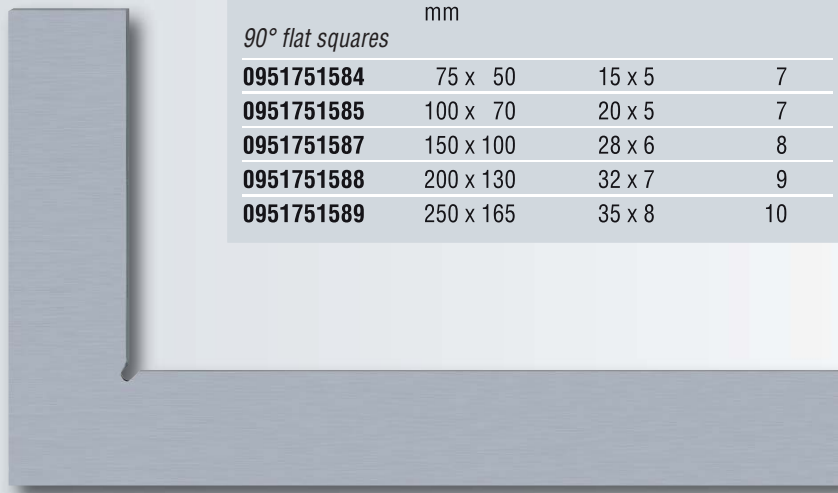
Declaration
of conformity

ROCH Flat and Try Squares

Made from stainless steel

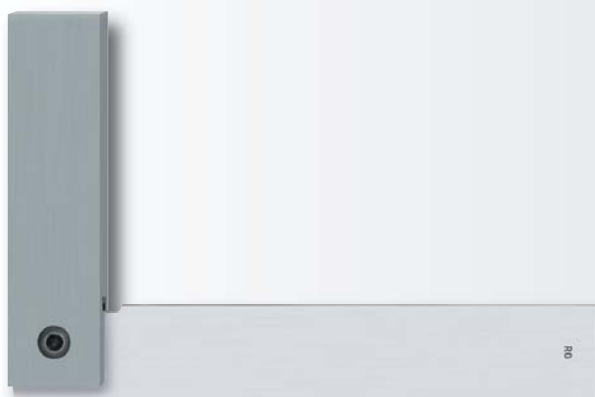
Accuracy class 0, not tempered

			
<i>90° flat squares</i>			
0951751584	75 x 50	15 x 5	7
0951751585	100 x 70	20 x 5	7
0951751587	150 x 100	28 x 6	8
0951751588	200 x 130	32 x 7	9
0951751589	250 x 165	35 x 8	10



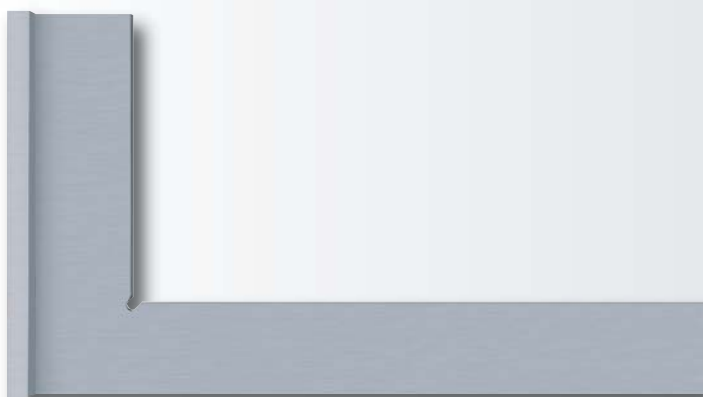
Accuracy class 0, tempered

						
		Length of beams mm	Flat squares section of beams mm	Try squares section long beam mm	short beam mm	µm
<i>90° flat squares</i>	<i>90° try squares</i>					
0951751523	0951751543	50 x 40	15 x 4	16 x 2	14 x 10	7
0951751524	0951751544	75 x 50	15 x 4	18 x 2	14 x 10	7
0951751525	0951751545	100 x 70	20 x 5	18 x 2	16 x 10	7
0951751527	0951751547	150 x 100	30 x 6	22 x 2	20 x 12	8
0951751528	0951751548	200 x 130	30 x 7	26 x 3	24 x 14	9
0951751530	0951751550	300 x 200	40 x 8	32 x 3	30 x 18	11



Accuracy class 1, not tempered

				
90° flat squares	90° try squares	Length of beams mm	Section mm	µm
0951751564	0951751604	75 x 50	15 x 5	14
0951751565	0951751605	100 x 70	20 x 5	15
0951751567	0951751607	150 x 100	28 x 6	18
0951751568	0951751608	200 x 130	32 x 7	20
0951751569	0951751609	250 x 165	35 x 8	23
0951751570	0951751610	300 x 200	40 x 8	25
0951751572	0951751612	500 x 330	50 x 10	35
0951751574	0951751614	750 x 500	60 x 12	43
0951751575	0951751615	1000 x 660	70 x 14	60





Factory standard

Hardened steel

Suited plastic case

Brown & Sharpe Try Square Set



06739001

Brown & Sharpe Try Square Set



mm

µm

Consisting of:

1 Try square	68 x 45	16
1 Try square	120 x 70	16
1 Try square	175 x 95	16



DIN 875
NF E 11-103

Stainless steel
hardened to
≥ 550 HV 30



Accuracy
class 00



Suited
carrying case



Declaration
of conformity

ROCH Bevelled Edge Squares

Made from stainless steel, hardened



Length
of beams
mm

Section
of beams
mm

µm

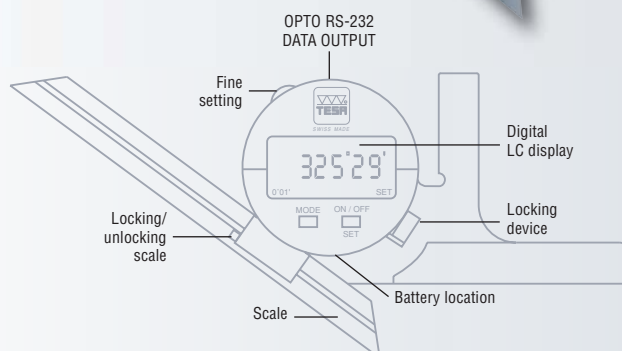
90° flat squares

0951751533	50 x 40	14 x 4,5	3
0951751534	75 x 50	16 x 4	3
0951751535	100 x 70	20 x 5	3
0951751537	150 x 100	28 x 6	4
0951751538	200 x 130	30 x 7	4



TESA Angle Protractor with Numerical Indication

- Decimal or sexagesimal large LC display
- 2 measuring directions
- Fine setting
- Locking device
- Scales - 200 300 or 500 mm



No

=

00630010

TESA angle protractor with numerical indication.
Provided with a regular scale, 200 mm long.

Accessories

00660004	Scale, 200 mm
00660005	Scale, 300 mm
00660006	Scale, 500 mm
00660007	Extra base with one flat plus one prismatic measuring faces for small angles
00660008	Edge square for sharp angles
01961000	3V lithium battery, type CR 2032, 190 mAh

For information on connecting cables etc., see section A.



00660007



00660008



LCD,
5 digits + sign



Measuring
ranges: 1 x 360°,
2 x 180°, 4 x 90°



Digit height:
8,5 mm



Resolution:
0,01° or 1 minute
of arc (0°01')



Preset
to 0° or 180°



Max. perm. error:
4 minutes of arc



Max. perm.
rotation speed:
1080°/s



IP51
(IEC 529)



+5 °C to +40 °C



3V lithium battery,
type CR 2032



Battery life
> 3000 hours



RS 232,
opto-coupled



Stainless
steel body,
hardened



410 g



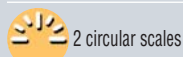
Wooden case



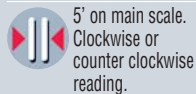
Serial number



Declaration of con-
formity



2 circular scales



5' on main scale.
Clockwise or
counter clockwise
reading.



10° on the
auxiliary scale



Stainless steel,
hardened



Max. perm.
error: 5' (without
accessory)



Plastic case



Declaration
of conformity

TESA EAC Angle Protractors with Dial

Circular scale with pointer – Easy, reliable readout of both the main and auxiliary scales – Very low hysteresis – Precision movement mechanism with compensation of play.



Scale length
mm

00630001 4 x 90°

200

00630002 4 x 90°

300

Optional accessories



mm

00660002 Scale

200

00660003 Scale

300

00610101 Auxiliary scale for acute angles up to 15°

00610102 Cast iron base with steel bottom surface, hardened



00610102



00610101



5'



Stainless steel,
hardened



Max. perm.
error: 5' (without
accessory)

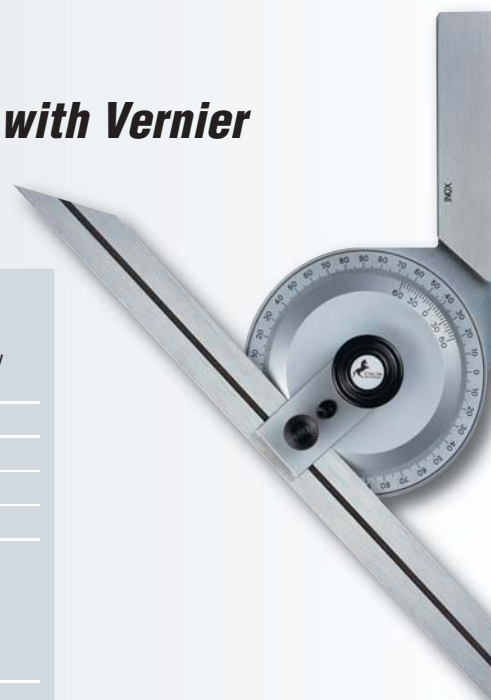


Plastic case



Declaration
of conformity

ETALON 436 Angle Protractor with Vernier



Scale
mm

Auxiliary
scale

076115566 4 x 90°

200

–

076115567 4 x 90°

300

–

076116009 4 x 90°

200

●

076116010 4 x 90°

300

●

Optional Accessories (as shown above)



mm

00660002 Scale

200

00660003 Scale

300

00610101 Auxiliary scale for acute angles up to 15°

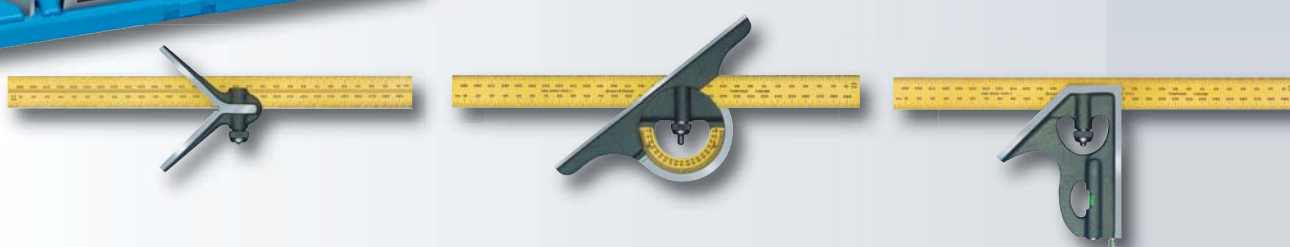
00610102 Cast iron base with steel bottom surface, hardened

00610103 Magnifying glass



Brown & Sharpe Angle Protractor Combination

Commonly used as bevelled protractor, ruler, scale, try square, depth and centre gauge as well as spirit level.



Nº

=

06719000 Brown & Sharpe Angle Protractor Combination

Consisting of:

- 1 Ruler graduated in millimetres, 300 mm long
- 1 Protractor head with 2 x 90° graduations
- 1 Centre head
- 1 Square head with hardened steel scriber



Hardened steel,
wear protected
measuring faces



Suited plastic case

Brown & Sharpe Sine Bar

Suited for setting ranges from 0 to 60° – Sine function for establishing the angle that needs to be set on the basis of the length dimensions obtained from parallel gauge blocks.



Nº

Centre distance

mm

06769005

127 ± 0,004

123 x 25



5 µm



Hardened steel



Removable
front stop



Cardboard box



Declaration
of conformity



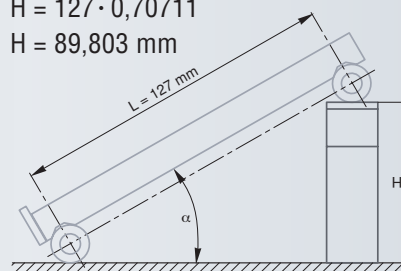
Calculating a 45° setting angle (example)

Gauge block combination H

$$H = l \cdot \sin \alpha$$

$$H = 127 \cdot 0,70711$$

$$H = 89,803 \text{ mm}$$





Angle standard made of fine-grained granite

Max. perm. error for squareness and straightness applies to the whole measuring range (carriage travel).

Valid for a theoretical line drawn symmetrically to the lateral guiding faces, at a distance of about 60 mm from the one in front of the angle standard.

ETALON RA only (without value sensor): 0,2 µm

Temperature stabilisation at < 0,1°C

Needed pressure: > 5 bar
Air consumption: < 20 l / min

Dimensions (L x W x H):
ETALON RA 500
250 x 80 x 634 mm
ETALON RA 700
250 x 80 x 884 mm

Suited carrying case

SCS calibration certificate

ETALON RA for Squareness Measurement

High-precision measuring instruments for determining squareness, straightness and parallelism errors – Perfect for use in the inspection laboratory as on the shop floor.

- Angle and straightness standards are made of natural granite with finely lapped measuring faces.
- Patented, hand moved carriage that attaches by vacuum on the guiding face of the angular standard. The grid potential thus obtained enables the carriage to be guided free of play.
- Base face on air bearing for easy displacement of the reference angle on the surface plate, practically without wear and tear.
- Helpful optional accessories to make measuring easy.



No	=	mm	Frontal µm	Lateral µm	µm	kg
05319201	ETALON RA 500	500	1,2	5	1,2	26
05319202	ETALON RA 700	700	1,5	7	1,5	37
Optional Accessories						
05360007	Auxiliary vacuum square for mounting either a flat or a try square at right angle on the ETALON RA front face.					
05360008	Probe holder with a 8 mm dia. clamp for inspecting the angle lying inside a flat or a try square and the like.					
05360009	Air filter unit (oil and water collector)					
05360011	Wooden case for safe storage of ETALON RA 500					
05360012	Wooden case for safe storage of ETALON RA 700					



TESA ClinoBEVEL 1 Electronic Inclinometer

User-friendly, versatile inclinometer made to measure the amount of tilt using either of both direct and differential modes – Measuring range $\pm 45^\circ$ with clear display of any measured angles or slopes – Reinforced aluminium housing and latest electronics – Large LC display for error free read-out.



05330203

TESA ClinoBEVEL 1 USB

$\pm 45^\circ$

mm/m

mm

100 x 75 x 35

Supplied with:

ClinoSOFT Software plus USB cable to host computer

Optional Accessories

04768002

4 Batteries, type LRC 6, AA, 1,5 V)

05360006

Cable with switch for value acquisition (2 m long)

05360014

Remote switch for value acquisition (range 10 to 15 m)

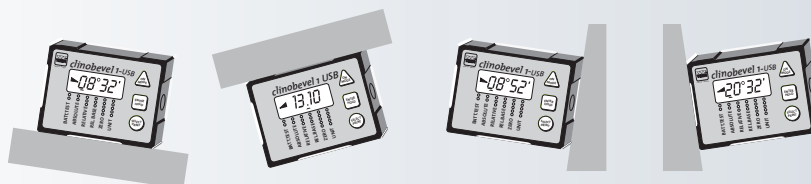
Numerous measuring applications, including comparative measurement of two parallel surfaces by means of two inclinometers. Inspection reports are also automatically generated under Microsoft EXCEL.



Measuring functions available: A ; B ; A+B ; A-B



ClinoBEVEL 1 USB can be used on any of its four faces.



DIN 2276
Part 2
(Form D)



LC display

Angle

Decimal or sexagesimal

Inclination

mm/m, in/10 or 12 in, mm
or in/basis length, radian
(mrad) and the like



Capacitive meas-
uring system with
gravity pendulum



Anodised light alloy



Flat face
4 x 90°



2' + 1 numerical
interval



21 storable
correction values
(high accuracy)



Response
time ≈ 1 s



Display lock



RS 485,
asynchronous,
7 bits, 2 stop bits,
no parity, 9600 bauds



1,5 V battery,
type LRC 6, AA



≈ 150 hours



Automatic
shut down
after 8 min



0 to 40 °C



-20 to 70 °C



IP65
(IEC 60529)



EN 50081-1 / -2
EN 50082-1 / -2



100 x 75 x 35 mm



0,52 kg



Plastic case



Identification
number



Inspection report
with a declaration
of conformity



DIN 2276
Part 2
(Form D)

LC display

Angle
Decimal or sexagesimal

Inclination
mm/m, in/10 or 12 in, mm
or in/basis length, radian
(mrad) and the like

Capacitive measuring system with gravity pendulum

Rust inhibiting housing

2 flat measuring faces with V-slot for diameters from 17 to 94 mm

5" +0,07% based on measured value

Response time: < 5 s

RS 232

2 batteries 1,5 V, type LRC 6, AA

40 to 60 hours

150x150x35 mm

3 kg

Automatic shut down after 8 min

0 to 40 °C

-20 to 70 °C

IP65
(IEC 60529)

EN 50081-1 / -2
EN 50082-1 / -2

Plastic case

Identification number

Declaration of conformity

TESA ClinoBEVEL 2 Electronic Inclinometer

World-class model – Tilting range $\pm 45^\circ$ with inclination or angle units clearly displayed – Integrated temperature compensation – Microprocessor-based auxiliaries allowing both display and tool setting – Dual data output for comparative measurements etc.



No

=

mm

mm

mm

05330202 TESA ClinoBEVEL 2 $\pm 45^\circ$ $\geq 5''$ 100 x 150 x 35

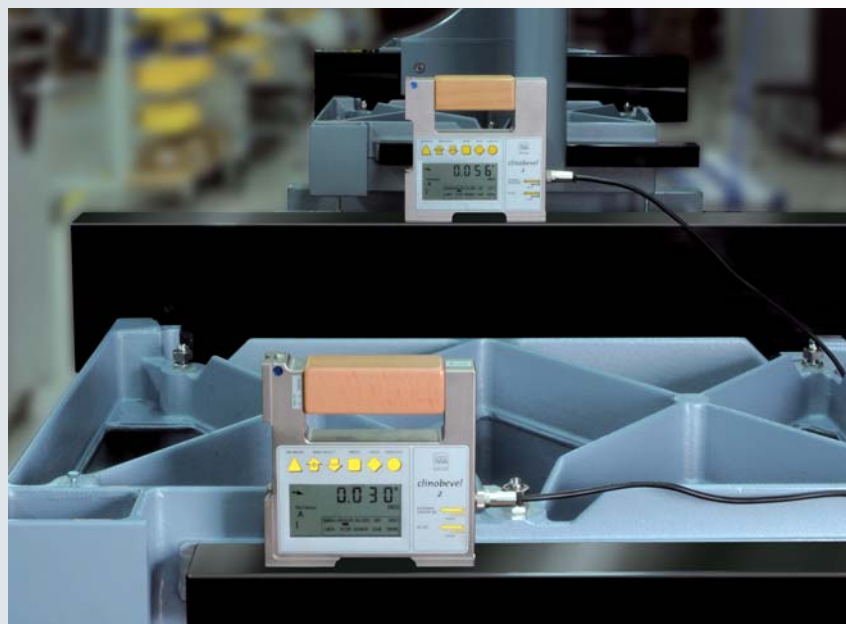
Optional Accessories

04768002 4 Batteries, type LRC 6, AA, 1,5 V

05360004 Cable for connecting two Clinobevel 2, length 2,50 m

S53070174 RS885 connecting cable Sub-D 9p/f to PC

ClinobeVEL 2 can be used on either of its both reference faces, but also linked to a second inclinometer. Use of a PC is unnecessary.



L

TESA MICROBEVEL 1

These electronic inclinometers measure slightly inclined surfaces, precisely – e.g. when inspecting flatness of a surface plate or the geometry of a machine – Specially suited for use in rough surrounding conditions.

			Basis length mm	Width mm	 mm/m	 kg
05330003	Horizontal model	110	45	0,01 or 0,001	1,8	
05330004	Horizontal model	150	45	0,01 or 0,001	2,1	
05330005	Square model	150	45	0,01 or 0,001	3,1	
Models with numerical interval to 0,05 or 0,005 mm/m available on request						
Optional Accessories						
04768002	4 Batteries, type LRC 6, AA, 1,5 V					



DIN 2276
Part 2
(Style D)



LCD
(see table)



See table



Fully encapsulated
measuring
system with gravity
pendulum



Cast iron base,
chromium plated
side faces,
varnished light alloy
housing



2 flat measuring
faces with V-slot
for diameters
from 20 to 120 mm



See table below



Response
time < 3 s



1 mV per unit
(100 kΩ)



1,5 V battery,
type LRC 6, AA



100 to 140 hours



Automatic
shut down
after 55 min



0 to 40°C



-20 to 70°C



≤ 0,1% / °C
based on the
measuring range
at 20 ± 5°C



As in above table,
incl. suited case



EN 50081-1 / -2
EN 50082-1 / -2



Plastic case



Identification
number



Declaration
of conformity

				 G = mm/m	 G = mm/m
Range	mm/m	mm/m	mm	≤ 5 mm/m	> 5 mm/m
1	± 20	± 5	0,01	G = 1% of measured value plus at least 0,01 mm/m	G = 0,01 mm/m
Range	mm/m	mm/m	mm	≤ 1 mm/m	> 1 mm/m
2	± 2	± 2	0,001	G = 1% of measured value plus at least 0,001 mm/m	G = 1% of (2x measured value - 1)



BEVELtronic 2

1 flat measuring face and 1 perpendicular face with a V-slot for diameters from 20 to 120 mm

BEVELmeter 2

LCD

Response time ≤ 3 s

RS232

33 à 40h

Automatic shut down after 8 min

SERVICE SET 2

0°C to 40°C

-20°C to 70°C

< 95%

EN 50081-1 / EN 50082-1

Plastic case

Identification number

Declaration of conformity

Inclinometer Sets for TESA SERVICE SET 2

Two distinct sets are available : TESA SERVICE SET 2-C operating with cables only, and TESA SERVICE SET 2-W allowing for data transfer either through cables or using the wireless operating mode.

Possible connection of a separate BEVELmeter 2 display unit to each BEVELtronic 2 for comparative measurement.



TESA SERVICE SET 2-W

TESA SERVICE SET 2-C

						
05330304	TESA SERVICE SET 2-C	± 10	1	0,2	*	**
05330305	TESA SERVICE SET 2-C	± 50	5	1	*	**
05330310	TESA SERVICE SET 2-W	± 10	1	0,2	*	**
05330311	TESA SERVICE SET 2-W	± 50	5	1	*	**

Each kit consists of the following:

- 1 BEVELtronic 2 – Horizontal model
- 1 BEVELtronic 2 – Square model
- 1 BEVELmeter 2, numerical interval to 0,001 or 0,005 mm/m
- 2 Single cables BEVELtronic 2 to BEVELmeter (2,5 m in length for each)
- 1 Infrared remote control
- 7 Alkaline batteries, type LR14 1,5V, C
- 2 Alkaline batteries, type LR03 1,5V, AA

* Maximum 1% of measured value + minimum 1 digit

** Maximum 1% of (2x measured value less 0,5x full scale value)

Additional Data

			
	Basis length mm	Width mm	kg
BEVELtronic 2 – Horizontal model	150	45	1,6
BEVELtronic 2 – Square model	150	45	1,7

Made for highly accurate difference measurements taken, for example, on granite plates or guiding rails or for checking the straightness.



TESA BEVELSOFT for SERVICE SET 2

The software that allows for geometry and flatness measurements.

TESA BEVELSOFT is specially designed for checking surfaces, but also for viewing any changes that need be made. Icon-driven menus besides a wide choice of languages available make it simple for the operator to quickly create full inspection reports.



Standards:
DIN 876, JIS,
GGG-P-463c,
BS 817, ISO 8512



Minimum requirements
for the computer:

- Microsoft Windows 98 / NT / 2000 / XP / 7
- Pentium III
- 128 MB RAM
- Graphics card, 800 x 600 pixels
- CD-Rom
- 50 MB free space on hard disk



05360015 TESA BEVELSOFT

Consisting of:

CD containing instructions for installation and TESA BEVELsoft programme
USB dongle

Connecting cable BEVELmeter 2/PC along with 2 extra outlets
and connector RS485 Sub-D 9-pin/f connector, length 2,5 m

Power supply, 24 V

Hand switch with cable for value acquisition, length 2,5 m

Measuring functions



Straight line

Twisted line



Parallelism

2 or 3 lines

Twisted parallelism

2 or 3 lines



Perpendicularity

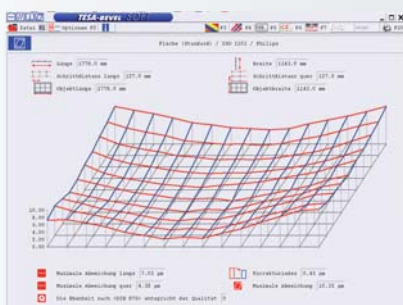
Various references



Flatness

Standard and U-Jack

Partial flatness



Measurement of a large granite plate



Measurement of a granite plate according to U-Jack



DIN 2276
Part 2
(Style D)



See table



See table



Inductive meas-
uring system with
gravity pendulum



Cast iron
body.
Horizontal model with
granite base.



Horizontal model
with a flat meas-
uring face. Square
model with 2 flat faces hav-
ing a V-slot for diameters
from 20 to 120 mm



0,005 mm / m
+ 1% of the
measured value



0,001 mm / m



$\approx \pm 0,2$ V
Impedance
4,5 k Ω



10 to 30°C



-20 to 60°C



EN 50081-1 / -2
EN 50082-1 / -2



Wooden case



Identification
number



Declaration
of conformity

TESA NIVELTRONIC Electronic Levels

Most popular electronic levels with a solid cast iron body used for checking and levelling horizontal and vertical surfaces – Also suitable for accurate measurement of small angles, especially while inspecting surface flatness of granite plates.



					
		Basis length mm	Width mm	mm/m	kg
03130063	Horizontal model	150	45	0,05 / 0,01	6,0**
03130060	Square model	200	45	0,05 / 0,01	6,5**
Optional Accessories					
03160007	Granite base*	200	50		1,0
03160008	Granite base*	250	50		1,5
03160009	Granite base*	500	50		6,0
03160048	Holder with built-in voltage regulator (4,65 V) plus 1 battery-set as below				
04761059	1 Set = 4 spare batteries, type LR 03, AAA, 1,5 V				
* For horizontal model ** Along with a wooden case					



Range	mm/m	"	mm/m	"
1	$\pm 0,75$	$\pm 150''$	0,05	10''
2	$\pm 0,15$	$\pm 30''$	0,01	2''

TESA Spirit Levels



DIN 877



See table



DIN 2276
Part 1



No. 05331350 to
No. 05331352
in a wooden
case, others models in
cardboard boxes



Declaration
of conformity



mm/m



mm



For shafts
mm

Model A Spirit levels with a prismatic measuring face, Ω-shaped

05331650	1,0	100 x 30 x 35	17 ÷ 80
05331651	0,3	100 x 30 x 35	17 ÷ 80

Model B Tubular spirit levels with a flat measuring face

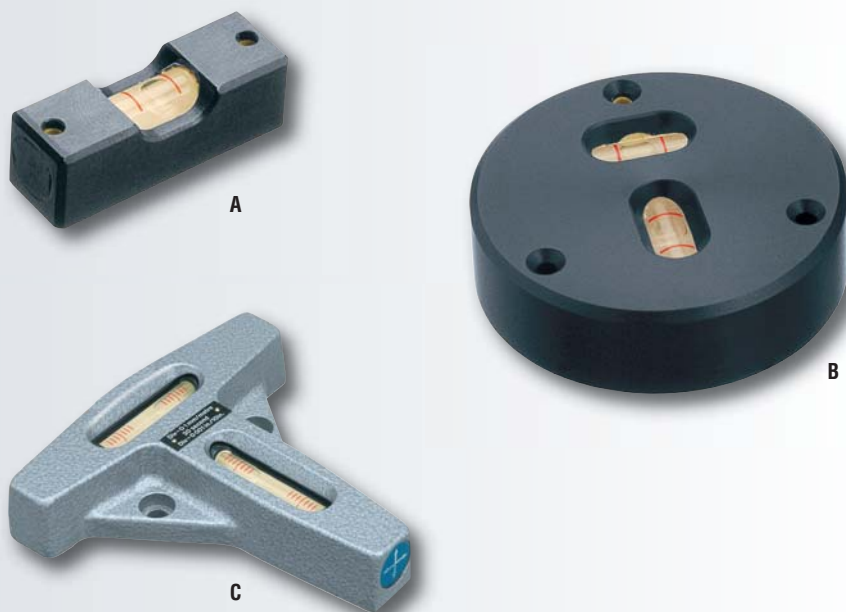
05331250	0,1	80 x 9, Ø 16	
05331251	0,3	80 x 9, Ø 16	
05331252	0,1	100 x 10, Ø 20	
05331254	0,05	150 x 11, Ø 22	
05331255	0,1	150 x 11, Ø 22	
05331256	0,3	150 x 11, Ø 22	
05331257	0,05	200 x 12, Ø 22	
05331258	0,1	200 x 12, Ø 22	

Model C Spirit levels for transmission shafts with side viewing slots

05331350	0,05	100 x 30 x 35	17 ÷ 80
05331351	0,3	100 x 30 x 35	17 ÷ 80
05331352	0,1	200 x 30 x 35	17 ÷ 80



TESA Screw-On Spirit Levels



					
Model A	<i>Screw-on spirit levels with a longitudinal vial</i>				
05331400		2 ÷ 5	30 x 10		10
05331401		2 ÷ 5	40 x 10		11
05331402		1,0	50 x 10		12
05331404		1,0	60 x 12		14
05331406		0,3	60 x 12		14
05331407		2 ÷ 5	80 x 15		18
05331408		0,1	80 x 15		18
05331410		1,0	100 x 18		22
05331411		0,1	100 x 18		22
Model B	<i>Circular screw-on spirit levels with both a longitudinal and cross vials</i>				
05331500		2 ÷ 5		40	11
05331502		0,3		60	13
Model C	<i>T-shaped screw-on spirit levels with both a longitudinal and cross vials</i>				
05331550		0,1	80 x 65		17
05331551		0,3	80 x 65		17
05331552		0,02	150 x 147		30

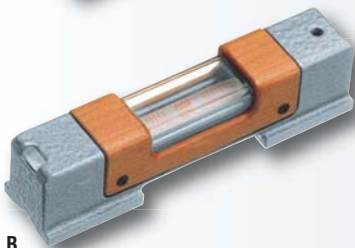


TESA Precision Spirit Levels

Used for checking and aligning flat or cylindrical surfaces in the horizontal position.



A



B



C



mm/m

mm

For shafts
mm

Precision spirit level with insulating pad

No	mm/m	mm	For shafts mm	A
05331600	0,05	100 x 45 x 35	19 ÷ 120	A

Precision spirit levels with insulating grip and vial protection, side viewing slots

No	mm/m	mm	For shafts mm	A
05331050	0,02	100 x 32 x 35	17 ÷ 84	B
05331051	0,1	100 x 32 x 35	17 ÷ 84	B
05331052	0,3	100 x 32 x 35	17 ÷ 84	B
05331054	0,02	150 x 35 x 38	17 ÷ 94	C
05331056	0,05	150 x 35 x 38	17 ÷ 94	C
05331057	0,1	150 x 35 x 38	17 ÷ 94	C
05331058	0,02	200 x 40 x 42	19 ÷ 108	C
05331059	0,04	200 x 40 x 42	19 ÷ 108	C
05331061	0,1	200 x 40 x 42	19 ÷ 108	C
05331063	0,02	250 x 45 x 42	19 ÷ 120	C
05331065	0,05	300 x 50 x 42	22 ÷ 135	C



DIN 877



Longitudinal and cross level vials



Flat and prismatic measuring faces



See table



DIN 2276 Part 1



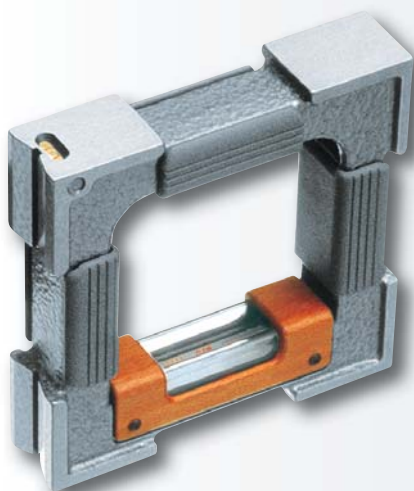
Wooden case



Declaration of conformity

TESA Precision Spirit Levels with a Frame

For checking and levelling flat or cylindrical surfaces in both horizontal and vertical positions – Insulating grips and vial protection – Side viewing slots.



mm/m

mm

For shafts
mm

No	mm/m	mm	For shafts mm
05331201	0,05	100 x 100 x 32	17 ÷ 84
05331202	0,1	100 x 100 x 32	17 ÷ 84
05331204	0,05	150 x 150 x 35	17 ÷ 94
05331206	0,02	200 x 200 x 40	19 ÷ 108
05331208	0,05	200 x 200 x 40	19 ÷ 108
05331210	0,05	250 x 250 x 45	19 ÷ 120



DIN 877



Longitudinal and cross level vials



4 x 90° flat measuring faces, machined to one another. Two of them have a V-shape



See table



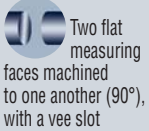
DIN 2276 Part 1



Wooden case



Declaration of conformity



TESA Precision Spirit Levels Magnetic Square Models

For inspecting and levelling flat or cylindrical surfaces in both horizontal and vertical positions – Attach magnetically on such surfaces – Fitted with insulating handle.

No	mm/m	mm	For shafts mm
05331000	0,02	150 x 150 x 40	19 ÷ 108
05331001	0,04	150 x 150 x 40	19 ÷ 108
05331002	0,05	150 x 150 x 40	19 ÷ 108



TESA Precision Spirit Level with Micrometer Element

For checking surface flatness and slopes – With insulating pads.

No	mm/m	mm	For shafts mm
05331450	0,02	150 x 45 x 45	19 ÷ 120



TESA Protractor Spirit Inclinator

No		Vial	mm	For shafts mm
05331300	4 x 90°	1°	7 ÷ 17'	180 x 75 x 22



TESA Protractor Spirit Inclinometers



Factory standard



Longitudinal and cross level vials

Square model



90° flat measuring faces with added V-slot, machined to one another.

Model with a frame

Four 90° measuring faces, machined to one another. Two of them have a V-slot.



Wooden case



Declaration of conformity



Vernier



Vial



mm



For shafts mm

Square model with fine setting for the pivoting vial

05331150	90°	10'	1'	150 x 150 x 40	19 ÷ 108
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Model with frame and fine setting for the rotating vial

05331700	2 x 180°	3'	1'	150 x 150 x 40	19 ÷ 108
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TESA Spirit Clinometer with Micrometer Element



DIN 877



Longitudinal and cross level vials



Hardened and ground base



Flat and prismatic measuring faces



DIN 2276 part 1



Wooden case



Declaration of conformity



Micrometer element



Vial



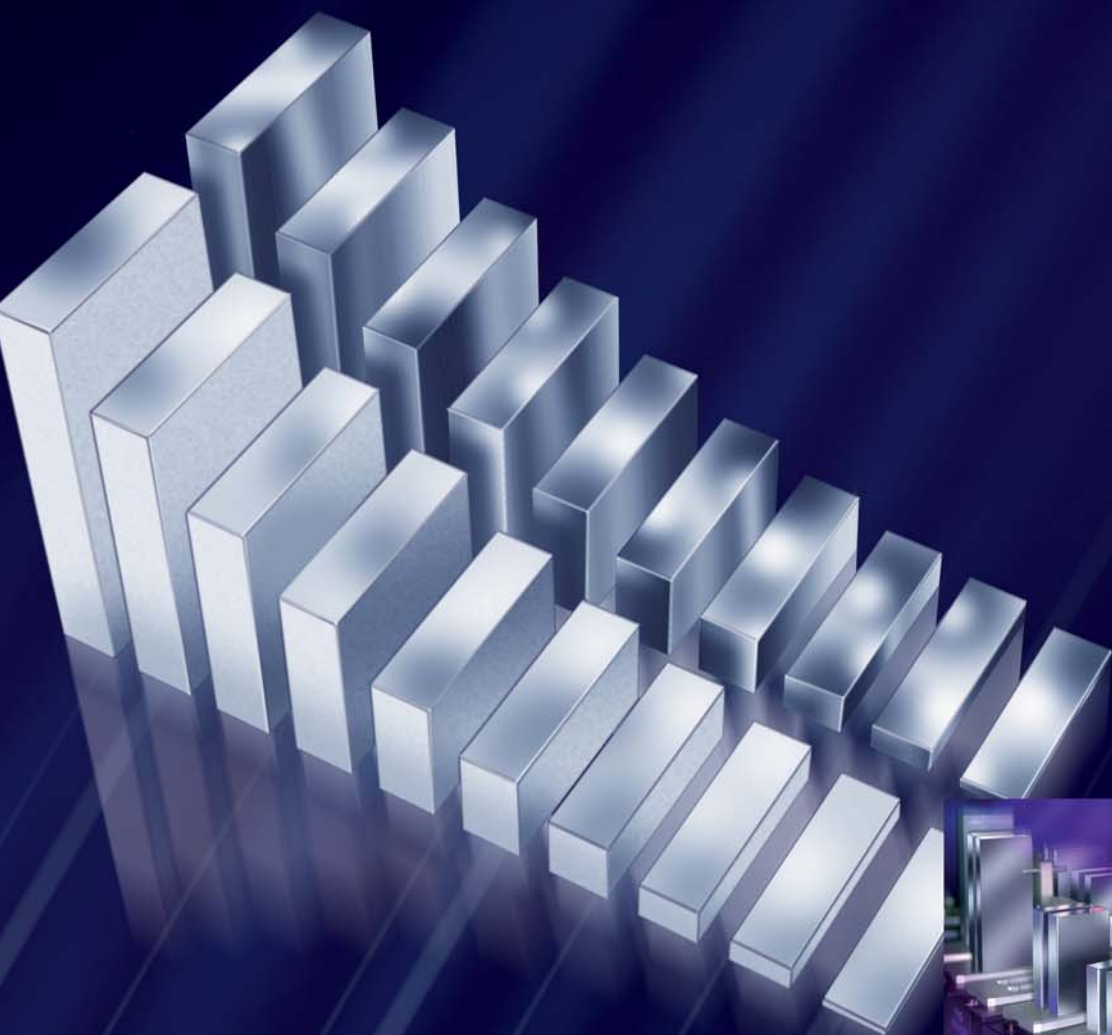
mm



For shafts mm

05331750	2 x 180°	1'	1'	150 x 35 x 116	17 ÷ 80
----------	----------	----	----	----------------	---------

Length and Angle Standards



PURCHASING GAUGE BLOCKS CALLS FOR CONFIDENCE

The high accuracy of TESA's gauge blocks is the result of years of experience in producing and making use of these products.

- Use of high quality raw materials and appropriate heat treatment, thus guaranteeing a durable shape and dimensional stability of the gauge blocks over years.
- Very low deviations in flatness and parallelism of the measuring faces, resulting in highly accurate gauges.
- Unique flat lapping polish as well as edge rounding techniques, leading to superior wringability.
- Proper serial number marked on each gauge block.

ISO 3650

Gauge blocks with metric nominal lengths conform to ISO 3650:1998. This international standard is based on the ones published either in a region, e.g. the European standard EN ISO 3650:1998 or in a country, e.g. the Swiss standard SN EN ISO 3650, German standard DIN EN ISO 3650 or French standard NF EN ISO 3650.

Gauge blocks with imperial nominal lengths comply with BS 4311 - Part 1. Compared to earlier standards, ISO 3650:1998 includes the following main changes:

- Withdrawal of the accuracy grade 00 (see «Which grade do you need»).
- Introduction of requirements as regards the uncertainty of measurement in relation to the declaration of conformance of the product according to ISO 14253-1:1998.
- Review of some definitions and shortened form of terms according to normative references that are currently applicable (see drawing).

Which Material Do You Need?

Steel

Steel gauge blocks have proven their reliability for more than hundred years. This raw material remains the most commonly accepted for length standards.

Steel gauge blocks provide high resistance to wear associated with a good property to adhere to other gauge blocks. However, steel must be protected against corrosion. Provided gauge blocks made from this material are properly handled, they will remain reliable for many years. TESA steel gauge blocks have the following key features:

- Highly alloyed steel
- Hardness guaranteed to 800 HV
- Artificially aged for optimum form and dimensional stability
- Coefficient of thermal expansion: $(11,5 \pm 1,0) \times 10^{-6} \text{ K}^{-1}$

Tungsten Carbide

Gauge blocks in tungsten carbide are 10 times as much resistant as steel gauges. They are intended for frequent use, also where superior wringing quality is required. TESA tungsten carbide gauge blocks provide:

- Hardness guaranteed to 1400 HV
- Coefficient of thermal expansion: $(4,23 \pm 0,1) \times 10^{-6} \text{ K}^{-1}$

Ceramic

Ceramic gauge blocks are extremely resistant to wear and scratches. Due to the properties of this material, any minor damage is unlikely to affect the wringability of their measuring faces. Being corrosion resistant, these gauge blocks are insensitive to sweaty hands, among others.

Manufactured from stabilised zirconia, TESA ceramic gauge blocks have the following key features:

- Non-magnetizable
- Hardness guaranteed to 1400 HV
- Coefficient of thermal expansion: $(9,7 \pm 0,8) \times 10^{-6} \text{ K}^{-1}$



Which Grade Do You Need?

Grade 2

These gauge blocks are commonly used as «**Working Standards**» in inspection rooms within the production to set and calibrate measuring instruments and other equipment as well as to inspect tools, fixtures and machines.

Grade 1

Gauge blocks of this class are mainly used as «**Working Standards**» to set and calibrate plug gauges and measuring instruments in measuring rooms or inspection areas within the production.

Grade 0

These gauge blocks are designated for use as «**Company Standards**» in calibration laboratories or environmentally controlled inspection room to set and calibrate plug gauges as well as measuring equipment.

Calibration grade K

Gauge blocks of this tolerance class are intended for use as «**Reference Standards**» in metrology oriented laboratories of National Institutes, precision measuring rooms and other laboratories of National Calibration Services, whether officially accredited or not. They should be used as masters to calibrate gauge blocks, length standards of same accuracy and measuring instruments as well.

Grade 00

The new standard ISO 3650 does no longer take this accuracy grade into consideration as the uncertainties of measurement achieved with the procedure applied for calibration usually lead to a disparity against specified tolerances.

The rules to the expression of uncertainty of measurement for proving the conformance or non conformance of the product with the specification, as stated in the standard ISO 14253-1:1998, have dictated the decision to withdraw the accuracy grade 00.

A wide experience in practical use of gauge blocks has proven that gauges of the calibration class K could easily replace those of the earlier accuracy grade 00. As a result, gauge blocks of grade 00 are no longer available.



Certificate of Calibration and Traceability

All set compositions from TESA are supplied with a certificate of calibration issued by the accredited calibration laboratory of a national calibration service. This service can either be the Swiss calibration service (SCS), British calibration service (UKAS) or Comité Français d'Accréditation (COFRAC) depending on the manufacturer.

Accreditation is the authentic assurance of the skills of the calibration laboratories as well as of the full traceability to national standards that conform with the International System of Units (SI). And this for any reference standard or measuring equipment being used.

Owing to a multilateral agreement (MLA), any certificates of calibration issued by the members of the European Cooperation for Accreditation of Laboratories (EA) is internationally accepted.



Deliveries

TESA gauge blocks can be delivered individually or in full sets with nominal lengths as listed in this section. Additional gauge sets and lengths can be made available upon request. Since individual gauge blocks could no be listed in their whole here, any inquiry or purchase order should specify:

- desired nominal length
- chosen material
- calibration grade or any other grade



Limit Deviations and Tolerances



Limit deviations t_e

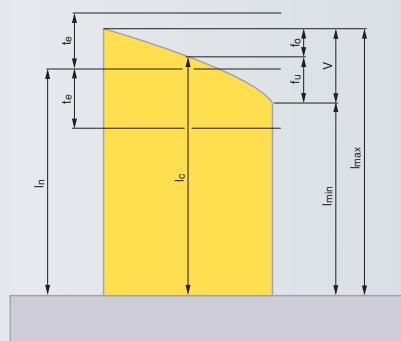


Tolerances t_v



Flatness tolerance t_r

Nominal length	Calibration grade and other grades			
	K	0	1	2
mm	μm	μm	μm	μm
$0,5 \leq l_n \leq 150$	0,05	0,1	0,15	0,25
$150 < l_n \leq 500$	0,1	0,15	0,18	0,25
$500 < l_n \leq 1000$	0,15	0,18	0,2	0,25



Nominal length l_n . Central length l_c .
Variation v with t_o and t_u .
Limit deviations t_e at any point, proceeding from the nominal length.

Nominal length	Calibration grade K		Grade 0		Grade 1		Grade 2	
	Limit deviation of length at any point from nominal length	Tolerance for the variation in length	Limit deviation of length at any point from nominal length	Tolerance for the variation in length	Limit deviation of length at any point from nominal length	Tolerance for the variation in length	Limit deviation of length at any point from nominal length	Tolerance for the variation in length
mm	$\pm t_e$ μm	t_v μm	$\pm t_e$ μm	t_v μm	$\pm t_e$ μm	t_v μm	$\pm t_e$ μm	t_v μm
$0,5 \geq l_n \leq 10$	0,2	0,05	0,12	0,1	0,2	0,16	0,45	0,3
$10 < l_n \leq 25$	0,3	0,05	0,14	0,1	0,3	0,16	0,6	0,3
$25 < l_n \leq 50$	0,4	0,06	0,2	0,1	0,4	0,18	0,8	0,3
$50 < l_n \leq 75$	0,5	0,06	0,25	0,12	0,5	0,18	1	0,35
$75 < l_n \leq 100$	0,6	0,07	0,3	0,12	0,6	0,2	1,2	0,35
$100 < l_n \leq 150$	0,8	0,08	0,4	0,14	0,8	0,2	1,6	0,4
$150 < l_n \leq 200$	1	0,09	0,5	0,16	1	0,25	2	0,4
$200 < l_n \leq 250$	1,2	0,1	0,6	0,16	1,2	0,25	2,4	0,45
$250 < l_n \leq 300$	1,4	0,1	0,7	0,18	1,4	0,25	2,8	0,5
$300 < l_n \leq 400$	1,8	0,12	0,9	0,2	1,8	0,3	3,6	0,5
$400 < l_n \leq 500$	2,2	0,14	1,1	0,25	2,2	0,35	4,4	0,6
$500 < l_n \leq 600$	2,6	0,16	1,3	0,25	2,6	0,4	5,0	0,7
$600 < l_n \leq 700$	3	0,18	1,5	0,3	3	0,45	6,0	0,7
$700 < l_n \leq 800$	3,4	0,2	1,7	0,3	3,4	0,5	6,5	0,8
$800 < l_n \leq 900$	3,8	0,2	1,9	0,35	3,8	0,5	7,5	0,9
$900 < l_n \leq 1000$	4,2	0,25	2,0	0,4	4,2	0,6	8	1

Limit deviations and tolerances according to ISO 3650

mm	$\pm t_e$ μm	t_v μm	$\pm t_e$ μm	t_v μm	$\pm t_e$ μm	t_v μm	$\pm t_e$ μm	t_v μm
$0,5 \geq l_n \leq 10$	0,2	0,05	0,12	0,1	0,2	0,16	0,45	0,3
$10 < l_n \leq 25$	0,3	0,05	0,14	0,1	0,3	0,16	0,6	0,3
$25 < l_n \leq 50$	0,4	0,06	0,2	0,1	0,4	0,18	0,8	0,3
$50 < l_n \leq 75$	0,5	0,06	0,25	0,12	0,5	0,18	1	0,35
$75 < l_n \leq 100$	0,6	0,07	0,3	0,12	0,6	0,2	1,2	0,35
$100 < l_n \leq 150$	0,8	0,08	0,4	0,14	0,8	0,2	1,6	0,4
$150 < l_n \leq 200$	1	0,09	0,5	0,16	1	0,25	2	0,4
$200 < l_n \leq 250$	1,2	0,1	0,6	0,16	1,2	0,25	2,4	0,45
$250 < l_n \leq 300$	1,4	0,1	0,7	0,18	1,4	0,25	2,8	0,5
$300 < l_n \leq 400$	1,8	0,12	0,9	0,2	1,8	0,3	3,6	0,5
$400 < l_n \leq 500$	2,2	0,14	1,1	0,25	2,2	0,35	4,4	0,6
$500 < l_n \leq 600$	2,6	0,16	1,3	0,25	2,6	0,4	5,0	0,7
$600 < l_n \leq 700$	3	0,18	1,5	0,3	3	0,45	6,0	0,7
$700 < l_n \leq 800$	3,4	0,2	1,7	0,3	3,4	0,5	6,5	0,8
$800 < l_n \leq 900$	3,8	0,2	1,9	0,35	3,8	0,5	7,5	0,9
$900 < l_n \leq 1000$	4,2	0,25	2,0	0,4	4,2	0,6	8	1

Limit deviations and tolerances according to BS 4311, Part 1:1993

in	$\pm t_e$ μin	t_v μin	$\pm t_e$ μin	t_v μin	$\pm t_e$ μin	t_v μin	$\pm t_e$ μin	t_v μin
$l_n \leq 0,4$	5	2	5	4	10	6	20	12
$0,4 < l_n \leq 1$	6	2	6	4	12	6	25	12
$1 < l_n \leq 2$	8	3	8	4	15	7	30	12
$2 < l_n \leq 3$	10	3	10	5	20	7	40	14
$3 < l_n \leq 4$	12	3	12	5	25	8	50	14

Limit deviations and tolerances according to factory standard for gauge blocks over 4 in

in	$\pm t_e$ μin	t_v μin	$\pm t_e$ μin	t_v μin	$\pm t_e$ μin	t_v μin	$\pm t_e$ μin	t_v μin
$4 < l_n \leq 6$	31	3	15	5	31	8	63	16
$6 < l_n \leq 8$	40	3	20	6	40	10	79	16
$8 < l_n \leq 10$	47	4	23	6	47	10	95	18
$10 < l_n \leq 12$	55	4	28	7	55	10	110	20
$12 < l_n \leq 16$	70	5	35	8	70	12	140	20
$16 < l_n \leq 20$	87	5	43	10	87	14	174	24



Steel:
highly alloyed,
wear resistant.
Tungsten carbide:
wear resistant and stable.
Ceramic:
stabilised zirconia,
extremely resistant
to wear
and scratches



Steel:
($11,5 \pm 1,0$) $\times 10^{-6} \text{ K}^{-1}$
Tungsten carbide:
($4,23 \pm 0,1$) $\times 10^{-6} \text{ K}^{-1}$
Ceramic:
($9,7 \pm 0,8$) $\times 10^{-6} \text{ K}^{-1}$



Limit deviations
to on page K-4



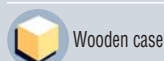
Tolerances to
on page K-4



See page K-4



Supplied
individually
or in sets



Wooden case



Identification
number



Steel gauges to
all grades with
DKD certificate.
Carbide or ceramic gauges
to all grades with UKAS
certificate

TESA Gauge Block Set, metric

Nominal lengths 1 to 100 mm



				Set compositions		
Steel	Carbide	Ceramic		mm	Steps mm	Pieces
						
32-Piece Set – M32						
0651516027	0651526027	0651536027	K	1,005		1
0651515027	0651525027	0651535027	0	1,01 ÷ 1,09	0,01	9
0651511027	0651521027	0651531027	1	1,1 ÷ 1,9	0,1	9
0651512028	0651522027	0651532027	2	1,0 ÷ 9,0	1,0	9
				10, 20, 30, 60		4
47-Piece Set – M47						
0651516021	0651526021	0651536021	K	1,005		1
0651515021	0651525021	0651535021	0	1,01 ÷ 1,09	0,01	9
0651511021	0651521021	0651531021	1	1,1 ÷ 1,9	0,1	9
0651512021	0651522021	0651532021	2	1,0 ÷ 24,0	1,0	24
				25 ÷ 100	25	4
88-Piece Set – M88						
0651516014	0651526014	0651536014	K	1,0005		1
0651515014	0651525014	0651535014	0	1,001 ÷ 1,009	0,001	9
0651511014	0651521014	0651531014	1	1,01 ÷ 1,49	0,01	49
0651512014	0651522014	0651532014	2	0,5 ÷ 9,5	0,5	19
				10 ÷ 100	10	10
112-Piece Set – M112						
0651516012	0651526012	0651536012	K	1,0005		1
0651515012	0651525012	0651535012	0	1,001 ÷ 1,009	0,001	9
0651511012	0651521012	0651531012	1	1,01 ÷ 1,49	0,01	49
0651512012	0651522012	0651532012	2	0,5 ÷ 24,5	0,5	49
				25 ÷ 100	25	4
122-Piece Set – M122						
0651516011	0651526011	0651536011	K	1,0005		1
0651515011	0651525011	0651535011	0	1,001 ÷ 1,009	0,001	9
0651511011	0651521011	0651531011	1	1,01 ÷ 1,49	0,01	49
0651512011	0651522011	0651532011	2	1,6 ÷ 1,9	0,1	4
				0,5 ÷ 24,5	0,5	49
				30 ÷ 100	10	8
				25, 75		2



TESA Maintenance Kit



Full set in a wooden case



No

=

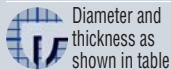
0652500450 TESA maintenance kit for gauge blocks

Supplied with the following items:

No

=

0652500452	1 Arkansas stone
0652500453	1 Soft tipped tweezers
0652500454	1 Pneumatic vacuum pen
0652500455	1 Nanofibre cleaning cloth
0652500456	1 Pair of cotton gloves
0652500457	1 Acid-free solvent
0652500458	1 Box with protective grease
02530050	1 Optical flat, 50 mm dia.
0652500460	1 Solvent container
0652500461	1 Dust remover
0652500462	1 Dust-brush
0652500463	1 Bottle of super-fine, acid-free oil
0652500451	1 Wooden case



Diameter and thickness as shown in table



Optical flats with 2 flat measuring faces.

No guaranty can be given for parallelism.



Wooden case

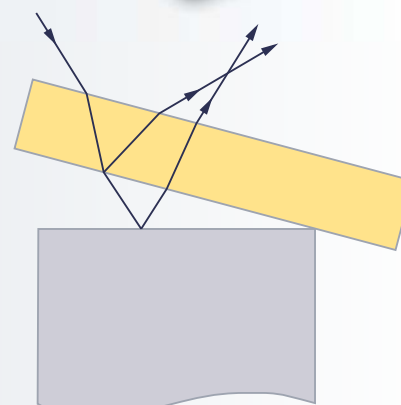
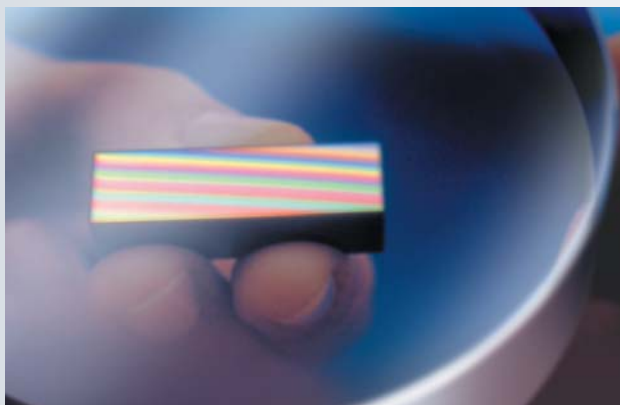


Declaration of conformity

TESA Optical flats

Used for examining flatness and wringability of gauge blocks or any other test pieces having flat faces with same high grade of accuracy.

			
	mm	mm	µm
02530050	50	15	0,125
02530075	75	20	0,125



Case in lacquered wood



406 x 406 x 355 mm (W x D x H)



Light source:
35 W sodium lamp,
89% monochromatic,
colour yellow,
wavelength 0,575 µm



See table



Surface plate in hardened steel



Surface plate: 0,5 µm



Surface plate: 2,5 µm



Suited carrying case

TESA Monochromatic Light Unit

For use with optical flats or optical parallels to measure both the flatness and parallelism of the measuring faces by interferometry.

Monochromatic light source providing high-contrast interference fringes. This light unit uses a single wavelength so that bright/light fringes only are visible.

The light source at the rear of the case also permits a visual examination, e.g. with the aid of a knife-edge or bevelled straight edge. .

	
0652500422	210 ÷ 230
<i>Accessories</i>	
0651570269	200 mm dia. surface plate. Lapped and polished measuring face
0652500424	Spare lamp (sodium)



Brown & Sharpe Angle Gauges

For setting and calibration purposes – Smallest step to 15' ($1/4^\circ$).



Hardened steel



30"



Width:
6,35 mm (1/4 in)
Length:
≥ 76,2 mm (3 in)



Suited plastic case



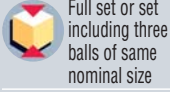
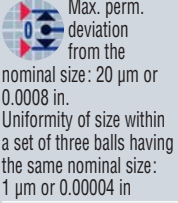
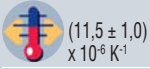
Set composition

06769002

1 Set = 12 precision squares

15'	30'	1°	2°	3°	4°
5°	10°	15°	20°	25°	30°

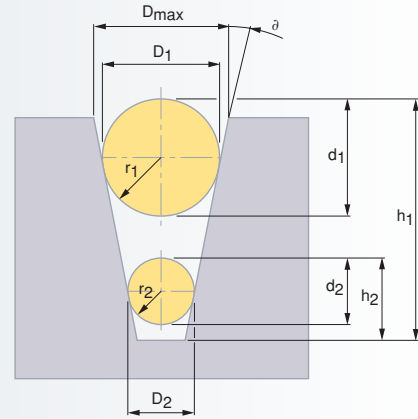




Steel Balls

Steel balls are used to measure internal tapers and the like.

TESA Steel Balls



 mm		 mm	 Step mm	 Pieces/ Nominal size	 Total pieces
0651500950	Steel ball set	1 ÷ 25	1	3	75
0651500951	Steel ball set	1,5 ÷ 12,5	1	3	36



Brown & Sharpe Steel Balls



 mm		 mm	 Step mm	 Pieces/ Nominal size	 Total pieces
06769009	Steel ball set	1 ÷ 25	1	2	50



Plug Gauges

The best and quickest method for inspecting bores with small diameters.

TESA CARY plug gauges with diameters from 0,050 up to 0,300 mm

Type TDH

Due to their small size, these plug gauges are best handled using tweezers.




mm	STANDARD $\pm 0,4 \mu\text{m}$		ETALON $\pm 0,15 \mu\text{m}$	
	Step 2 μm	1 μm	Step 2 μm	1 μm
0,050 ÷ 0,080	CJ1D1S2	CJ1D1S0	CJ1D1E2	CJ1D1E0
0,081 ÷ 0,309	CJ1D2S2	CJ1D2S0	CJ1D2E2	CJ1D2E0

Type TLH

This type is identical to the TDH one, but with a 30 mm long handle.




mm	STANDARD $\pm 0,4 \mu\text{m}$		ETALON $\pm 0,15 \mu\text{m}$	
	Step 2 μm	1 μm	Step 2 μm	1 μm
0,050 ÷ 0,080	CJ1L1S2	CJ1L1S0	CJ1L1E2	CJ1L1E0
0,081 ÷ 0,309	CJ1L2S2	CJ1L2S0	CJ1L2E2	CJ1L2E0

Type TLH-5 or TLH-10 with a length of 5 or 10 mm

	mm	STANDARD		ETALON	
		Step 2 μm	1 μm	Step 2 μm	1 μm
TLH-5	0,101 ÷ 0,309	CJ1L5S2	CJ1L5S0	CJ1L5E2	CJ1L5E0
TLH-10	0,101 ÷ 0,309	CJ1L10S2	CJ1L10S0	CJ1L10E2	CJ1L10E0



EN ISO 1938
Factory standard



Steel



Light alloy,
coloured
handle
with engraved nominal
diameter



Accuracy:
STANDARD
(blue handle)
 $\pm 0,4 \mu\text{m}$.
ETALON (yellow handle)
 $\pm 0,15 \mu\text{m}$



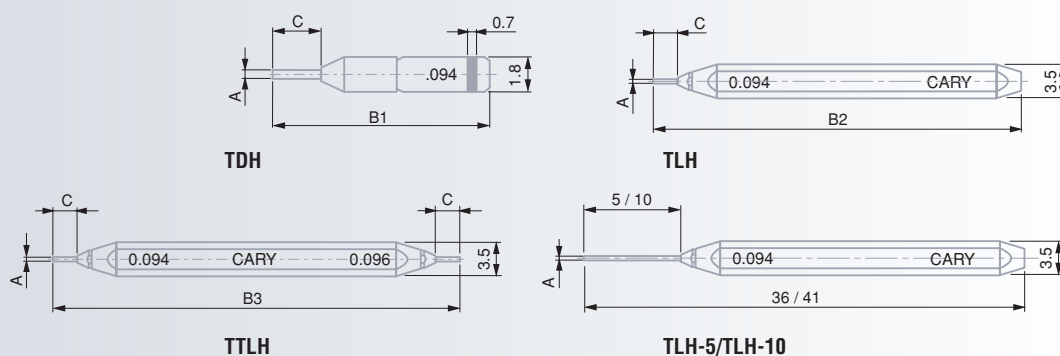
Inspection
report available
on request

Type TTLH

Double-ended plug gauges consisting of two TDH-type plug gauges.



STANDARD $\pm 0,4 \mu\text{m}$			ETALON $\pm 0,15 \mu\text{m}$		
mm	Step 2 μm	1 μm	mm	Step 2 μm	1 μm
0,050 ÷ 0,080	—	CJ1LL1S0	0,050 ÷ 0,080	—	CJ1LL1E0
0,081 ÷ 0,309	—	CJ2LL2S0	0,081 ÷ 0,309	—	CJ1LL2E0



TDH/TLH/TTLH gauge sizes

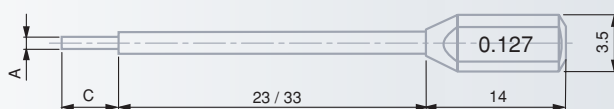
					
A mm	B1 mm	B2 mm	B3 mm	C mm	
0,050 ÷ 0,100	10,3	31,8	33,6	0,8	
0,100 ÷ 0,150	10,5	32	34	1,0	
0,150 ÷ 0,200	10,7	32,2	34,2	1,2	
0,200 ÷ 0,250	10,9	32,4	34,4	1,4	
0,250 ÷ 0,300	11,1	32,6	34,6	1,6	

Standard accessories

CJ1ED25N	ED25N	Wooden case for 25 TDH plug gauges
CJ1EL25N	EL25N	Wooden case for 25 TLH plug gauges
CJ1XDL	XDL	Plastic case for TDH/TLH/TXH plug gauges



Type TZH for deep bores with diameters from 0,050 up to 0,300 mm



These plug gauges are mounted on holders for checking hard-to-reach bores.

When ordering, please specify:

- plug gauge diameter (0,050 to 0,300 mm)
- desired quality (STANDARD or ETALON)
- holder length (23 or 33 mm)

TESA CARY steel plug gauges with diameters from 0,3 up to 10 mm

Type TXH

Single-ended steel plug gauges (1 item).



EN ISO 1938
Factory standard



Light alloy,
coloured
handle
with engraved nominal
diameter



Accuracy:
STANDARD (blue
handle) $\pm 0,4 \mu\text{m}$
for diameters $0,3 \div 3 \text{ mm}$ or
 $\pm 0,5 \mu\text{m}$ for diameters
 $3 \div 10 \text{ mm}$. ETALON (yellow
handle) $\pm 0,25 \mu\text{m}$ for diam-
eters $0,3 \div 3 \text{ mm}$ or $\pm 0,3 \mu\text{m}$
for diameters $3 \div 10 \text{ mm}$.



Inspection
report available
on request

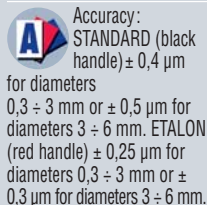
mm	STANDARD			ETALON		
	Step 10 μm	2 μm	1 μm	Step 10 μm	2 μm	1 μm
0,300 ÷ 1,509	CJ1X1S10	CJ1X1S2	CJ1X1S0	CJ1X1E10	CJ1X1E2	CJ1X1E0
1,510 ÷ 3,509	CJ1X2S10	CJ1X2S2	CJ1X2S0	CJ1X2E10	CJ1X2E2	CJ1X2E0
3,510 ÷ 10,000	CJ1X3S10	—	CJ1X3S0	CJ1X3E10	—	CJ1X3E0

Type TTXH

Steel plug gauges, type GO/NOT GO (2 items)



mm	STANDARD		ETALON	
	Step 1 μm		Step 1 μm	
0,300 ÷ 1,509	CJ1XX1S0		CJ1XX1E0	
1,510 ÷ 3,509	CJ1XX2S0		CJ1XX2E0	
3,510 ÷ 6,509	CJ1XX3S0		CJ1XX3E0	
6,510 ÷ 10,000	CJ1XX4S0		CJ1XX4E0	



TESA CARY tungsten carbide plug gauges with diameters from 0,3 up to 6 mm

Type TCH

Single-ended tungsten carbide plug gauges (1 item)



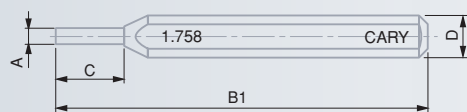
	STANDARD	ETALON
mm	Step 10 µm	Step 10 µm
	1 µm	1 µm
0,300 ÷ 1,509	CJ1C1S10	CJ1C1E10
1,510 ÷ 3,509	CJ1C2S10	CJ1C2E10
3,510 ÷ 6,000	CJ1C3S10	CJ1C3E10

Type TTCH

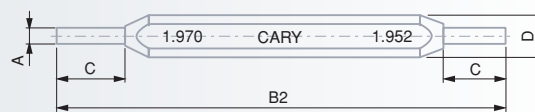
Tungsten carbide plug gauges, type GO/NO GO (2 items)



	STANDARD	ETALON
mm	Step 1 µm	Step 1 µm
0,300 ÷ 1,509	CJ1CC1S0	CJ1CC1E0
1,510 ÷ 3,509	CJ1CC2S0	CJ1CC2E0
3,510 ÷ 6,000	CJ1CC3S0	CJ1CC3E0



TXH/TCH



TTXH/TTCH

Plug gauge sizes

		A mm	B1 mm	B2 mm	C mm	D mm
0,30 ÷ 0,50		38	41	3	3,5	
0,50 ÷ 1,00		39	43	4	3,5	
1,00 ÷ 1,50		40	45	5	3,5	
1,50 ÷ 2,00		46	52	6	5	
2,00 ÷ 2,50		47	54	7	5	
2,50 ÷ 3,00		48	56	8	5	
3,00 ÷ 3,50		49	58	9	5	
3,50 ÷ 4,00		60	70	10	8	
4,00 ÷ 5,00		61	72	11	8	
5.00 ÷ 10.0		62	74	12	8	

Standard accessories

CJ1PTXK	PTXK	Suited case for 50 plug gauges Ø 0,300 ÷ 1,509 mm
CJ1MTXK	MTXK	Suited case for 50 plug gauges Ø 1,510 ÷ 3,509 mm
CJ1GTXK	GTXK	Suited case for 50 plug gauges Ø 3,510 ÷ 10,00 mm



LTXH-type precision steel pins with diameters from 0,30 up to 10 mm

These steel pins can be made available without handle upon request.

When ordering, please specify:

- pin diameter (0,30 to 10 mm)
- desired quality (STANDARD or ETALON)

PNH-type wires with handle for checking threads. wire diameters from 0,10 up to 10 mm



	STANDARD	ETALON
		
mm	Step 10 µm	Step 10 µm
0,10 ÷ 0,15	CJ1N1S	CJ1N1E
0,16 ÷ 0,50	CJ1N2S	CJ1N2E
0,51 ÷ 4,00	CJ1N3S	CJ1N3E
4,01 ÷ 10,00	CJ1N4S	CJ1N4E



EN ISO 1938



Hardened steel,
ground and lapped



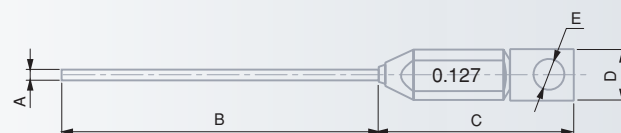
Aluminium,
coloured
handle with
engraved nominal
diameter



Accuracy:
STANDARD (blue
handle) ± 0,8 µm
for diameters 0,1 ÷ 10 mm.
ETALON (yellow handle)
± 0,3 µm for diameters
0,1 ÷ 6 mm or ± 0,5 µm for
diameters 6 ÷ 10 mm.



Inspection
report available
on request



PNH

Plug gauge sizes

				
A mm	B mm	C mm	D mm	E mm
0,10 ÷ 0,15	20	9,5	1,8	0,9
0,16 ÷ 0,30	32	9,5	1,8	0,9
0,31 ÷ 1,10	32	14	3,5	1,5
1,11 ÷ 10,00	32	14	5	2

Standard accessories

	
CJ1N50	Suited clear box for 50 PNH thread wires
CJ1N3	Carrying tube for 3 PNH thread wires
CJ1NGC	Box engraving for each diameter
CJ1NLSM	Thread wire alone, without handle

Ring Gauges

Designed for inspecting cylindrical components such as pivots or axles –
Used to determine external diameters.

TESA CARY steel ring gauges with diameters from 0,151 up to 5 mm



Type BAH	1 Steel ring gauge	
Type BIMHa	2 BAH steel ring gauges mounted in pairs on plates for use as GO/NOT GO type gauges	
		
BAH	BIMHa	
		
mm	Step 1 µm	Step 1 µm
0,151 ÷ 1,500	CJ1B2A	CJ1B2IA
1,501 ÷ 2,500	CJ1B3A	CJ1B3IA
2,501 ÷ 4,000	CJ1B4A	CJ1B4IA
4,001 ÷ 4,999	CJ1B5A	CJ1B5IA

TESA CARY carbide ring gauges with diameters from 0,060 up to 5 mm



Type BCH	1 Carbide ring gauge	
Type BIMHm	2 BCH carbide ring gauges mounted in pairs on plates for use as GO/NOT GO type gauges	
		
BCH	BIMHm	
		
mm	Step 1 µm	Step 1 µm
0,060 ÷ 0,150	CJ1B1C	CJ1B1IM
0,151 ÷ 1,500	CJ1B2C	CJ1B2IM
1,501 ÷ 2,500	CJ1B3C	CJ1B3IM
2,501 ÷ 4,000	CJ1B4C	CJ1B4IM
4,001 ÷ 4,999	CJ1B5C	CJ1B5IM



EN ISO 1938
Factory standard



Inserted into a
light alloy, blue
coloured ring
for easier handling.
Also with engraved nominal
diameter.

Ø 0,15 ÷ 3 mm:
± 0,6 µm
Ø 3 ÷ 4,999 mm:
± 0,75 µm

Inspection
report from
2 mm available
on request



EN ISO 1938
Factory standard



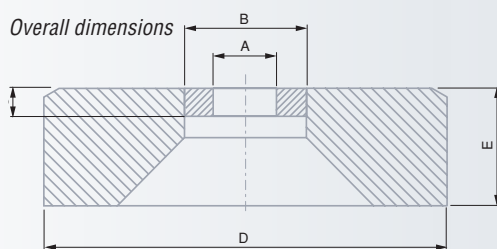
Inserted into a
black coloured,
light alloy ring
for easier handling.
Also with engraved nominal
diameter of the ring

Ø 0,060 ÷ 3 mm:
± 0,6 µm
Ø 3 ÷ 4,999 mm:
± 0,75 µm

Inspection
report from
2 mm available
on request



PLUG AND RING GAUGES



	Ring gauges				Outer rings	
A mm	B mm		C mm		D mm	E mm
	BAH	BCH	BAH	BCH		
0,060 ÷ 0,50	1,4	1,8	0,35	0,5	8	2,5
0,50 ÷ 0,75	1,8	1,8	0,5	0,5	8	2,5
0,75 ÷ 1,25	2,4	2,4	0,75	0,75	8	2,5
1,25 ÷ 1,50	3	3	0,9	0,9	8	2,5
1,50 ÷ 2,50	5	5	1,5	1,5	12	4
2,50 ÷ 4,00	8	8	2,4	2,4	16	5,5
4,00 ÷ 5,00	10	10	3	3	20	7

Standard accessories

		 A mm
CJ1CEB3	Suited case for 3 rings	0,06 ÷ 1,50
CJ1CEB4	Suited case for 4 rings	0,06 ÷ 1,50
CJ1EB12	Suited case for 12 rings	0,06 ÷ 1,50
CJ1CB40	Suited case for 12 rings	1,50 ÷ 2,50
CJ1CB24	Suited case for 24 rings	2,50 ÷ 4,00
CJ1CB18	Suited case for 12 rings	4,00 ÷ 5,00
CJ1280,21.010A	Aluminium resting plate for 2 rings	0,06 ÷ 1,50
CJ1280,21.011A	Aluminium resting plate for 2 rings	1,51 ÷ 2,50
CJ1280,21.012A	Aluminium resting plate for 2 rings	2,51 ÷ 4,00
CJ1280,21.013A	Aluminium resting plate for 2 rings	4,01 ÷ 5,00
CJ1BAA	Bearing ring (one item for each ring gauge)	

TESA CARY steel ring gauges with diameters from 5 up to 30 mm



Type BOMa	1 Steel ring gauge	
Type BBOMa	2 BOMa steel ring gauges mounted in pairs on plates for use as GO/NOT GO type gauges	
		
mm	BOMa	BBOMa
	Step 1 µm	Step 1 µm
5,00 ÷ 9,99	CJ1BOA1	CJ1BBA1
10,00 ÷ 11,99	CJ1BOA2	CJ1BBA2
12,00 ÷ 13,99	CJ1BOA3	CJ1BBA3
14,00 ÷ 15,99	CJ1BOA4	CJ1BBA4
16,00 ÷ 17,99	CJ1BOA5	CJ1BBA5
18,00 ÷ 19,99	CJ1BOA6	CJ1BBA6
20,00 ÷ 22,99	CJ1BOA7	CJ1BBA7
23,00 ÷ 25,99	CJ1BOA8	CJ1BBA8
26,00 ÷ 29,99	CJ1BOA9	CJ1BBA9



Inserted into a light alloy, grey coloured ring for easier handling. Also with engraved nominal diameter.

5 ÷ 10 mm dia.: ± 1,25 µm
10 ÷ 18 mm dia.: ± 1,5 µm
18 ÷ 29,99 mm dia.: ± 2 µm

Inspection report available on request



EN ISO 1938
Factory standard

Tungsten carbide

Inserted into a
light alloy, black
coloured ring
for easier handling.
Also with engraved nominal
diameter.

Ø 5 ÷ 10 mm:
± 1,25 µm
Ø 10 ÷ 18 mm:
± 1,5 µm
Ø 18 ÷ 29,99 mm: ± 2 µm

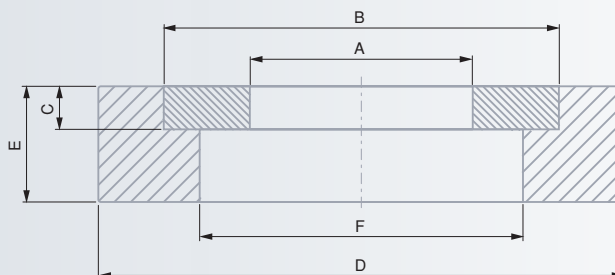
Better quality
upon request (Q5)
5 ÷ 10 mm dia.: ±1 µm
10 ÷ 18 mm dia.: ±1,2 µm
18 ÷ 29,99 mm dia.: ±1,5 µm

Inspection
report available
on request

TESA CARY tungsten carbide ring gauges with diameters from 5 up to 30 mm

Type BOMm	1 Tungsten carbide ring gauge	
Type BBOMm	2 BOMm carbide ring gauges mounted in pairs on plates for use as GO/NOT GO plug gauges	
		
mm	Step 1 µm	Step 1 µm
5,00 ÷ 9,99	CJ1BOM1	CJ1BBM1
10,00 ÷ 11,99	CJ1BOM2	CJ1BBM2
12,00 ÷ 13,99	CJ1BOM3	CJ1BBM3
14,00 ÷ 15,99	CJ1BOM4	CJ1BBM4
16,00 ÷ 17,99	CJ1BOM5	CJ1BBM5
18,00 ÷ 19,99	CJ1BOM6	CJ1BBM6
20,00 ÷ 22,99	CJ1BOM7	CJ1BBM7
23,00 ÷ 25,99	CJ1BOM8	CJ1BBM8
26,00 ÷ 29,99	CJ1BOM9	CJ1BBM9

Overall dimensions



	Ring gauges		Outer rings		
	B mm	C mm	D mm	E mm	F mm
5 ÷ 10	18	2	30	4	10,5
10 ÷ 14	24	2,5	38	5	15
14 ÷ 18	30	3	46	6	19
18 ÷ 24	38	3,5	56	8	25
24 ÷ 30	46	4	68	8	31

Standard Accessory



CJ1BBA



Bearing ring (one item for each ring gauge)





Calibration Equipment



CONFIDENCE IS NOT ENOUGH...

Control of inspection and measuring equipment is an element of the quality management that is more important than ever before. The introduction of the ISO 9000 family of international standards has led to major changes in this field as well. Among other things, ISO 9001 specifies that:

«all inspection and measuring equipment that can affect product quality must be identified, calibrated and adjusted at prescribed intervals, or prior to use, against certified equipment having a known valid relationship to internationally or nationally recognised standards».

This standard also states that the supplier shall:

«ensure that the inspection and measuring equipment is capable of the necessary accuracy and precision».

A Big Choice

TESA can provide you with the most varied means specifically suited for inspection and calibration of standards, handtools and plug gauges. Some of them are described in the various sections of this catalogue, especially:



- Gauge blocks
- Setting rings
- Steel balls
- Cylindrical setting standards with outside diameters
- Optical flats
- Plan parallel optical flats
- Electronic levels for both straightness and flatness measurement
- Instruments for both squareness and perpendicularity measurement
- Calibration equipment for length measuring devices fitted with inductive probes

This section is devoted to the measuring equipment that serve to calibrate other such inspection means. But, they can also be used for high-accuracy measurement of precision parts.



The precision tool that was first developed for calibrating gauge blocks is an improved external micrometer manufactured early in the 20th century by Brown & Sharpe for the inventor of the gauge set compositions, C.E. Johansson.

Gauge Block Calibration

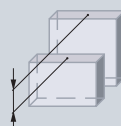
In the hierarchical chain of dimensional transfers that can be traced to the metre length unit, the gauge blocks hold a key position. And this makes them the most important material measures used in metrology.

The transference of the length unit, based on specific wavelengths of light, to gauge blocks is achieved in the first instance by a fundamental interferential measurement. From the gauge blocks measured in this way, the lengths are transferred to other gauge blocks by hierarchical measurements.

TESA Gauge Block Comparators – General Overview

TESA offer two models operating based on to two different measurement procedures.

- TESA UPD measures gauges blocks directly over a measuring span of 25 mm/1 in.
- TESA UPC is used for comparative measurement of gauge blocks having a same nominal length.

TESA Gauge Block Comparators		UPD	UPC	
Measuring procedures				
	Direct measurement			
	- Length comparison with a variation in nominal length up to 25 mm - Number of reference gauge blocks required for calibrating a 122-piece set: 9 blocks - Number of gauges blocks required for calibrating the comparator: 9 blocks + 6 pairs of blocks		● ● ●	
	Comparative measurement		● ● ●	● ● ●
	Errors of measurement	For details about the information below, refer to both pages L-8 and L-10		
	Repeatability limit	0,015 µm 0,025 µm	● ●	● ●
	Uncertainty of measurement	$U = \pm (0,05 + 0,5 \cdot L) \mu\text{m}$ L in m $U = \pm (0,10 + 1,0 \cdot L) \mu\text{m}$	● ●	● ●
	Application ranges			
	Nominal lengths	0,5 to 100 mm/0.02 to 4.0 in 0,5 to 500 mm/0.02 to 20 in	● ▲	● ▲
	Measuring span	25 mm/1 in		●
	Sensors for capturing length dimensions	- Two axial probes in sum measurement - Digital system, opto-electronic with incremental divisions - Analogue measuring system, both electric and inductive - Inductive analogue system, electric - electro-motorised - under the spring force - Measuring bolt retraction - electro-motorised - by vacuum	● ● ● ● ●	● ● ● ●
	Template systems (see page L-5)	- Single template system - Dual template system	● ●	● ○
	Handling of gauge blocks with nominal lengths up to 10 mm approx.	Suction loader used in conjunction with the electric vacuum pump	○	○
	TESA UPT temperature device	Includes 4 thermal sensors (4-wire type) which measure the electric resistance	●	○
	TESA software programme for value processing			
	TESA UP, WINDOWS 98, 2000, NT, XP	●	●	
▲ Available upon request ○ Recommended option				

▲ Available upon request ○ Recommended option

TESA UPD Gauge Block Comparator with a 25 mm Measuring Span

- Direct measurement of gauge blocks with a variation in nominal length of up to 25 mm or 1 in.
 - Allows the number of required reference gauge blocks to be reduced by nearly 80%.
- Typical comparative measurement of gauge blocks having a same nominal length.
 - Enables lower measurement uncertainties to be achieved due to weaker influences of the systematic errors.
- Equipped with HEIDENHAIN high-precision incremental probes.
- Templates with a new concept for positioning the gauge blocks.
 - Single or dual template system to provide optimum ease of handling of the gauge blocks
- Integrated device for most accurate temperature acquisition.
- On-line transfer of both measured length and temperature values.
- Computer-aided data processing with all needed corrections included.



General



EN ISO 3650



For gauge blocks with nominal lengths from 0,5 mm to 100 mm / 0.02 in to 4 in



Measuring procedures: direct and comparative measurements through the transference of the length of a reference gauge block to the gauge block to be measured.

In **direct measurement**, the nominal length of the two gauge blocks to be compared may vary up to the size of the measuring span, i.e. 25 mm.

In **comparative measurement**, comparison is always based on two gauge blocks of same nominal length.

Measuring configuration

Two probes with mechanical contact with the measuring face to be probed are connected in sum measurement (function +A+B).

Measuring points

On the reference gauge block: at the centre of the measuring face (point R). On the gauge block to be measured: at the centre (point 1) as well as the four corners of the measuring face, each lying 2 mm away from the adjacent faces (points 2 to 5). The central length L is determined by probing both points R and 1.

For establishing lengths at any point, the measurements shall be carried out at points R plus 1 to 5.

The variation in length v is obtained from measurements taken at points 1 to 5.



Shipping packaging



Identification number



Calibration certificate from the supplier for the comparator or the Swiss Calibration Service for the temperature device.

New Technical Concept through Direct Measurement

Two mutually opposed aligned probes connected in sum measurement (+A+B) also check thin gauge blocks reliably as the upper sensor A is able to capture lengths up to 25 mm. Displacement of the measuring bolt and activation of the measuring force are both electro-motorised.

PT 100 platinum resistances let you capture the temperature of the two gauge blocks as well as the measuring table and support.

The TESA UP software programme processes length and temperature values as measured while executing and controlling your measurement cycles simultaneously.



TESA UPD – The flexible concept that provides distinctive metrological features with substantial savings

Direct Measurement

- Permits over 90% of a 122-piece set to be checked using the same reference gauge block. All nominal lengths of the full gauge set being contained within 0,5 and 25 mm, the measuring span is therefore not exceeded.
- Allows the reference gauge set to be reduced by nearly 80% against the ones needed until now.
- Provides substantial savings in the gauge block supply and recalibration through reduced set compositions.
- Enables direct measurement of gauge blocks that cannot be compared with other existing gauge blocks due to their unusual nominal lengths.



Comparative Measurement

- Allows the gauge blocks of same nominal lengths to be measured by comparison as usual.
- Enhances the measuring conditions, thus permitting all measurements to be taken with a lower uncertainty.
- Reduces the number of systematic errors through limited length related influences of both the upper probe A and the gauge block to be compared.

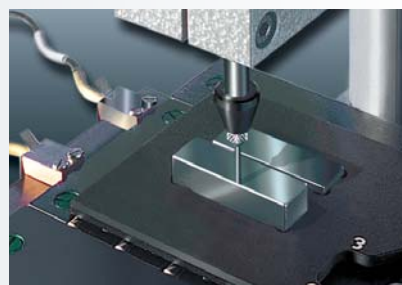


TESA dual template system that protects expensive reference gauge blocks (patented)

- Simultaneous use of two templates allows you to release your reference gauges until their handling becomes necessary.
- This system makes it possible for you to save time and money.
- During the measurement cycles on a routine basis, the travel length of the reference gauges over the measuring table is reduced by nearly 70%. This contributes to significantly lower the risks of damaging and wearing the measuring faces.
- The double protection of your reference gauges leads to significant cost savings by reducing the need for:
 - recalibration
 - restoring the measuring faces
 - replacing worn or damaged reference gauge blocks
 - long downtime while extending the life of your full reference gauge sets.

Single Template System

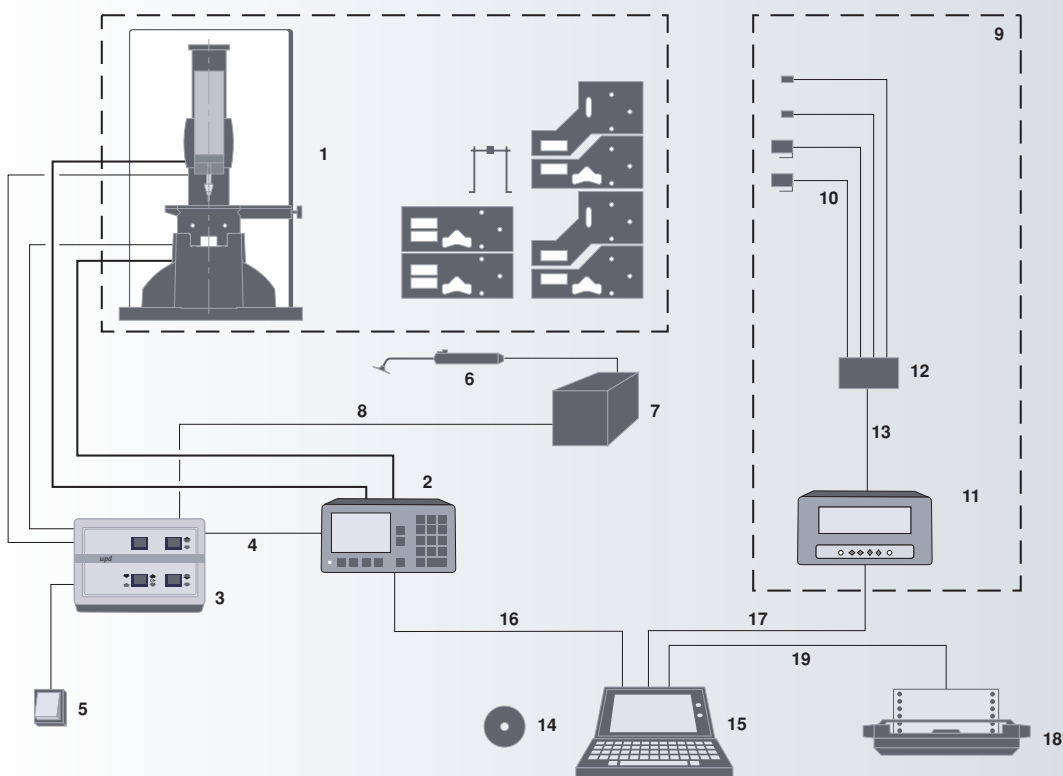
- With this system, your reference gauge blocks along with those to be calibrated are moved together during the measurement cycles.



TESA UPD Delivery Programme – Three Ordering Variations

No				
05930005	TESA UPD gauge block comparator with temperature device*			●
05930004	TESA UPD gauge block comparator without temperature device*			●
S59300102	TESA UPD gauge block comparator, complete* with temperature device, TESA UP software programme for value processing, PC (standard), printer	●		
<i>Key components</i>				
1	05930008	1 TESA UPD mechanical part	●	● ●
2	05960016	1 HEIDENHAIN computing counter ND 287 featuring 2 probe inputs	●	● ●
3	05960013	1 Control panel	●	● ●
4	05960014	1 Connecting cable for control panel to ND 287 computing counter	●	● ●
5	04768001	1 Foot switch	●	● ●
6	01660011	1 Suction loader	●	●
7	03260433	1 Electrical vacuum pump with external control, 230 Vac, 50 Hz	●	●
8	05960028	1 Connecting cable for electric vacuum pump to control panel	●	●
9	05930011	1 TESA UPT temperature device, complete	●	●
14	05960025	1 TESA UP software programme for value processing	●	
15	S59070014	1 Computer. For minimum requirements, refer to page L-14	●	
16	03969007	1 Connecting cable for ND 287 counter to host computer	●	
17	05960026	1 Connecting cable for temperature device to host computer	●	
18	S59070012	1 Laser printer, colour	●	
19	S59070013	1 Connecting cable for host computer to printer	●	

* Special execution for 110 Vac, 60 Hz also available on request.



Measuring stand

Heavy construction with toothed rack guide plus hand wheel for setting the measuring arm. Fixing bores (16 and 3 mm dia, resp.) for upper probe A plus one temperature sensor No. 05960010

Main body in cast iron. Hardened steel column, dull-chrome plated and ground.

Special table

Solid measuring table fitted with 6 cylindrical pins so as to ensure and protect each handled gauge block.

3 mm diameter clamping bore for one temperature sensor No. 05960010 as well as retaining plate mounted laterally on the table for both sensors 05960008 and 05960009 fitted with clip.

Steel, hardened. Tungsten carbide pins, cylindrical.

Positioning device for gauge blocks

Single and dual template systems to shift the gauge blocks to selected measuring points. For more details on both systems, report to the previous page.

Sensors for length measurements

Two HEIDENHAIN axial probes, opto-electronic with electro-motorised bolt activation.

ZERODUR® glass ceramic with incremental divisions

Dividing periods 4 µm

25 mm / 1 in for upper probe A. 1 mm for lower probe B.

Measuring bolt on a plain bearing 1,0 N for upper probe A. 0,63 N for lower probe B.



Measuring bolt
in invar steel



Tungsten carbide
tip with a spherical
measuring face,
R = 20 mm

Computing counter



HEIDENHAIN
up and down
computing
counter ND 287 provided
with two probe inputs



TFT type,
9-decade
display plus sign.
Also with auxiliary
display for activated
functions.



Signal
division
≤ 400x



0,5 to 0,002 µm
0,02 to
0.000001 in



14 mm



21 keys available
for digit input
as well as
operating functions



Sum
measurement
with both probes
set to +A+B.
Linear correction of
systematic errors.
PRESET function for
digit entry.
2 programmable datum
points.



RS 232 and V.24



100 to 240 Vac
(-15% to 10%),
50 to 60 Hz



0°C to 45°C



-30°C to 70°C



75%,
non-condensing



Die-cast
aluminium
housing



IP40
(IEC 60529)



EN 55022,
Class B



211x112x209 mm
(W x H x D)

TESA UPD System Components

		
1	05930008	TESA UPD Mechanical Part <i>Consisting of:</i>
	05930009	1 Measuring stand with toothed rack guide. Manually operated for setting the measuring arm. Attachment has a 16 mm dia. fixing bore for the upper probe.
	05960015	1 Solid measuring table in special version Made from hardened steel and fitted with 6 tungsten carbide cylindrical pins for safe positioning of the gauges blocks. Provide high protection and wear resistance to the gauge blocks over many years. Threaded bores for clamping the lower probe. Prepared for the integration of the temperature sensor (see below).
	05960029	1 Positioning device provided with a single or dual template system Interchangeable templates to shift the gauge blocks from a given measuring point to another delivered as follows: 1 Pair for gauge blocks having a 9 x 30 mm cross-section. Consists of 1 template No. 05960019 for the reference gauge blocks plus 1 template No. 05960020 for the gauge blocks to be calibrated. 1 Pair for gauge blocks having a 9 x 35 mm cross-section. Consists of 1 template No. 05960021 for the reference blocks plus 1 template No. 05960022 for the blocks to be calibrated. Also with added support to prevent the blocks from tilting. 1 Template No. 05960023 for reference blocks and those to be calibrated (9x30 mm) Template No. 05960024 for the reference blocks and those to be calibrated having a 9 x 35 mm cross-section. Also with added support to prevent the gauge blocks from tilting.
	05930010	1 System for value acquisition with electro-motorised bolt activation. <i>Consisting of:</i> 1 Upper probe A, type HEIDENHAIN CT 25 (No. 05930006). Measuring span 25 mm/1 in. Measuring force 1,0 N. Fitted with probe insert No. 03510003. 1 Lower probe B, type HEIDENHAIN special (No. 05930007). Measuring span 1 mm. Measuring force 0,63 N. Fitted with probe insert No. 03510003.
	01660031	1 Setting piece for probe alignment
	01640420	1 Heat protection shield, 250 x 380 mm
	01660001	1 Pair of grip pliers for safe handling of gauge blocks
	01660030	1 Dust cover
2	05960016	HEIDENHAIN Computing Counter ND 287 Up and down computing counter with LCD color monitor consisting of: 1 counter 05969029 + 1 card 05960040, each with a single entry - i.e. 2 probe entries along with 1 RS 232 data output, 100 to 240 Vac, 50 to 60 Hz.
3	05960013	Control Panel With touch keys for electro-motorised activation of the measuring bolt as well as for triggering data transfer.
4	05960014	Connecting Cable For control panel No. 05960013 to HEIDENHAIN computing counter ND 287 No. 05960016.
5	04768001	Foot Switch For fine displacement of the measuring bolt as well as data transfer.
6	01660011	Pneumatic Suction Loader For safe and easy handling of the gauge blocks with nominal length up to 10 mm. To be connected to the vacuum pump.
7	03260433 S32070030	Electrical Vacuum Pump with External Control For the connection of the suction loader No. 01660011. Execution 230 Vac, 50 Hz Execution 110 Vac, 60 Hz
8	05960028	Connecting Cable For vacuum pump to control panel No. 05960013.

continued next page



		
9	05930011	TESA UPT temperature device for TESA Gauge Block Comparators Fully calibrated for the measuring ranges from 19 °C up to 24 °C with a numerical interval to 0,001 °C. Supplied with a calibration certificate issued by the Swiss Calibration Service (SCS). Uncertainty of measurement achieved during calibration $U = \pm 0,03^{\circ}\text{C}$. <i>Consisting of:</i>
10	05960018	1 Set of 4 temperature sensors PT 100 platinum resistances giving exceptional long-term stability while drifts are kept to a minimum over years of use. This set includes the following single sensors: 1 Temperature sensor with clamp R for reference gauge blocks having nominal lengths from about 14 mm, No. 05960009 1 Temperature sensor with clamp P for gauge blocks to be calibrated having nominal lengths from about 14 mm, No. 05960008. 2 Temperature sensors to be mounted on the measuring stand or the table. PT 100 diameter: 3 g8 mm, 10 mm long. Order number 05960010 for 1 item.
11	05960038	1 FLUKE 1529 temperature measuring unit Precision thermometer including a switch for the measuring points. With use of the PT 100 platinum resistances, provides 4 measuring channels with a 0,001°C numerical interval. RS 232 or IEEE 488 data output, 115 or 230 Vac for 50 or 60 Hz.
12	05960012	1 Adapter For connecting up to 4 temperature sensors
13	05960011	1 Connecting cable For adapter N° 05960012 to temperature unit N° 05960038.
14	05960025	TESA UP Software Programme for Value Processing Running under WINDOWS 98, 2000, NT or XP. Software package including 1 CD-ROM along with 1 Hardkey. 10 languages available for function menus. For more details, see page L-14.
15	S59070014	Computer Available upon request.
16	03969007	Connecting cable For serial data transmission from HEIDENHAIN ND 287 to host computer (2 connectors 9-pin/female).
17	05960026	Connecting cable For serial data transmission from temperature device to host computer (9-pin/male and 9-pin/female).
18	S59070012	Laser printer, colour Upright A4 format. USB interface.
19	S59070013	Connecting cable For USB data transmission from host computer to printer

Temperature Sensors

 4 PT 100 platinum resistances, 4-wire type

Temperature Device

 Multiple-channel precision thermometer. Also equipped with a switch for the measuring points.

 Procedure: 4-wire resistance measurement with continuous value acquisition through connected sensors. PT 100 linearisation according to EN 60751.

 Alphanumeric LC display with background lighting

 0,001°C

 °C, °F or K

 8 mm

 6 keys available for the functions

 RS 232 and IEEE 488

 115 ±10% Vac or 230 ±10% Vac, for 50 and 60 pHz

 5°C to 40°C

 -25°C to 60°C

 75%, non-condensing

 EN 61010, EN 50081, EN 50082 and EN 55011

 191 x 102 x 208 mm (W x H x D)

Errors of Measurement

Provided all metrological conditions are met, the reliability of the comparator used for direct measurement of steel gauge blocks is expressed as follows:

 Repeatability limit (with no influence of external temperature): 0,015 µm

 Uncertainty of measurement: $U = \pm (0,05 + 0,5 \cdot L) \mu\text{m} (L \text{ in m})$

 Condition requires the use of reference standards whose measurement uncertainty is equal to

$U \leq \pm 0,015 \mu\text{m}$
for the comparator

$U \leq \pm (0,02 + 0,2 \cdot L) \mu\text{m} (L \text{ in m})$
for the gauge blocks

General



EN ISO 3650



For gauge blocks ranging from 0,5 mm to 100 mm or 0.02 in to 4 in



Comparative measurement procedure

with transference of the length of a reference gauge block to the gauge block being measured.

Measuring configuration
2 probes connected in sum measurement (function +A+B) with mechanical contact with the measuring face.

Measuring points

On the reference gauge block: at the centre of the measuring face (point R).
On the gauge block to be measured: at the centre (point 1) as well as the 4 corners of the measuring face, each lying 2 mm away from the adjacent faces (points 2 to 5).

Central length l_c is defined by probing both points R and 1. Establishing lengths at any point requires measurements to be taken at points R plus 1 to 5.

Variation in length v is the result of measurements taken at points 1 to 5.

TESA UPC Gauge Block Comparator for Comparative Measurement

- Measures gauge blocks of same nominal length by comparison.
- Comes with the new template system for positioning the gauge blocks.
 - Single or dual template system for optimum ease of gauge handling.
- Features TESA high-precision inductive probes.
- Allows ultra-precise temperature measurement, integrated.
- Transfers on-line all measured length and temperature values.
- Executes computer-aided data processing with all needed correction values included.
- Performs calibrations that meet the requirements of both ISO standards and EA guidelines (EAL – European cooperation for Accreditation of Laboratories).
- Includes an execution for greater accuracy along with a calibration certificate (optional).

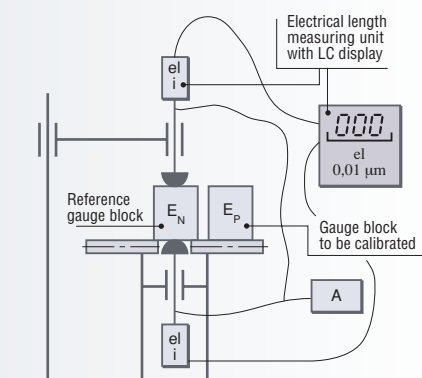


If specified, TESA can also provide the temperature device available as an option. This device has 4 PT100 platinum resistances, each capturing the temperature of the two gauge blocks along with that of both the measuring table and the support.

Computer-aided data processing lets you carry out any calibration most reliably and rationally – for sure.

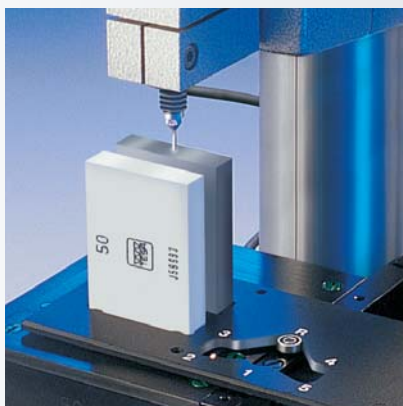
TESA UPC is specially designed for the calibration – or dimensional inspection – of gauge blocks with nominal lengths ranging from 0,5 to 100 mm. The configuration, which consists of two probes aligned opposite one another, associated with both the concept and quality of the measuring system provides full guarantee for an extra low uncertainty of measurement.

Although TESA UPC is mainly intended for manufacturers and end-users of gauge blocks, this comparator is also widely used in nationally accredited laboratories.



Single Template System

- With this system, your reference gauge blocks along with those to be calibrated are moved all together throughout the measurement cycle.



Errors of Measurement

Provided all the metrological conditions are met, the reliability of the two standard executions No. 05930000 and 05930002 is expressed as follows:



Repeatability limit (with no effect due to external temperature): 0,025 µm



Measurement uncertainty* $U = \pm (0,10 + 1,0 \cdot L) \mu\text{m}$ (L in m)



Condition involves the use of reference standards (see pages L-14 and L-15) whose uncertainty is as follows:

$U \leq \pm 0,030 \mu\text{m}$
when calibrating the comparator

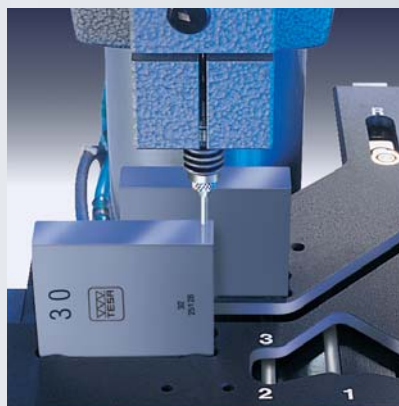
$U \leq \pm (0,05 + 0,5 \cdot L) \mu\text{m}$ (L in m)
when calibrating the gauge blocks

* Applicable to steel gauge blocks

Dual Template System

(TESA Patent)

- The use of two templates instead of a single one allows you to leave your reference gauge blocks aside until their handling becomes necessary.



Provided all the metrological conditions are met, the reliability of both executions No. 05930001 and 05930003 along with the option for greater accuracy (No. 01690021) is expressed as follows:



Repeatability limit (with no effect due to external temperature): 0,015 µm



Measurement uncertainty* $U = \pm (0,05 + 0,5 \cdot L) \mu\text{m}$ (L in m)



Condition involves the use of reference standards (see pages L-14 and L-15) whose uncertainty is as follows:

$U \leq \pm 0,015 \mu\text{m}$
when calibrating the comparator

$U \leq \pm (0,02 + 0,2 \cdot L) \mu\text{m}$ (L in m)
when calibrating the gauge blocks

* Applicable to steel gauge blocks

Measuring stand



Heavy construction with toothed rack guide plus handwheel for coarse setting of the measuring arm. Encapsulated attachment plus device for extra-fine setting of upper probe A. 3 mm dia. fixing bore for one temperature sensor No. 05960010.



Main body in cast iron. Column in hardened steel, dull-chrome plated and ground.

Special table



Solid measuring table fitted with 6 cylindrical pins to ensure and protect the gauge blocks as they are being handled. 3 mm dia. clamping bore for one temperature sensor No. 05960010 as well as retaining plate mounted laterally on the table for both sensors No. 05960008 and 05960009 with clip.



Hardened steel. Tungsten carbide cylindrical pins.

Positioning device



Single and dual template systems to shift the blocks to predefined measuring point.

For further details on both template systems, report to page L-5 as well as to System components on page L-12.

Sensors for length values



2 TESA GT 22-spec. inductive probes with pneumatic retraction of the measuring bolt. Electrical adjustment through resistances fitted on each probe



$\pm 150 \mu\text{m}$ measuring travel



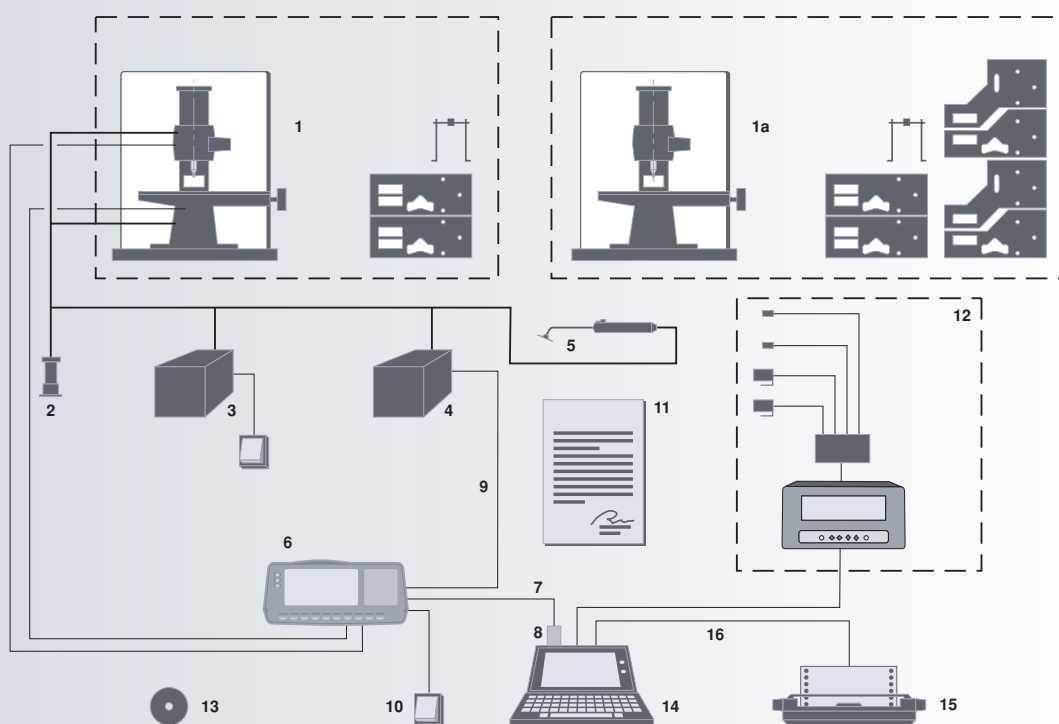
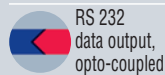
Upper probe A $\approx 1\text{N}$, lower probe B $\approx 0,63\text{N}$



Tungsten carbide insert with spherical measuring face, $R = 20\text{mm}$

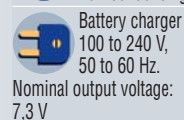
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1	01610401	1 TESA UPC mechanical part Equipped with the single template system					●	●	●	●
1a	05960030	1 TESA UPC mechanical part Equipped with the single and dual template system	●	●	●	●				
2	03260401	1 Pneumatic retraction of the measuring bolt, manually operated				●				●
3	03260432	1 Electric vacuum pump with foot switch			●				●	
4	03260433	1 Electric vacuum pump with external control	●	●			●	●		
5	01660011	1 Pneumatic suction loader	●	●	●		●	●	●	
6	04430012	1 TESATRONIC electronic unit TT90	●	●	●	●	●	●	●	●
	05960039	1 Set of TESA UPC accessories, including the components listed under 7,8,9								
7	04761049	1 Opto-RS cable, bidirectional	●	●			●	●		
8	04760087	1 Opto-RS interface	●	●			●	●		
9	04761070	1 Connecting cable TESATRONIC TT90 to vacuum pump	●	●			●	●		
10	04768000	1 Hand switch	●	●			●	●		
11	01690021	1 Option for greater accuracy with calibration certificate	●		●		●		●	

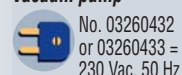


TESA UPC System Components

		
1	01610401	TESA UPC mechanical part provided with single template system Prepared for mounting the TESA UPT temperature device <i>Consisting of:</i>
	01630004	1 Measuring stand with toothed rack guide Manually operated for coarse setting of the measuring arm. Encapsulated attachment and device allowing extra-fine setting of the upper probe.
	05960031	1 Special solid measuring table Made from hardened steel and fitted with 6 carbide cylindrical pins for a safe positioning. Provides high protection and wear resistance to the gauge blocks over years. Adjustable attachment for lower probe B. Prepared for the integration of the temperature sensors.
	05960032	1 Single template system Used to shift the gauge blocks from a given point to another. Interchangeable templates No. 01660045 (for gauge blocks 9 x 30 mm) and No. 01660046 (for gauge blocks 9 x 35 mm). Also with added support to prevent them from tilting.
	03230045	1 Sensor system for value acquisition consisting of: – Upper probe A, GT 22-spec. No. 03290075. Measuring force to 1 N. Fitted with the measuring insert No. 03510003. – Lower probe B, GT 22-spec. No. 03290076. Measuring force to 0,63 N. Fitted with the measuring insert No. 03510003. – Air pipe system
	01660031	1 Setting piece for probe alignment
	01640420	1 Heat protection shield, 250 x 380 mm in size.
	01660001	1 Pair of grip pliers for safe handling of gauge blocks
	01660030	1 Dust cover
1a	05960030	TESA UPC mechanical part provided with the single and dual template system Prepared for mounting the TESA UPT temperature device <i>Includes the same components as described under the first item above, except for:</i>
	05960029	1 Single and dual template system for positioning the gauge blocks including: 1 Pair of templates for gauge blocks 9 x 30 mm with 1 item No. 05960019 for the reference blocks and 1 item No. 05960020 for the gauge blocks to be calibrated. 1 Pair of templates for gauge blocks 9 x 35 mm with 1 item No. 05960021 for the reference blocks and 1 item No. 05960022 for the gauge blocks to be calibrated. Also with added support to prevent tilting. 1 Template No. 05960023 for the reference blocks and those to be calibrated, 9x30 mm. 1 Template No. 05960024 for the reference blocks and those to be calibrated, 9x35 mm Also with added support to prevent the gauges tilting.
2	03260401	Pneumatic retraction of the measuring bolt Manually operated
3	03260432	Electric vacuum pump with foot switch For retracting the measuring bolt of each probe. Also used to plug the hand-operated pneumatic suction loader No. 01660011, 230 V.
4	03260433	Electrical vacuum pump with external control Connected to the measuring unit TT90 No. 044430012. Used for the retraction of the measuring bolt of each probe. Also used to plug the suction loader No. 01660011, 230 V.
5	01660011	Pneumatic suction loader For safe, easy handling of gauge blocks with nominal lengths up to 10 mm. Connected to the electric vacuum pump No. 03260432 or No. 03260433.
6	04430012	TESATRONIC length measuring instrument TT90 For a detailed description, see chapter O.



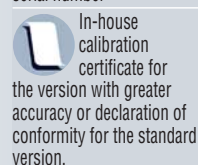
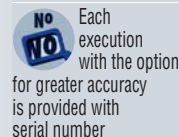
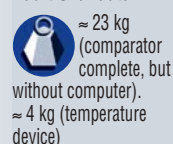
Electric vacuum pump



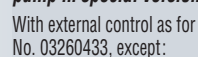
Temperature device



Additional data



Electric vacuum pump in special version





05960039

Set of TESA UPC accessories*consisting of:*

Components as listed under items 7, 8 and 9 below.

7

04761049

Opto-RS cable, bidirectional

For serial data transfer.

8

04760087

Opto-RS interface

For Opto-RS cable to RS 232 PC port.

9

04761070

Connecting cable

For electronic unit TT90 (No. 04430012) to vacuum pump (No. 03260433)

10

04768000

Hand switch

Used for triggering any movement of the measuring bolt along with data transfer from TESATRONIC TT90 (No. 04430012) to host computer.

Direct connection to the electronic unit.

11

01690021

Option for greater accuracy and calibration certificate

Consists of TESA UPC (mechanical part No. 01610401 together with TESATRONIC TT90 specially adjusted and calibrated. All key components are marked with serial number.

12

05930011

TESA UPT temperature device for TESA gauge block comparatorsFully calibrated for the measuring ranges from 19°C up to 24°C with a numerical interval to 0,001°C. Supplied with a calibration certificate issued by the Swiss Calibration Service (SCS). Uncertainty of measurement achieved during calibration $U = \pm 0,03^\circ\text{C}$. Used in association with TESA UP software programme for value processing.*Consisting of:*

05960018

1 Set of 4 temperature sensors

05960038

1 FLUKE 1529 temperature device

05960012

1 Adapter

05960011

1 Connecting cable

For a detailed description, refer page L-15.

13

05960025

TESA UP software programme for value processingRunning under **WINDOWS 98, 2000, NT or XP**

- For details on the programme related features, report to page L-14.

14

S59070014

Computer

Available upon request. For minimum requirements, see page L-14.

15

S59070012

Laser Printer, colour

Upright A4 format. USB interface.

16

S59070013

Connecting cable

For USB data transmission between host computer to printer.

Hardware

All hardware components listed opposite (items 14 to 16) can be purchased locally. Should you wish to, we may also provide you with a quotation on request.

TESA cannot assure the UP system will operate properly when run on a network.

Therefore, we recommend to inquire about a technical information before purchasing your own equipment.



TESA UP Software Programme for Value Processing

Suitable for both TESA gauge block comparators UPD and UPC as well as for comparators from other manufacturers.

- Choice of 10 languages.
- On-line processing of length and temperature values as transferred.
- Measurement cycles and result outputs according to EN ISO 3650.
- Flexible architecture for optimum adaptation to specific User's needs.
- Possible entry of limit values and accuracy grades peculiar to Users.
- Surveillance of value dispersion or value drift throughout length and temperature measurements.
- Automatic execution of all relevant corrections. The programme makes allowances for actual sizes of the reference standards, flattening due to different materials used (steel, tungsten carbide, ceramic), compensation of temperature variations with reference to 20°C according to the varying coefficients of linear expansion – as typical examples.
- Assignment of gauge blocks to their relevant grade.
- Possible storage of gauge block set related data.
- Inch or metric value processing.
- Calibration certificate in various versions.



05960025

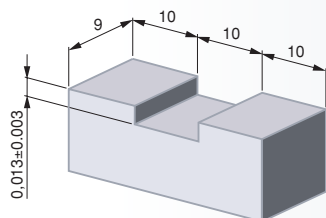


TESA UP software programme for gauge block calibration

Running under WINDOWS 98, 2000, NT, XP

Software package including:

1 CD-ROM plus 1 USB protective Hard-key



Gauge Blocks for the Calibration of Comparators

To calibrate both TESA gauge block comparators UPD and UPC, we recommend the use of the gauge block set described hereafter. The 9-piece set listed on page L-15 is additionally required for calibrating TESA UPD.

Set Composition Including 11 Gauge Blocks

Each pair is in full compliance with:

- EAL-G21 – Calibration of Gauge Block Comparators – European cooperation for Accreditation of Laboratories
- DKD-R 4-1 – Guidelines of the German Calibration Service (DKD) for the calibration of gauge block comparators.



µm

Set of 11 gauge blocks for calibrating each comparator

Set composition as listed in the chart opposite. Supplied with:

S59110152 Calibration certificate issued by the Physikalisch Technische Bundesanstalt (PTB) ± 0,015

S59110489 Calibration certificate issued by a laboratory accredited by the German calibration service (DKD) ± 0,030

Full tungsten carbide set also available on request



Pairs

N°

Nominal length

A mm

B mm

1	0,5	0,5
2	1,0	1,005
3	1,0	1,01
4	4,0	4,0
5	100,0	100,0
6	6,0	6,0*

* Special bridge-shaped gauge blocks (see drawing) used for establishing the measuring deviations of lower probe B.



EN ISO 3650



Metric/Inch units

Minimum profile requirements for the computer needed to run the TESA UP software programme



Personal Computer

- Configuration without heat source to avoid disturbing the ambient temperature at the measurement spot.
- Operating system: Windows 98, 2000, NT or XP
- Processor: 650 MHz
- 1 Hard disc (6 GB)
- RAM capacity: 64 MB
- CD-ROM drive (24x)
- RS 232 serial port 1 for length values 1 for temperature values
- USB port



EN ISO 3650



Special high-alloy steel,

wear resistant and stable. Exception: 6 mm special carbide gauge blocks.



Class K



The given expanded uncertainty

k = 3 refers to the difference of central length of both gauge blocks A and B forming the pairs 1 to 5 as well as to the deviations f₁ and f₂ from the central length of gauge blocks forming both pairs 2 and 3. No need to calibrate those of pair No. 6.



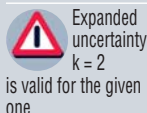
Wooden case



Identification number



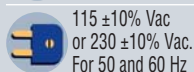
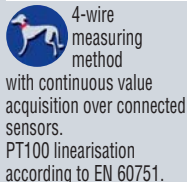
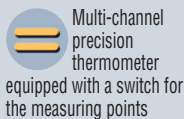
PTB or DKD calibration certificate



Temperature Sensors



Temperature Device



Additional technical data listed on page L-8

Additional Gauge Block Set for the Calibration of TESA UPD

To achieve the lowest uncertainty of measurement, we recommend the use of reference standards of grade K, which are measured directly by interferometry and come along with a calibration certificate. And this, irrespective of any other requirement such as the ambient conditions.



µm

9-piece gauge set for the calibration of TESA UPD

Set composition as listed in table opposite. Supplied with:

S59300103	Calibration certificate issued by the laboratory of a national institute of metrology	$\pm(0,02+0,2 \cdot L) \mu\text{m}$ L in m
S59300107	Metas (Switzerland)	Measuring method: direct interferometry
S59300104	PTB (Germany)	
S59300104	Calibration certificate issued by a laboratory officially accredited SCS	$\pm(0,05+0,5 \cdot L) \mu\text{m}$ L in m
		Measuring method: by comparison



Set Composition (mm)
1 5 10 15 20 25 50 75 100



Steel



Accuracy grade K

Other set compositions or carbide gauge blocks also available on request.

TESA UPT Temperature Devices



05930011

TESA UPT temperature device for TESA Gauge Block Comparators

Fully calibrated for the measuring ranges from 19°C up to 24°C with a numerical interval to 0,001 °C. Supplied with a calibration certificate issued by the Swiss Calibration Service (SCS). Uncertainty of measurement achieved during calibration $U = \pm 0,03^\circ\text{C}$.

Consisting of:

05960018

1 Set of 4 temperature sensors

PT100 platinum resistances giving exceptional long-term stability while drifts are kept to a minimum over years of use.

This set includes the following sensors:

1 Temperature sensor with clamp R for reference gauge blocks having nominal lengths from about 14 mm, No. 05960009.

1 Temperature sensor with clamp P for gauge blocks to be calibrated having nominal lengths from about 14 mm, No. 05960008

2 Temperature sensors mounted on the measuring stand or the table.

PT 100 sensors. 3 g8 in diameter, 10 mm long.

Order number for a single item: 05960010.

05960038

1 FLUKE 1529 measuring unit for temperature

Precision thermometer including a switch for the measuring points.

With use of the PT 100 platinum resistances, provides 4 measuring channels with a 0,001 °C numerical interval. RS 232 or IEEE 488 data output. 115 or 230 Vac for 50 or 60 Hz.

05960012

1 Adapter. Allows up to 4 temperature sensors to be connected.

05960011

1 Connecting cable

For adapter No 05960012 to measuring unit No 05960038.

05960026

Connecting cable

For serial data transfer from temperature device to computer, 9-pin/m and 9-pin/f connector.



ETALON POLO Horizontal Measuring Bench

A giant for small sizes – Specially designed for the control of measuring and test equipment in compliance with ISO 9000.

- Application range from 0 up to 100 mm for external dimensions or 2,5 up to 110 mm for internal dimensions – 50 mm measuring span.
- Resolution to 0,001 or 0,0001 mm – Metric/Inch conversion.
- Maximum permissible error of 0,5 μm .
- Measuring force from 0 to 4 N.
- Comes with a calibration certificate issued by the supplier.



Shipping packaging



Identification number



In-house calibration certificate

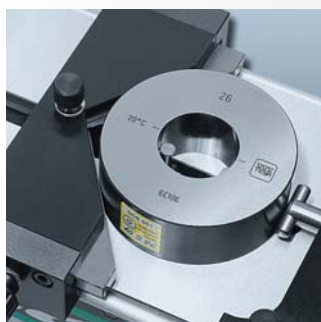


Calibration of Standards

- Cylindrical test pins
- Setting standards with cylindrical, plane-parallel measuring faces
- Threaded reference gauges (calibrated using the 3-wire method)
- Setting masters
- Setting rings

Calibration of Plug Gauges

- Limit plug gauges
- Plug gauges «GO»
- Plug gauges «NOT GO»
- Plain plug gauges
- Ring gauges «GO»
- Ring gauges «NOT GO»
- Threaded plug gauges



ETALON POLO Measuring Bench



0 to 100 mm
for external
dimensions

• 10 to 110 mm with
standard accessories

• 2,5 to 110 mm with
optional accessories



50 mm
measuring span



Max. perm.
error within the
measuring span:
0,5 µm with standard
accessories



0,1 µm



0 to 4 N



Opto-electronic
measuring
system with
incremental glass scale,
type LIF – HEIDENHAIN



8,0 · 10⁻⁶/°C



Tilting
range of the
floating table
± 0,5°



See on
drawing

• shortest distance A =
0 mm

• longest distance A =
11,5 mm



19,0 kg net
net
(main part alone, without
table)
2,8 kg net (floating table)
2,1 kg net (fixed table)



10°C to 40°C



-10°C to 40°C



EN 50081-1
EN 50082-2
EN 61000-4-2
EN 61000-4-4



Calibration of Hand-Held Tools

- Dial gauges
- Precision indicators
- Dial test indicators
(lever-type)
- Electronic probes



ETALON POLO with Floating Resting Table



05939001

**ETALON POLO measuring bench with floating resting table
and HEIDENHAIN computing counter ND 287 included.**

Consists of the following main components:

05919002

1 Main part

Application range 0 to 100 mm for external dimensions or 10 to 110 mm for internal dimensions (with standard accessories). 50 mm measuring span.

Base plate with measuring unit and mounting block for the fixed measuring stops fitted with a stop pin; measuring unit equipped with a spindle as well as opto-electronic system featuring an incremental glass scale. Stop pin and spindle have both a mounting bore for a 6,5 mm dia. measuring insert; attachment for the stops and measuring device allowing the table to be moved vertically, and then tilted for inside measurements. Also with adjust system for the measuring force.

05969024

1 Pair of standard measuring inserts for external dimensions

With a 6,5 mm dia. tungsten carbide flat face, already mounted.

05969015

1 Floating resting table

Already mounted, also interchangeable. Used for positioning parts in the measuring direction when inspecting internal dimensions. Includes a stainless steel plate, hardened and ground, mounted on ball bearings. 200 x 100 mm table surface area, also with mount for the limit stops.

05969029

1 HEIDENHAIN computing counter ND 287

Up/down counter with LCD color display. Switchable from metric to inch. Captures both extreme values with output of the difference between these values. Value classification capability. RS 232 data output.

Supplied with the following standard accessories:

05969020

1 Pair of standard inserts for internal dimensions from 10 mm

Stainless steel measuring face, hardened and ground. Ball tip section R = 2,5 mm. M4 locking screw.

05969030

1 Dust cover



ETALON POLO with Fixed Resting Table



05939000 ETALON POLO measuring bench with fixed resting table and HEIDENHAIN computing counter ND 287 included

Consists of the following components:

- | | |
|-----------------|--|
| 05919002 | 1 Main part
As described on the previous page. |
| 05969024 | 1 Pair of standard measuring inserts for external dimensions
With a 6,5 mm dia. carbide flat measuring face, already mounted. |
| 05969014 | 1 Fixed resting table
Already mounted, also interchangeable. Used for internal measurements. Includes a stainless steel base plate, hardened and ground. Table surface 200 x 100 mm. Also with stop clamp for positioning the workpiece. |
| 05969029 | 1 HEIDENHAIN computing counter ND 287
Up/down counter with LCD color display.
Switchable from metric to inch. Captures extreme values with output of the difference between both.
Value classification capability. RS 232 data output. |

Supplied with the following standard accessories:

- | | |
|-----------------|---|
| 05969016 | 1 Single pair of standard inserts for internal dimensions from 10 mm |
| 05969030 | 1 Dust cover |

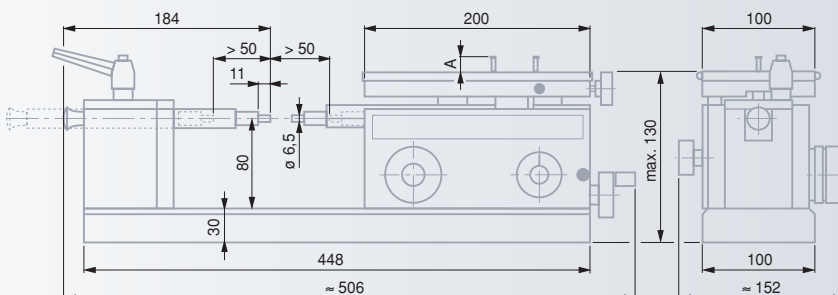
Workpiece Inspection

External dimensions

- Stepped shafts
- Cutting tools
- Cylindrical pins
- Ball tips
- Grooves
- Short centring shoulders
- Threads (measured according to the 3-wire method)

Internal dimensions

- Through bores
- Blind bores
- Centring grooves
- Slots
- Sliding guides



HEIDENHAIN ND 287 Computing Counter



Up/down counter for inner data processing and output



TFT display screen, 9-decade plus sign. Auxiliary display for active functions.



0,001 and 0,0001 mm or 0,0001 and 0,0001 in



14 mm



RS 232



0°C to 45°C



-30°C to 70°C



75%



100 to 240 Vac (-15% to +10%), 50 to 60 Hz



211 x 112 x 209 mm (L x H x D)



≈ 2,5 kg



IP40 (IEC 60529)



Noise acuteness to grade 4 (VDE 0843, Parts 2 and 4)



EN 55022, class B



Standard Accessories

Available according to the model supplied.



- 05969024** 1 Pair of standard measuring inserts for external dimensions
6,5 mm dia. carbide inserts with a flat face
- Standard measuring inserts for internal dimensions from 10 mm**
5 mm dia. inserts with stainless steel measuring face, hardened. M4 locking screw.
- 05969020** 1 Pair of inserts for use with the floating table
No. 05960015, H = 20 mm.
- 05969016** 1 Pair of inserts for use with the fixed table
No. 05969014, H = 12,5 mm.

Optional Accessories



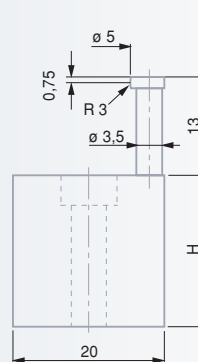
- Measuring inserts for internal measurement using the floating resting table**
Height H = 20 mm. M4 locking screw.
- 05969021** 1 Pair for internal dimensions from 2,5 mm
Barrel-shaped inserts with a 1,2 mm dia. carbide ball tip.
- 05969023** 1 Pair for internal dimensions from 5 mm
Fitted with a 1,5 mm dia. carbide ball tip.
- 05969022** 1 Pair for internal dimensions from 13 mm
Fitted with a 6 mm dia. carbide ball tip.
- Measuring inserts for internal measurements using the fixed resting table**
Height H = 12,5 mm. M4 locking screw.
- 05969017** 1 Pair for internal dimensions from 2,5 mm
Barrel-shaped inserts, with a 1,2 mm dia. carbide ball tip.
- 05969019** 1 Pair for internal dimensions from 5 mm
Fitted with a 1,5 mm dia. carbide ball tip.
- 05969018** 1 Pair for internal dimensions from 13 mm
Fitted with a 6 mm dia. carbide ball tip.
- 05969028** 1 Pair for external dimensions
Tungsten carbide flat measuring face, D = 2 mm.
- 05969027** 1 Pair for external dimensions
Tungsten carbide flat measuring face, D = 8 mm.
- Attachments for the measuring inserts**
with mounting thread G = M2,5
05969026 G = 1/48 in
- Inserts with special design** available on request
Inserts with M2,5 thread, see pages F-42 to F-44.
- Wires** for thread measurement, see page C-24.



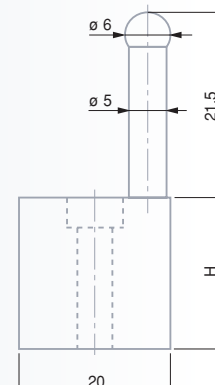
- 05969000** Bench stand with swivelling plate
For raising the measuring bench from horizontal to vertical position. Accommodates a clamp lever. Length (upright): 295 mm, mass ≈ 20 kg.



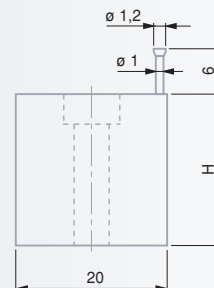
05969024



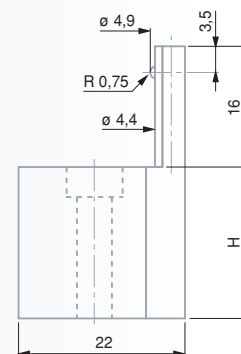
05969016-20



05969018-22



05969017-21



05969019-23



05969028



05969027



05969025/26





05969002

05969001



05969003

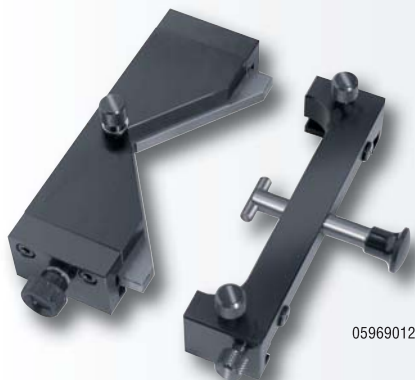


05969034



05969005

05969007/8



05969012



05969010



05969001

Base for the computing counter

For heightening the HEIDENHAIN computing counter ND 287 up to 380 mm, mass 5,2 kg.

Intermediate resting block

Features a 10 mm dia. mounting bore for:

- resting table No. 05969003
- Holder No. 05969004 for a dial test indicator (lever-type)

Supporting plate

Used for external measurement. 60 x 60 mm surface area with recesses. Hardened, ground steel. Also with a 10 mm dia. fixing pin.

05969034

Floating resting table

Used for external measurement on oblong parts up to 60 mm in diameter; centres, L=160 mm; movable positioning fixture for parts having varying lengths, 3 freedom degrees.

Consisting of:

05969032

Resting table with centres

05969033

Vise support for cylindrical test pins

05969005

Intermediate resting block

Used in conjunction with the floating mount device No. 05969013.

05969012

Centring device

Allows to search for the transverse culmination point against the measuring direction. Used with either of both fixed or floating table No. 05969014 or 05969015. Prismatic stop adjustable transversely, max. diameter 110 mm. Counterpressure piece finished with cylindrical stop pins.

Clamping rods

For clamping the instruments that need be calibrated such as dial gauges or precision indicators.

05969010

For fixing shafts with a 8 mm dia.

05969011

$\frac{3}{8}$ in dia.

05969004

Holder

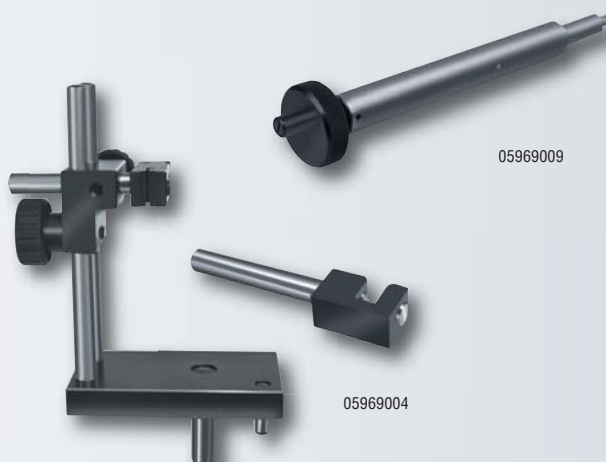
for a dial test indicator (lever-type)r

Provided with 2 dovetail clamps, TESAST-type or in compliance with BS 2795:1981.

05969009

Spindle for calibrating dial gauges, dial test indicators and the like

Setting range = 50 mm,
Spindle rotation = 0,5 mm



05969009

05969004



Shipping packaging

Surface Roughness Testing



Roughness Parameters Commonly Used in Short

Mean roughness R_a (ISO 4287, DIN 4768)

The mean roughness R_a matches the arithmetical mean of the absolute values related to the profile deviation y within the reference length l .

Max. profile valley depth R_{max} (DIN 4768)

The max. profile valley depth R_{max} counts for the most significant single roughness depths Z_i within the total length l_m .

According to ISO 4288 and DIN 4287 - Part 1, this parameter is also specified as $R_y \max$.

Mean roughness depth R_z DIN (DIN 4768)

The mean roughness depth R_z is the arithmetical mean of single roughness depths of successive sampling lengths l_e .

According to ISO 4287 and DIN 4762, the parameter R_z DIN is also specified as R_{y5} .

Since R_z changes its name in both DIN 4768 and ISO 4287, this parameter is also specified as R_z DIN or R_z ISO.

If the parameter R_z is measured according to DIN, it is generally admitted that the extreme value specified by ISO is matched providing that R_z ISO does not exceed R_z DIN.

Use of Roughness Comparison Specimens

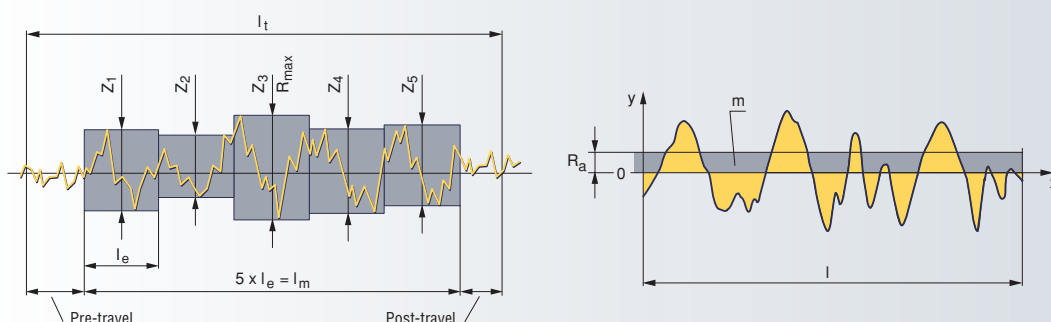
These specimens used for testing any surface finish quality have long proven their value in praxis.

They serve for touch and/or sight comparisons with the surface of work pieces that are produced using the same manufacturing process. Condition is that materials have to be comparable.

When comparing the workpiece surface against the specimen, roughness is not quantitatively expressed. The assessment of the extent to which the surface finish of both is alike can only be subjective.

Sight comparison requires optimum light source angle. For small surfaces, the use of a magnifying glass with up to 8x magnification is recommended.

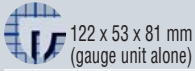
Touch comparison is made using the finger nail or a small cooper piece like a coin, for instance.



TESA RUGOSURF 10 Roughness Gauge

Robust, versatile and compact gauge unit designed for inspecting any work piece surface finish and capturing roughness parameter values – Wide variety of probes for the most varied applications – Possible tolerancing of each parameter available.

- Interchangeable probe, swivelling through to 90° to let you measure even in hard-to-reach recesses.
- Extended autonomy. Can equally be connected to the mains adapter or the battery pack for direct use on a machine-tool.
- Value storage, output or transfer to a PC of up to max. 100 measured values).
- USB data output for full use and further storage of the measurement results.
- Automatic idle mode if the gauge is left unused for 40 seconds. Preserve the battery pack.
- Fast and easy analysis of the results obtained from the measured parameters with assigned tolerances.



06930010 TESA RUGOSURF roughness gauge 10

delivered with the following standard accessories:

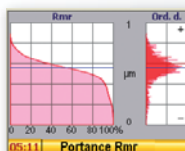
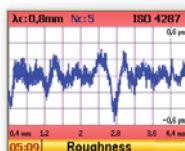
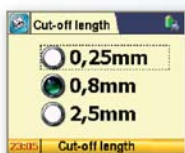
Roughness standard, nominal value $R_a = 2,97 \mu\text{m} / 117 \mu\text{in}$
Rechargeable battery 8,4 V, 170 mAh, NiMH in PP3 format
Standard probe, type SB10
Battery charger
Adapter for universal stand, 8 mm diameter
Positioning support



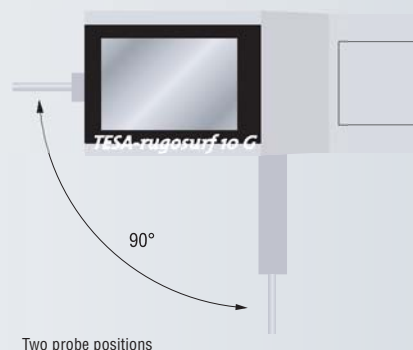
TESA RUGOSURF Roughness Gauge 10G

Portable, versatile gauge unit with compact design, well suited for receiving inspection or for use in the production area or the measurement laboratory.

Measures roughness parameters according to ISO 4287:1997 / JIS B0601:2001, DIN and ISO 12085:1998 (MOTIF or CNOMO).



- TFT graphic display for optimum visual representation of any measured parameters and workpiece profiles, size to 2".
- Direct displaying of all measured values and computed profiles.
- 31 roughness parameters available.
- Wide autonomy through mains adapter or battery pack.
- Output, storage or transfer to a PC of the results obtained from a number of measurements as high as 999.
- Possible tolerancing of all parameter values.
- Multilingual menu options.
- USB data output enabling a direct connection to the printer unit or a conventional PC equipped with RUGOSOFT 10 (both are optional).



06930011 TESA RUGOSURF roughness gauge 10G

Delivered with the following standard accessories:

- Roughness standard, nominal value $R_a = 2,97 \mu\text{m} / 117 \mu\text{in}$
- Rechargeable battery 7,2 V, 300 mAh, NiMH in PP3 format
- Standard probe, type **SB10**
- Battery charger
- Adapter for universal stand, 8 mm diameter
- Positioning support

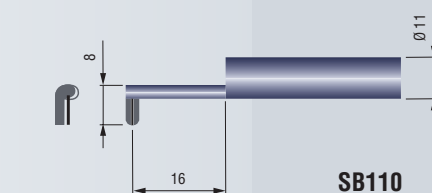
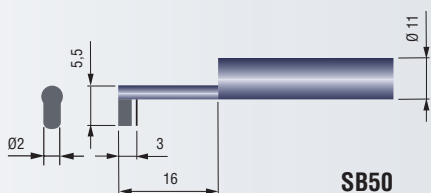
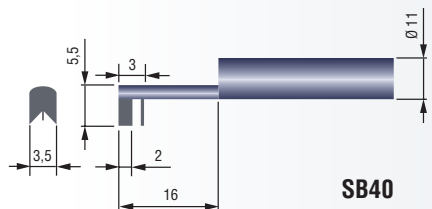
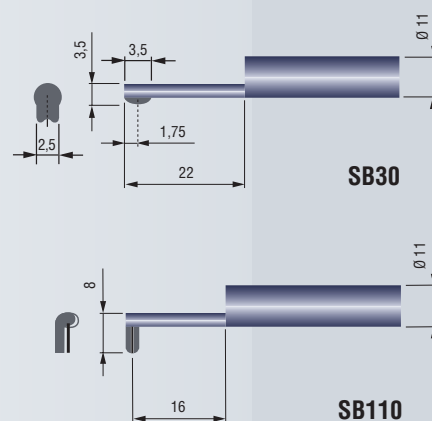
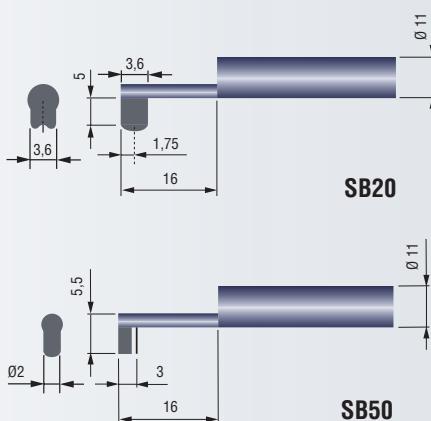
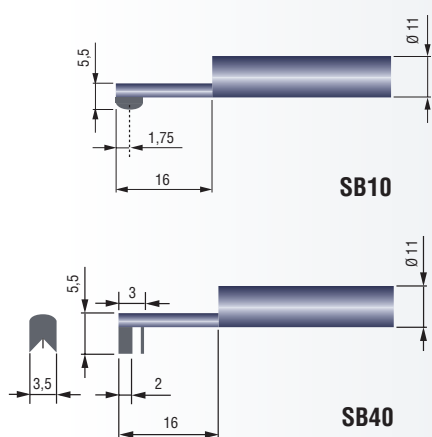
Technical Data

	 06930010	06930011
	 RUGOSURF 10	RUGOSURF 10G
Display	LCD, 2 lines of 16 characters	TFT colour display, 2" in size
Roughness parameters	according to ISO 4287-1997/JIS B0601 / ASME B46-2002 Ra - Rq (RMS) - Rt - Rz - Rc - Rsm according to ISO 12085 (CNOMO) Pt - R - Rx - AR	according to ISO 4287-1997/JIS B0601:2001 ASME B46-2002 Ra - Rq (RMS) - Rt - Rz - Rp - Rc - Rv - Rsm - Rδc - Pa - Pq - Pt - Pp - Pc - Pv - Psm - Pδc according to PrEN 10049 RPC - PPC according to ISO 13565 Rk - Rpk - Rvk - Mr1 - Mr2 according to DIN 4776 Rmax according to DB N31007 R3z - R3zm according to ISO 12085 (CNOMO) Pt - R - Rx - AR
Measuring span		
X-axis	16 mm (0.63 in)	16 mm (0.63 in)
Z-axis	160 μm (6300 μin)	300 μm (11810 μin)
Unit system	mm / in	mm / in
Range of indication	Ra 0 ÷ 40 μm (0 ÷ 1575 μin) Rt 0,05 ÷ 160 μm (0 ÷ 6300 μin)	Ra 0 ÷ 75 μm (0 ÷ 2952 μin) Rt 0,05 ÷ 300 μm (0 ÷ 11810 μin)
Resolution	0,01 μm (0.1 μin)	0,001 μm (0.01 μin)
Cut-off length	0,25-0,8-2,5 mm (0.01-0.03-0.1 inch)	0,25-0,8-2,5 mm (0.01-0.03-0.1 inch)
Numerical filter	Gaussian as per ISO 11562	Gauss as per ISO 11562
Traversing length l _t	(number of cut-offs + 1) x λ _c	(number of cut-offs + 1) x λ _c
Cut-off l _c	number of cut-offs x λ _c	number of cut-offs x λ _c
Number of selectable cut-offs	1 to 5	1 to 10 cut-offs of 0,25 and 0,8 mm 1 to 5 cut-offs of 2,5 mm
Probing speed	1 mm/s	1 mm/s
Reverse speed	2 mm/s	2 mm/s
Keypad	4-key, membrane type key pad, protected against dust particles and liquids	4-key, membrane type key pad protected against dust particles and liquids
Probe	Inductive probe	Inductive probe
Stylus	90° diamond tip	90° diamond tip
Tip radius	5 μm	5 μm
Measuring force	0,75 mN (ISO 3274)	0,75 mN (ISO 3274)
Languages	English, French, German, Spanish, Italian, Portuguese	English, French, German, Spanish, Italian, Portuguese
Memory capacity	max. 100 measured values	max. 999 measured values
Power supply	Battery pack, 8,4 V – 170 mAh	Battery pack, 7,2V – 300 mAh
Power consumption	max. 3 VA at 220 V	max. 6,5 VA at 220 V
Overall dimensions	122 x 53 x 81 mm (gauge unit alone)	122 x 53 x 75 mm (gauge unit alone)
Weight	590 g	590 g

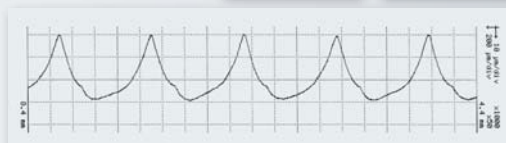
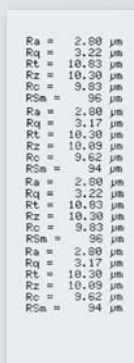


Optional Probes

N°		
06960036	SB10	Standard probe for surfaces and bores, internal/external diameters of >10 mm.
06960037	SB20	Probe for grooves, max. depth 5 mm.
06960038	SB30	Probe for small bores from 4 mm dia.
06960039	SB40	Probe with V-skid for cables with external diameter of >1 mm.
06960040	SB50	Probe with front mounted contact skid for concave surfaces. Ideal for 90° measurement.
06960056		Probe extension, 100 mm long (1 single item).
06960057	SB110	Probe for concave or convex surfaces, smaller tip radius to 5 mm.



Matrix Printer



N°		
06960033	Matrix printer, 24 columns	
Provided along with:		
	Rechargeable battery pack	
	Connecting cable to RUGOSURF 10/10G / 90G	
06960043	Inked ribbon fort printer (3 items)	
06960044	Paper rolls, 57 mm wide (10 units)	

RUGOSOFT 10 Software



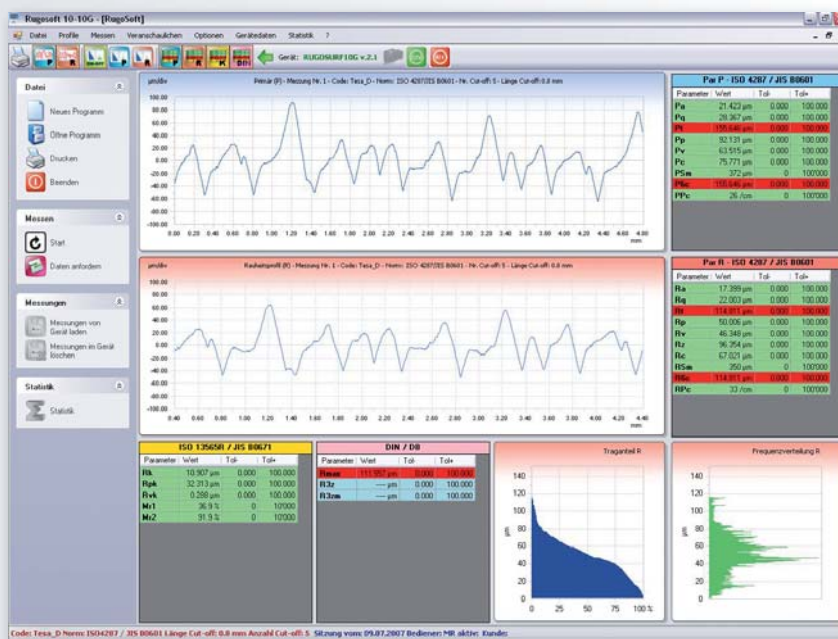
06960034 Rugosoft 10 software

Provided along with:

CD with all instructions for installation, 6 languages available

Instruction manual plus on-line help (included on the CD)

USB cable, L = 1,80 m



Additional Accessories



06960035 Support with granite base, 400 x 250 mm

06960041 Roughness standard, nominal value Ra = 2,97 µm / 117 µin

06960042 Remote control

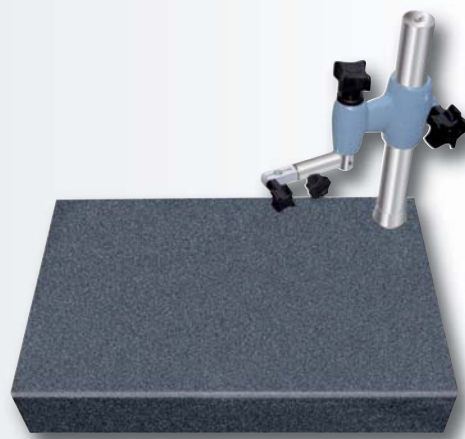
06960045 Battery pack for powering Rugosurf 10G

06960046 Mains adapter, 100 to 240 Vac / 50 to 60 Hz

06960047 Suited plastic case for both Rugosurf 10 and 10G

06960059 Double connector for external power switch and printer

06960063 Battery pack for Rugosurf 10



06960035





TESA RUGOSURF Roughness Tester 90G

Small-size, versatile roughness tester providing maximum ease of use – Ideally suited for high-precision measurements on the shop floor or in the inspection laboratory.

- Measures roughness parameters according to ISO 4287, 12085 (CNOMO), 13565, DIN 4776, JIS B0601:2001 and ASME B46-2002.
- Tactile TFT colour display with size to 3,5".
- Three function keys.
- Graphical interface.
- Direct displaying of all measured values and computed profiles.
- Measuring span to 50 mm/2 in (X-axis) or 1000 µm/39370 µin (Z-axis).
- Interchangeable probe, with or without contact skid.
- Possible input of tolerances.
- USB digital output for data transfer to a PC running TESA Measurement Studio (this software is available as an option).
- Measures up to 90 mm vertically without the need for a special support.
- Profile measurement up to 2 mm (optional accessory).



USB

ISO 3274 (cl. 1)

10°C to 40°C

-10°C to +50°C

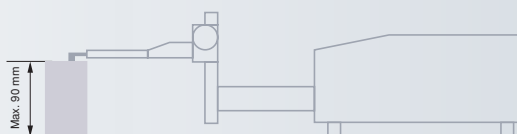
270 x 140 x 90 mm
(tester alone)

3 kg

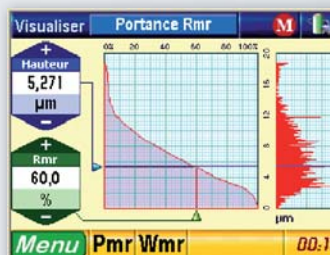


Suited
plastic case

Declaration
of conformity



Visualiser	Paramètres	M	
Ra	2,927 µm	Rdc	18,793 µm
Rq	3,529 µm	Rmr1 0,0%	Rmr2 100,0%
Rt	18,783 µm	RPC(0,001)	36 /cm
Rz	13,182 µm	Pa	4,338 µm
Rp	7,681 µm	Pq	5,763 µm
Rv	5,501 µm	Pt	34,086 µm
Rc	9,627 µm	Pp	20,840 µm
RSm	249 µm	Pv	13,246 µm
		Pc	10,464 µm
Menu			



N°

=

06930012 TESA RUGOSURF roughness gauge 90G

Supplied with the following standard accessories:

Roughness standard, Ra = 2,97 µm / 117 µin

Rechargeable built-in battery, 12 V

SB60/10 standard probe, with or without contact skid

Two-position probe holder
– Locked for probe without skid
– Unlocked for probe with skid

Guiding column, setting range up to 90 mm

Battery charger, 100 to 240V, 50/60 Hz

Technical data

 	06930012
	RUGOSURF 90G
Display	Tactile TFT colour display, size 3,5" Resolution 320 x 240 pixels, 256 colours
Roughness parameters	according to ISO 4287:1997/JIS B0601:2001/ASME B46-2002 Ra – Rq – Rt – Rz – Rp – Rv – Rc – RSm – Rδc Pa – Pq – Pt – Pp – Pv – Pc – PSm – Pδc Wa – Wq – Wt – Wz – Wp – Wv – Wc – WSm – Wδc according to ISO 13565 Rk – Rpk – Rvk – Mr1 – Mr2 according to PrEN 10049 PPc – RPC- WPC according to DIN 4776 Rmax according to DB N31007 R3z – R3zm according to ISO 12085 (CNOMO) Pt – R – AR – Rx – Wte – AW – Wx – Rke – Rpk – Rvk – W – Mrle – Mr2e
Measuring span	
X-axis	50 mm
Z-axis	1000 µm
System of units	mm / in
Resolution	0,001 µm (0.01 µin)
Cut-offs	0,08 - 0,25 - 0,8 - 2,5 - 8 mm
Numerical filter	Type Gaussian as per ISO 11562
Traversing length l _t	(number of cut-offs + 1) x λ _c
Cut-off l _c	number of cut-offs x λ _c
Probing speed	0,5 mm/s – 1 mm/s
Number of selectable cut-offs	1 up to 19 cut-offs of 0,08; 0,25; 0,8; 2,5 mm 1 up to 5 cut-offs of 8 mm
Keypad	Three-key, membrane-type keypad protected against dust particles and liquids
Probing system	inductive probe
Probe tip	90° diamond tip
Tip radius	5 µm
Measuring force	0,75 mN (ISO 3274)
Available languages	English, French, German, Spanish, Italian, Portuguese
Memory capacity	≈ 60 000 measurements
Autonomy	≈ 2 000 measurements / ≈ 10 hours
Power supply	12V integrated Battery pack – Battery charger 100 to 240 Vac, 50/60 Hz
Power consumption	max. 20 VA at 220 V
Overall dimensions	270 x 140 x 90 mm (gauge unit alone)
Weight	3 kg

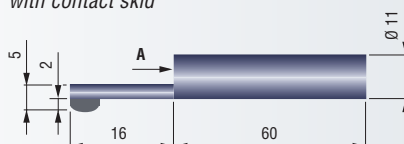


Optional probes (90° diamond tip with a tip radius to 5 µm, unless otherwise specified)

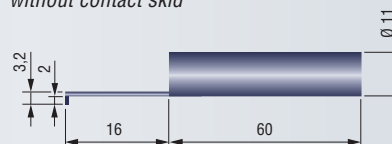
		
06960049	SB60/10	Probe with contact skid For surfaces and bores with external diameter over 10 mm or internal diameter smaller than 6 mm. Probe without contact skid For surfaces and small bores with diameter from Ø 4 mm.
06960067	SB60/10	Same as 06960049, but with a diamond tip, R=2 µm.
06960050	SB20 P	Probe for grooves, max. depth 5 mm.
06960051	SB30 P	Probe for small bores from Ø 4 mm.
06960052	SB40 P	Probe with V-skid for cables with external diameter over 1 mm.
06960053	SB50 P	Probe with contact skid for concave surfaces. Ideal for 90° measurement.
06960054	SB120P	Probe for grooves, max. depth 20 mm.
06960058	SB120S	Probe without skid for grooves, max. depth 15 mm.
06960061	SB60-D2	Probe for small bores with diameter from 2 mm, L = 30 mm.

SB60/10 Probe

with contact skid



without contact skid

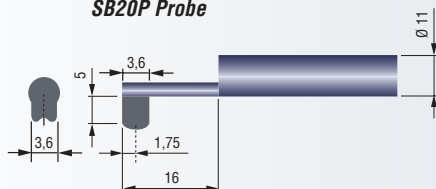


A Undo both screws on the front face to remove the skid. Once done, use the probe very carefully for any further measurement (see Fig. 1).

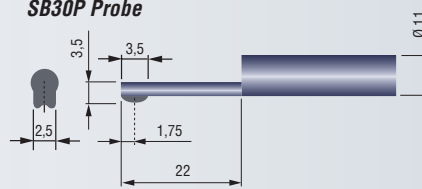


Fig. 1

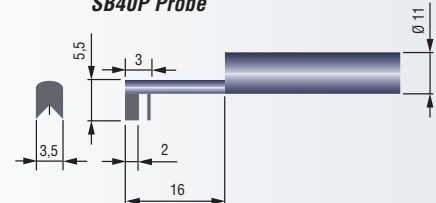
SB20P Probe



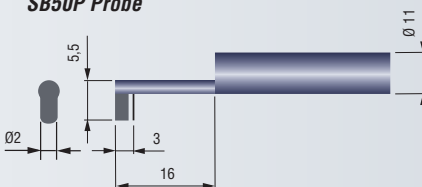
SB30P Probe



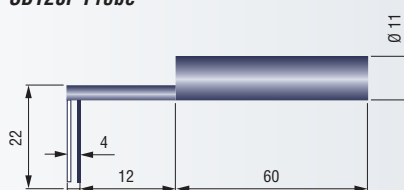
SB40P Probe



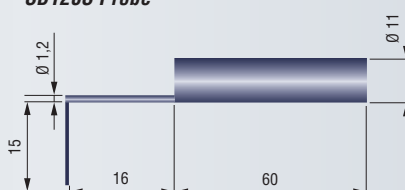
SB50P Probe



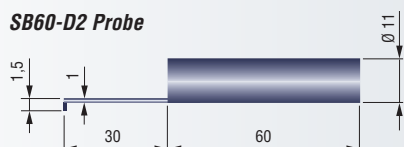
SB120P Probe



SB120S Probe



SB60-D2 Probe



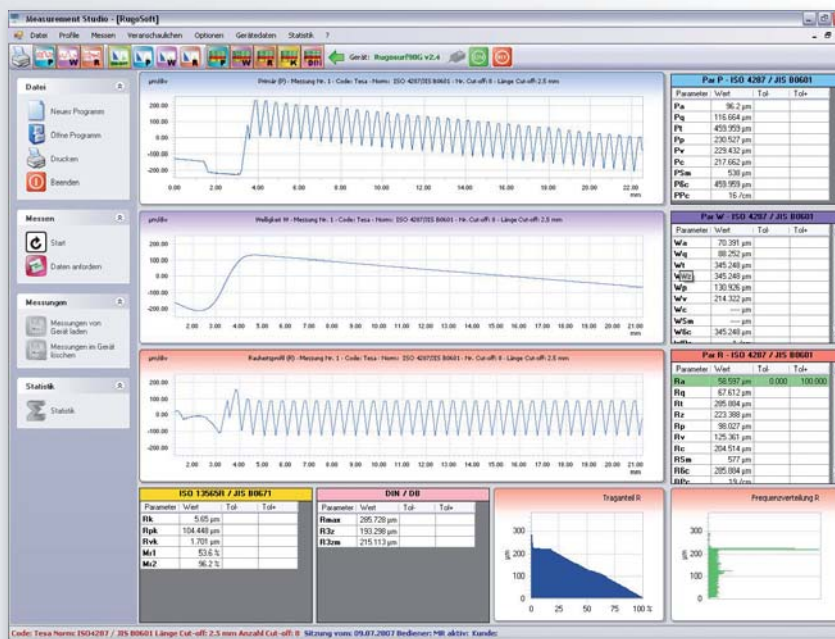
Measurement Studio Software



06960048 TESA Measurement Studio Software

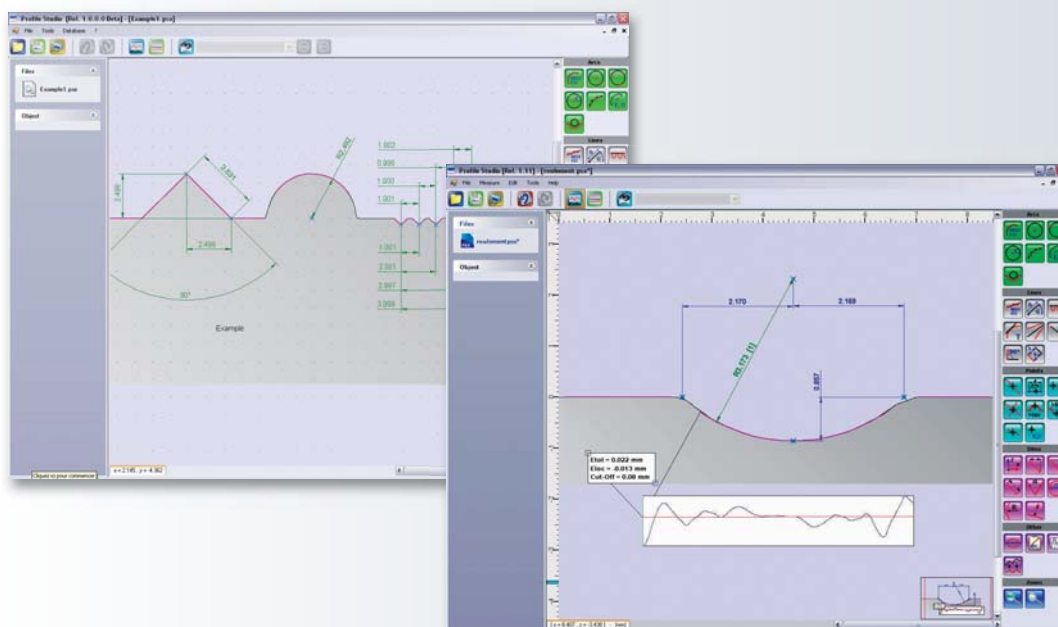
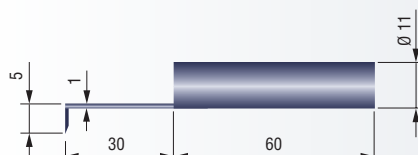
provided with:

Instructions for installation, 6 languages available on the CD
Instruction manual plus Online Help (also available on the CD)
USB connecting cable, L = 1,80 m



OPTIONAL PROFILE MEASUREMENT

Fitted with a probe with special design, your Rugosurf 90G changes into a profile gauge. Simple and accurate, this tool used in connection with its proper software can measure any length, radius or arc of circle on any parts. Sometimes, checking these features is just impossible.



Fast, easy setting and evaluation of achieved results. Each relevant dimension can be input upon recognition of the part geometry feature (a point, straight line or arc of circle). Both the rotation and symmetry of the profile being checked let it be conveniently aligned.

The use of a measured profile for the evaluation of a new measurement makes all operations easier. Each needed handling is automatically reproduced.

All measurement results, including detailed user-defined reports, are checked at a glance based on specified tolerances.

- Z = 2 mm
X = 50 mm
- Z = 0,1 µm
X = 0,4 ÷ 4 µm
depending on measured length
- Z = 3,5 + 0,75 * H µm,
*H in mm
X = 3,5 + L/10 µm,
L = distance in mm
- 1 mm/s
- 70° (upward probe)
85° (downward probe)



06960100



Profile Set 2 mm

Supplied with:

06960102 SB 2000 probe

06960103 Setting standard (along with inspection report)

06960101 Profile Studio multilingual software (EN/FR/DE/EN/IT/ES/PT)

USB connecting cable, L = 1,80 m



ISO 2632
Parts 1 and 2



Rust-resistant
nickel



Specimens
for roughness
comparison
cannot be used as reference
ones. Therefore, they are
not suitable for calibrating
surface roughness testers.



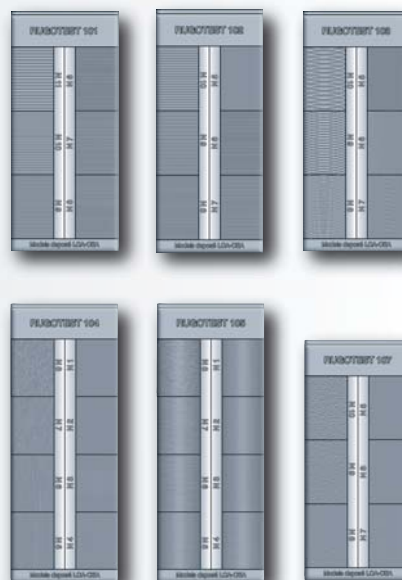
Leather case

RUGOTEST Roughness Comparison Specimens

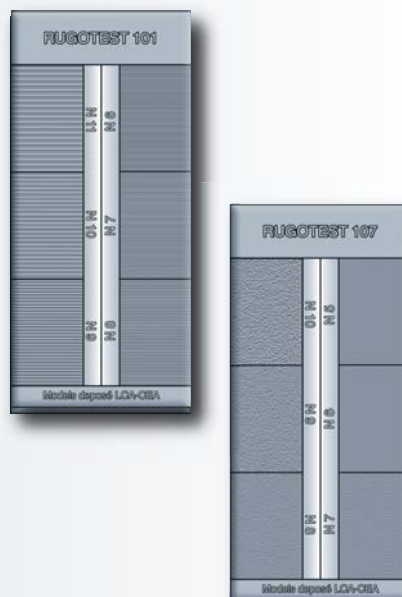
For touch and/or sight comparisons of the workpiece surface finish.

Sets of roughness specimens for single machining methods according to ISO roughness parameters

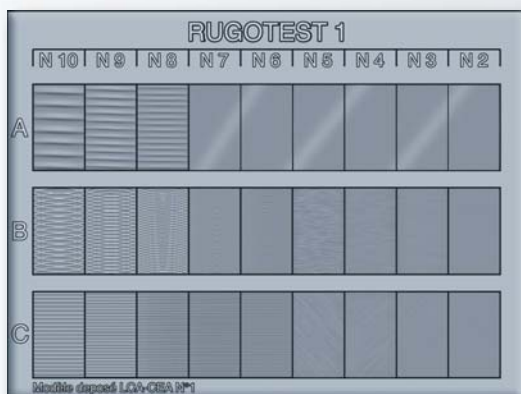
Nº	RUGOTEST	RUGO-TEST	Number of single specimens	ISO roughness parameters
081112346	RUGOTEST A4			
<i>Consisting of the following single specimens:</i>				
081112053	Metal working	1	27	N2 ÷ N10
081112054	Hand grinding	2	6	N6 ÷ N11
081112055	Shot blasting	3	18	N6 ÷ N11
081112056	Hand filing	4	6	N6 ÷ N8
081112345	RUGOTEST A6			
<i>Consisting of the following single specimens:</i>				
081112058	Planing	101	6	N6 ÷ N11
081112059	Turning	102	6	N5 ÷ N10
081112060	Face milling	103	6	N5 ÷ N10
081112061	Surface grinding	104	8	N1 ÷ N8
081112062	Circular grinding	105	8	N1 ÷ N8
081112063	Spark erosion	107	6	N5 ÷ N10



Nº	RUGOTEST	mm	g
081112053	1	135 x 105	160
081112054	2	120 x 90	160
081112055	3	120 x 90	190
081112056	4	120 x 90	160
081112057	5	120 x 90	200
081112058	101	110 x 50	110
081112059	102	110 x 50	105
081112060	103	110 x 50	110
081112061	104	130 x 50	125
081112062	105	130 x 50	130
081112063	107	110 x 50	110
081112344	12	127 x 27	60
081112346	A4	330 x 250	710
081112345	A6	330 x 250	780



Specimens for individual machining methods according to ISO roughness parameters



ISO roughness parameters				N0	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
Mean roughness value Ra		μm		0,0125	0,025	0,05	0,1	0,2	0,4	0,8	1,6	3,2	6,3	12,5	25
		μin		0.5	1	2	4	8	16	32	63	125	250	500	1000
Mean roughness value Rz iso				$\mu\text{m} / \mu\text{in}$											
				These values are changing depending on the machining method used.											
No	=	RUGO-TEST No.	Number of single-specimens												
081112053	Metal working	1	27												
	Side milling		3												
	Face milling		5												
	Turning/Planing		5												
	Grinding		6												
	Lapping		4												
	Finish grinding/Honing		4												
081112054	Hand grinding	2	6												
081112055	Shot blasting	3	18												
	Blasting grains														
	– spherical	coarse	3												
		fine	6												
	– angular	coarse	3												
		fine	6												
081112056	Hand filing	4	6												
	– straight		3												
	– intersected		3												
081112057	Hand polishing	5	10												
	Surface shape														
	– cylindrical		5												
	– plane		5												
081112058	Planing	101	6												
081112059	Turning	102	6												
081112060	Face milling	103	6												
081112061	Plane grinding	104	8												
081112062	Circular grinding	105	8												
081112063	Spark erosion	107	6												

Specimens according to Charmille roughness parameters (VDI 3400)

Charmille roughness parameters				12	15	18	21	24	27	30	33	36	39	42	45
Mean roughness Ra		μm		0,40	0,56	0,80	1,12	1,60	2,24	3,15	4,5	6,3	9,0	12,5	18,0
No	=		Number of single-specimens												
081112344	Spark erosion		12												

Height Gauges



Made To Measure in the Course of the Manufacturing Process

Height gauges are single-axis handtools made to measure on a surface plate, preferably in granite. The TESA-μHITE version being offered to you in this section clearly shows that combining a surface plate with any height gauge can create a whole measuring system.

Providing the needed versatility, they are well suited for dimensional inspection directly on a machine or a group of machines, usually during the various setting and sampling operations throughout the whole manufacturing process. They are specially made for checking parts that are difficult to machine due to their critical sizes.

TESA-HITE or TESA MICRO-HITE, whether manually operated or motor-driven, do not require any special skills. Nearly everyone working in the workshop can use them easily.

SCS Calibration Certificate

The newly implemented TESA-HITE and TESA MICRO-HITE production line now also includes its own temperature-controlled laboratory recently certified by the Swiss Accreditation Service, so that each height gauge comes with a SCS calibration certificate provided free of charge. The negligible temperature variation ($20^{\circ}\text{C} \pm 0,1^{\circ}$) along with the use of high-precision step gauges allow the lowest uncertainty of measurement to be achieved during the calibration process.

- As a first step, all values needed for automatic compensation for the systematic errors of the finished height gauge through Computer Aided Accuracy (CAA) are captured.
- Once conveniently calculated, each single compensation value is then stored in the tool memory so as to allow the correction of the measured values during calibration, automatically.
- Finally, the relevant calibration certificate is issued based on the values obtained during a new series of measurements taken at another measuring point, also equipped with step gauges.

The applied calibration procedure together with the SCS based certification ensure that every TESA height gauge is traceable to national standards.




Height Measurement – One of TESA's Strengths

TESA offer the largest range of height gauges for reliable one or two-dimensional measurements. En-Users can choose the convenient model according to the requirements of their metrology applications, but also to their financial resources. This wide range goes from the simple height and scribing gauge to the motorised vertical column suitable for high-precision measurements in two coordinate directions.



Height Gauge Models	Details on page	μm (L in m)	Accessory Std (mm)	Accessory Spec. (mm)	Measuring capabilities						
					1D	$\varnothing$	$\perp$	$\angle$	2D		Moto-rised
	TESA-HITE Magna	N-4	8	870	1095	●	●	–	–	–	–
	TESA-HITE	N-7	2,5+4L	870	1095	●	●	●	–	–	–
	TESA -HITE plus M	N-10	2,5+3L	860	1085	●	●	●	●	●	●
	TESA MICRO-HITE	N-12	2+3L	1075	1300	●	●	●	●	–	–
	TESA MICRO-HITE plus M	N-16	2+1,5L	1075	1300	●	●	●	●	●	●
	TESA-μHITE	N-21	1/2	160	360	●	●	–	–	–	●
	TESA-μHITE + Power Panel Plus M	N-25	1/2	160	360	●	●	–	●	●	●
	ETALON height and scribing gauges	N-30	40	1000	–	●	–	–	–	–	–



TESA-HITE magna 400 and 700

Made to withstand severe workshop conditions

Emanating from a well-proven TESA technology, both TESA-HITE magna 400 and 700 are equipped with the patented TESA magna μ system. They are designed to remain unaffected even in the toughest conditions (water and oil splashing, dust particles).

They have exceptional features that make them indispensable for the workshop while also offering the most favourable price-performance relationship. Robust and dependable, their modern design provides the highest resistance for use close to the production area.

Each height gauge is battery-powered and serve to measure height or step dimensions, diameters, centre-to-centre distance of bores or grooves, width of nuts, and much more.



- Wide application range, two sizes available with measuring span to 415 mm / 16 in or 715 mm / 28 in, respectively.
- Electronics totally protected against oil and water splashing or dust particles (IP65).
- Control panel with numerical display to 0,001/0,005/0,01 mm or 0,0001/0,0002/0,001 in.
- Dynamic probing of the workpiece with a constant measuring force.
- Easiness, high reliability when checking bores or shafts using TESA's unique device for automatic detection of the culmination point – patented.
- Acoustic signal to acknowledge value capture, also conveniently programmable.
- Ability to measure parallelism errors.
- TESA's magnetic system, guaranteeing correct operating even in harsh workshop conditions – patented.
- Large LC display, also with symbols for the measuring functions.
- Zero-setting anywhere within the measuring range.
- PRESET function for entering any given value.
- Metric/inch conversion.
- RS 232 data output.
- SCS calibration certificate provided with each height gauge.



Factory standard
83 x 49 mm
LC display.
7-decade plus
minus sign. Also with
graphical symbols for all
active functions.



0,001/0,005/
0,01 mm or
0,0001/0,0002/
0,001 in



12 mm



Metric/Inch
conversion



Measuring span,
application range
and precision:

see relevant table on
page N-5.



Nickel plated
gauge base
(chemical coating)



Magnetic
scale



(12 $\pm$ 1,5) x
10⁻⁶ K⁻¹



Probing head
mounted on a
ball-bearing,
hand wheel for head dis-
placement, fine setting. Head
drive carriage can be locked.



500 mm/s
20 in/s



1,5 $\pm$ 0,5 N
(at switch
point)



RS 232



Rechargeable
batteries, 6V



≈ 60 h



10°C to 40°C



-10°C to 60°C



100%



IP55 or IP65 for
both electronics
and measuring
system (IEC 60529)



See table
on page N-5



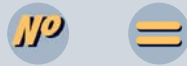
EN 61326,
Class B
(with disconnected
charger)



Shipping
packaging

- Identification number
- Declaration of conformity
- SCS calibration certificate

TESA-HITE magna 400 / 700



- 00730047 TESA-HITE magna 400 height gauge**
Measuring span 415 mm / 16 in
Application range 0 ÷ 570 mm / 0 ÷ 22 in
- 00730059 TESA-HITE magna 700 height gauge**
Measuring span of 715 mm / 28 in
Application range of 0 ÷ 870 mm / 0 ÷ 34 in

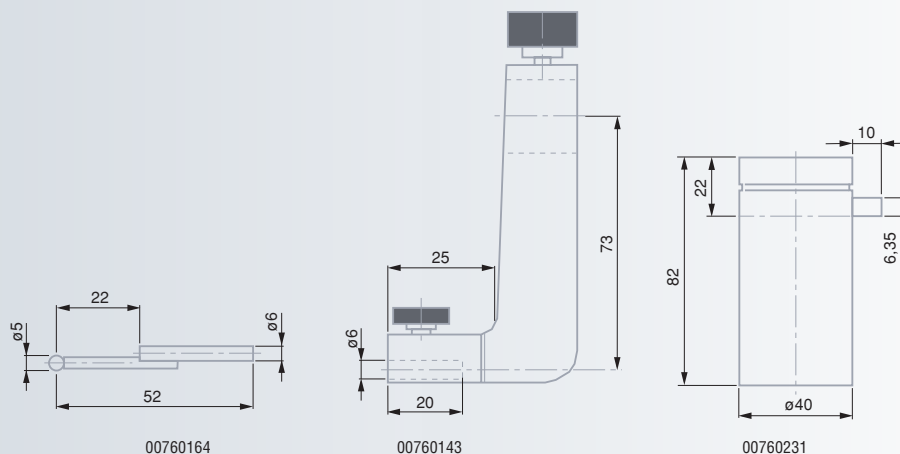
Each height gauge is supplied with the following standard accessories:

- 00760143** 1 Standard probe insert holder
- 00760164** 1 Standard probe insert with a 5 mm dia. tungsten carbide ball tip
- 00760231** 1 Master piece for establishing the probe constant, nominal dimension to 6,350 mm / 0.250 in
- 00760157** 1 Rechargeable battery, 6V
- 04761054** 1 Mains adapter, 100 ÷ 240 Vac / 50 ÷ 60Hz
- 04761055** 1 Cable EU for mains adapter
- 04761056** 1 Cable US for mains adapter

Technical Data

		TESA-HITE magna	
		400	700
	mm in	415 16	715 28
With standard accessory	mm in	0 ÷ 570 0 ÷ 22	0 ÷ 870 0 ÷ 34
With probe insert holder No. 00760057	mm in	0 ÷ 625 0 ÷ 24	0 ÷ 925 0 ÷ 36
With probe insert holder No. S07001622	mm in	0 ÷ 795 0 ÷ 31	0 ÷ 1095 0 ÷ 43
With standard accessory	µm in	< 8 < 0.0003	< 8 < 0.0003
With standard accessory		on flat surfaces: 2δ = < 3 µm / < 0.00015 in into bores: 2δ = < 5 µm / < 0.00020 in	
	kg	15	18

Standard Accessories for TESA-HITE magna 400 / 700



Optional Accessories for TESA-HITE magna 400 / 700

Nº

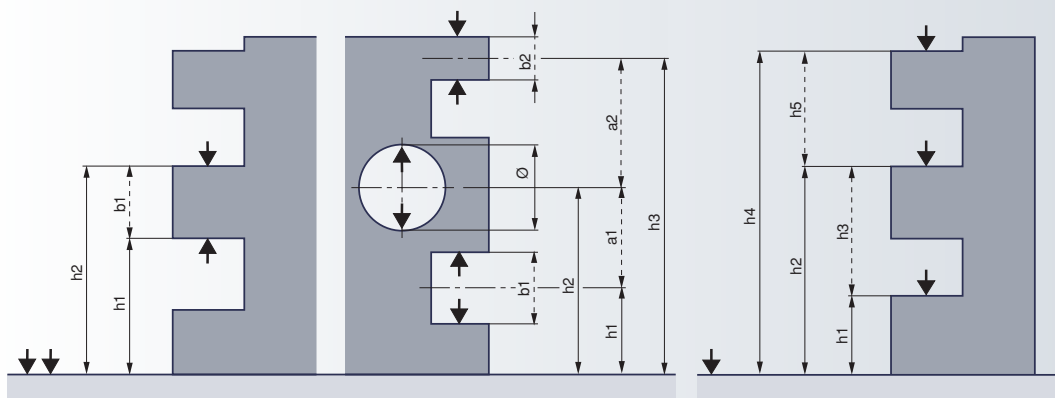


04761052 RS 232 connecting cable for PC and TESA PRINTER SPC

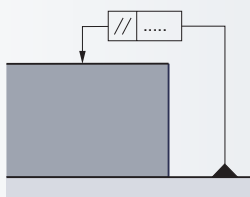
04761063 Connecting cable Sub-D 9pin and USB for PC

Additional accessories: see page N-27

One-Dimensional Measurement



Measurement of Parallelism



TESA-HITE 400 / 700

Precision in motion

The two TESA-HITE 400 and 700 height gauges are fitted with the patented, opto-electronic TESA's measuring system with incremental glass scale. Due to their robust and reliable construction, they are ideally suited for dimensional inspection on the shop floor.

Full autonomy is ensured through battery power. Each model allows height or step dimensions, diameters, centre-to-centre distances, groove width and the like to be accurately measured. Excellent price/performance ratio.



Factory standard



83 x 49 mm LC display. 7-decade plus minus sign. Also with graphical symbols for all active functions.



0,0001 / 0,001 / 0,01 mm or 0,00001 / 0,0001 / 0,001 in



12 mm



Metric/Inch conversion



Air-cushion for easy displacement over the surface plate. Measuring span, application range and precision: see table on page N-8.



Nickel plated gauge base (chemical coating) with bottom face including 3 resting points, finely lapped.



Frontal, model 400 < 9 µm, model 700 < 13 µm



Incremental glass scale, opto-electronic



(12 ± 1,5) x 10⁻⁶ K⁻¹



Probing head mounted on a ball-bearing, hand wheel for head displacement, fine setting. Head drive carriage can be locked.



500 mm/s
20 in/s



1,5 ± 0,5 N (at switch point)



RS 232



Rechargeable batteries, 6V



≈ 60 h



10°C to 40°C



-10°C to 60°C



80%, non-condensing



IP40, electronics to IP65 (IEC 60529)

- Wide application range, two sizes available with measuring span of 415 mm / 16 in or 715 mm / 28 in, respectively.
- Integrated air-bearing for easy displacement across the granite plate.
- Electronics totally protected against oil and water splashing, dust particles (IP65).
- Control panel with numerical display to 0,0001 / 0,001 / 0,01 mm or 0,00001 / 0,0001 / 0,001 in.
- Dynamic probing of the workpiece with a constant measuring force.
- Ease of use, high reliability when checking bores or shafts using TESA's unique device for automatic detection of the culmination point – patented.
- Acoustic signal to acknowledge value capture, also conveniently programmable.
- Ability to measure any deviation in parallelism.
- Possible use of a digital sensor for determining perpendicularity errors with stated angle of the linear regression line.
- Patented TESA's opto-electronic system. Long-lasting stability of the glass scale for unbroken high accuracy.
- Large LC display with symbols for the measuring functions.
- Zero-setting anywhere within the measuring range.
- PRESET function for entering any given value.
- Metric/inch conversion.
- RS 232 data output.
- SCS calibration certificate provided with each height gauge.



TESA-HITE 400/700



00730043 TESA-HITE 400 height gauge
Measuring span 415 mm / 16 in
Application range 0 ÷ 570 mm / 0 ÷ 22 in

00730044 TESA-HITE 700 height gauge
Measuring span 715 mm / 28 in
Application range 0 ÷ 870 mm / 0 ÷ 34 in

Each height gauge is supplied with the following standard accessories:

- 00760143** 1 Standard probe insert holder
- 00760227** 1 Standard probe insert with shank and 5 mm dia. ball tip in tungsten carbide
- 00760219** 1 Master piece for establishing the probe constant, nominal dimension to 6,350 mm / 0.2500 in
- 00760226** 1 Electric pump for creating the air-cushion beneath the gauge base, already mounted
- 00760157** 1 Rechargeable battery, 6 V
- 04761054** 1 Mains adapter, 100 ÷ 240 Vac/50 ÷ 60 Hz
- 04761055** 1 Cable EU for mains adapter
- 04761056** 1 Cable US for mains adapter



See table opposite



EN 61326, Class B
(with disconnected charger)



Shipping packaging



Identification number



Declaration of conformity

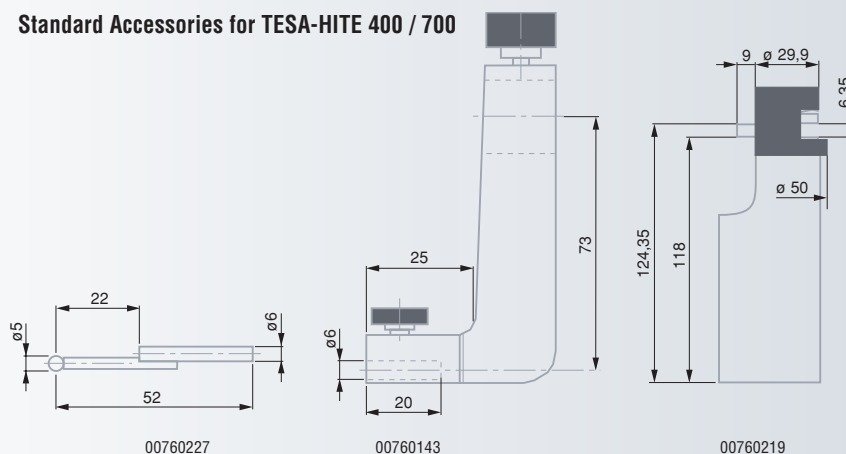


SCS calibration certificate

Technical data

			TESA-HITE 400	TESA-HITE 700
	mm in		415 16	715 28
 With standard accessory	mm in		0 ÷ 570 0 ÷ 22	0 ÷ 870 0 ÷ 34
With probe insert holder No. 00760057	mm in		0 ÷ 625 0 ÷ 24	0 ÷ 925 0 ÷ 36
With probe insert holder No. S07001622	mm in		0 ÷ 795 0 ÷ 31	0 ÷ 1095 0 ÷ 43
 With standard accessory	µm in		(2,5+4•L) µm (L in m) (0.0001+0.000004•L) in (L in in)	
 With standard accessory			on flat surfaces: 2δ = <2 µm / <0.0001 in into bores: 2δ = <3 µm / <0.00015 in	
 Frontal, mechanical	µm in		9 0.00035	13 0.0005
	kg		27	32

Standard Accessories for TESA-HITE 400 / 700

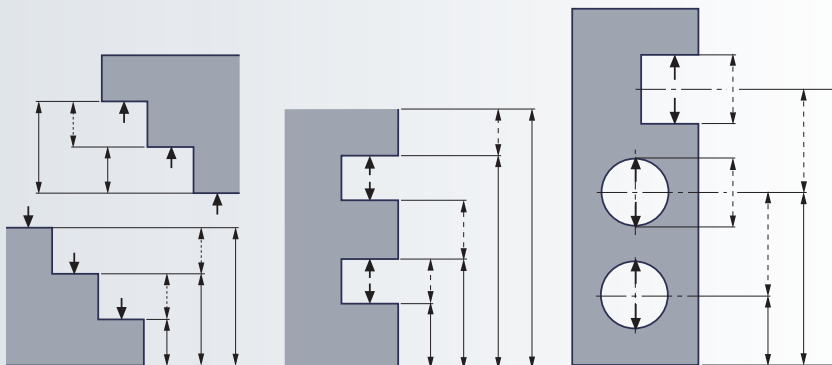


Standard Accessories for TESA-HITE 400 / 700

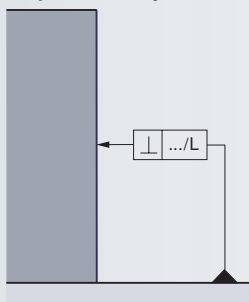


04760070	RS port. Used to connect a digital sensor for perpendicularity measurement
04761052	RS 232 connecting cable for PC and TESA PRINTER SPC
04761063	Connecting cable Sub-D 9pin and USB for PC
Additional accessories: see page N-27	

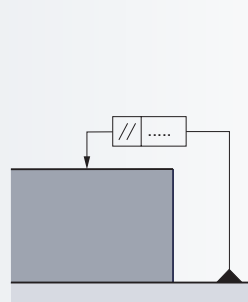
One-Dimensional Measurement



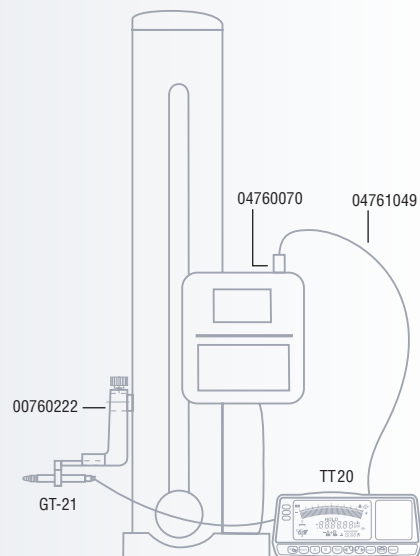
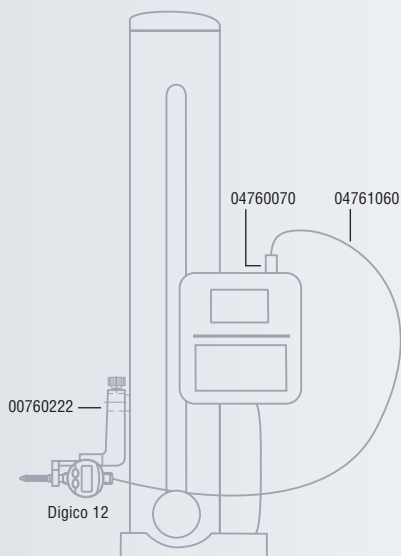
Perpendicularity Measurement



Parallelism Measurement



Configuration for Perpendicularity Measurement



TESA-HITE plus M 400 / 700

Precision in Motion – Motorised Version

The added value of the motorised TESA-HITE plus M 400 / 700 is not only noticeable in their technical features, but also in their ease of use. Combine with the programming function, this solution is ideal for recurrent measurements in the shop floor environment. Advanced functions allow for complex calculations such as those required for two-axis or perpendicularity measurement. These height gauges with outstanding features offer the most attractive price/performance relationship, making them indispensable for the workshop.



- Wide application range.
- Electronics entirely protected from the penetration of liquids and dust particles.
- Integrated air cushion, mounted control panel.
- Easy, intuitive use of the rotary power control.
- Provide all the measuring functions of a dedicated motorised column, including height, diameter, distance, parallelism, perpendicularity, straightness, angle and 2D measurement besides programming, automatic probing cycles, statistical value processing.
- TESA's patented measuring system, opto-electronic.
- Probe insert holder and inserts compatible with those of TESA MICRO-HITE.
- SCS calibration certificate attached to each height gauge.



Factory standard



Dual LC display, 128 x 63 mm in size.

• Upper display field for length values (7 segments/sign). Also with symbols for the functions.

• Lower full dot display field for perpendicularity and straightness along with symbols for all operator-controlled function keys.

7segment display plus minus sign for the measured values.



0,0001 / 0,001 / 0,01 mm or 0,00001 / 0,0001 / 0,001 in



Main display with a size to 12,7 x 6,4 mm or 6,3 x 4,2 mm for auxiliary display.



Metric/Inch conversion



Air bearing for easy displacement on the granite plate.

For measuring span, application range and precision: see the table on page N-11.

30 function keys available on the keyboard.



Rugged nickel plated gauge base having

3 resting points, finely lapped.



Frontal for models
400 = < 8 μ m
700 = < 12 μ m



Incremental glass scale, opto-electronic data capture



(12 $\pm$ 1,5) x 10⁻⁶ K⁻¹



Measuring head mounted on a ball-bearing.

Electro-motorised head displacement at varying speeds from 7,5 up to 40 mm/s.

Manual displacement: $\leq$ 600 mm/s. Automatic value acquisition with a constant measuring force.



1 N. Coupled servomotor for triggering the measuring force.



RS 232



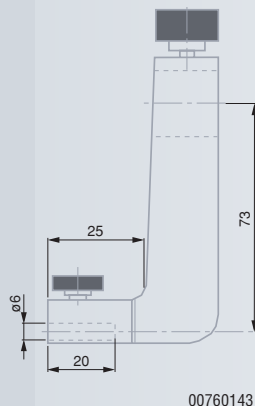
Rechargeable batteries, 6V



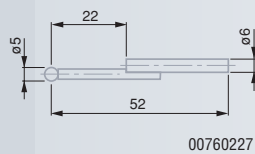
$\approx$ 60 h, full charging takes 8 hours



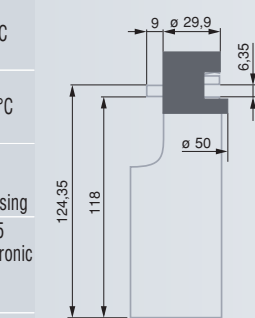
Standard accessories for
TESA-HITE plus M 400 / 700



00760143



00760227



00760219

- 10°C to 40°C
- 10°C to 60°C
- 80%, non-condensing IP40 or IP65 for the electronic cabinet (IEC 60529)
- See table opposite
- EN 61326, class B (with disconnected battery charger)
- Shipping packaging
- Identification number
- Declaration of conformity
- SCS calibration certificate

TESA-HITE plus M 400/700



- 00730045** TESA-HITE plus M 400 height gauge
Measuring span 405 mm / 16 in
Application range 0 to 560 mm / 0 to 22 in
- 00730046** TESA-HITE plus M 700 height gauge
Measuring span 705 mm / 27 in
Application range 0 to 860 mm / 0 to 33 in
- 00730057** TESA-HITE plus M 400 height gauge with built-in printer
Same as N° 00730045, but with a built-in matrix printer for results output.
- 00730058** TESA-HITE plus M 700 height gauge with built-in printer
Same as N° 00730046, but with a built-in matrix printer for results output.

Each height gauge is supplied with the following standard accessories:

- 00760143** 1 Probe insert holder
- 00760227** 1 Standard probe insert with shank and 5 mm dia. ball tip in tungsten carbide
- 00760219** 1 Master piece for establishing the probe constant, nominal dimension: 6,350 mm / 0.2500 in
- 00760226** 1 Electric pump for creating the air cushion under the height gauge base, already mounted
- 00760157** 1 Rechargeable battery, 6V
- 00761054** 1 Mains adapter, 100 ÷ 240 Vac / 50 ÷ 60 Hz
- 00761055** 1 Cable EU for mains adapter
- 00761056** 1 Cable US for mains adapter

Technical Data

		TESA-HITE plus M 400	TESA-HITE plus M 700
		405 16	705 27
	mm in		
With standard accessory	mm in	0 ÷ 560 0 ÷ 22	0 ÷ 860 0 ÷ 33
With probe insert holder N° 00760057	mm in	0 ÷ 615 0 ÷ 24	0 ÷ 915 0 ÷ 35
With probe insert holder N° S07001622	mm in	0 ÷ 785 0 ÷ 31	0 ÷ 1085 0 ÷ 42
With standard accessory	µm in	(0.0001+0.000003 • L) in (L in in)	
With standard accessory		on flat surfaces: 2δ = < 1 µm / < 0.00005 in into bores: 2δ = < 2 µm / < 0.0001 in	
Frontal, mechanical	µm in	8 0.00031	12 0.00047
	kg	27	32

Optional Accessories for TESA-HITE plus M 400 / 700



- 04760070** RS port. Used to connect a digital sensor for perpendicularity measurement
 - 04761052** RS 232 connecting cable for PC and TESA PRINTER SPC
 - 04761063** Connecting cable with Sub-D connector 9-pin – USB type for PC
 - 04765008** Thermal paper roll, 57 mm wide
- For additional accessories, report to page N-27



TESA MICRO-HITE 350 / 600 / 900

The metrology-based reference for the workshop



Stand-alone design – Made to measure any size in in the form of internal, external, height, depth, step and distance dimensions of geometric part features having either a flat, parallel or cylindrical surface.

Automatic capture of the culmination point on bores or shafts – Dynamic probing with memory functions «max.», «min.» plus «max.-min.»

The TESA IG-13 digital probe lets you also measure any deviation from perpendicularity, straightness and parallelism as well as runout errors with result output according to ISO 1101.

- State-of-the-art concept associated with a high-quality design is the fruit of years of experience in the manufacture of electronic height gauges.
- Ideal for dimensional inspection close to the manufacturing cell. No cumbersome cables to clutter up the working area.
- Fast, simple and reliable probing of the workpiece or holes, especially.
- 3 main gauges available with either a 365, 615 or 920 mm measuring span.
- Numerical display to 0,0005, 0,001, 0,01 and 0,1 mm, or equivalent inch units.
- Extremely accurate measuring of deviations from length, straightness and perpendicularity due to the automatic correction of the bias errors through CAA (Computer Aided Accuracy).
- Coefficient of linear expansion identical to steel ($11,5 \times 10^{-6} \text{ K}^{-1}$).



- POWER PANEL for value processing and output with interactive display to guide the operator.
- No manual calculation.
- 99 workpiece oriented measurement cycles, programmable. Each cycle includes a number of 64 features with related limits of size.
- Built-in printer for result output or possible use of an external printer unit to get a hard-copy in A4 format.
- RS 232 data output.
- Every height gauge comes with a SCS calibration certificate.

TESA MICRO-HITE 350 / 600 / 900 main gauges



Factory standard



Measuring span, application range and accuracy as stated on page N-14



Rugged nickel plated base with bottom face including 3 resting points finely lapped



Air cushion usable for easy move of the height gauge over the surface plate, if so.



Frontal, model 350 < 7 µm, model 600 < 9 µm, model 900 < 11 µm



Incremental glass scale with reference point, dividing period of 20 µm. Opto-electronic value capture (TESA patent).



$11,5 \times 10^{-6} \text{ K}^{-1}$



Probing head mounted on a ball-bearing and moved by means of both knurled hand wheel and crank. Head drive system can be locked. Fine adjust device can also be additionally mounted (available as an option). Automatic value capture with a constant measuring force. Visual and acoustic signal for acknowledgment



300 mm/s
12 in/s



$1,6 \pm 0,25 \text{ N}$
(at switch point for value capture)

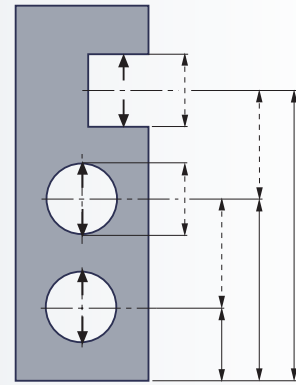
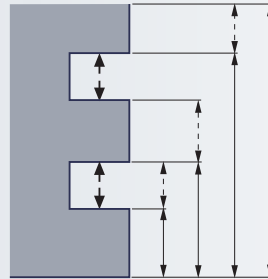
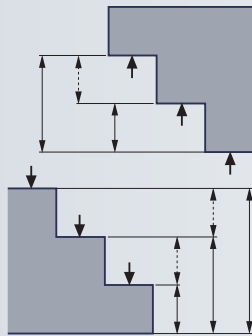


RS 232, opto-electronic

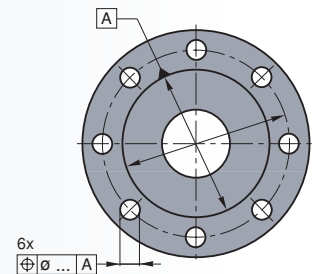
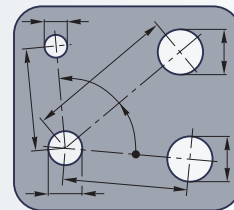
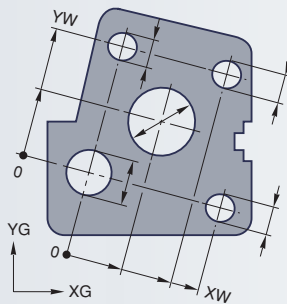
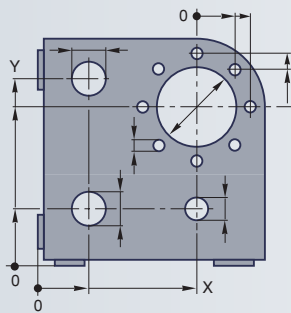
Continued next page

TESA MICRO-HITE – Efficient and Powerful One-Dimensional Measurement

- Rechargeable batteries, 6 V, 3,0 Ah or mains adapter
- ≈ 12 hours for one battery pack;
≈ 2 hours for the pump used to form the air cushion
- 10°C to 40°C
- 10°C to 60°C
- 80% non-condensing
- IP40 (IEC 60529)
- EN 61326-1, Class B (with disconnected charger)
- Net weight (w/o panel nor battery pack)
Main gauges
350: 33 kg
600: 38 kg
900: 45 kg
- Shipping packaging
- Identification number
- SCS calibration certificate

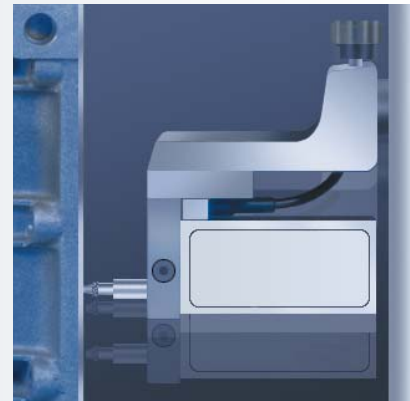
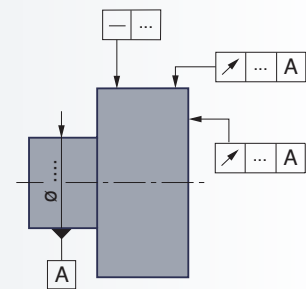
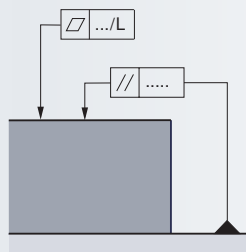
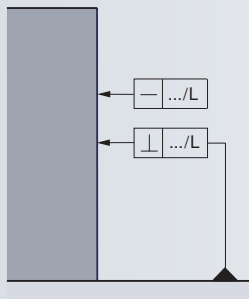


Two-Dimensional Measurement



Programme functions for the detection of form and position errors

with use of a TESA IG-13 digital probe



TESA IG-13



TESA MICRO-HITE 350 / 600 / 900 Height Gauge Sets



		
00730033	TESA MICRO-HITE height gauge set	350
00730034	TESA MICRO-HITE height gauge set	600
00730035	TESA MICRO-HITE height gauge set	900

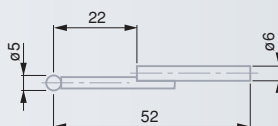
Each gauge set includes the following components, control panel excluded:

00730021	1 TESA MICRO-HITE 350 main gauge	●		
00730022	1 TESA MICRO-HITE 600 main gauge		●	
00730023	1 TESA MICRO-HITE 900 main gauge			●
00760143	1 Standard probe insert holder	●	●	●
00760227	1 Standard probe insert with shank and 5 mm dia. ball tip in tungsten carbide	●	●	●
00760150	1 Master piece for establishing the probe constant, nominal dimension 20,0000 mm/0.78740 in	●	●	●
00760142	1 Electric pump for creating the air-cushion beneath the gauge base, already mounted	●	●	●
00760141	1 Battery pack	●	●	●
04761054	1 Mains adapter, 100 to 240 Vac/50 to 60 Hz	●	●	●
04761055	1 Cable EU for mains adapter	●	●	●
00760151	1 Dust cover for TESA MICRO-HITE 350	●		
00760152	1 Dust cover for TESA MICRO-HITE 600		●	
00760153	1 Dust cover for TESA MICRO-HITE 900			●

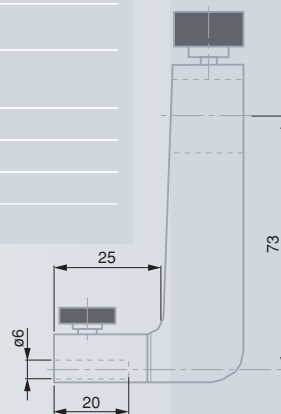
Optional Accessories for TESA MICRO-HITE 350 / 600 / 900

00760144	Add-on fine adjust device for extra fine movement of the measuring head, complete
00760157	Spare battery pack No. 00760141
04761056	Cable US for mains adapter
04761023	RS 232 connecting for PC and TESA PRINTER SPC

For additional accessories, see pages N-20 and N-27.



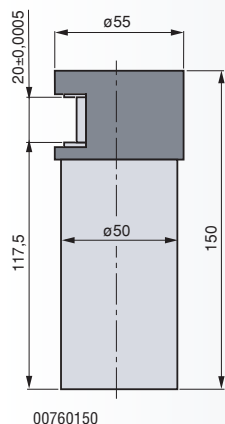
00760227



00760143

Technical Data

	Models		350	600	900
		mm	365	615	920
		in	14	24	36
	With standard accessory	mm	0 ÷ 520	0 ÷ 770	0 ÷ 1075
		in	0 ÷ 20	0 ÷ 30	0 ÷ 42
	With probe insert holder No. 00760057	mm	0 ÷ 575	0 ÷ 825	0 ÷ 1130
		in	0 ÷ 22	0 ÷ 32	0 ÷ 44
	With probe insert holder No. S07001622	mm	0 ÷ 745	0 ÷ 995	0 ÷ 1300
		in	0 ÷ 29	0 ÷ 39	0 ÷ 51
	With standard accessory		(2 + 3 • L) μm (0.0001 + 0.000003 • L) in		(L in m) (L in in)
	With standard accessory		2δ = ≤ 1 μm / ≤ 0.00005 in		
	Frontal, mechanical	μm	7	9	11
		in	0.00028	0.00035	0.00043
	Frontal and lateral using TESA IG-13	μm	6	8	10
		in	0.00024	0.00031	0.00039



00760150

POWER PANEL



Dual LC display, 128 x 63 mm in size.

- Upper display field for length values (7-segment/sign). Also with symbols for the functions.
- Lower full dot display field for perpendicularity and straightness along with symbols for all operator-controlled function keys.

7-decade display plus minus sign for the measured values.

12,7 x 6,4 mm main display, 6,3 x 4,2 mm auxiliary display.

See opposite

Metric/Inch conversion

Floating zero

PRESET function for entering a given value.

Continuous displaying.

Manual or automatic triggering of data transfer.

Output of predefined inspection reports with headings in 5 languages plus A4 format using an external printer unit.

Via TESA MICRO-HITE

IP40 (IEC 60529)



Control Panel for TESA MICRO-HITE 350 / 600 / 900



00760163



TESA POWER PANEL

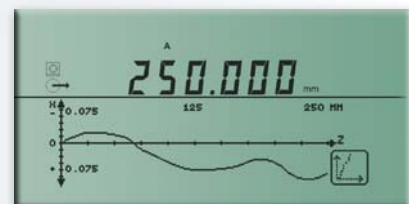
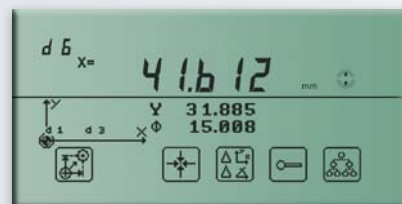
Includes a dedicated programme for measuring in 1 and 2 coordinate directions with geometric combination of the measured values. Lets you measure perpendicularity, straightness and squareness. Provides 99 workpiece oriented measurement cycles including 64 features with related limits of size, programmable. Memory capacity for 2500 measured values. Statistical data processing (SPC). Result output via the built-in matrix printer or in A4 format using an external printer unit.



0,0005 / 0,001 / 0,01 / 0,1 mm
0,00002 / 0,0001 / 0,001 / 0,01 / 0,1 in

Accessory for TESA POWER PANEL

04765008 Thermal paper roll, 57 mm wide



TESA MICRO-HITE plus M 350 / 600 / 900

Speed of the manual vertical column combined with the precision of the motorised one



All TESA MICRO-HITE plus M height gauges are unique in that they have exceptional metrological capabilities and can be used intuitively with ease. The revolutionary rotary power control combines the speed of the manual concept with the precision of the motorised one.

With their robust and stand-alone design, these electronic height gauges are optimally suited for use on the shop floor as in the inspection laboratory.

Measure lengths in the form of internal, external, height, depth or distance dimensions of geometrical part features having either a plane, parallel or cylindrical surface, whether in one or two coordinate directions – Determine the position of bores in two coordinate directions with output in both polar and Cartesian (rectangular) coordinates – Mechanically adjusted at our plant based on a patented TESA's method used to verify the correct position of the guiding column against the gauge base. This method allows form and position error to be easily and quickly detected by means of a lever-type dial indicator – Check deviations from straightness or parallelism according to ISO 1101 when used in conjunction with TESA IG-13 linked to the Power panel plus M.

- Modular design descending from the successful TESA MICRO-HITE dynasty. Also equipped with the unique rotary power control located close to the rugged base. This feature serves for guiding the column that moves on a cushion of air, commanding fast motion of the probe insert and triggering all main measuring functions. Its intuitive use allows accurate, easy handling of the column. A simple rotation causes the measuring head to move rapidly, approach the contact point quickly or slowly, probe upward or downward or execute bore measurement.
- Available in three different sizes with a measuring span of 365, 615 or 920 mm.
- Choice between two control panels for value processing and output.
- Metric and inch LC display with a resolution to 0,0001 and 0,001 mm, or inch equivalent.
- Autonomous run through batteries. No cumbersome cable.
- Built-in air bearing for easy displacement over the surface plate.
- Motorised measuring head for fast, accurate probing at each contact point with a constant measuring force.
- TESA μ system for matchless reliability and simplicity.
- High precision through CAA (Computer Aided Accuracy). All correction values stored in the memory still add to the mechanical precision.
- Coefficient of linear expansion matching that of steel ($11,5 \times 10^{-6} \text{ K}^{-1}$).
- RS 232 data output.
- SCS calibration certificate delivered with every height gauge.

TESA MICRO-HITE plus M
main height gauges
350 / 600 / 900



Factory standard



Measuring span, application range and accuracy as stated on page N-18



Rugged nickel plated gauge base having 3 resting points, finely lapped



Built-in air-bearing for easy move of the column over the surface plate



Frontal, for models
350 < 5 μm
600 < 7 μm
900 < 9 μm



Incremental glass scale with datum point, 20 μm grating division. Opto-electronic data acquisition (TESA patent).



Measuring head mounted on a ball-bearing. Motorised head displacement at a varying speed from 7,5 up to 40 mm/s. Manual displacement: $\leq 600 \text{ mm/s}$. Automatic value capture with a constant measuring force.



$11,5 \times 10^{-6} \text{ K}^{-1}$



1 N Coupled for triggering the measuring force

Continued next page

TESA MICRO-HITE plus M

Unrivalled Power, Performances, Ease of use

Rechargeable batteries 6 V, 3,0 Ah or mains adapter 100 to 240 Vac/50 to 60 Hz

≈ 12 hours after full recharging (8 hours)

10 °C to 40 °C

-10 °C to 60 °C

80% non-condensing

IP40 (IEC 60529)

EN 61326-1, Class B (with disconnected charger)

Net weight (w/o control panel nor battery pack)
main part 350 = 33 kg, 600 = 38 kg, 900 = 45 kg

Shipping packaging

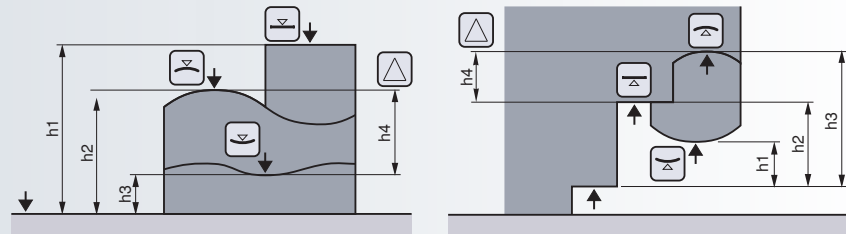
Identification number

Declaration of conformity

SCS calibration certificate

Measurement without change of the probe direction

Probe constant excluded

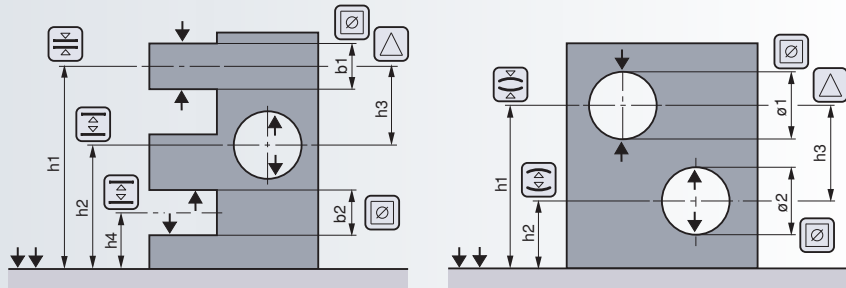


Measurement with change of the probe direction

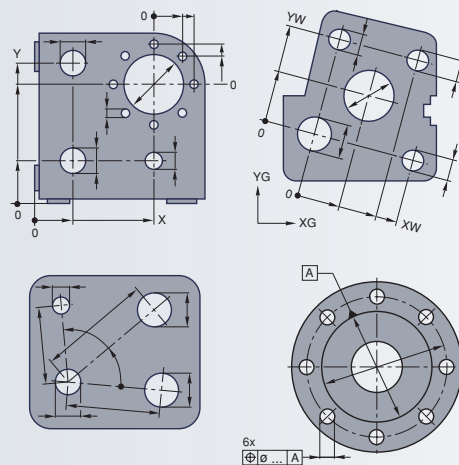
Probe constant included

– Disregarding the culmination point

– Considering the culmination point



Two-Dimensional Measurement

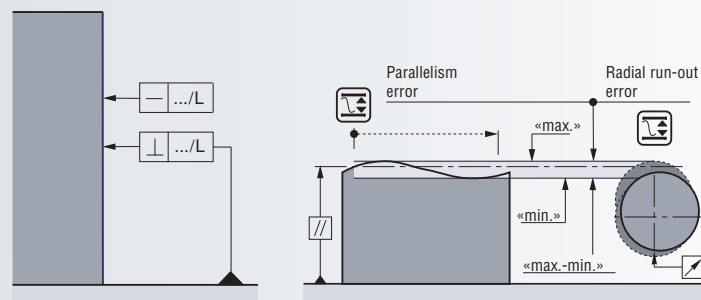


TESA μ System

⊥ using TESATAST

⊥ using TESA IG-13

Measurement of Form and Position Errors



TESA MICRO-HITE plus M Height Gauge Sets 350 / 600 / 900



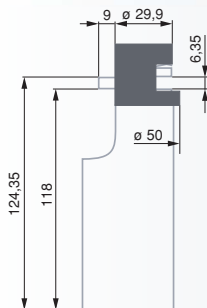
No		
00730063	TESA MICRO-HITE plus M height gauge set	350
00730064	TESA MICRO-HITE plus M height gauge set	600
00730065	TESA MICRO-HITE plus M height gauge set	900

Each gauge set includes the following components, control panel excluded:

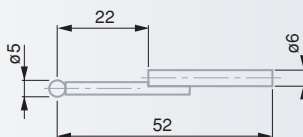
00730060	1 TESA MICRO-HITE plus M main gauge	●		
00730061	1 TESA MICRO-HITE plus M main gauge		●	
00730062	1 TESA MICRO-HITE plus M main gauge			●
00760143	1 Standard probe insert holder	●	●	●
00760227	1 Standard probe insert with shank and 5 mm dia. ball tip in tungsten carbide	●	●	●
00760219	1 Master piece with nominal dimension 6,350 mm/0.2500 in	●	●	●
00760142	1 Electric pump for creating the air cushion beneath the gauge base	●	●	●
00760141	1 Battery pack	●	●	●
04761054	1 Mains adapter, 100 to 240 Vac/50 to 60 Hz	●	●	●
04761055	1 Cable EU for mains adapter	●	●	●
04761056	1 Cable US for mains adapter	●	●	●
00760151	1 Dust cover for Model 350	●		
00760152	1 Dust cover for Model 600		●	
00760153	1 Dust cover for Model 900			●

Optional Accessories for TESA MICRO-HITE plus M 350 / 600 / 900

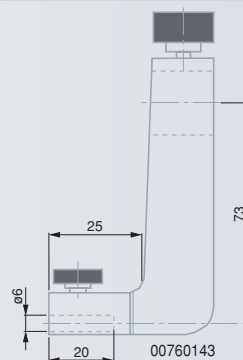
00760157	Spare battery for battery pack No. 00760141
For additional accessories, report to both pages N-20 and N-27	



00760219



00760227



00760143

Technical Data

Models		350	600	900
	mm	365	615	920
	in	14	24	36
With standard accessory	mm	0 ÷ 520	0 ÷ 770	0 ÷ 1075
	in	0 ÷ 20	0 ÷ 30	0 ÷ 42
With probe insert holder No. 00760057	mm	0 ÷ 575	0 ÷ 825	0 ÷ 1130
	in	0 ÷ 22	0 ÷ 32	0 ÷ 44
With probe insert holder No. S07001622	mm	0 ÷ 745	0 ÷ 995	0 ÷ 1300
	in	0 ÷ 29	0 ÷ 39	0 ÷ 51
With standard accessory		(2 + 1,5•L) µm (0.0001 + 0.0000015•L) in		(L in m) (L in in)
With standard accessory		on flat surfaces: 2δ = ≤0,5 µm / ≤ 0.000025 in into bores: 2δ = ≤1 µm / ≤ 0.00005 in		
Frontal, mechanical	µm	5	7	9
Frontal and lateral using TESA IG-13	in	0.00020	0.00028	0.00035

POWER PANEL plus M



LC dual display,
128 x 63 mm
in size.

- Length measurement:
7-segment/digit upper
display field for values plus
symbols for the functions.
- Straightness or perpendicularity measurement:
display field for values plus
symbols (function keys).
Operator controlled operations (full dot display).

Measured values:
7-decade display plus
minus sign.

12,7 x 6,4 mm
main display,
6,3 x 4,2 or
3,8 x 2,9 mm auxiliary
display

Keypad with
42 softkeys

See opposite

Metric/Inch
conversion

PRESET function
for entering a
given value.

Acoustic signal.

Manual or automatic
triggering of data transfer.

Output of predefined reports
with headings in 5 languages
(plus a programmable one)
using an external printer unit
(A4 format).

Bidirectional
RS 232, opto-
electronic and
Centronics

Via
TESA MICRO-HITE
plus M

IP50
(IEC 60529)



Declaration
of conformity

Control Panels for TESA MICRO-HITE plus M 350 / 600 / 900



00760221



TESA POWER PANEL plus M

Includes a part programme for one or two-dimensional measurement.

- Captures flatness, parallelism and run-out deviations.
- Measures any deviation in perpendicularity or straightness.
- Executes angle measurement.
- Allows for value input through the keypad and digital value sensor.
- Enables automatic programming of the measurement cycles in Teach-in mode. Up to 9999 features distributed in several part programmes (each including max. 999 values) can be stored in the memory.
- Memory capacity for up to 25 000 measured values.
- Provides SPC capability with output of mean value, range, standard deviation, histogram, comparison nominal value/actual value, number of out-of-tolerance values, control limits, control charts.
- Prints reports in A4 format with related tables and graphics. Creates tailor-made headings to suit Users' needs.



0,0001 / 0,001 / 0,01 mm
0.00001 / 0.0001 / 0.001 in

00760220

TESA POWER PANEL plus M with built-in printer

Identical to item N° 00760221, but with integrated matrix printer for result output.

Optional Accessories for TESA Power Panel plus M

04761052	RS 232 connecting cable for PC and TESA PRINTER SPC
04761063	USB connecting cable for PC
04765008	Thermal paper roll, 57 mm wide



Optional Accessories for TESA MICRO-HITE 350 / 600 / 900 TESA MICRO-HITE plus M 350 / 600 / 900 equipped with Power Panel plus M

For additional optional accessories, see on page N-27.

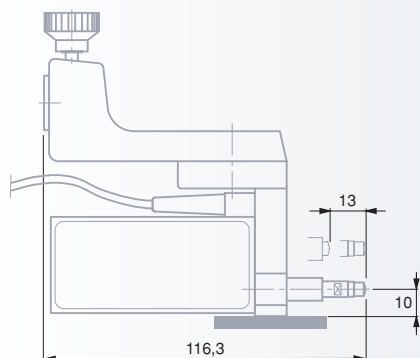
Optional Accessories



Factory
standard



Shipping
packaging



00760140 TESA IG-13 probe set

Consisting of:

00760139 1 TESA IG-13 digital probe



13 mm/0.51 in



1 μ m



0,45 N at zero
0,75 N at stop

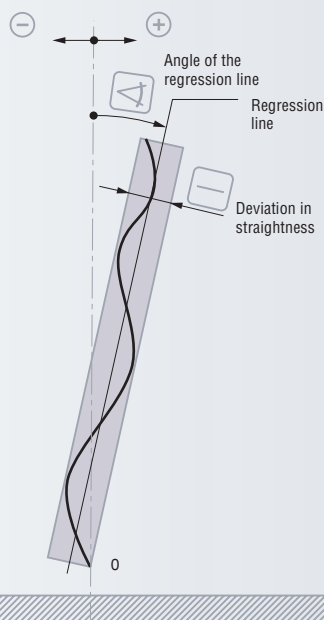
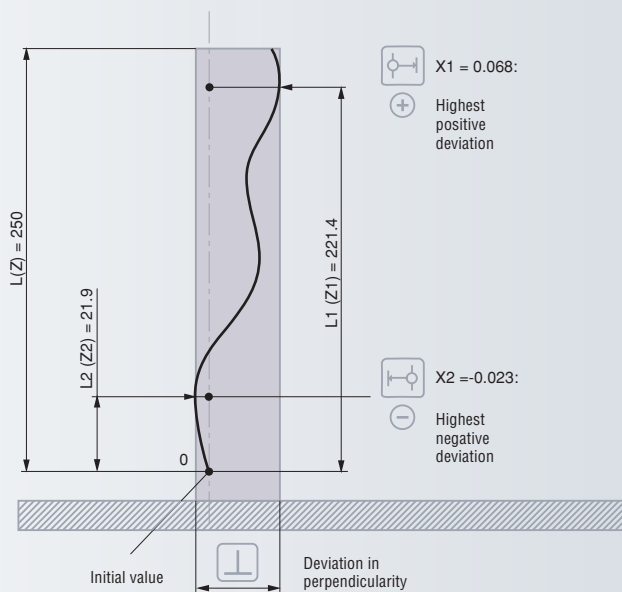
00760138 1 TESA IG-13 attachment

Accessories:

01960005 Lift lever for the measuring bolt

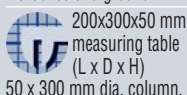
03540501 10 mm long extension for the probe insert

04761047 Connecting cable IG-13/Power Panel plus M (1 m)

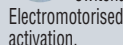
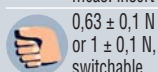
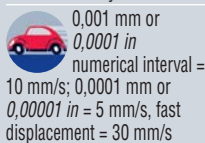
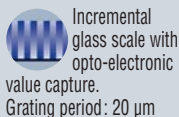




Support

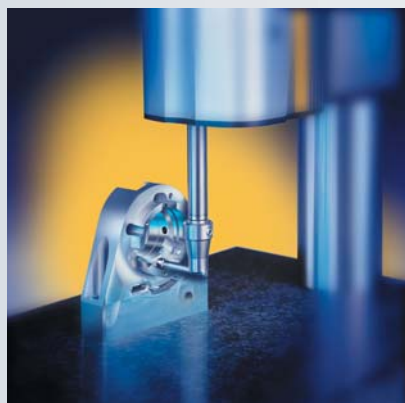


TESA-μHITE value sensor



TESA-μHITE Height Gauge

The solution for the most varied metrology applications



Compact design with measuring stand included – Sensor equipped with a system for coaxial measuring according to the Abbe principle or using an offset probe relative to the gauge axis.

Measures internal, external, height, depth, step and distance dimensions on geometric elements having either a flat, parallel or cylindrical surface – Automatic detection of the culminating point on bores or shafts – Dynamic probing with memory functions «max.», «min.» and «max.-min.».

The whole system provides the best solution for measuring straightness, flatness and parallelism or inspecting axial and radial runouts depending on the chosen tool configuration.

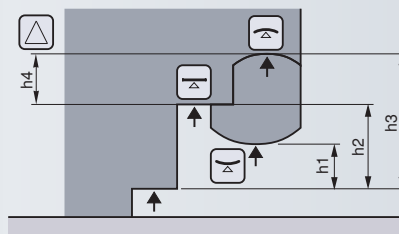
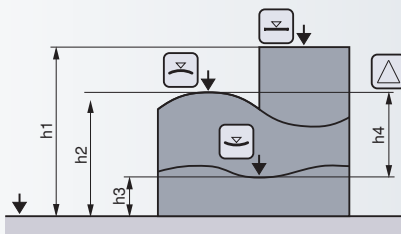
- Ideal for workpiece inspection close to the production area.
- 100 mm measuring span.
- 0,001 mm and 0,0001 mm or 0.0001 in and 0.00001 in scales intervals.
- Max. perm. error as low as 2 μm (or 1 μm when checking coaxiality).
- Integrated temperature sensor so that the coefficient of linear expansion of each gauge unit matches that of steel ($11,5 \times 10^{-6} \text{ K}^{-1}$).
- Motorised measuring head for fast probing at each point.
- Automatic value capture, controlled over the stability of the measuring force, but also all measured values.
- Constant measuring force through the motor-driven actuator. Switchable.
- No manual calculation needed.
- RS 232 data output with direct connection to TESA PRINTER SPC.
- Memory capacity for 99 single values.



TESA-μHITE Capabilities

Measurement without change of the probe direction

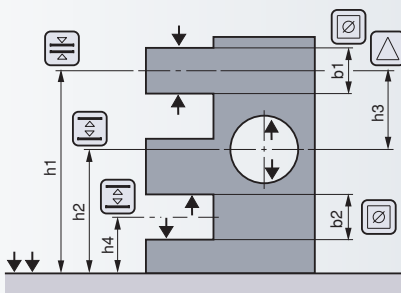
Probe constant excluded



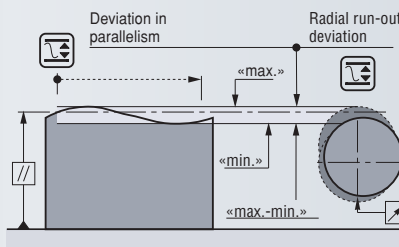
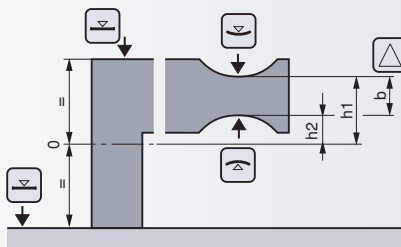
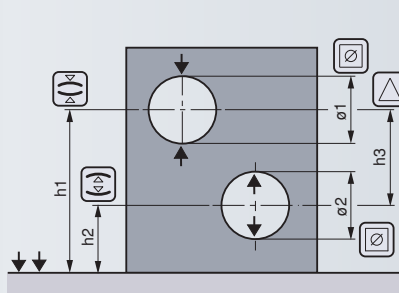
Measurement with change of the probe direction

Probe constant included

– Disregarding the culmination point



– Considering the culmination point



Control Panel

67 x 33 mm
LC display.
Alphanumeric display:
3-line display 7segment/
digit plus symbols.
Display for measured values:
7-decade display plus minus
sign.
Auxiliary display 1 or 2:
7 or 4 digits.

10 x 4,9 mm
(value display),
7,5 x 3,7 or
5 x 2,5 mm (auxiliary
display 1 or 2),

Metric/Inch
Conversion

Keyboard with
20 softkeys

PRESET
function for
entering any
given value.
Acoustic signal.
7 languages available
for report headings

RS 232,
opto-electronic
and bidirectional

Mains adapter
100 to 240 Vac /
50 to 60 Hz /
6,6 Vdc / 750 mA
(order N° 04761054)

Additional Data

5°C to 40°C

-10°C to 60°C

80%
non-condensing

See
drawings

16,2 kg net
(support
N° 00760203).
2,6 kg net (TESA-μHITE
N° 00730050).
1,45 kg net (control panel
N° 00760204 with cable
N° 00760191)

IP50
(IEC 60529)

EN 61326-1,
Class B

Shipping
packaging

Identification
number

SCS calibration
certificate

Declaration
of conformity



00730049 TESA-μHITE height gauge

mm
0 ÷ 160

in
0 ÷ 6.3

Provided with the following components:

00760203 1 TESA measuring support, granite measuring table, size 200 x 300 x 50 mm

00730054 1 TESA-μHITE electronic length unit

Also included:



00730050 1 TESA-μHITE value sensor

mm
100

in
4

00760204 1 Control panel. To be connected to TESA-μHITE.

mm
0,001
0,0001

in
0.0001
0.00001

00760191 1 Connecting cable for TESA-μHITE to control panel

00760195 1 Probe insert holder, axial with a M2,5 thread

03510002 1 Probe insert with a 3 mm dia. tungsten carbide ball tip

00760197 1 Probe insert with a 5 mm dia. tungsten carbide ball tip, offset

00760192 1 Master piece for establishing the probe constant, nominal dimension 10 mm/0.39370

04761054 1 Mains adapter, 100 to 240 Vac/50 to 60 Hz

04761055 1 Cable EU for mains adapter

04761056 1 Cable US for mains adapter

038407 1 Suited plastic case

For additional accessories, see page N-26.

Accuracy



μm

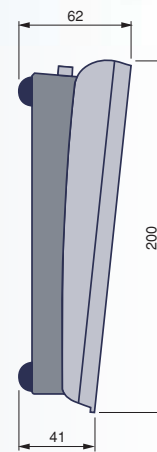
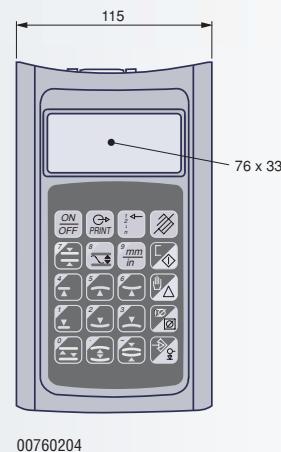
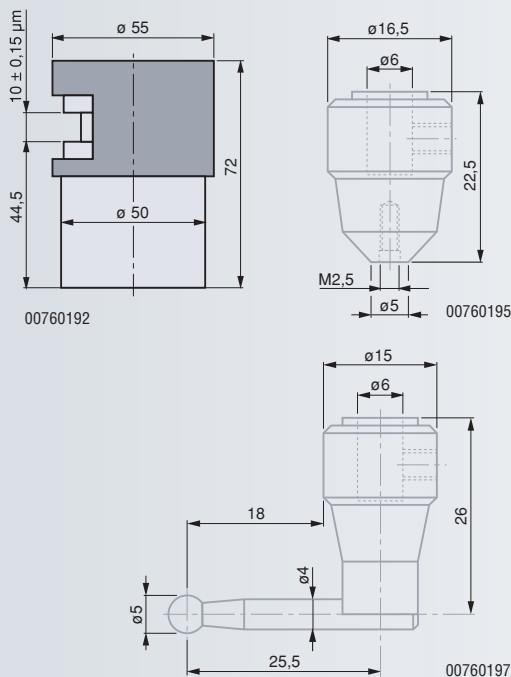


in

Insert's position
relative to the
axis of the
measuring bolt

coaxial	1,0	0.00005	0,5	0.00002
offset	2,0	0.0001	1,0	0.00004

Applicable with used standard accessory.



TESA-μHITE

Extended application range up to 360 mm



Factory standard



100 mm/4 in



0 to 360 mm
0 to 14.2 in



0.001 mm and
0.0001 mm or
0.0001 in and
0.00001 in



Max. perm.
error G: see
table page N-23



Repeatability
limit r: see
table page N-23

Support



Granite measuring
table; dull-chrome
plated steel column,
hardened and ground.



300x400x50 mm
measuring table
(L x D x H).
50 x 500 mm dia. column.



Finish lapped



33 kg net
(support
N° S07600163)



2.6 kg net
(TESA-μHite N° 00730050)



1.45 kg net
(control panel N° 00760204
with cable N° 00760191)



Accuracy grade
00 according to
DIN 876, Part 1

TESA-μHITE value sensor



Incremental
glass scale with
opto-electronic
data acquisition.
Grating period: 20 μm.



11,5 x 10⁻⁶ K⁻¹



Electro-
motorised
gauge head
displacement; can also
be moved manually.



Numerical interval
to 0,001 mm/
0,0001 in =
10 mm/s; to 0,0001 mm/
0,00001 in = 5 mm/s; fast
displacement = 30 mm/s



6 mm dia. x
10 mm long
attachment for
the probe insert



0,63 ± 0,1 N
and 1 ± 0,1 N,
switchable.



Electromotorised
activation.



Via the
control
panel

N°

=

mm

in

TESA-μHITE height gauge with extended application range

0 ÷ 360 0 ÷ 14.2

Provided with the following components (must be ordered under 2 positions)

S07600163 1 TESA measuring support, granite measuring table, overall dimensions 300 x 400 x 50 mm. The guiding column has a 50 x 500 mm diameter.

00730054 1 TESA-μHITE electronic length measuring unit

Also included:

N°

=

mm

mm

in

in

00730050 1 TESA-μHITE value sensor

100

4

00760204 1 Control panel, connected to TESA-μHITE.

0,001

0.0001

0,0001

0.00001

00760191 1 Cable for connecting TESA-μHITE to control panel

00760195 1 Probe insert holder, axial with a M2,5 thread

03510002 1 Probe insert with a 3 mm dia. tungsten carbide ball tip

00760197 1 Probe insert with a 5 mm dia. tungsten carbide ball tip, offset

00760192 1 Master piece for establishing the probe constant, nominal dimension 10 mm/0.39370

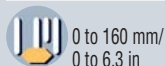
04761054 1 Mains adapter, 100 to 240 Vac/50 to 60 Hz

04761055 1 Cable EU for mains adapter

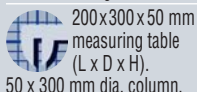
04761056 1 Cable US for mains adapter

038407 1 Suited plastic case

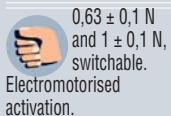
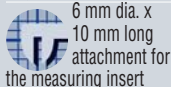
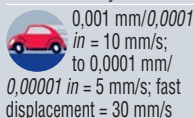
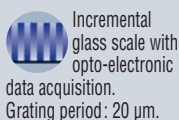
Additional accessories, see page N-26.



Support



TESA-μHITE value sensor



TESA-μHITE

Strong, user-friendly with Power Panel plus M

Capable to operate using all TESA POWER PANEL plus M measuring functions, those for perpendicularity measurement excepted (more details on both pages N-17 and N-19).



TESA-μHITE height gauge, plus M version

mm 0 ÷ 160 in 0 ÷ 6.3

Provided with the following components (must be ordered under 3 positions):

- 00760203** 1 TESA measuring support, granite table, 200 x 300 x 50 mm (large-size support No. S07600163 can alternately also be used)
- 00760221** 1 POWER PANEL plus M Related features listed on page N-19 (can alternately also be used with host printer No. 00760220)
- S07010288** 1 TESA-μHITE electronic length measuring unit, without control panel

Also included:



- 00730050** 1 TESA-μHITE value sensor
- 00760191** 1 Cable for connecting TESA-μHITE to control panel
- 00760195** 1 Probe insert holder, axial for probe inserts with a M2,5 thread
- 03510002** 1 Probe insert with a 3 mm dia. tungsten carbide ball tip
- 00760197** 1 Probe insert with a 5 mm dia. tungsten carbide ball tip, offset
- 00760192** 1 Master piece for establishing the probe constant, nominal dimension 10 mm/0.39370
- 04761054** 1 Mains adapter 100 to 240 Vac/50 to 60 Hz
- 04761055** 1 Cable EU for mains adapter
- 04761056** 1 Cable US for mains adapter
- 038407** 1 Suited plastic case

For additional accessories, see page N-26.

For measuring applications, see page N-17.



Optional Accessories



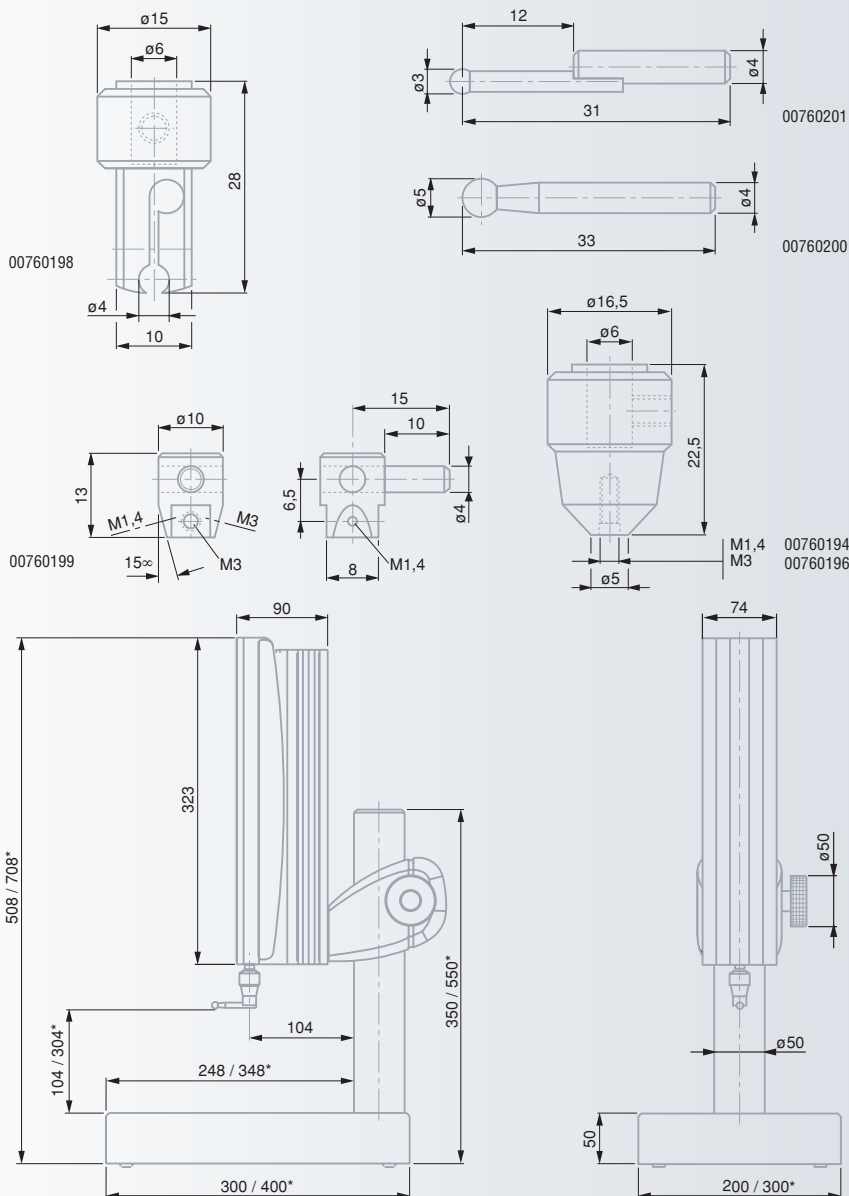
00760186	Set of special probe inserts (see page N-29).
00760194	Axial probe holder for probe inserts with a M1,4 thread.
00760196	Axial probe holder for probe inserts with a M3 thread
00760198	Radial probe holder with a 4 mm dia. mounting bore.
00760199	Universal probe insert holder with a 4 mm dia. clamping shank (used in conjunction with radial probe holder No. 00760198). M1,4 plus M3 threads (2 x 2) for the probe inserts.
00760200	Probe insert with a 5 mm dia. tungsten carbide ball tip. Also with a 4 mm dia. fixing rod for use with radial probe holder No. 00760198.
00760201	Probe insert with a 3 mm dia. tungsten carbide ball tip. Also with a 4 mm dia. fixing rod for use with radial probe holder No. 00760198.
04768001	Foot switch for triggering data transfer or letting a measuring function be repeated.
00760207	Swivel support for control panel
00760202	Spare batteries for control panel N° 00760204, 6 Vdc/1,2 Ah.
00761052	RS 232 connecting cable for PC and TESA PRINTER SPC
00761063	Sub-D connector 9-pin – USB type for PC



Factory standard



Shipping packaging



* With measuring support No. S07600163



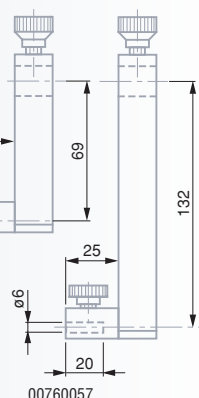
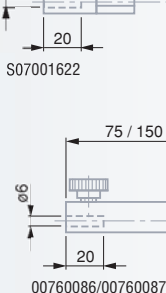
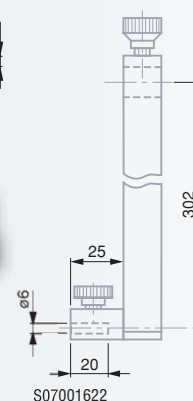
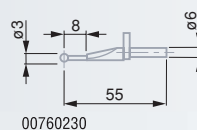
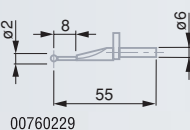
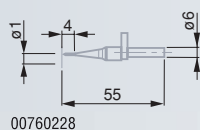
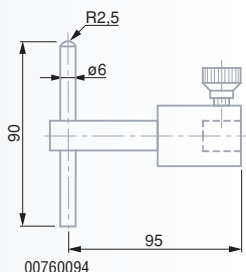
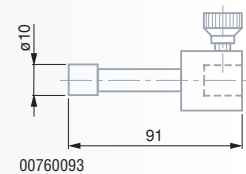
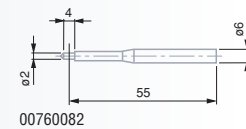
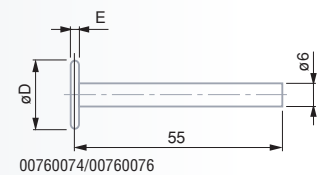
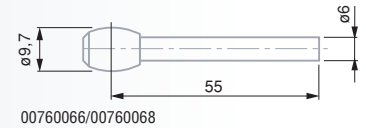
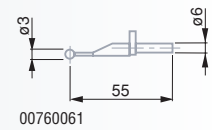
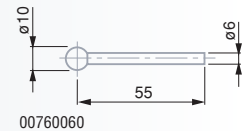
Shipping
packaging



Declaration
of conformity

Optional Accessories for TESA MICRO-HITE plus M 350 / 600 / 900 TESA MICRO-HITE 350 / 600 / 900 TESA-HITE 400 / 700 – TESA-HITE plus M 400 / 700 TESA-HITE magna 400 / 700

Nº	=	
00760173	Partial accessory set	●
00760148	Full accessory set	●
<i>Supplied in a suited plastic case with the following items:</i>		
00760061	1 Probe insert with a 3 mm dia. carbide ball tip	● ●
00760060	1 Probe insert with a 3 mm dia. carbide ball tip	● ●
	Probe inserts with carbide, barrel-shaped measuring faces for cylindrical bores as well as for determining the position of metric inside threads (or similar).	
00760066	1 item with a 2,2 mm diameter (for M3 to M16 threads)	●
00760067	1 item with a 4,5 mm diameter (for M6 to M48 threads)	●
00760068	1 item with a 9,7 mm diameter for M12 to M150 threads)	●
	Probe inserts with a carbide disc tip for grooves, slots, centring shoulders etc.	
00760074	1 Item, E = 1 mm / 4,5 mm diameter	●
00760075	1 Item, E = 2 mm / 14 mm diameter	●
00760076	1 Item, E = 3 mm / 19 mm diameter	●
00760082	1 2 mm dia. probe insert with a small cyl. carbide face	●
00760093	1 Probe insert with a cylindrical, tungsten carbide measuring face (10 mm dia., 12 mm long). Stainless steel body, hardened.	● ●
	Probe insert holder for depth increase	
00760086	1 Item for depth up to 110 mm (L = 75 mm)	●
00760087	1 Item for depth up to 185 mm (L = 150 mm)	●
00760057	1 Probe insert holder for extending the application range	●
00760094	1 Probe insert with a stainless steel shank, hardened. Also with one flat and one spherical carbide measuring face. Interchangeable shank.	● ●
	Probe inserts with shank and ball tip in tungsten carbide	
00760228	1 Item with a 1 mm tip diameter	● ●
00760229	1 Item with a 2 mm tip diameter	● ●
00760230	1 item with a 3 mm tip diameter	● ●
S07001622	Probe insert holder for extending the range of application	



Nº



00760096 1 Holder for TESATAST probe inserts with a M1,4 thread or any other ones with a M2,5 thread.

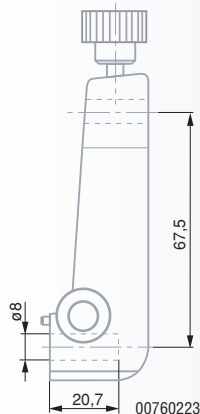
TESATAST probe inserts, carbide ball tip, M1,4 thread

01860201 1 Item with a 1 mm probe tip diameter

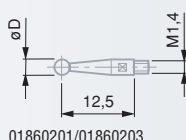
01860202 1 Item with a 2 mm probe tip diameter

01860203 1 Item with a 3 mm probe tip diameter

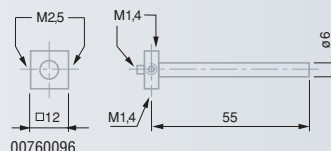
01860307 1 Wrench



01860307



01860201/01860203



00760096

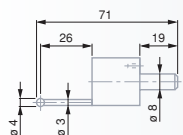
Optional accessories for use with insert holder No. 00760223

Nº

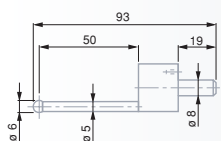


00760223 Holder for use with any probe insert listed below

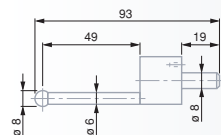
0071684825 Probe insert with a 6 mm dia. tungsten carbide ball tip



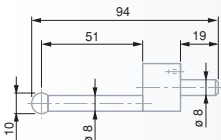
0071684815



0071684816



0071684832



0071684829

Nº



0071684815 1 Probe insert with a 4 mm dia. tungsten carbide ball tip

0071684816 1 Probe insert with a 6 mm dia. tungsten carbide ball tip

0071684832 1 Probe insert with a 8 mm dia. tungsten carbide ball tip

0071684829 1 Probe insert with a 10 mm dia. tungsten carbide ball tip

0071684817 1 Long probe insert with a 10 mm dia. tungsten carbide ball tip

0071684826 1 Attachment for interchangeable inserts with M1,4 thread. Supplied with 1 insert No. 01860201 having a 1 mm dia. carbide ball tip.

0071684820 1 Probe insert with cylindrical measuring face in hardened steel, 12 mm diameter, 2 mm long.

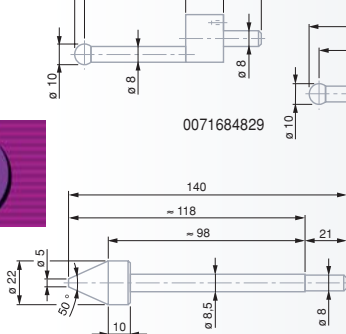
0071684827 1 Probe insert with disc-shaped face in hardened steel for blind bores or short centring shoulders, 12 mm in diameter, 3 mm wide.

0071684822 1 Probe insert with cone-shaped measuring face in hardened steel, for diameters from 0,5 up to 5,5 mm.

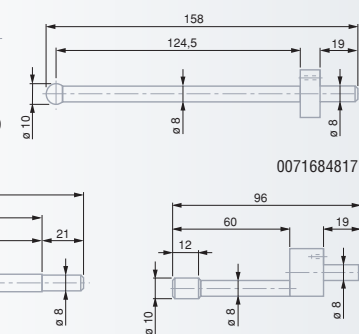
0071684819 1 Probe insert with cone-shaped measuring face in hardened steel, for diameters from 5 up to 20 mm.

0071684828 1 Attachment for interchangeable inserts with M1,4 thread. Supplied with 2 probe inserts No. 01860202 having a 2 mm dia. carbide ball tip

0071684818 1 Probe insert with a 1 mm dia. steel tip, hardened. Also with adjustable shank for depth measurement.

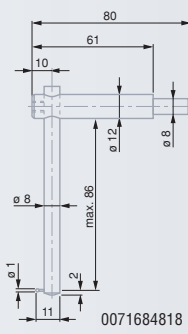


0071684819

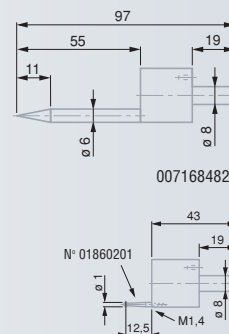


0071684817

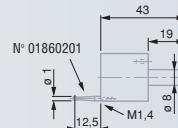
0071684820



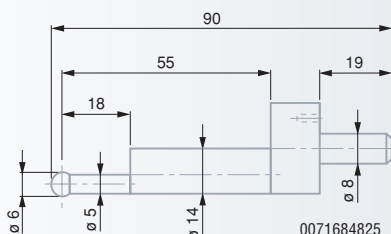
0071684818



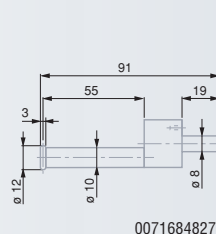
0071684822



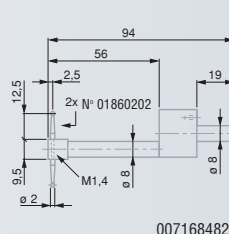
0071684826



0071684825



0071684827



0071684828



Factory standard



Shipping packaging

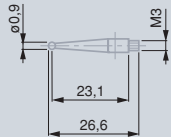
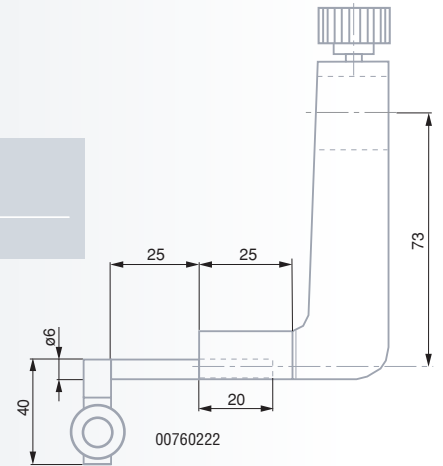


Accessories for measuring perpendicularity by means of a dial test indicator

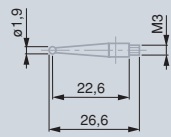
(Used with TESA MICRO-HITE plus M, TESA MICRO-HITE, TESA-HITE 400/700 and TESA-HITE plus M 400/700)



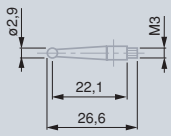
00760222 Probe insert holder for a dial test indicator (lever-type)



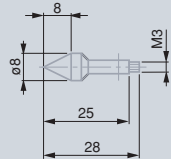
00760180



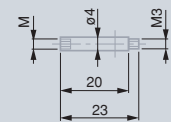
00760181



00760182



00760183



00760184/00760185

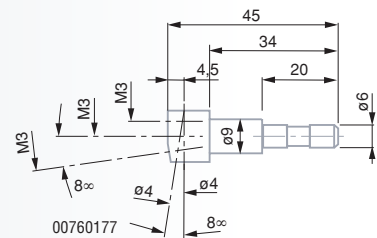
Optional Accessories



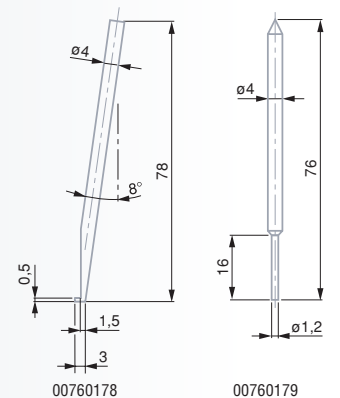
- | | | | |
|-----------------|---|---|---|
| 00760175 | Set of probe inserts for TESA-HITE, TESA-HITE plus M, TESA-HITE magna, MICRO-HITE and MICRO-HITE plus M | ● | ● |
| 00760186 | Set of probe inserts for TESA-μHITE | ● | ● |

Provided in a suited plastic case including:

- | | | | |
|-----------------|---|---|---|
| 00760177 | 1 Probe insert holder | ● | ● |
| 00760187 | 1 Probe insert holder | ● | ● |
| 00760178 | 1 Hardened steel rod for grooves, centring shoulders, blind bores etc., angled through 8° | ● | ● |
| 00760179 | 1 Tungsten carbide cylindrical rod for depth measurement | ● | ● |
| | Probe inserts, each with hardened steel ball tip | | |
| 00760180 | 1 Item with a 0.9 mm tip diameter | ● | ● |
| 00760181 | 1 Item with a 1.9 mm tip diameter | ● | ● |
| 00760182 | 1 Item with a 2.9 mm diameter | ● | ● |
| 00760183 | 1 Hardened steel probe insert with a cone-shaped measuring face, 8 mm diameter | ● | ● |
| | Extensions, 20 mm | | |
| 00760184 | 1 Extension with a M3 thread for M3 | ● | ● |
| 00760185 | 1 Extension with a M3 thread for M2,5 | ● | ● |

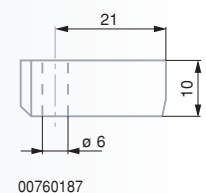
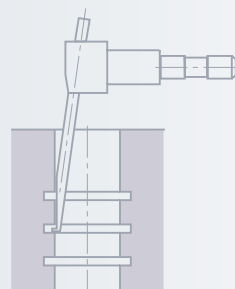
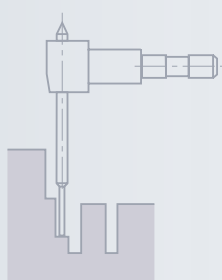
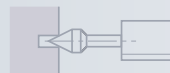
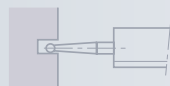


00760177



00760178

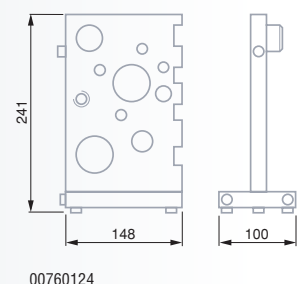
00760179



00760187



- 00760124** Practice piece
- For one or two-dimensional measurements. Also for measuring straightness, perpendicularity and parallelism errors. Each User's manual POWER PANEL and POWER PANEL plus M includes some examples of programmed measurement cycles.



00760124



ETALON Height and Scribing Gauges with Digital Display

Electronic height and scribing gauges

- Resolution to 0,01 mm/0.005 in
- RS 232 interface

						
		Size	mm	in	Column mm	Base (L x H x W) mm
<i>ETALON height and scribing gauges with digital display</i>						
07739001		300	0 ÷ 300	0 ÷ 12	25 x 6	60 x 40 x 100
07739002		600	0 ÷ 600	0 ÷ 24	30 x 12	110 x 50 x 160
07739003		1000	0 ÷ 1000	0 ÷ 40	30 x 12	110 x 50 x 160



Optional Accessories

				
			Suitable for models	Length mm
07769001		Scriber	300	65
07769003		Scriber	600, 1000	75
Holder for a dial gauge, axial probe, dial test indicator (lever-type) etc., 8 mm dia. fixing bore.				
07769005		Can be mounted instead of the scriber		
07769006		Rotating and tilting version with a 8 mm dia. shank		



Factory standard



Slider with interchangeable scriber.

Also with back mounted clamping holder having a 8 mm diameter. Slider with locking screw and fine adjust device.

Base has a ground face with dust grooves. Top face also ground.



Steel base, hardened



DIN 862
For lengths up to
600 mm = 30 µm
1000 mm = 40 µm



Floating zero



Preset and Hold functions



Wooden case

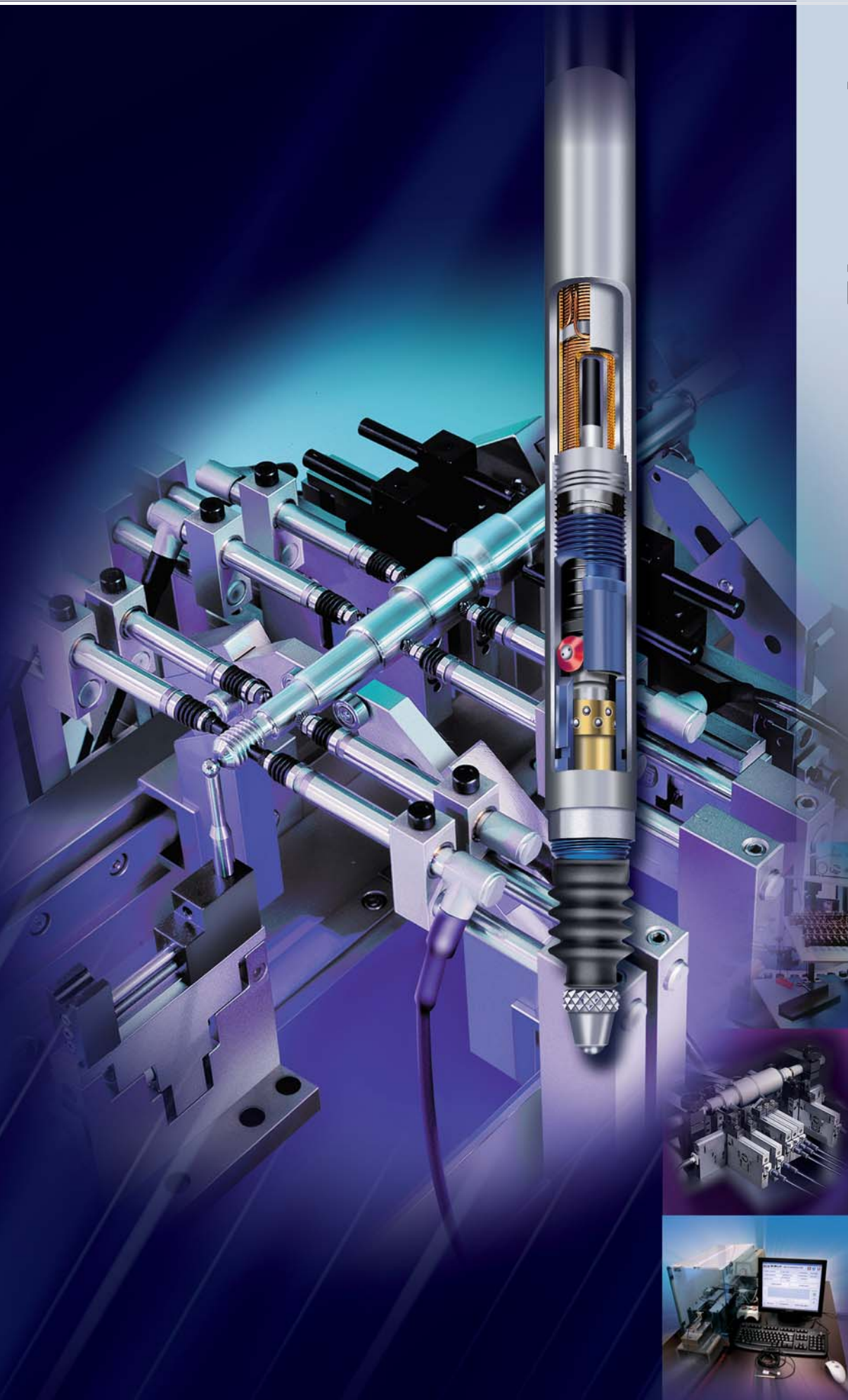


Identification number



Declaration of conformity

Electronic Length Measuring Equipment



TESA LENGTH MEASURING EQUIPMENT WITH INDUCTIVE PROBES

TESA offers a complete family of value sensors (electronic probes) as well as dedicated measuring instruments for the most demanding applications. Our **standard probes** – also known as **half-bridge probes** – operate according to the electrical principle. They do not require any special setting.

Electronic probes that are used in conjunction with measuring instruments from other manufacturers work partly on the basis of a differential transformer. These probes are known as LVDT (Linear Variable Differential Transformer) probes. TESA also offer a full range of this kind of probes which, however, need to be fitted with a convenient socket and further adapted, accordingly.

For more details about TESA half-bridge or LVDT inductive probes, read the information that follows.

Countless Measuring Capabilities

All TESA electronic probes can either be used with hand-held tools, whether internal or external, or in conjunction with other typical measuring devices and supports.

TESA can supply such executions as axial probes with linear displacement of the measuring bolt, angled probes with inclinable lever or probes with parallel guiding that are specially designed for multigauging devices as well as any other equipment for in-process inspection – thus allowing to spare many assembly components.

With a very few exceptions, these probes perform comparative measurement, essentially. Based on a master standard, which can either be a gauge block, a setting ring or any other workpiece accepted as such, a number of sizes are compared on the test piece.

- All measurements are taken with high accuracy. The bias errors usually count for very little in the uncertainty budget since the comparison is made between two values nearly equal to the measurand.
- Random errors are also significantly reduced as display setting and all subsequent measurements are usually made under the same conditions.
- TESA provide measuring instruments equipped with an analogue and/or digital display, depending on their type.

Internal Data Processing

The measurement signals are processed differently, depending on the measuring application.

Mathematical Data Processing

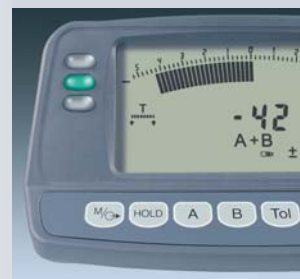
Signal processing can equally be made with positive or negative polarity signs. The use of a single probe enables single measurement of internal or external dimensions while the combination of the signals of two probes produces either a «sum measurement» or a «difference measurement».

Value Storage

Provides the needed safety for your dynamic measurement cycles. The smallest or highest value as well as the difference between both values are some of the part features that are questioned when capturing form and position errors.

Value Classification

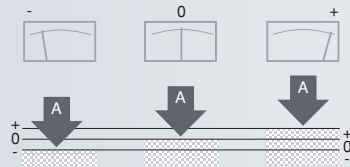
Uses limit deviations to classify the measured values while producing additional control signals usable through a remote unit.



MEASURING FUNCTIONS – OVERVIEW

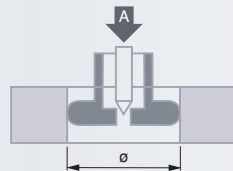
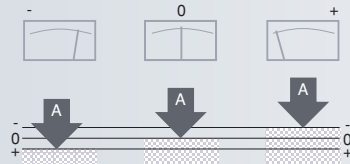
Single measurements with positive polarity sign (+A)

Measuring external dimensions with use of a measuring stand, snap gauge etc.



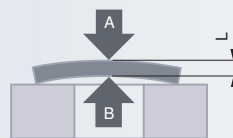
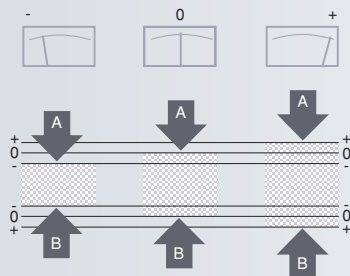
Single measurements with negative polarity sign (-A)

Inspecting sizes with change of the polarity sign. Display shows a low value for a small bore or a high value for a large diameter.



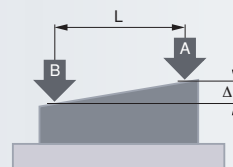
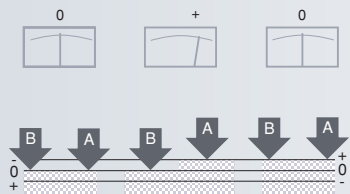
Sum measurements with positive polarity signs (+A +B)

Measuring external dimensions regardless of form and position errors.

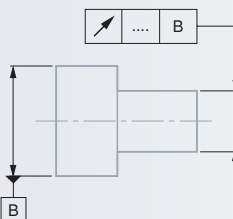
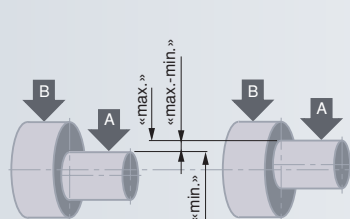


Difference measurements with opposite polarity signs (+A -B)

Performing step, cone and inclination measurements.



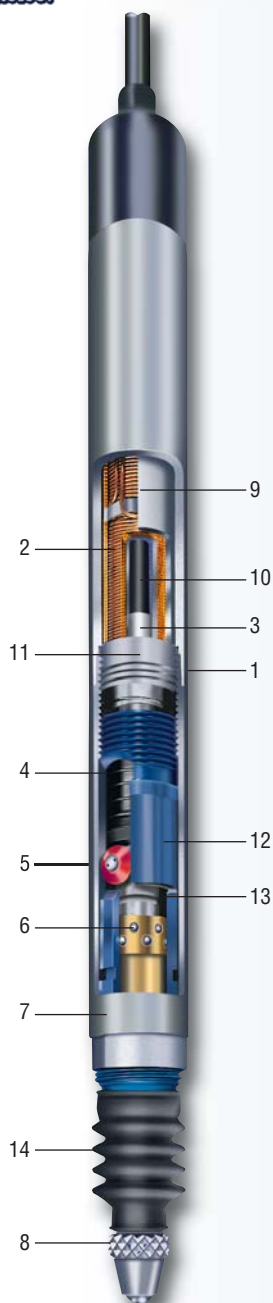
Establishing form and position errors such as runout errors with use of the memory function «max.-min.» as shown in this example.



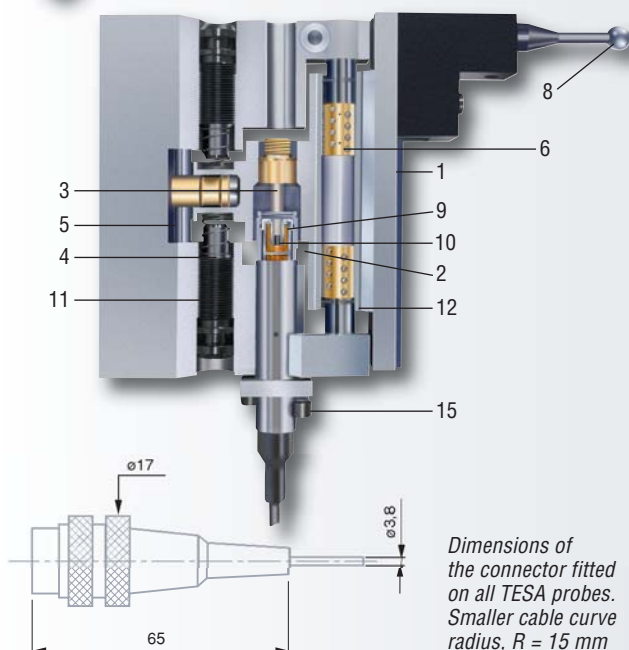
TESA Electronic Probes at the Forefront in Precision Measurement

TESA is a leading designer, manufacturer and user of inductive probes for more than 40 years. Its high-precision electronic probes are made to withstand the stresses sustained in the production environment where they can be constantly used for series inspection. But, these probes are also designed for high accuracy measurements such as those performed in gauge block calibration, for instance.

- All electronic probes are mounted on ball-bearings, except for miniature axial probes.
- Ball-bearings are virtually insensitive to radial forces.
- Probe guide system is efficiently protected against the penetration of solid and liquid contaminants by sealing rubber bellows. In normal conditions of use, nitrile elastomer bellows are sufficient. For applications where the probes remain permanently in contact with cooling and lubricating agents, we would recommend the use of Viton rubber bellows.
- Sealing bellows ensure full airtightness so that the measuring bolt is retracted by throwing off the air contained in the probe. This provides optimum protection of the guiding system as no mechanical device is used.
- Electronic signal amplification produces excellent repeatability and low hysteresis.
- Resolution is as high as 0,01 μm .



- | | |
|--|---|
| 1 Mounting stem or probe housing | 8 Probe insert |
| 2 Coil system | 9 In-between tube being part of the coil system |
| 3 Element mounted between the ferro-magnetic core and the measuring bolt for the correction of varying coefficients of thermal expansion | 10 Ferro-magnetic core |
| 4 Force compression spring | 11 Force spring stop |
| 5 Anti-rotation guiding system | 12 Ball-bearing guiding tube |
| 6 Ball cage | 13 Measuring bolt |
| 7 Setting element for limiting the measuring bolt travel | 14 Sealing bellow |
| | 15 Mechanical device for zero-setting |



Dimensions of the connector fitted on all TESA probes. Smaller cable curve radius, $R = 15 \text{ mm}$

Sensitivity of standard half-bridge probes used in conjunction with TESA electronic probes

All given values are valid for the following reference conditions:

	
• Drive voltage	3 V
• Drive frequency	13 kHz
• Adjustment load	2 k Ω
	
	mV/V/mm
For any probe type	73,75
except probe series:	
• GT 61/62	29,5
• GT 61S/62S	7,375
• FMS 130/132	49,17

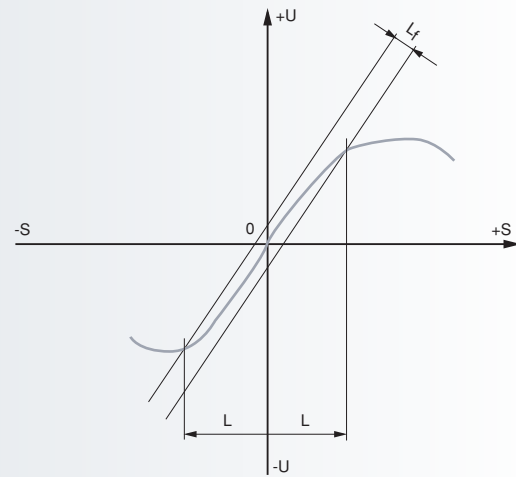
Operating Principle

All TESA electronic probes (value sensors) work based on the inductive principle with mechanical contact of the workpiece.

They are fitted with a coil system inducing an alternating output voltage that depends on the the position of the ferromagnetic core. When symmetrically positioned - i.e. at electrical zero - no voltage is impressed.

A move of the core, which may be attached to the measuring bolt while the measurand is being taken, causes the inductance to change. This change generates a signal that is amplified and rectified before being displayed and further output. Depending on the instrument type, the analogue signal will be shown on a voltmeter or a numerical display after a digital transformation.

Unambiguous assessment of the measurand (at bolt position) to the signal (displayed value) is the main characteristic of analogue value acquisition. One of its distinct advantages lies in the value primarily displayed, which will be reproduced in the event of a power cut (switch-off or power failure).



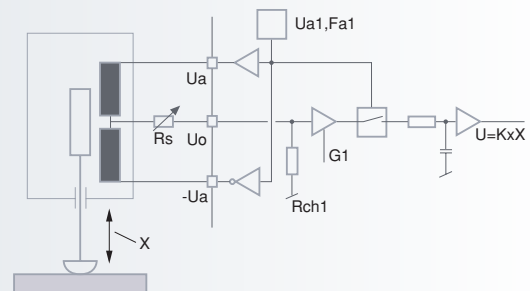
Inductive measuring

s	Travel
U	Output current
0	Electrical zero
L	Linearity range
Lf	Linearity error

The linearity range L , which is the range within which the max. perm. errors are contained, is equal to the measuring range. The max. perm. errors are limiting values given for the linearity errors.

TESA Standard Half-Bridge Probes for TESA Electronic Equipment

These probes have two serial coils with middle output mounted side by side, which are energized by a sinusoidal alternation at 13 kHz. Both are linked together to a Wheatstone bridge over an additional half-bridge.

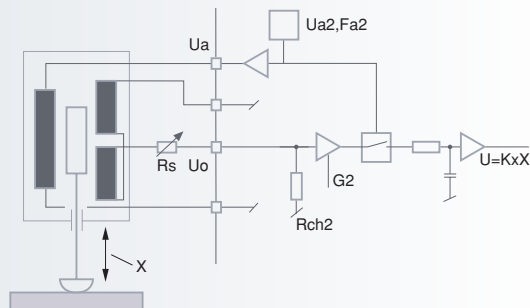


Wiring plan of half-bridge probes

TESA LVDT Probes

These probes are based on a Linear Variable Differential Transformer (LVDT). They have three coils, i.e. one primary coil being energized by a sinusoidal alternation at 5 kHz, and two secondary coils connected in opposite phase, which generate the output current proportional to the measuring travel.

Available upon request



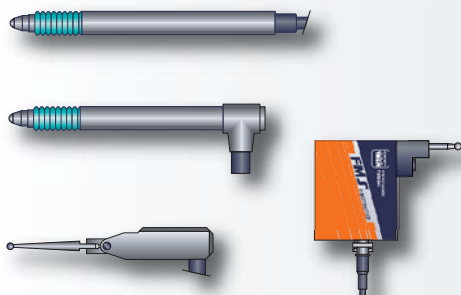
Wiring plan of LVDT probes

Compatible Probes

Upon request, all TESA's probes can be made available with a data output compatible with any electronic equipment from other makers.



TESA Half-Bridge Probes



Full probe range.
See pages 0-8 to 0-13.



TESA BPI interface box

Modular system for connecting up to 64 TESA half-bridge probes.

Setting and operating the system requires the use of a host computer.

See pages 0-48 to 0-49.



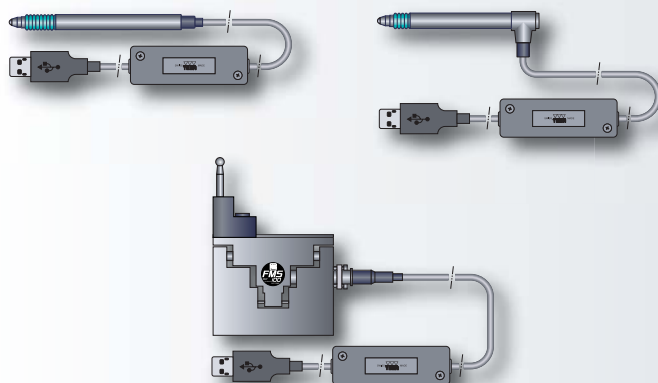
Display unit with 2 connected probes TESATRONIC

Measurements and value display with value classification.

See pages 0-42 to 0-47.



TESA USB Probes

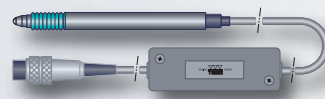


Direct connection to host computer

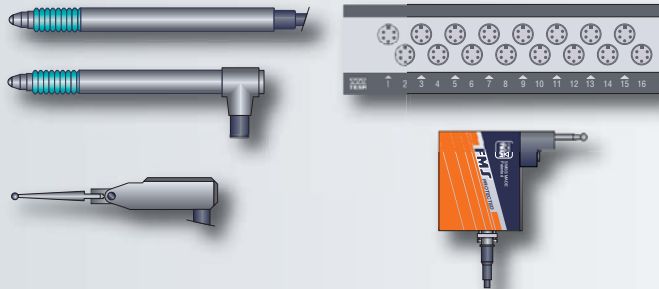
Easy-to-use and effective for single accurate and multi-gauging devices.

See pages 0-14 to 0-15.

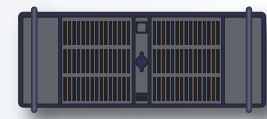
TESA DC Probes



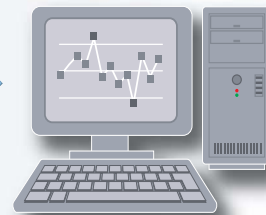
DC probes.
See page O-16.



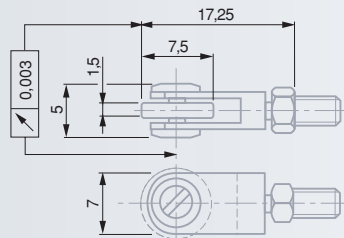
Interface boxes for TESA half-bridge probes. Analogue data output as for DC probes.
See page O-50.



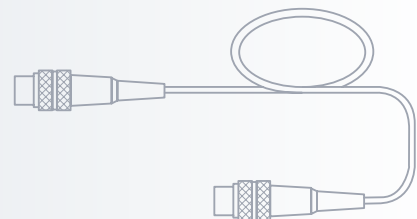
SPC or computer with analog board.



TESA Accessories



Accessories for TESA's probes.
See pages O-34 to O-41.



TESA Software Tools

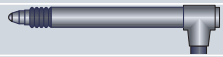
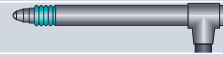
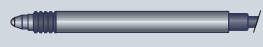
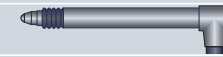
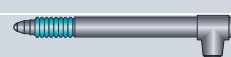
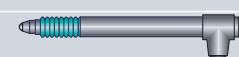


Software tools for data capture and data analysis (settings, measurements, inspection reports).
See chapter A – Connectivity

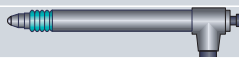
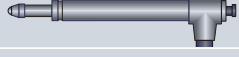
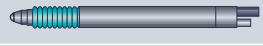
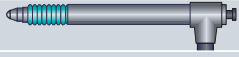
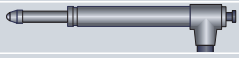
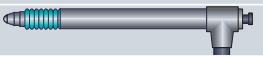
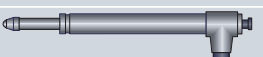


TESA Standard Probes – Overview

8 mm diameter axial probes with ball-bearing measuring bolt

						Measuring bolt retraction	Sealing bellows
<i>Standard probes</i>							
	03210904	GT 21	± 2	4,3	axial	mechanical	Nitrile
	03210924	GT 22	± 2	4,3	radial	by vacuum	Nitrile
	03230057	GTL 21	± 2	4,3	axial	mechanical	Viton
	03230072	GTL 211	± 2	4,3	axial	by vacuum	Viton
	03230056	GTL 22	± 2	4,3	radial	by vacuum	Viton
<i>Standard high-precision probes</i>							
	03230036	GT 21HP	± 0,2	4,3	axial	mechanical	Nitrile
	03230021	GT 22HP	± 0,2	4,3	radial	by vacuum	Nitrile
<i>Standard long-travel probes</i>							
	03230027	GT 27	± 2	10,3	axial	mechanical	Viton
	03230073	GT 271	± 2	10,3	axial	by vacuum	Viton
	03230026	GT 28	± 2	10,3	radial	by vacuum	Viton
<i>Probes with extended measuring range</i>							
	03230041	GT 61	± 5	10,3	axial	mechanical	Viton
	03230074	GT 611	± 5	10,3	axial	by vacuum	Viton
	03230042	GT 62	± 5	10,3	radial	by vacuum	Viton

...with activation of the measuring bolt by pneumatic pressure

						Pressure (bar) nominal	maximum	Sealing bellows
<i>Standard probes</i>								
	03230060	GTL 212	± 1,5	3,2	axial	0,7	1,0	Viton
	03230054	GTL 222	± 1,5	3,2	radial	0,7	1,0	Viton
	03230067	GTL 212-A	± 1,5	3,2	axial	0,25	6,0	none
	03230063	GTL 222-A	± 1,5	3,2	radial	0,25	6,0	none
<i>Long-travel probes</i>								
	03230061	GT 272	± 2	10,3	axial	1,1	1,5	Viton
	03230053	GT 282	± 2	10,3	radial	1,1	1,5	Viton
	03230068	GT 272-A	± 2	10,3	axial	1,0	6,0	none
	03230069	GT 282-A	± 2	10,3	radial	1,0	6,0	none
<i>Probes with extended measuring range</i>								
	03230062	GT 612	± 5	10,3	axial	1,1	1,5	Viton
	03230055	GT 622	± 5	10,3	radial	1,1	1,5	Viton
	03230070	GT 612-A	± 5	10,3	axial	1,0	6,0	none
	03230071	GT 622-A	± 5	10,3	radial	1,0	6,0	none

ELECTRONIC LENGTH MEASURING EQUIPMENT - ANALOGUE



- ** Nominal value of the measuring force at electrical zero, max. deviation $\pm 25\%$.
 *** Highest mechanical frequency valid for the final value of the measuring range, amplified by 10%.
 **** Linearity related max. permissible errors.

 N**	 Moving mass (g)	 Frequency limit Hz***	 Dismountable	 μm	 (L in mm) μm ****	 $^{\circ}\text{C}$	 IEC 60529	
0,63	6	60	●	0,01	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-17
0,63	6	60	●	0,01	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-18
0,63	6	60	●	0,01	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP65	0-17
0,63	6	60	●	0,01	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP65	0-17
0,63	6	60	●	0,01	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP65	0-18
0,63	6	60	—	0,01	$0,07 + 0,4 \cdot L$	$10 \div 40$	IP64	0-17
0,63	6	60	—	0,01	$0,07 + 0,4 \cdot L$	$10 \div 40$	IP64	0-18
0,63	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-19
0,63	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-19
0,63	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-19
0,9	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP65	0-20
0,9	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP65	0-20
0,9	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP65	0-20
 N**	 Moving mass (g)	 Frequency limit Hz***	 Dismountable	 μm	 (L in mm) μm ****	 $^{\circ}\text{C}$	 IEC 60529	
1,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP65	0-21
1,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP65	0-21
0,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP50	0-21
0,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	$-10 \div 65$	IP50	0-21
1,0	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-22
1,0	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP65	0-22
0,85	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP50	0-22
0,85	8	60	●	0,05	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP50	0-22
2,0	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP65	0-23
2,0	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP65	0-23
1,0	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP50	0-23
1,0	8	60	●	0,05	$1 + 4 \cdot L$	$-10 \div 65$	IP50	0-23



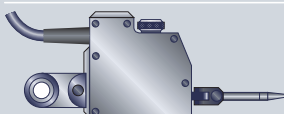
Miniature axial probes, 8 mm dia. probe housing

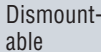
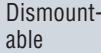
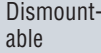
								
			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows	
<i>Measuring bolt hanging from diaphragm springs</i>								
	03230001	GT 41	± 0,3	0,7	axial	without	Nitrile	
	03230002	GT 42	± 0,3	0,7	radial	vacuum	Nitrile	
<i>Measuring bolt mounted on a plain bearing</i>								
	03230035	GT 43	± 1	2,1	axial	mechanical	Viton	
	03230017	GT 44	± 1	2,1	radial	vacuum	Viton	

Axial probes with measuring bolt mounted on a ball-bearing, with no brand name

								
			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows	
<i>Standard probes</i>								
	03230490	490	± 1,5	4,3	axial/radial	mechanical	Viton	
<i>Standard probes with short body</i>								
	96410012	410	± 1	2,5	axial/radial	mechanical	Nitrile	
<i>Standard probes with short body, 6 mm dia. fixing shank</i>								
	96160013	160	± 1	3,3	axial	mechanical	Viton	
<i>Miniature probes, 8 mm dia. fixing shank</i>								
	96430029	430	± 0,5	1,25	axial	mechanical	Nitrile	
	96441041	451	± 0,5	2,1	radial	vacuum	Nitrile	

Lever probes

								
			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows	
	96420004	420	± 0,15	0,525	parallel	without	none	
	96499007	499	± 0,5	1,2	parallel	without	none	

 N**	 Moving mass g	 Frequency limit Hz***	 Dismount-able	 μm	 (L in mm) μm^{****}	 °C	 IEC 60529	
0,63	2	60	—	0,01	$0,2 + 5 \cdot L^2$	$-10 \div 65$	IP65	0-24
0,63	2	60	—	0,01	$0,2 + 5 \cdot L^2$	$-10 \div 65$	IP65	0-24
0,4	2	60	—	0,1	$0,2 + 5 \cdot L^2$	$5 \div 65$	IP65	0-24
0,4	2	60	—	0,1	$0,2 + 5 \cdot L^2$	$5 \div 65$	IP65	0-24
 N**	 Moving mass g	 Frequency limit Hz***	 Dismount-able	 μm	 %****	 °C	 IEC 60529	
0,63	6	60	●	0,02	0,2	$-10 \div 65$	IP65	0-25
0,6	3,1	58	—	0,1	0,2	$0 \div 60$	IP62	0-26
0,6	2,5	60	—	0,1	0,2	$0 \div 60$	IP62	0-27
0,75	1,9	60	—	0,1	0,2	$0 \div 60$	IP62	0-27
0,6	3	60	—	0,1	0,2	$0 \div 60$	IP62	0-27
 N**	 Moving mass g	 Frequency limit Hz***	 Dismount-able	 μm	 %****	 °C	 IEC 60529	
1,8	2,5	10	—	0,5	0,3	$0 \div 60$	IP40	0-28
$0,02 \div 0,2$	10,6	10	—	0,25	0,6	$0 \div 60$	IP40	0-28

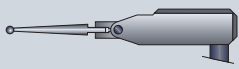
** Nominal value of the measuring force at electrical zero, max. deviation $\pm 25\%$.

*** Highest m mechanical frequency valid for the final value of the measuring range, amplified by 10%.

**** Linearity related max. permissible errors.



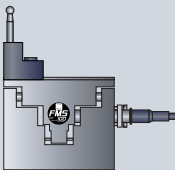
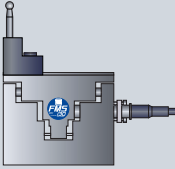
TESA probe with inclinable lever

						
	03210802	GT 31	± 0,3	0,7	angled	without

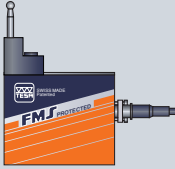
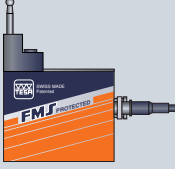
TESA universal probes

						
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Standard probes

	03230019	FMS 100	± 2	5,8	parallel	air pressure
	03230028	FMS 102	± 2	5,8	angled	air pressure
	03230049	FMS 130	± 2,9	5,8	parallel	air pressure
	03230050	FMS 132	± 2,9	5,8	angled	air pressure

Probes «FMS Protected»

	03230037	FMS 100-P	± 2	5,8	parallel	air pressure
	03230038	FMS 102-P	± 2	5,8	angled	air pressure
	03230051	FMS 130-P	± 2,9	5,8	parallel	air pressure
	03230052	FMS 132-P	± 2,9	5,8	angled	air pressure

* Position against the measuring direction

 N**	 Moving mass (g)	 Frequency limit Hz***	 Dismountable	 μm	 (L in mm) μm^{****}	 $^{\circ}\text{C}$	 IEC 60529	
0,1	12	25	—	0,1	$0,2 + 50 \cdot L^2$	$5 \div 60$	IP40	0-29
 N/mm	 Moving mass (g)	 Frequency limit Hz***	 Dismountable	 μm	 (L in mm) μm^{****}	 $^{\circ}\text{C}$	 IEC 60529	
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP50	0-31
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP50	0-32
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP50	0-31
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP50	0-32
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP54	0-31
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP54	0-32
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP54	0-31
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	$-10 \div 65$	IP54	0-32

** Nominal value of the measuring force at electrical zero, max. deviation $\pm 25\%$.

*** Highest mechanical frequency valid for the final value of the measuring range, amplified by 10%.

**** Linearity related max. permissible errors.

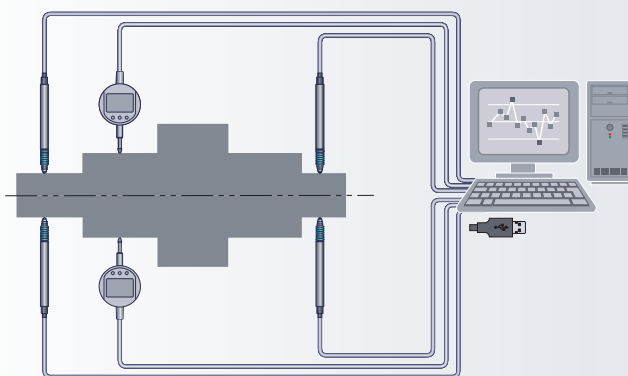


TESA PROBES WITH DIRECT USB CONNECTION

New generation of TESA's USB probes for a surprising ease of use

These probes can be directly connected to your host computer over the widely known USB interfaces. The highest number of connectable probes depends on the USB ports available. Since interface boxes or cards are no longer necessary, the use of a USB multiplexer provides Users with a flexible and affordable solution.

Each probe will be identified as a standard peripheral device, using an RS232 protocol for communicating. Electronics is optimized, thus guaranteeing high accuracy throughout the measuring range. Making use of this technology will allow you to fit and combine your inspection means according to given requirements for precision and probe travel.



Most of the software tools available for data processing are able to process the values obtained from the measurements taken in static multigauging. The USB technologie is convenient for these devices besides complex metrology applications, but also for simple gauging operations where high precision is critical.



*Software for data acquisition and data processing.
See chapter A – Connectivity*

TESA's probes available in the USB version and Half-bridge probes have the same dimensions. Their range of standard accessories is also identical.



DIN 32876
Part 1

See table

Any position
of use

Distance between
stops and
electrical zero
can not be set.
Cable length: 2,9 m.

0,1 μm

USB 2.0
RS 232, virtual

20 $\pm 0,5^\circ\text{C}$

-10°C to 40°C

80%

IP65 as per
IEC 60529
IP50 for
GT222-A
GT622-A
FMS 100-102

Shipping
packaging

Identification
number

Inspection report
with a declaration
of conformity

TESA USB Probes

Probes for use with a USB interface.

- Easy and quick connection to the USB port. Data transmission uses a virtual port along with any RS 232 protocol.



				
		Measuring range (mm)	Bolt retraction	Sealing bellow
03230200	GTL 21 USB	+/- 2	mechanical	Viton
03230201	GTL 22 USB	+/- 2	mechanical	Viton
03230202	GTL 222 USB	+/- 1,5	air pressure	Viton
03230203	GTL 222-A USB	+/- 1,5	air pressure	—
03230204	GT 61 USB	+/- 5	mechanical	Viton
03230205	GT 62 USB	+/- 5	vacuum	Viton
03230206	GT 622 USB	+/- 5	air pressure	Viton
03230207	GT 622-A USB	+/- 5	air pressure	—
03230208	FMS 100 USB	+/- 2	air pressure	—
03230209	FMS 102 USB	+/- 2	air pressure	—

					
	Mechanical displacement	Precision (μm)	μm	Standard execution	Technical data sheets
GTL 21 USB	4,3	1,2	< 0,1	0-17	03200587
GTL 22 USB	4,3	1,2	< 0,1	0-18	03200588
GTL 222 USB	3,1	1,2	< 0,1	0-21	03200589
GTL 222-A USB	3,1	1,2	< 0,1	0-21	03200590
GT 61 USB	10,3	3	< 0,24	0-20	03200591
GT 62 USB	10,3	3	< 0,24	0-20	03200592
GT 622 USB	10,3	3	< 0,24	0-23	03200593
GT 622-A USB	10,3	3	< 0,24	0-23	03200594
FMS 100 USB	5,8	1,2	< 0,1	0-31	03200597
FMS 102 USB	5,8	1,2	< 0,1	0-32	03200597

Data acquisition on the PC: 20 to 80 ms depending on used mode – No synchronisation in dynamic measurement.

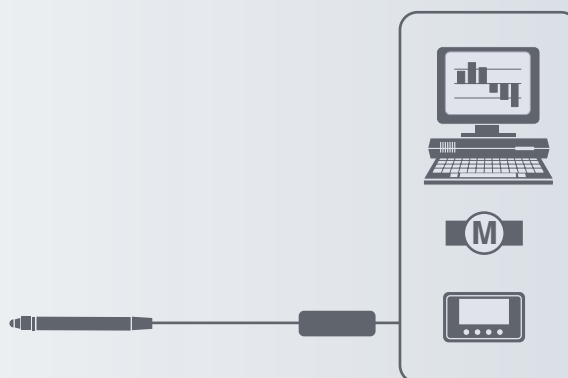
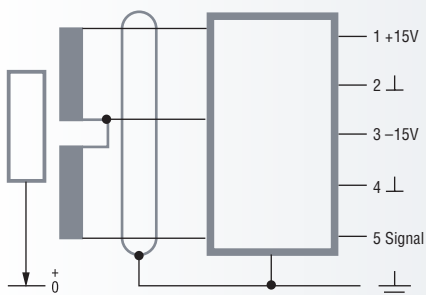
Note: – Adapter for standard probe to USB interface, see page 0-50.
– Advised limite of amount; 49 probes on 2 Hub levels.



TESA DC Probes

Provided with a DC output for direct connection to a host computer or a peripheral fitted with an analogue input.

Operating principle



DIN 32876
Part 1



See table



Any position
of use



Drive
voltage:
 ± 15 V

Consumption: 15 mA
Adjustment load: > 1 k Ω
Sensitivity: see table



See table



See table



Additional data: see
standard probes



Measuring
range (mm)



Output
voltage V



Sensitivity
V/mm



μ m



(L in mm)
 μ m*



Technical
data sheets

Standard probes

03230059	GTL 21 DC	± 2	± 2	1	0,1	$0,2 + 3,5 \cdot L^2$	03200396
03230058	GTL 22 DC	± 2	± 2	1	0,1	$0,2 + 3,5 \cdot L^2$	03200397

Probes with extended measuring range

03230086	GT 61 DC	± 5	± 5	1	0,1	$1 + 4 \cdot L$	03200519
03230087	GT 62 DC	± 5	± 5	1	0,1	$1 + 4 \cdot L$	03200520

Miniature probes with measuring bolt hanging from a diaphragm spring

03230082	GT 41 DC	$\pm 0,3$	$\pm 0,3$	1	0,1	$0,2 + 5 \cdot L^3$	03200516
-----------------	-----------------	-----------	-----------	---	-----	---------------------	----------

Miniature probes with measuring bolt mounted on a plain bearing

03230085	GT 44 DC	± 1	± 1	1	0,1	$0,2 + 5 \cdot L^3$	03200518
-----------------	-----------------	---------	---------	---	-----	---------------------	----------

Probes with inclinable lever

03230081	GT 31 DC	$\pm 0,3$	$\pm 0,3$	1	0,1	$0,2 + 50 \cdot L^2$	03200484
-----------------	-----------------	-----------	-----------	---	-----	----------------------	----------

* Linearity related max. permissible errors.

Note: Other existing probe types and versions are available on request (2 V/mm, 5 V/mm, 10 V/mm or 0 to + 10 V; max. output voltage 10 V).

TESA Axial Probes

Standard Probes

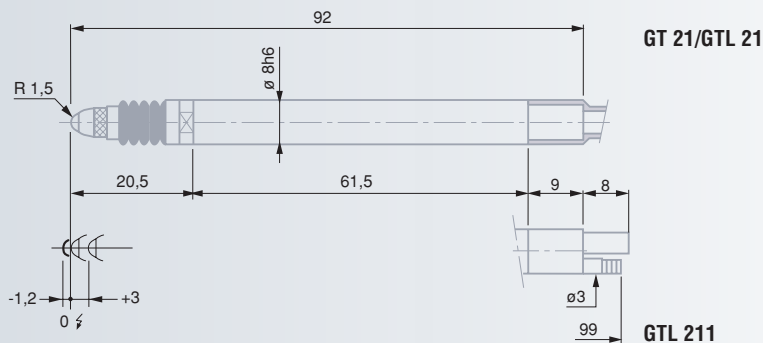
Universal probes for common but constraining applications.

- 8 mm diameter probe housing. Can be clamped over its entire length.
- Measuring bolt mounted on a ball bearing.
- Both the probe housing and ball-bearing guide are separate from one another, so that the measuring bolt moves easily even if the probe is not clamped appropriately.
- Degree of protection IP65 according to IEC 60529.
- Wide range of accessories including measuring inserts, spring sets, etc.
- LVDT probes compatible with measuring equipment from other makers available on request.

GT 21 and GTL 21 probes with axial cable exit

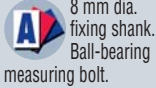
		Measuring range (mm)	N*	Bolt retraction	Sealing bellows
Standard probes					
03210904	GT 21	± 2	0,63	mechanical	nitrile
03210905	GT 21	± 2	1,0	mechanical	nitrile
03210906	GT 21	± 2	1,6	mechanical	nitrile
03210907	GT 21	± 2	2,5	mechanical	nitrile
03210908	GT 21	± 2	4,0	mechanical	nitrile
03230057	GTL 21	± 2	0,63	mechanical	nitrile
03230072	GTL 211	± 2	0,63	vacuum	Viton
High-precision standard probes					
03230036	GT 21 HP	± 0,2	0,63	mechanical	nitrile

* Nominal value at electrical zero, max. ± 25%. Valid in upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



	Lower stop of the measuring bolt**, adjustable from... to ex-factory	mm	µm	µm	µm***	Technical data sheets
GT 21	-2,2 to 0,1	-1,2	4,3	0,01	0,02	0,2 + 3 · L ³
GTL 21	-2,2 to 0,1	-1,2	4,3	0,01	0,02	0,2 + 2,4 · L ²
GTL 211	-2,2 to 0,1	-1,2	4,3	0,01	0,02	0,2 + 2,4 · L ²
GT 21 HP	-2,2 to 0,1	-1,2	4,3	0,01	0,01	0,07 + 0,4 · L

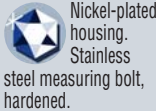
** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).



Distance from electrical zero of both stops is either adjustable (downward) or depending on the position of the lower stop (upward).

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip plus M2,5 thread.

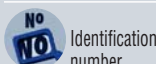
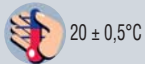
2 m long cable. DIN 45322 5-pin connector.



Sealing bellows made from resistant nitrile or high-resistance elastomer (Viton)



Highest mechanical frequency to 60 Hz.



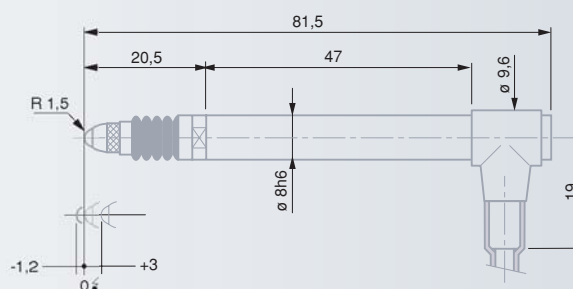
GT 22 and GTL 22 probes with radial cable exit

			N*		
Measuring range (mm)					
Standard probes					
03210924	GT 22	± 2	0,63	vacuum	nitrile
03210921	GT 22	± 2	0,16	vacuum	nitrile
03210922	GT 22	± 2	0,25	vacuum	nitrile
03210923	GT 22	± 2	0,4	vacuum	nitrile
03210925	GT 22	± 2	1,0	mechanical	nitrile
03210926	GT 22	± 2	1,6	mechanical	nitrile
03210927	GT 22	± 2	2,5	mechanical	nitrile
03210928	GT 22	± 2	4,0	mechanical	nitrile
03230056	GTL 22	± 2	0,63	vacuum	Viton
03230076	GTL 22	± 2	1	vacuum	Viton
High-precision standard probes					
03230021	GT 22 HP	± 0,2	0,63	vacuum	nitrile

* Nominal value at electrical zero, max. ± 25%. Valid in upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



GT 22/GTL 22



DIN 32876 Part 1



See in the table



Any position of use



8 mm dia. fixing shank. Ball-bearing measuring bolt.

Distance from electrical zero of both stops is either adjustable (downward) or depends on the position of the lower stop (upward).

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip plus M2,5 thread.

2 m long cable. DIN 45322 5-pin connector.



Nickel-plated housing. Stainless steel measuring bolt, hardened.

Sealing bellows made from resistant Nitrile or high-resistance Viton (elastomer)



Moved mass 6 g



13 kHz (± 5%) drive frequency. Highest mechanical frequency to 60 Hz.



0,15 µm/°C or 0,2 µm/°C for GTL 22



20 ± 0,5°C



-10°C to 65°C
10°C to 40°C for GT 22 HP



80%



IP65 (IEC 60529) or IP64 for GT 22 HP



Shipping packaging



Identification number



Inspection report with a declaration of conformity



Lower stop of the measuring bolt**, adjustable from... to... ex-factory mm



mm



µm



µm



µm***



Technical data sheets

	GT 22	GTL 22	GT 22 HP
Lower stop of the measuring bolt**	-2,2	-2,2	-2,2
Adjustable from... to...	0,1	0,1	0,1
Ex-factory mm	-1,2	-1,2	-1,2
mm	4,3	4,3	4,3
µm	0,01	0,01	0,01
µm	0,02	0,02	0,01
µm***	$0,2 + 3 \cdot L^3$	$0,2 + 2,4 \cdot L^2$	$0,07 + 0,4 \cdot L$
Technical data sheets	03200250	03200392	03200265

** Distance from electrical zero. *** Linearity related max. perm. errors. (L in mm).

DIN 32876
Part 1See
in the tablesAny position
of use8 mm dia.
fixing shank.
Ball-bearing
measuring bolt.

Distance from electrical zero of both stops is either adjustable (downward) or depending on the position of the lower stop (upward).

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip plus M2,5 thread.

2 m long cable. Standard probes with a 5-pin DIN 45322 connector.



Nickel-plated housing.
Stainless steel measuring bolt, hardened.

Viton bellows in high-resistance elastomer

Moving mass
8 g

13 kHz (± 5%)
drive frequency.
Highest mechanical frequency to 60 Hz.



0,15 µm/°C



20 ± 0,5 °C



-10°C to 65°C



80%

IP65
(IEC 60529)Shipping
packagingIdentification
numberInspection report
with a declaration
of conformity

TESA Axial Probes with Long Retraction Travel

Standard Probes

Universal inductive probes for common applications, especially those using multigauging devices.

- Long retraction travel to prevent the probe from being damaged.

LVDT probes compatible with measuring equipment from other makers also available on request.

GT 27 probes with axial cable exit

Measuring
range (mm)

N*

Measuring bolt
retractionSealing
bellows

Standard probes

03230027	GT 27	± 2	0,63	mechanical	Viton
03230073	GT 271	± 2	0,63	vacuum	Viton

GT 28 probes with radial cable exit

Measuring
range (mm)

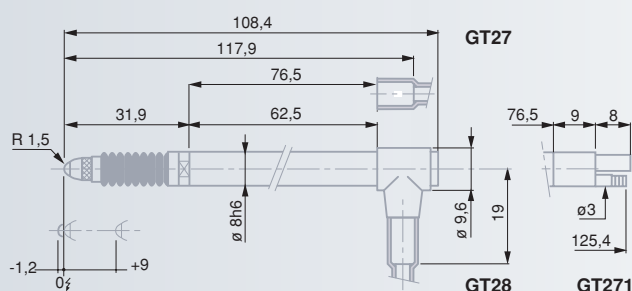
N*

Measuring bolt
retractionSealing
bellows

Standard probes

03230026	GT 28	± 2	0,63	vacuum	Viton
----------	-------	-----	------	--------	-------

* Nominal value at electrical zero, max. ±25%. Valid in upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



GT 27

GT 28



Lower stop of the measuring bolt**, adjustable from... to ex-factory mm



mm



µm



µm



µm***

Technical
data sheets

GT 27	-2,2	0,1	-1,2	10,3	0,05	0,05	0,2 + 3 · L ³	03200251
GT 271	-2,2	0,1	-1,2	10,3	0,05	0,05	0,2 + 3 · L ³	03200436
GT 28	-2,2	0,1	-1,2	10,3	0,05	0,05	0,2 + 3 · L ³	03200252

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).



TESA Axial Probes with Extended Measuring Range

Standard Probes

Designed for long travels and low resolutions – Specially suited for use on multigauging devices.

- Correction factor applied to get the true value is 2,5x (10x for the S probe version).

LVDT probes compatible with measuring equipment from other makers also available on request.

GT 61 probes with axial cable exit

Standard probes					
03230041	GT 61	± 5	0,9	mechanical	Viton
S32070041	GT 61S	± 5	0,9	mechanical	Viton
03230074	GT 611	± 5	0,9	vacuum	Viton

GT 62 probes with radial cable exit

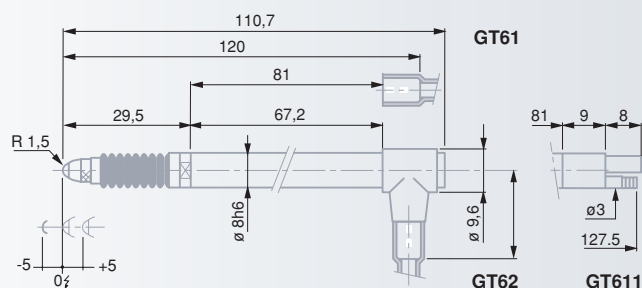
Standard probes					
03230042	GT 62	± 5	0,9	vacuum	Viton
S32070042	GT 62S	± 5	0,9	vacuum	Viton
S32080861	GT62	± 5	0,16	mechanical	none

* Nominal value at electrical zero, max. ± 25%. Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



GT 62

GT 61



DIN 32876
Part 1



See
in the tables



Any position
of use



Signal
combination
with probes having
a standard resolution may
require your special attention
to needed correction



8 mm dia.
fixing shank.
Ball-bearing
measuring bolt

Both lower and upper stops
are fixed.

Interchangeable measuring
insert with a 3 mm dia. tung-
sten carbide ball tip. M2,5
thread.

2 m long cable.

5-pin DIN 45322 connector.



Nickel-plated
housing.
Stainless steel
measuring
bolt, hardened.

Viton bellows in
high-resistance elastomer



Moved mass
8 g



13 kHz (± 5%)
drive
frequency.
Highest mechanical
frequency to 60 Hz.



0,09 µm/°C



20 ± 0,5°C



-10°C to 65°C



80%



IP65
(IEC 60529)



Shipping
packaging



Identification
number



Inspection report
with a declaration
of conformity



Measuring bolt stops**
lower stop (mm) upper stop (mm)



mm



µm



µm



µm***



Technical
data sheets

	GT 61	GT 611	GT 62
Measuring bolt stops**	-5,1	-5,1	-5,1
lower stop (mm)	5,2	5,2	5,2
upper stop (mm)	10,3	10,3	10,3
mm	0,05	0,05	0,05
µm	1 + 4 · L	1 + 4 · L	1 + 4 · L
µm***	03200294	03200437	03200295

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).

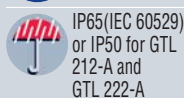


Both lower and upper stops are fixed.

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip. M2,5 thread.

2 m long cable.

Standard probes with a 5-pin DIN 45322 connector.



TESA Axial Probes with Measuring Bolt Activation by Pneumatic Pressure

Standard Probes

These probes are intended for use with measuring devices providing full or half-assisted inspection routines.

LVDT probes compatible with measuring equipment from other makers also available on request.

GT 212 probes with axial cable exit

No		Measuring range (mm)	N*	Measuring bolt activation	Sealing bellows
<i>Standard probes</i>					
03230060	GTL 212	± 1,5	1,2	▼	▲ Viton
03230067	GTL 212-A	± 1,5	0,2	▼	▲ none

GT 222 probes with radial cable exit

No		Measuring range (mm)	N*	Measuring bolt activation	Sealing bellows
<i>Standard probes</i>					
03230054	GTL 222	± 1,5	1,2	▼	▲ Viton
03230063	GTL 222-A	± 1,5	0,2	▼	▲ none

* Nominal value at electrical zero, max. ± 25%. Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring

▼ Downward movement of the measuring bolt activated by pneumatic pressure.

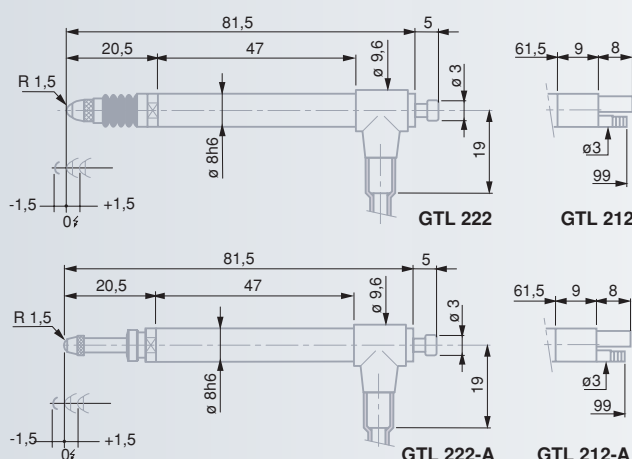
▲ Upward movement of the measuring bolt activated under the spring force only.



GTL 222



GTL 212-A



	Air pressure (bar)	mm	µm	µm	µm***	Technical data sheets
	nominal	maximum				
GTL 212	0,7	1,0	3,2	0,015	0,02	0,2 + 2,4 · L ² 03200413
GTL 212-A	0,25	6,0	3,2	0,015	0,02	0,2 + 2,4 · L ² 03200430
GTL 222	0,7	1,0	3,2	0,015	0,02	0,2 + 2,4 · L ² 03200393
GTL 222-A	0,25	6,0	3,2	0,015	0,02	0,2 + 2,4 · L ² 03200422

*** Linearity related max. perm. errors (L in mm).



TESA Long-Travel Probes with Measuring Bolt Activation by Pneumatic Pressure

Standard Probes

Made for use with measuring devices providing full or half-assisted inspection routines.

LVDT probes compatible with measuring equipment from other makers also available on request.



GT 282

GT 272-A

GT 272 probes with axial cable exit

			Measuring range (mm)	Upper travel (mm)*	N**			Measuring bolt activation	Sealing below
<i>Standard probes</i>									
03230061	GT 272	± 2	8,1	1,0	▼ ▲	▲	Viton		
03230068	GT 272-A	± 2	8,1	0,85	▼ ▲	▲	none		

GT 282 probes with radial cable exit

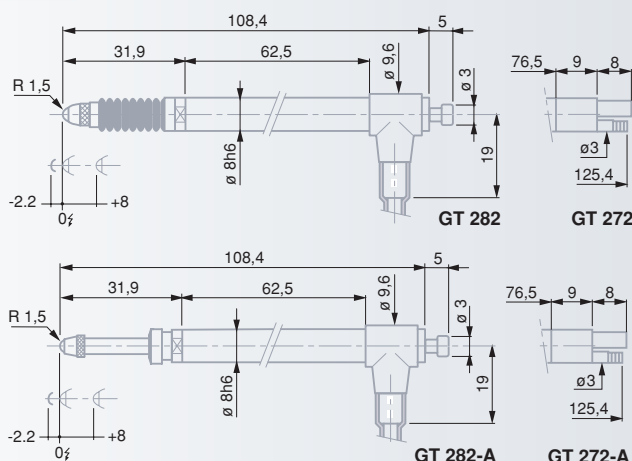
			Measuring range (mm)	Upper travel (mm)*	N**			Measuring bolt activation	Sealing below
<i>Standard probes</i>									
03230053	GT 282	± 2	8,1	1,0	▼ ▲	▲	Viton		
03230069	GT 282-A	± 2	8,1	0,85	▼ ▲	▲	none		

* Travel from the electrical zero up to the upper stop.

** Nominal value at electrical zero; max. deviation ±25%. Valid in upright assembly position with downward oriented measuring bolt, as well as in static measuring.

▼ Downward movement of the measuring bolt activated by pneumatic pressure.

▲ Upward movement of the measuring bolt activated under the spring force only.



GT 272-A

GT 282-A

GT 272-A

		Air pressure (bar)						
		nominal	maximum	mm	µm	µm	µm ^{***}	Technical data sheets
GT 272	1,1	1,5	10,3	0,05	0,05	0,2 + 3 · L ³	03200414	
GT 272-A	1,0	6,0	10,3	0,05	0,05	0,2 + 3 · L ³	03200431	
GT 282	1,1	1,5	10,3	0,05	0,05	0,2 + 3 · L ³	03200390	
GT 282-A	1,0	6,0	10,3	0,05	0,05	0,2 + 3 · L ³	03200432	

*** Linearity related max. permissible errors (L in mm).



DIN 32876
Part 1



See in tables



Any position
of use



8 mm dia.
fixing shank.
Ball-bearing

measuring bolt.
Both lower and upper stops
are fixed.

Interchangeable insert with a
3 mm dia. carbide ball tip.
M2,5 thread.

2 m long cable.

5-pin DIN 45322 connector.



Nickel-plated
housing.

Stainless steel measuring
bolt, hardened.

Viton bellows in high-resist-
ance elastomer



Moved mass
8 g



13 kHz (±5%)
drive frequency.
Highest mechanical
frequency to 60 Hz.



0,15 µm/ °C



20 ± 0,5°C



-10°C to 65°C



80%



IP65 (IEC 60529)
or IP50 for
GT 272-A plus
GT 282-A



Shipping
packaging



Identification
number



Inspection report
with a declaration
of conformity



DIN 32876
Part 1

See in tables

Any position
of use

8 mm dia.
fixing shank.
Ball-bearing

measuring bolt.
Both lower and upper stops
are fixed.

Interchangeable insert with a
3 mm dia. carbide ball tip.
M2,5 thread.

Cable length: 2 m.
5-pin DIN 45322 connector.

Nickel-plated
housing.

Stainless steel measuring
bolt, hardened.

Viton bellows in
high-resistance elastomer

Moved mass
8 g

13 kHz ($\pm 5\%$)
drive frequency.
Highest
mechanical frequency 60 Hz.

0,09 $\mu\text{m}/^\circ\text{C}$

20 $\pm 0,5^\circ\text{C}$

-10 $^\circ\text{C}$ to 65 $^\circ\text{C}$

80%

IP65 (IEC 60529)
or IP50 for
GT 612-A plus
GT 622-A

Shipping
packaging

Identification
number

Inspection report
with a declaration
of conformity

TESA Probes with Extended Measuring Range and Bolt Activation by Pneumatic Pressure

Standard Probes

Probes intended for use with measuring devices providing full or half-assisted inspection routines.

LVDT probes compatible with measuring equipment from other makers also available on request.

GT 612 probes with axial cable exit



Sealing
bellow

Measuring
range (mm)

N*

Measuring
bolt activation

Standard probes

03230062	GT 612	± 5	2,0	▼	▲	Viton
03230070	GT 612-A	± 5	1,0	▼	▲	none

GT 622 probes with radial cable exit



Sealing
bellow

Measuring
range (mm)

N*

Measuring
bolt activation

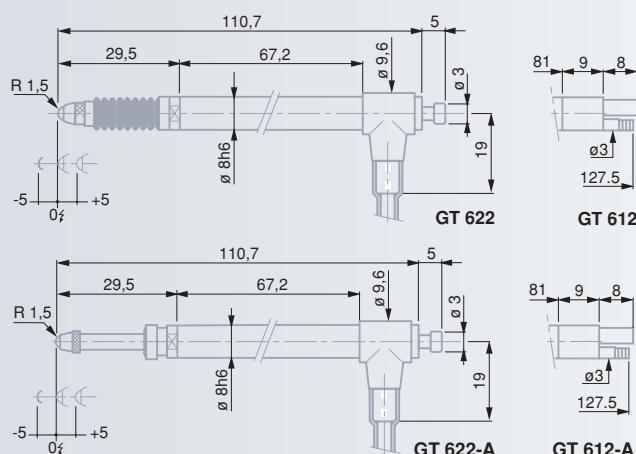
Standard probes

03230055	GT 622	± 5	2,0	▼	▲	Viton
03230071	GT 622-A	± 5	1,0	▼	▲	none

* Nominal value at electrical zero, max. $\pm 25\%$. Valid in upright assembly position with downward oriented measuring bolt, as well as in static measuring.

▼ Downward movement of the measuring bolt activated by pneumatic pressure.

▲ Upward movement of the measuring bolt activated under the spring force only.



GT 622

GT 612-A



Air pressure (bar)
nominal maximum

mm

μm

μm

μm^{**}

Technical
data sheets

GT 612	1,1	1,5	10,3	0,05	0,05	1 + 4 · L	03200415
GT 612-A	1,0	6,0	10,3	0,05	0,05	1 + 4 · L	03200433
GT 622	1,1	1,5	10,3	0,05	0,05	1 + 4 · L	03200394
GT 622-A	1,0	6,0	10,3	0,05	0,05	1 + 4 · L	03200434

** Linearity related max. permissible errors (L in mm).



TESA Axial Miniature Probes

Standard probes

Compact probes specially designed for use where there's no room for longer probes – Possible assembly on measuring heads for bore measurement and the like.

GT 41 and GT 43 probes with axial cable exit



Measuring range (mm)



N*



Measuring bolt retraction



Sealing bellows

Measuring bolt hanging from a diaphragm spring

03230001	GT 41	± 0,3	0,63	without	nitrile
----------	-------	-------	------	---------	---------

Measuring bolt mounted on a plain bearing

03230035	GT 43	± 1	0,4	mechanical	Viton
----------	-------	-----	-----	------------	-------

GT 41

GT 43



GT 42



GT 44

GT 42 and GT 44 probes with radial cable exit



Measuring range (mm)



N*



Measuring bolt retraction



Sealing bellows

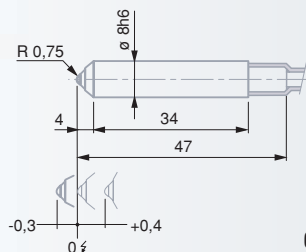
Measuring bolt hanging from a diaphragm spring

03230002	GT 42	± 0,3	0,63	vacuum	nitrile
----------	-------	-------	------	--------	---------

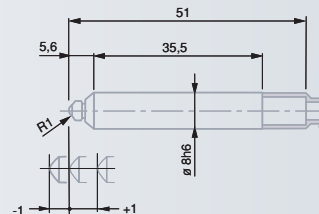
Measuring bolt mounted on a plain bearing

03230017	GT 44	± 1	0,4	vacuum	Viton
----------	-------	-----	-----	--------	-------

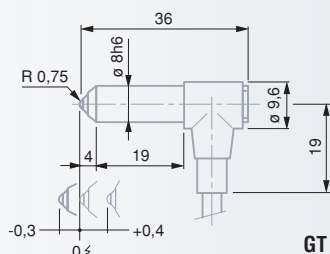
* Nominal value at electrical zero, max. ±25%. Valid in upright assembly position with downward oriented measuring bolt, as well as in static measuring.



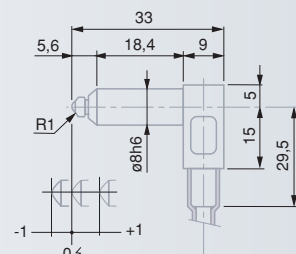
GT 41



GT 43



GT 42



GT 44



Measuring bolt stops**
lower (mm) upper (mm)



mm



µm



µm



µm***



Technical data sheets

	GT 41	GT 43	GT 42	GT 44			
Measuring bolt stops**							
lower (mm)	-0,3	-1,05	-0,3	-1,05			
upper (mm)	0,4	1,05	0,4	1,05			
mm	0,7	2,1	0,7	2,1			
µm	0,01	0,1	0,01	0,1			
µm	0,01	0,15	0,01	0,15			
µm***	0,2 + 5 · L ²	0,2 + 5 · L ²	0,2 + 5 · L ²	0,2 + 5 · L ²			
Technical data sheets	03200258	03200260	03200259	03200261			

** Distance from electrical zero. *** Linearity related max perm. errors (L in mm).



DIN 32876
Part 1



See in tables



Any position of use



8 mm dia. fixing shaft. Measuring bolt guided on a plain bearing or hanging from diaphragms. Both lower and upper stops are fixed.

GT 41 or GT 42 with a fixed measuring insert; spherical carbide measuring face, R = 0,75 mm. GT 43 or GT 44 with a selectable measuring insert; spherical carbide face, R = 1 mm. M2 coupling thread. Cable length: 2 m.

5-pin DIN 45322 connector.



Nickel-plated fixing shank. Sealing bellows: Resistant nitrile or high-resistance elastomer (Viton).



Moved mass 2 g



13 kHz (± 5%) drive frequency. Highest mechanical frequency 60 Hz.



0,1 µm/°C



20 ± 0,5°C



-10°C to 65° for GT 41 and GT 42; 5°C to 65°C for GT 43 and GT 44.



80%



IP65 (IEC 60529)



Shipping packaging



Identification number



Inspection report with a declaration of conformity

TESA Axial Probes – Serie 490

Probes with no brand name for TESA's electronic equipment

Universal probes to suit common but constraining applications.

- 8 mm diameter probe body that can be clamped over its entire length.
- Measuring bolt mounted on a ball-bearing.
- Probe body made in steel, nickel-plated.
- Degree of protection to IP65.
- Flexible axial cable exit fitted with a steel spring to prevent the cable from breaking.

Other probes compatible with measuring equipment from other makers also available on request.



Adjustable distance between both lower stop and electrical zero.

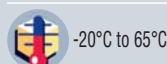
Interchangeable measuring insert with M2,5 thread. 3 mm dia. carbide ball tip.

Cable length: 2 m.

DIN 45322 connector.



Sealing bellow: high-resistance elastomer (Viton)



Measuring range (mm)



N*



Measuring bolt retraction



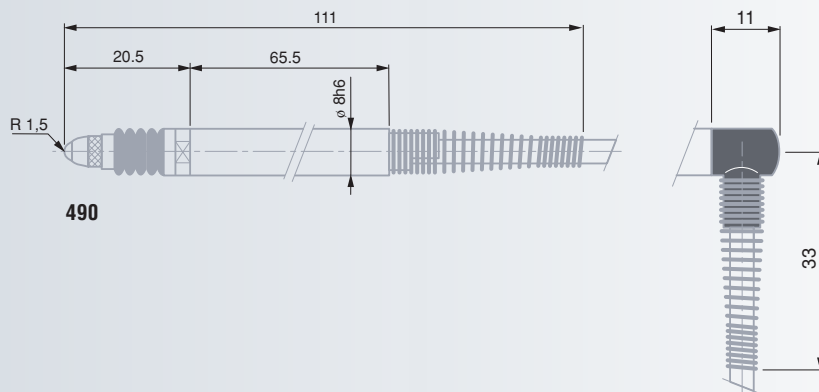
Sealing bellow

Probe series 490 with axial/radial** cable exit

03230490	± 1,5	0,63	mechanical	Viton
----------	-------	------	------------	-------

* Nominal value at electrical zero; max. deviation $\pm 0,15$ N. Valid in upright assembly position with downward oriented measuring bolt, as well as in static measuring. Also available upon request: Probes 410 with measuring force to 0,4, 1,0, 1,6, 2,5 or 4 N.

** Using the right angle adaptor that came with the probe.



Lower stop of the measuring bolt***, adjustable from... to ex-factory



mm



µm



%****



Technical data sheet

490	TESA	-2	0	-1,7	4,3	0,02	0,2	03200456
-----	------	----	---	------	-----	------	-----	----------

*** Distance from electrical zero.

**** Linearity related max. perm. errors within the measuring span of 3 mm (measuring range $\pm 1,5$ mm).



Axial Probes with Short Body – Serie 410

Probes for TESA's electronic equipment

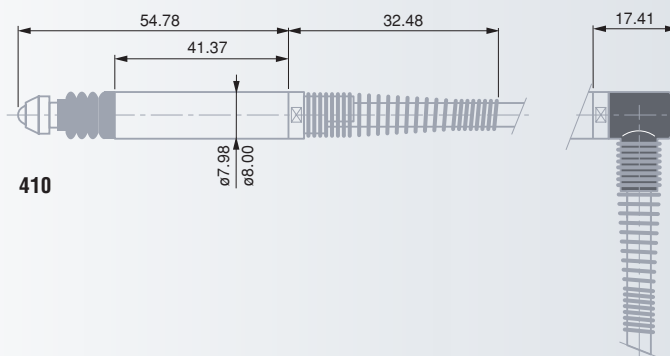
Universal probes for common but constraining applications.

- 8 mm diameter probe body that can be clamped over its entire length.
- Ball bearing measuring bolt.
- Hardened steel body, hard-chrome plated.
- Degree of protection to IP62.
- Flexible axial cable exit fitted with a steel spring to prevent the cable from breaking.

Other probes compatible with measuring equipment from other makers also available on request.



	 Measuring range (mm)	 N*	 Measuring bolt retraction	 Sealing bellow
Probe series 410 with axial/radial cable exit**				
96410012	± 1	0,6	mechanical	nitrile
* Nominal value at electrical zero; max. deviation ± 0,15 N. Valid in upright assembly position, with downward oriented measuring bolt, as well as in static measuring. Also available upon request: Probes 410 with measuring force to 1,0 or 1,6 N.				
** Using the right angle adaptor that came with the probe.				



DIN 32876 Part 1



See in tables



Axial probes usable in any position



8 mm body diameter. Measuring bolt mounted on a ball-bearing.

Adjustable distance between both lower stop and electrical zero.

Interchangeable probe insert with a M2,5 mounting thread. 3 mm dia. tungsten carbide ball tip.

Cable length: 2 m.

DIN 45322 connector.

Hardened steel probe body, hard-chrome plated.

Stainless steel bolt, hardened.

Sealing bellow: resistant nitrile



Moved mass 3,1 g



Force increase 0,15 N/mm



Highest mechanical frequency to 60 Hz



0,025 µm/°C



0°C to 65°C



-40°C to 65°C



IP62 (IEC 60529)



Shipping packaging



Identification number



Lower stop of the measuring bolt***, adjustable from... to ex-factory



mm



µm



%****



Technical data sheet

410	TESA	-1,2	0	-1,08	2,5	0,1	0,2	F96410012
-----	------	------	---	-------	-----	-----	-----	-----------

*** Distance from electrical zero.

**** Linearity related max. perm. errors; within the measuring span of 2 mm (measuring range ±1 mm).



DIN 32876
Part 1

See in tables

Axial probes
usable in
any position

6 and 8 mm probe
housing diameters
for both series 160
and 430/45, resp.

Ball-bearing measuring bolt.

Distance between both stops
and electrical zero is either
adjustable (series 160, but
lower stop only) or fixed
(series 451).

Interchangeable probe insert.
M2 thread for series 160 or
M2,5 for both series 430 and
451

3 mm dia. tungsten carbide
ball tip.

2 m long cable.

DIN 45322 connector.

Hardened steel
probe body,
chrome plated.

Measuring bolt in stainless
steel, hardened.

Sealing bellows in resistant
nitrile or high-resistance
elastomer (Viton).

Moved mass
2,5 g (series 160)
1,9 g (series 430)
3,0 g (series 451)

Force increase to
0,3 N/mm
(series 160),
0,25 N/mm (series 430) or
0,15 N/mm (series 451)

Highest
mechanical
frequency to 60 Hz

0,025 $\mu\text{m}/^\circ\text{C}$

0°C to 60°C

-40°C to 60°C

IP62
(IEC 60529)

Shipping
packaging

Identification
number

Axial Probes with Short Body – Series 160, 430 and 451

Probes for TESA's electronic equipment

Their compact size and robust construction make them the ideal probes for a frequent use.

- 8 mm diameter probe body (6 mm for probe series 160) that can be clamped over its entire length.
- Chrome-plated, hardened steel body. Ball-bearing probe insert.

Other probes compatible with measuring equipment from other makers also available on request.



Measuring
range
mm



N*



Measuring
bolt
retraction

Sealing
bellows

Series 160 – Probes with short body, axial cable exit

96160013	± 1	$0,6 \pm 0,15$	mechanical	Viton
-----------------	---------	----------------	------------	-------

Series 430 – Miniature probes with axial cable exit

96430029	$\pm 0,5$	$0,75 \pm 0,2$	mechanical	nitrile
-----------------	-----------	----------------	------------	---------

Series 451 – Miniature probes with radial cable exit

96441041	$\pm 0,5$	$0,6 \pm 0,15$	mechanical	nitrile
-----------------	-----------	----------------	------------	---------

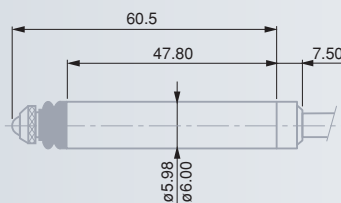
* Nominal value at electrical zero; max. deviation $\pm 0,15$ N. Valid in upright assembly position with downward oriented measuring bolt, as well as in static measuring.



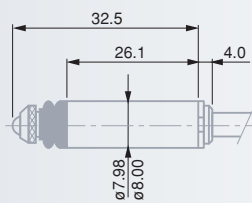
451

430

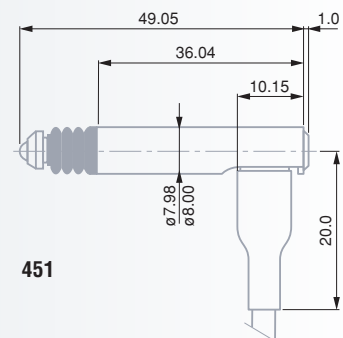
160



160



430



451



Lower stop of the meas-
uring bolt**, adjustable
from... to... ex-factory
mm mm mm



mm



μm



%***



Technical
data sheets

		from... mm	to... mm	ex-factory mm	mm	μm	%***	Technical data sheets
160	TESA	-1,2	0	-1,08	3,3	0,1	0,2	F96160013
430	TESA	-0,7	0	-0,58	1,25	0,2	0,2	F96430029
451	TESA	—	—	-0,58	2,1	0,1	0,2	F96441041

** Distance from electrical zero.

*** Linearity related max. perm. errors; within either of both measuring spans of 2 mm (measuring range ± 1 mm) and 1 mm (measuring range $\pm 0,5$ mm).



Lever Probes – Series 420 and 499

Probes for TESA's electronic equipment

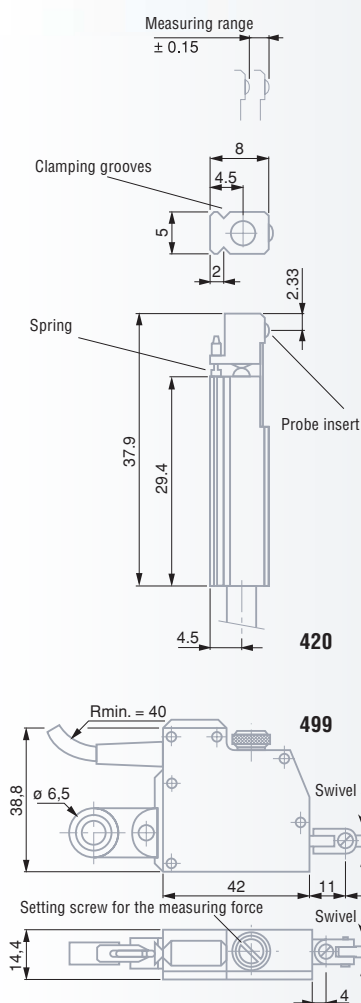
Probe series 420

- Very short body that can be recessed into a fixture or a plug gauge.
- Probe insert mounted on leaf springs.

Probe series 499

- Parallel guiding of the measuring bolt moving in both probing directions.
- Interchangeable probe insert. Any of those having a varying length can equally be used with no influence on the leverage.
- Used where probes with measuring bolt moving lengthwise cannot easily be handled.
- Without switch-over feature for the probing direction.

Other probes compatible with measuring equipment from other makers also available on request.



Measuring range (mm)

N*

Series 420 – Miniature lever probes

96420004 ± 0,15 1,8 ± 0,4

Series 499 – Lever probes with parallel guiding

96499007 ± 0,5 0,02 ÷ 0,2**

Accessories for probe series 499



mm

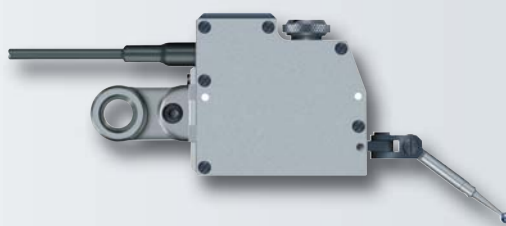
mm

03238401	Measuring insert	0,8	carbide	12,3
03238402	Measuring insert	1,6	carbide	12,3
03238403	Measuring insert	3,2	carbide	12,3
03238411	Measuring insert	0,8	carbide	37,7
03238412	Measuring insert	1,6	carbide	37,7
03238413	Measuring insert	3,2	carbide	37,7
01840105	Cylindrical clamp	8		

For other clamping items, report to page G-6.

* Nominal values at electrical zero. Valid in static measuring.

** Adjustable with probe housing and lever lying horizontally.



DIN 32876 Part 1



See in tables



Any position of use



Series 420 with a clamping groove.

Leaf-spring mounted articulation.

Series 499:
2 dovetails with mounting lug or clamping rod.
Probe insert on a leaf-spring bearing. 2 x 90° friction clutches for smooth displacement of the probe insert.

Triple protection against damages in both probing directions.

Series 499 with Interchangeable insert fitted with a 10 BA coupling thread.

2 m long cable.

DIN 45322 connector.

Stainless steel probe body, hardened (series 420). Dull-chrome plated housing (series 499).

Tungsten carbide ball tip

Moved mass 2,5 g (series 420) or 10,6 g (series 499)

Force increase: 0,2 N/mm (420) 0,25 N/mm (499)

Highest mechanical frequency 10 Hz

0,025 µm/°C for series 420 or 0,25 µm/°C for series 49

0°C to 60°C

-40°C to 60°C

IP40 (IEC 60529)

Series 499 along with a 3,2 mm dia. probe insert (No. 03238403) plus lug (No. 03238013)

Shipping packaging

Identification number



Lower stop of the measuring insert***, adjustable from... to ex-factory



mm



µm



%****



Technical data sheets

		mm	mm	mm	mm	µm	%****	
420	TESA	—	—	-0,225	0,525	0,5	0,3	F96420004
499	TESA	0,6	0	0,6	1,2	0,25	0,6	F96499007

*** Distance from electrical zero.

**** Linearity related max. perm. errors; within either of both measuring spans of 0,3 mm (measuring range ±0,15 mm) and 1 mm (measuring range ±0,5 mm).

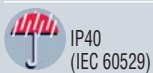
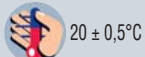
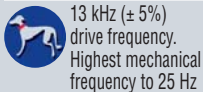


Probe inserts with removable stainless steel shaft. Also with a 2 mm carbide ball tip.

For all other inserts, see under optional accessories on next pages.

2 m long cable.

5-pin DIN 45322 connector.



TESA GT 31 Lever Probes

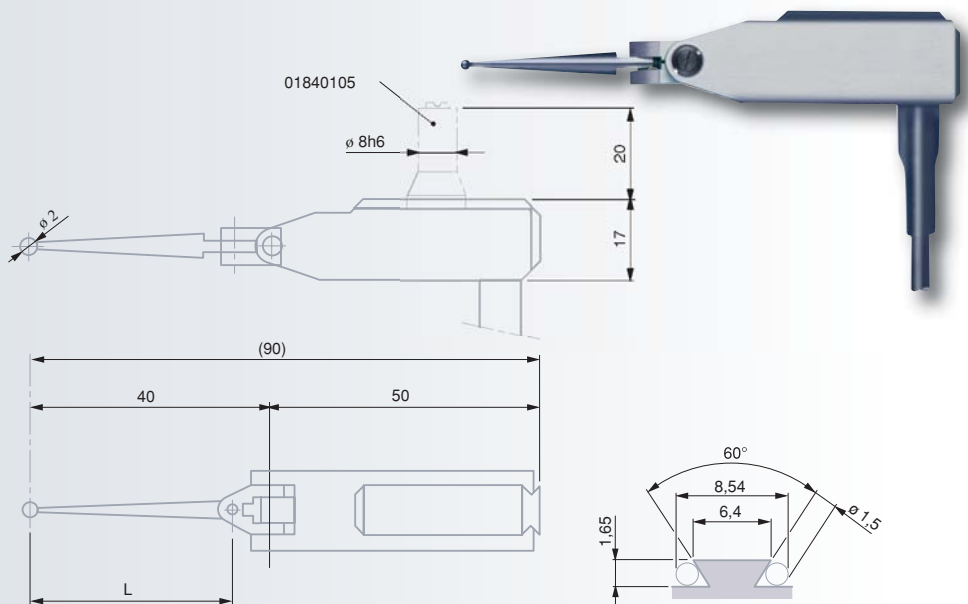
Models with inclinable probe insert for measuring in two directions – Well suited for use where probes with measuring bolt moving lengthwise can not be conveniently operated.

- Ball-bearing balanced lever.
- Interchangeable probe insert fitted with a tungsten carbide ball tip, inclinable through to 180°.
- Automatic reversal of the probing direction while that of the indication remains unchanged.
- Protected against shocks by 2 safety clutches.
- One-piece housing provided with 2 dovetails.

			Measuring range (mm)	 N*
03210802	GT 31	± 0,3		0,1 (standard)
03210801	GT 31	± 0,3		0,02
03210803	GT 31	± 0,3		0,2

* Nominal value at electrical zero; max. deviation ±25%. Valid with probe housing and lever lying horizontally, as well as in static measuring.

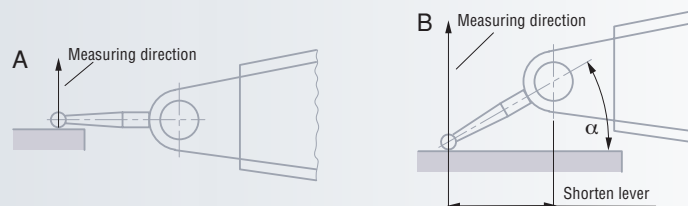
* Nominal value at electrical zero; max. deviation ±25%. Valid with probe housing and lever lying horizontally, as well as in static measuring.



					
mm	μm	μm	μm*	Technical data sheet	
GT 31	0,7	0,1	0,25	0,2 + 50 · L ²	03200266

* Linearity related max permissible error (L in mm).

* Linearity related max permissible error (L in mm).



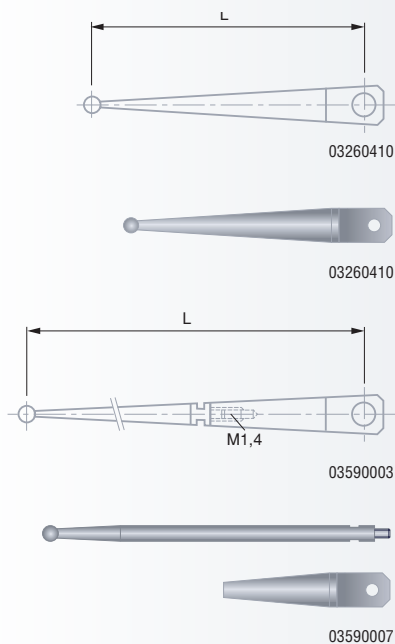
Note

With the insert lying parallel to the workpiece surface (Fig. A), the leverage matches 1:1. Therefore, no correction of the measured values is needed.

Any other position (angle α, Fig. B) will change the effective lever length, so that read values must be corrected. With regard to this, also report to the instructions for use that came with your electronic probes.



Accessories for TESA Probes GT 31



Probe inserts



Ball tip
mm



Lever –
amplification



Length
L in mm

Standard probes with a one-piece shaft

03260402	1	1 : 1	32
03260410	2	1 : 1	32
03260403	3	1 : 1	32

Special probes with a two-piece shaft

03590002	1	1 : 1	32
03590003	2	1 : 1	32
03590004	3	1 : 1	32
03590005	4	1 : 1	32
03590006	1	1 : 2	72
03590007	2	1 : 2	72
03590008	3	1 : 2	72
03590009	4	1 : 2	72



Stainless steel
insert holder,
tungsten carbide
ball tip



Shipping
packaging



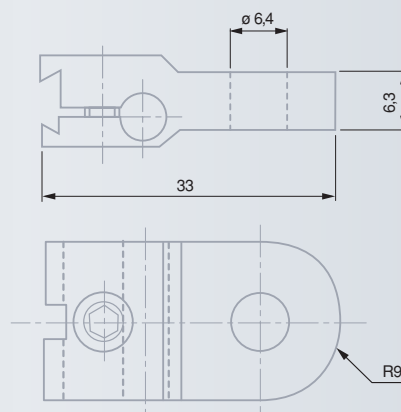
03240100

Fixing brackets

Features both a dovetail and cylindrical bore.



Shipping
packaging



03240100

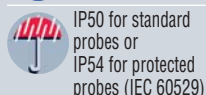
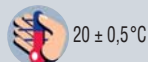
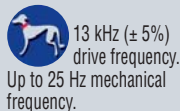


ball-bearing guiding with fixed stops.

Insert holder attachment with dovetail.

Cable length: 2 m.

5-pin connector including a feature matching DIN 45322 for signal adjustment.



TESA Probes with Parallel Guiding

Standard or protected FMS probes

Universal probes for multigauging devices. Let you capture the values measured on machines or other fixtures for in-process inspection.

- Long-life probes featuring a small-size, rugged design.
- Modular construction to eliminate the need for many assembly components.
- Ball-bearing probe displacement.
- Direction of the probing force and probe retraction depending on used accessory.
- Wide variety of measuring inserts and supports for optimum adaptation to your measuring job.

Other probes compatible with measuring equipment from other makers also available on request.

FMS probes with parallel cable exit



Measuring range (mm)



N*



Measuring bolt retraction (accessory)

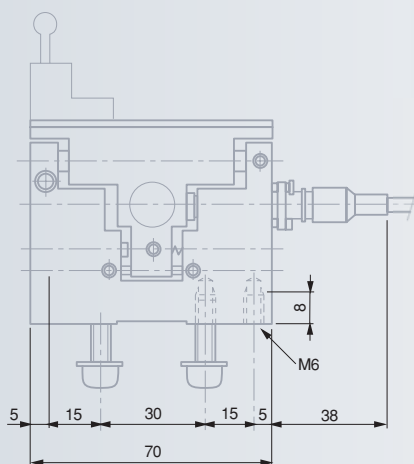
Standard probes

03230019	FMS 100	± 2	2	air pressure
03230049	FMS 130	± 2,9	2	air pressure

Probes «FMS protected»

03230037	FMS 100-P	± 2	2	air pressure
03230051	FMS 130-P	± 2,9	2	air pressure

* Nominal value at electrical zero; max. deviation ± 25%. Valid for probing movement exerted horizontally or in static measuring.



Mechanical stop**
lower mm upper mm



mm



µm



µm



µm***



Technical data sheets

FMS 100	−2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L ³
FMS 100-P	−2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L ³
FMS 130	−2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L ³
FMS 130-P	−2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L ³

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).



FMS probes with angled cable exit



Measuring
range (mm)



N*



Measuring bolt
retraction (accessory)

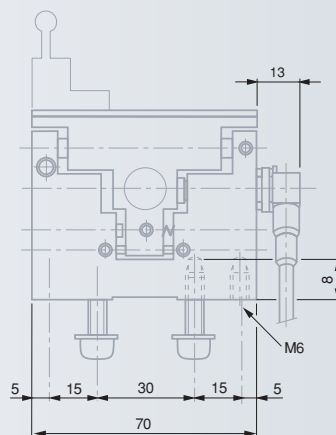
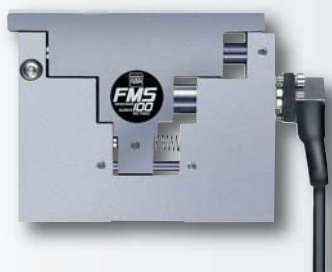
Standard probes

03230028	FMS 102	± 2	2	air pressure
03230050	FMS 132	± 2,9	2	air pressure

Probes «FMS protected»

03230038	FMS 102-P	± 2	2	air pressure
03230052	FMS 132-P	± 2,9	2	air pressure

* Nominal value at electrical zero; max. deviation ±25%. Valid for probing movement exerted horizontally or in static measuring.



DIN 32876
Part 1



See in tables



Any position
of use



4 coupling
threads M6.
Linear

ball-bearing guiding with
fixed stops.

Insert holder attachment
with dovetail.

Cable length: 2 m.

5-pin connector including
a feature matching
DIN 45322 for signal
adjustment.

Hardened steel
probe body,
nickel-plated

Moved mass
110 g

13 kHz (± 5%)
drive
frequency.
Highest mechanical
frequency to 25 Hz

0,15 µm/°C

20 ± 0,5 °C

-10 °C to 65 °C

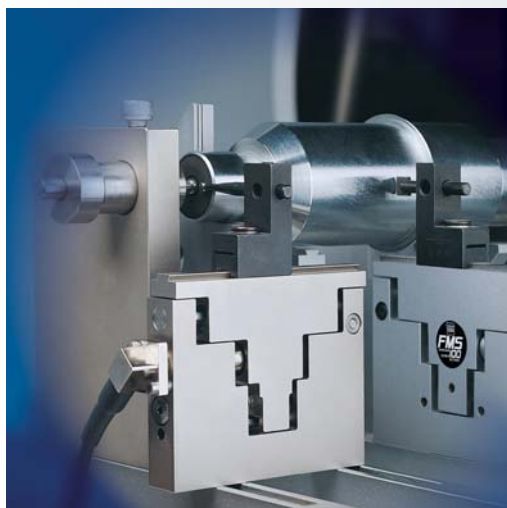
80%

IP50 for standard
probes or
IP54 for protected
probes (IEC 60529)

Shipping
packaging

Identification
number

Inspection report
with a declaration
of conformity



Mechanical stop**
lower
mm upper
mm

mm

µm

µm

µm***

Technical
data sheets

FMS 102	-2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200254
FMS 102-P	-2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200289
FMS 132	-2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200343
FMS 132-P	-2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200345

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).

Configuration and Use of TESA FMS Probes

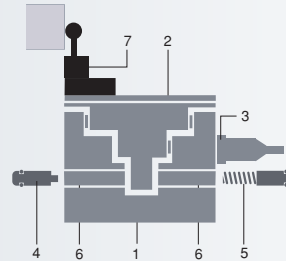
The following examples provide you with a number of possibilities to activate and retract the measuring insert during your measurement cycles.

Example A

- Moving the probe insert toward the part to be inspected using the measuring force produced through the compression spring.
- No insert's retraction.

Effect

The insert remains into position. Exchanging parts is made with mechanical contact of the probe under the measuring force.



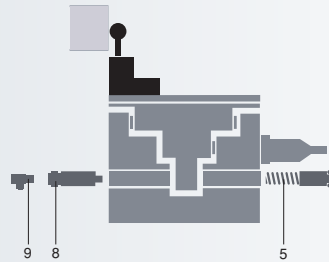
- 1 Fixed probe body
- 2 Moving probe body
- 3 Measuring element with fine adjust
- 4 Adjustable stop
- 5 Spring set for the measuring force
- 6 Mounting bores
- 7 Holder for the probe insert

Example B

- Moving the probe insert toward the part to be inspected using the measuring force produced through the compression spring.
- Insert's retraction by pneumatic pressure.

Effect

Exchanging parts is made with no mechanical contact of the probe.



- 5 Spring set for the measuring force
- 8 Pneumatic jack, No. 03260440
- 9 Connector (No. 024388, page 0-41)

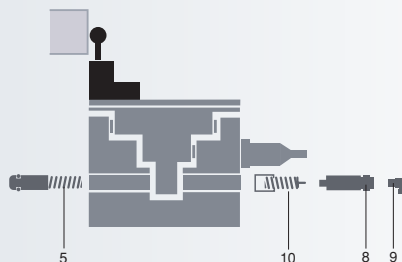
Example C

- Activating the measuring insert towards the part to be inspected by air pressure using the measuring force produced by the compression spring.
- Insert's retraction by disabling the pneumatic pressure.

Effect

Exchanging parts is made with no mechanical contact of the probe, thus providing absolute security since the probe insert retract itself due to a lack of air pressure.

This configuration is also applied where there is no room on the left side for the pneumatic jack (as shown in the example B).



- 5 Spring set for the measuring force
- 8 Pneumatic jack, No. 03260440
- 9 Connector (No. 024388, page 0-41)
- 10 Auxiliary spring-loaded element, No. 03260445

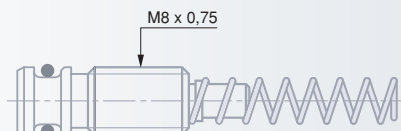


The force of the spring set (5) must be equivalent to the force of the auxiliary spring-loaded element (10).



Accessories for TESA FMS Probes

Spring set for the measuring force



Spring set for the measuring force

Examples A to C
Item 5



	N	
*	2,0	nickel-plated
03260448	0,4	red
03260449	0,63	yellow
03260450	1,0	green
03260451	1,6	blue
03260452	2,5	brown
03260453	4,0	black

* Provided with FMS probes



All values given in the table for the measuring force equal nominal values at electrical zero; max. deviation $\pm 25\%$. Valid for probing movements exerted horizontally as well as in static measuring.



Shipping packaging

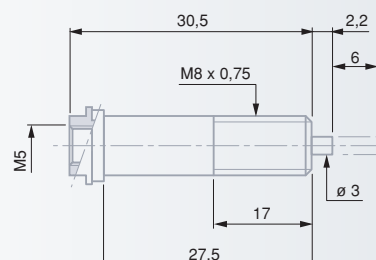
Accessories for Pneumatic Activation of the Mobile Probe Body



03260440

Pneumatic jack

Operates the mobile probe body. Force under a pressure of 4 bars = 11 N
Examples B and C
Item 8

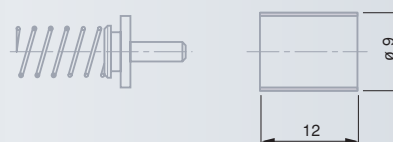


Auxiliary spring-loaded element

Example C
Item 10



	N	
03260441	0,4	red
03260442	0,63	yellow
03260443	1,0	green
03260444	1,6	blue
03260445	2,0	nickel-plated
03260446	2,5	brown
03260447	4,0	black



Probe Insert Holder with Fine Adjustment

Helps you to set the probe – Setting and locking screws remain accessible even when several probes are mounted side by side.



Width of the insert holder. 12 mm

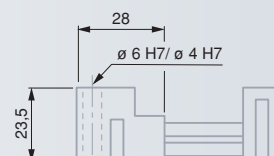
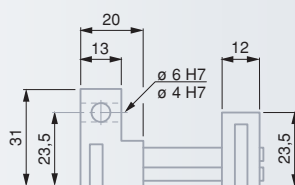
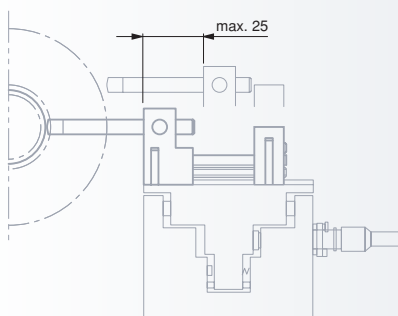


Shipping packaging

Mounting bores for probe inserts



	mm	Number	Position	mm
02630053	4	2	horizontal	25
02630055	4	1	vertical	25
02630052	6	2	horizontal	25
02630054	6	1	vertical	25



02630052/53

02630054/55

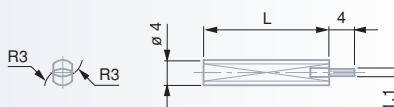
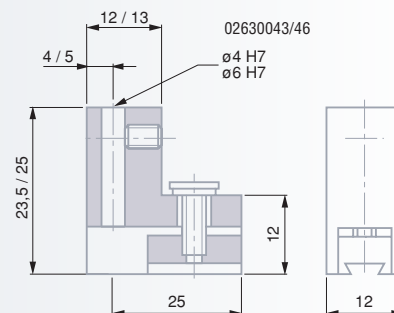
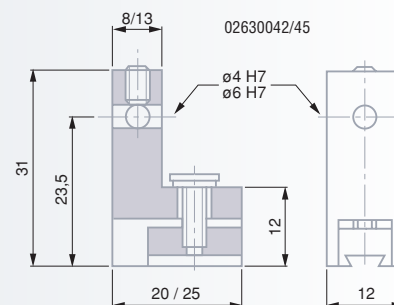


Fixed probe insert holder

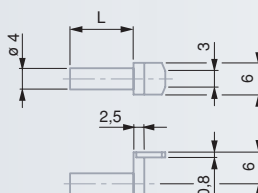
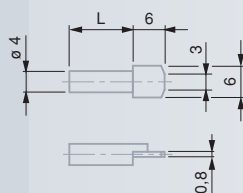
Mounting bores for probe inserts



	mm	Number	Position
02630042	4	2	horizontal
02630043	4	1	vertical
02630045	6	2	horizontal
02630046	6	1	vertical



Probe inserts with a 4 mm diameter mounting shaft



Centred probe inserts with a flat, right-angle measuring face



L mm

02660066	Carbide	12
02660068	Carbide	25

Off-centre probe inserts with a flat, right-angle measuring face



L mm

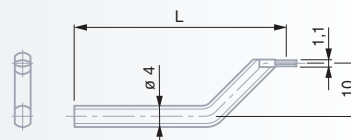
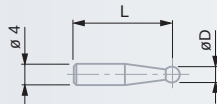
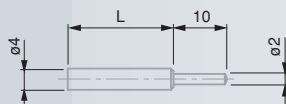
02660067	Carbide	12
02660069	Carbide	25

Centred probe inserts with 2 cylindrical measuring faces



L mm

02660070	Carbide	20
02660071	Carbide	40
02660072	Carbide	60



Probe inserts with a 2 mm dia. contact pin with spherical measuring face



L mm

02660073	Carbide	20
02660074	Carbide	40
02660075	Carbide	60

Inserts with a tungsten carbide ball tip



mm

L mm

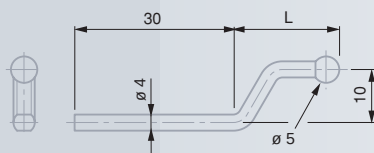
02660076	3	20
02660077	3	40
02660078	3	60
02660079	5	20
02660080	5	40
02660081	5	60

Off-centre probe inserts with 2 cylindrical measuring faces



L mm

02660082	Carbide	40
02660083	Carbide	60



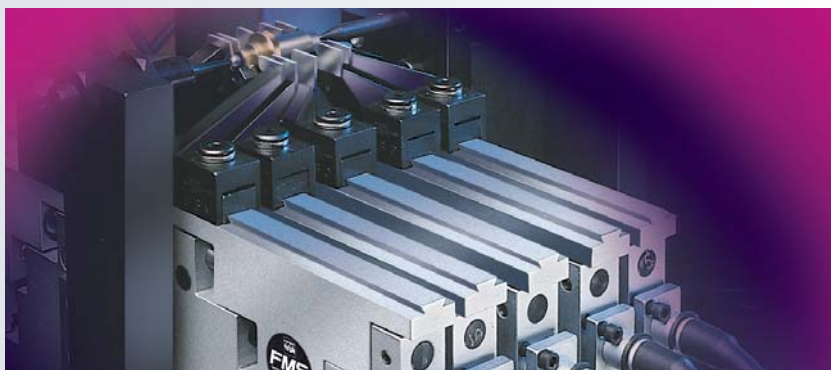
Off-centre probe inserts with a tungsten carbide ball tip



mm

L mm

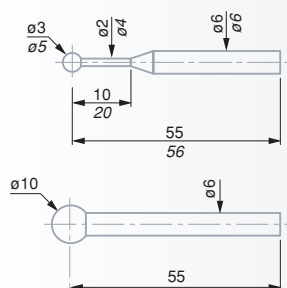
02660084	5	20
02660085	5	33
02660086	5	48



Probe inserts with a 6 mm diameter mounting shaft

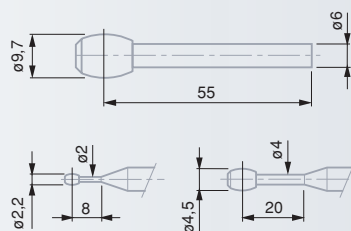


Shipping packaging



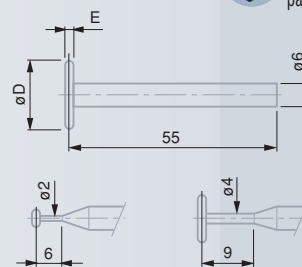
Probe inserts with a carbide ball tip

No	mm
00760058	3
00760059	5
00760060	10



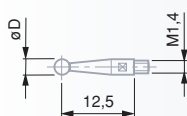
Probe inserts with a barrel-shaped measuring face for cylindrical bores. Also serve for determining the position of internal threads.

No	mm	For threads
00760066	2,2	M3 ÷ M16
00760067	4,5	M6 ÷ M48
00760068	9,7	M12 ÷ M150



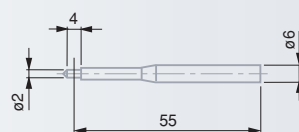
Probe inserts with a tungsten carbide disc for grooves, nuts, centering shoulders etc.

No	mm	E mm
00760074	4,5	1
00760075	14	2
00760076	19	3



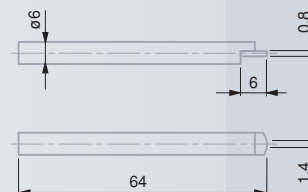
TESATAST probe inserts with a tungsten carbide ball tip. M1,4 mounting thread.

No	D mm	L mm
01860201	1	12,53
01860202	2	12,53
01860203	3	12,53
01860307	Wrench	



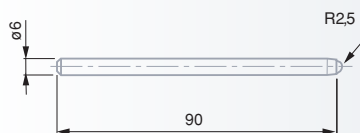
Probe insert with small cylindrical measuring face

No	mm
00760082	Carbide 2



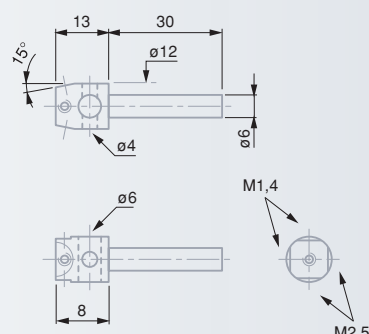
Centred probe insert with a small flat, right angle measuring face

No	mm
S26074380	Carbide 64



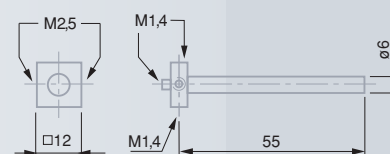
Probe inserts with one flat and one spherical measuring faces

No	mm
025589	Carbide 64



Universal probe insert holder specially designed for various types of clamps

No	mm
S26074372	1 x Ø 4 mm 1 x Ø 6 mm 2 M1,4 threads 2 M2,5 threads



Universal probe insert holder with 2 mounting threads

No	mm
00760096	M1,4; M2,5



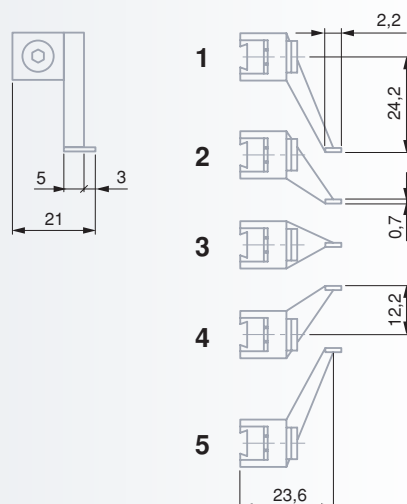
Probe inserts with offset measuring face

Probe inserts with a flat, right-angle measuring face in tungsten carbide, whether centred or offset



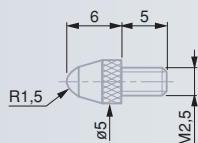
As shown opposite

02630047	1
02630048	2
02630049	3
02630050	4
02630051	5



Measuring Inserts for Axial Probes, Dial Gauges and the Like

Models with a M2,5 mounting thread

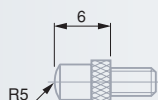


Standard probe inserts with a ball tip



L mm

03510001	Steel	6
03510002	Carbide	6

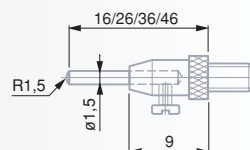


Probe inserts with a spherical measuring face



R mm

03510101	Steel	5
03510102	Carbide	5

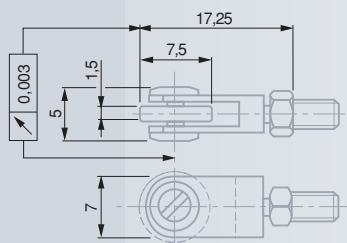


Probe insert with 4 interchangeable steel pins. Spherical face, R = 1,5 mm



L mm

03510201	Steel	16, 26, 36, 46
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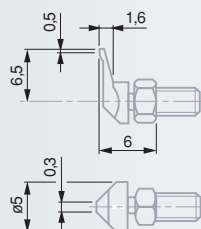


Probe inserts with a ball-bearing steel roller.
Counternut for radial alignment.



Shape

03560010	Steel	cylindrical
03560011	Steel	domed

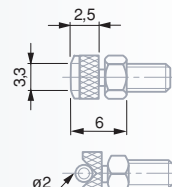


Off-centre probe insert (A) with pointed measuring face.
Counternut for radial alignment.



A mm

03510401	Steel	6,5
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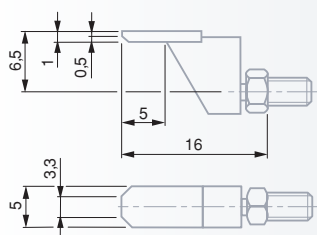
Probe insert with cylindrical measuring face. Counternut for radial alignment.



Carbide

03510502	Carbide
----------	---------

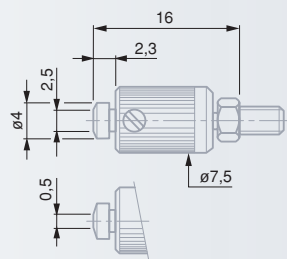




Offset probe insert with a narrow measuring face. Counternut for radial alignment.



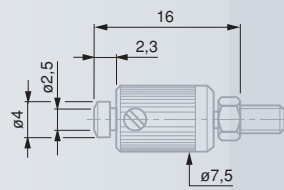
03510602 Carbide 0,5



Probe insert with a narrow measuring face, parallel adjustable. Counternut for radial alignment.



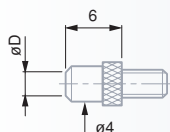
03510702 Carbide 0,5



Probe insert with a flat measuring face, parallel adjustable. Counternut for radial alignment.



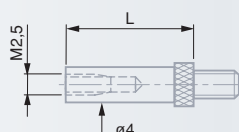
03510902 Carbide 2,5



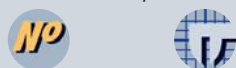
Probe inserts with a flat measuring face



		D mm
03510801	Steel	2,5
03510802	Carbide	2,5
03560022	Steel	3,4
03560023	Carbide	3,4



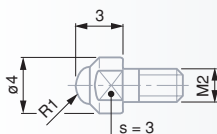
Extensions for probe inserts



	L mm
03540501	10
03540502	15
03540503	20
03540504	40

Additional probe inserts as well as extensions with M2,5 coupling thread as listed on the pages F-42 to F-44.

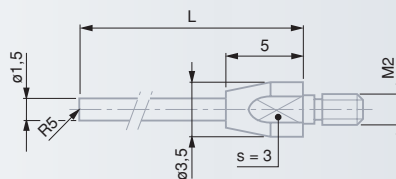
Probe Inserts with a M2 Coupling Thread for GT 43 and GT 44 Miniature Probes as well as Probes with Short Body, Series 160



Probe inserts with spherical measuring face. Also with a M2 thread.



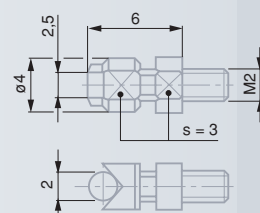
		mm
03510204	Carbide	R 1
03510103	Carbide	R 5



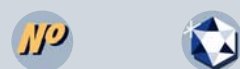
Probe inserts with a spherical measuring face (R5). Also with a M2 thread.



		mm
03510202	Carbide	16
03510203	Carbide	26

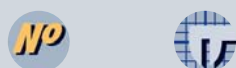


Probe insert with cylindrical measuring face. Counternut for radial alignment. M2 thread.

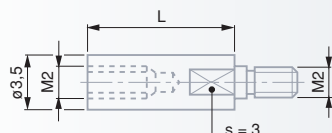


03510503 Carbide

Extensions for inserts with a M2 thread



	L mm
03540505	10
03540506	15





All values given in the table for the measuring force equal nominal values at electrical zero; max. deviation $\pm 25\%$. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring.

Plastic sleeve marked with force related data

Shipping packaging



Accessories for TESA Probes

Spring Sets for Axial Probes

Nº



N

Probes GT 22 and GTL 22

03260419 0,16

03260420 0,25

03260421 0,40

Probes GT 21, GT 22, GTL 21, GTL 211, GTL 22 plus probe series 490

03260457 0,63

03260422 1,0

03260423 1,6

03260424 2,5

03260425 4,0

Nº



N

Probes GT 27, GT 271 and GT 28

03260458 0,63

03260459 1,0

03260460 1,6

03260461 2,5

Probes GT 61, GT 611 and GT 62

03260483 0,8

03260463 1,0

03260464 1,6

03260465 2,5

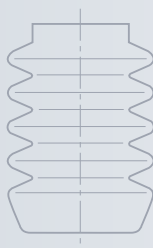


Nitrile: resistant synthetic sealing for normal use.

Viton: high-resistance synthetic sealing used where probes are permanently exposed to cooling and lubricating agents.

Safety rings plus washer.

Shipping packaging



Spare Bellows for Axial Probes

Complete set with safety ring and washer

Nº



Probes GT 21, GT 22, GTL 21, GTL 211, GTL 22 plus probe series 490

03260468 nitrile

03260470 Viton

Probes GTL 212 and GTL 222

03260489 Viton

Nº



Probes GT 27, GT 271, GT 28, GT 61, GT 611 plus probe series GT 62

03260491 Viton

Probes GT 272, GT 282, GT 612, GT 622

03260490 Viton

Bellows supplied individually

Probes GT 43 and GT 44

037608 Viton

Extension cable

Nº



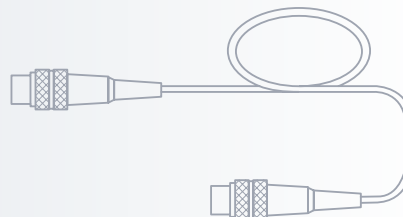
m

03240201 1

03240202 2

03240203 3

Other cable lengths available on request



For high accuracy requirements, we recommend to adjust each part of your measuring equipment all together

Shipping packaging



Clamping Elements for Axial Probes

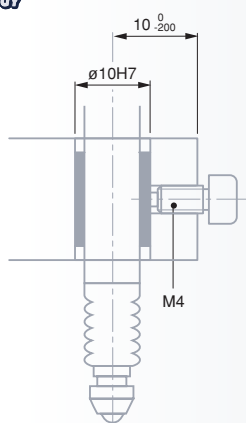
Provided with 3 clamping faces – Prevent the metrology properties of the guiding system from being altered due to possible distortion.



All dimensions shown in the drawing must be respected



Shipping packaging

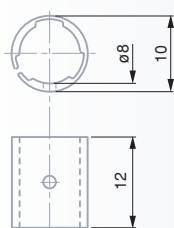
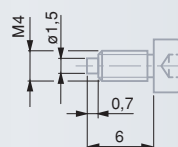


VKD clamp screw



02611013

M4



VKE clamp



02611014

mm
8

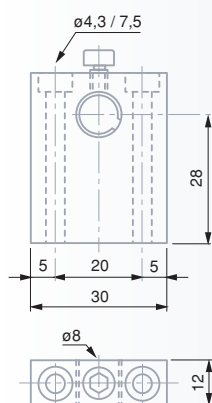
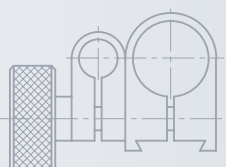
Clamp collar



Fastening points
mm

01860401

5,6 or 9,5 in diameter with dovetail



VDE clamps with fastening sleeve and screw included



02660048

mm
8

Manually Operated Devices for Retracting the Measuring Bolt



Shipping packaging



03540104 Mechanical retraction device

Consisting of:

03540101 1 Lift lever

03540102 1 Washer



03260401 Pneumatic retraction device

Suited for probes GT 22, 271, 28, 42, 44, 611, 62 – GTL 211, 22

Consisting of:

1 Hand-operated vacuum pump

03540405 1 Air tube, 4,7 mm in diameter, 1 m long





Suited for
20 probes GT 22,
42 and 44 series
or max. 10 probes
GT 28 and 62.

230 V, 50 Hz



Shipping
packaging



230 ± 10% V,
switchable to
115 ± 10% V

Needed
pressure:
1 to 7 bars

190 x 170 x
310 mm

3,5 kg



Shipping
packaging

Electropneumatic Systems for Activating the Measuring Bolt

Electropneumatic vacuum pump

For lifting up to 20 measuring bolts simultaneously with a measuring force up to 0,63 N



03260432 Operated via the mains powered foot switch

03260433 Externally controlled

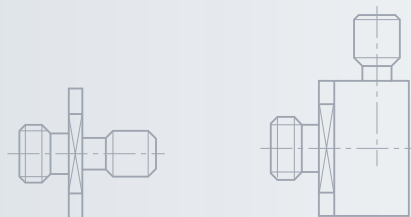


FMS-C electropneumatic vacuum pump

Uses vacuum or air pressure; allows simultaneous connection of up to 30 TESA probes. Ideal for use with FMS probes with parallel guiding.



03260486 Controlled electrically through a TESA's electronic unit or manually



Air tube connectors for TESA probes GT 22, 271, 28, 42, 44, 611, 62 - GTL 211, 22

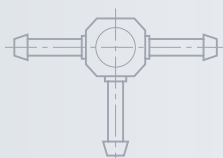
M4 coupling threads; suited for a 4,7 / 2 mm dia. air pipe (No. 03540405)



Connector type

03560000 straight

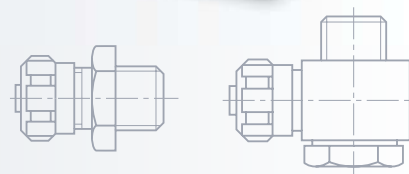
03560002 angled



Connecting T-piece



03540403 For air pipe diameter Ø 4,7 / Ø 2 mm (N° 03540405)



Air tube connectors for TESA FMS probes

M5 coupling threads; suited for a 4,7 / 2 mm dia. air pipe (No. 03540405)



Connector type

026522 straight

024388 angled



Vacuum release delay valve

For controlling the lowering speed of axial probes



03540404 For air pipe diameter Ø 4,7 / Ø 2 mm (N° 03540405)



TESATRONIC Length Measuring Instruments – General Overview

Dedicated compact units having either an analogue or a numerical display – Usually applied in association with precision handtools or on stationary devices for shop floor inspection and maintenance, but also in the measuring room.



 TESATRONIC	TT 10	TT 20	TT 60	TT 80	TT 90	TTA 20
 Model	04430008	04430009	04430010	04430011	04430012	04430003
 Number of probe inputs – Automatic recognition	1 —	2 ●	2 ●	2 ●	2 ●	2 —
 Number of measuring ranges – Lowest value – Highest value – Zoom function (5x) – Automatic conversion	3 ± 5 µm ± 500 µm ● ●	7 ± 5 µm ± 5000 µm — ●	7 ± 5 µm ± 5000 µm — ●	9 ± 0,5 µm ± 5000 µm — ●	9 / 6 ± 0,5 µm ± 5000 / ± 100 µm — ●	6 ± 3 µm ± 1000 µm — —
 Digital display	—	●	●	●	●	—
 Numerical interval – lowest value 0,1 µm – highest value 10 µm	—	0,1 µm 0,1 µm	0,1 µm 0,1 µm	0,01 µm 0,01 µm	0,01 / 0,001 µm 0,01 / 0,001 µm	— —
 Analogue display	—	●	●	●	●	●
 Scale value – lowest value 0,1 µm – highest value 10 µm	—	0,2 µm 200 µm	0,2 µm 200 µm	0,02 µm 200 µm	0,02 µm 200 / 10 µm	0,1 µm 50 µm
 Metric/Inch unit systems	●	●	●	●	●	●
 Value classification – Number of classes – Signal outputs	—	● 3 ●	● > 42 ●	● > 42 ●	● / – > 42 / – ● / –	● 3 ●
 Memory	—	—	●	●	●	—
 Digital output	RS232	RS232	RS232	RS232	RS232	—
 Analogue output	—	—	●	●	●	●
 Power supply	Batteries	Adapter	Adapter	Adapter	Adapter	Mains

TESATRONIC TT 10

Pocket-sized, battery-operated electronic unit for use on the move – Perfect for your measurement tasks on the surface plate, in the inspection room right next to the production floor or directly on the machine – Provides full portability where there's no room for cumbersome power cable.

- Simple-to-use function keys used in conjunction with the combined analogue/digital indication providing easy reading.
- LCD, pointerless display for high repeatability and negligible hysteresis.
- 3 measuring ranges, switchable manually or automatically depending on the size of the measured value.
- Metric and inch conversion.
- Additional signal amplification (5x) for easy display setting.
- Quick zero-setting through to digital technology.
- Signal input for one probe.
- Opto-coupled RS 232 compatible digital output.



DIN 32876
Part 1

66 x 57 mm
LC display

9 x 4,5 mm

Response time of
display ≤ 100 ms.
Hold time ≥ 100 ms

Zero drift*
≤ ± 0,005% / °C.
Frequency limit
of display based on the
signal input: 10 Hz

Max. indication
error*: 2%

± 1 numerical
interval

Opto-coupled
RS 232
compatible output

3,5 V to 4,5 V,
3 batteries, type
LRC 6, 1,5 V, AA.

Power consumption:
≈ 7 mW/3,5 V

Self-controlled voltage
fluctuation.

Drive voltage
of the probe: 0,7 V

Drive frequency:
13 ± 0,65 kHz

0 °C to 60 °C

-10 °C to 70 °C

80%, with no
condensation

IP42
(IEC 60529)

EN 50081-1,
EN 50081-2,
EN 50082-1,
EN 50082-2

95 x 170 x 68 mm
(W x D x H)

490 g
(incl. batteries)

Shipping
packaging

Identification
number

Declaration
of conformity

* With reference to 20 °C as
well as a relative humidity
of ≤ 50%..



04430008



TESATRONIC TT 10

Electronic measuring unit with both analogue
and numerical display; 3 measuring ranges,
switchable from metric to inch;
1 probe input; RS 232 data output.

Provided with following accessories:

04768002 3 batteries, 1,5 V, type LRC 6, AA

04460007 1 Visual template for value classification



Measuring ranges with numerical intervals

						
	Zoom function	Used for	µm	µm	in	in
1	without 5x	measuring setting	± 500 ± 100	10 2	± 0.025 ± 0.005	0.0005 0.0001
2	without 5x	measuring setting	± 50 ± 10	1 0,2	± 0.0025 ± 0.0005	0.00005 0.00001
3	without	measuring	± 5	0,1	± 0.00025	0.000005



TESATRONIC TT 20, TT 60, TT 80 and TT 90

Feature most advanced technology – Provide functional reliability – Simple to use – Essential for shop floor inspection or in the measurement laboratory.

TESATRONIC TT 20

Includes a combined analogue/numerical display – Two probe inputs for single, sum or difference measurements.

- Large LC display for error-free reading.
- Better repeatability and negligible hysteresis as the analogue display has no mechanical pointer.
- Choice between pointer or bargraph.
- All measuring functions are readable on the LC display.
- 7 measuring ranges, selectable manually or automatically according to the size of the measured value.
- Direct conversion from metric to inch units.
- Zeroing with just one touch button for each measuring channel.
- Setting of tolerances over the keyboard.
- 3 quality classes displayed through LEDs with control signal outputs.
- Lockable display for step by step measurement routines.
- Automatic recognition of the connected TESA's probe with direct adaptation of the measurement signals to the right output (only for TESA probes made in 1997 or later).
- Opto-coupled RS 232 output, bidirectional.
- Power supply through mains adapter.



TESATRONIC TT 60

Same features as TESATRONIC TT 20, but with added functions that include:

- Memory for retaining extreme values «max.», «min.», «max.-min.» along with mean value obtained from «max.» minus «min.».
- Dynamic measurement with acquisition of more than 100 single values/s.
- Value classification with output signals through contact relay for 5, 10, 20 or 40 good classes.
- Remote signal processing using the analogue output.

TESATRONIC TT 20, TT 60, TT 80, TT 90



DIN 32876
Part 1



126 x 62 mm
LC display



110 mm
scale length



50 scale
divisions



2,2 mm



6-decade display
plus minus sign



12,5 x 6,6 mm



Zero drift plus
drift of the signal
amplification*:
 $\leq \pm 0,005\%/^{\circ}\text{C}$.

No drift for registered values.



± 1 numerical
interval



RS232
opto-coupled
output



6,5 Vdc up
to 7,3 Vdc.
Consumption: 2 W

Self-controlled voltage
fluctuation.

Drive voltage of the probe:
3 V



0°C to 60°C



-10°C to 70°C



80%,
non-condensing



Resistant
plastic



Front face
protected to
IP54
(IEC 60529,
DIN 40 050)



IEC/EN 61326-1
USA: CFR47,
Part 15, Subpart B,
Class B,
Digital Device



255 x 235 x
120 mm
(W x D x H)



1,1 kg

* With reference to 20°C
as well as a relative
humidity of $\leq 50\%$.

-  Shipping packaging
-  Identification number
-  Declaration of conformity

Additional data on TESATRONIC TT 20

 Response time* of analogue display with pointer and digital display: ≤ 80 ms.

Holding time of digital display: 80 ms

 Frequency limit for all displays with reference to the signal input: 12,5 Hz

 Limit value* for analogue display: $\leq 2\%$.

Digital display and output: $\leq 0,3\%$

 Dive frequency $13 \pm 0,65$ kHz

Additional data on TESATRONIC TT 60

 Response time* of analogue display with pointer and digital display: ≤ 80 ms.

Holding time of digital display: 80 ms.

Response time of analogue signal output with reference to the analogue display: ≤ 30 ms.

Response time of the LEDs used for value classification: ≤ 80 ms

 Frequency limit for all displays with reference to the signal input: 12,5 Hz

Frequency limit with reference to the signal input: 20 Hz for the analogue output or 100 Hz for the memory

 Limit value* for analogue display: $\leq 2\%$.

Digital display, analogue and digital outputs: $\leq 0,3\%$

 Voltage range: ± 2 V up to ± 10 V

* With reference to 20°C as well as a relative humidity of $\leq 50\%$.

**04430009****TESATRONIC TT 20**

Electronic length measuring unit with both analogue and digital display; 7 measuring ranges, switchable from metric to inch; value classification with 1 good class; signal output through contact relay; 2 probe inputs; RS 232 data output.

04430010**TESATRONIC TT 60**

Same features as model TT 20, but with added memory; dynamic measuring and signal output through contact relay for 5, 10, 20 or 40 good classes; analogue output.

Delivery includes the following items:

04761054 1 Mains adapter, 100 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA

04761055 1 Adapter cable EU

Optional accessory

Adapter for 5, 10, 20 or 40 classes available on request



Measuring ranges along with scale divisions or numerical intervals (TESATRONIC TT 20 and TT 60)

					
μm	μm	μm	in	in	in
± 5000	0,1	200	± 0.200	0.000005	0.01
± 2000	0,1	100	± 0.100	0.000005	0.005
± 500	0,1	20	± 0.02	0.000005	0.001
± 200	0,1	10	± 0.01	0.000005	0.0005
± 50	0,1	2	± 0.002	0.000005	0.0001
± 20	0,1	1	± 0.001	0.000005	0.00005
± 5	0,1	0,2	± 0.0002	0.000005	0.00001



TESATRONIC TT 80 / TT 90

High resolution electronic units – Combined analogue/digital display – Two probe inputs for single, sum and difference measurements.

Both models have the same features as TESATRONIC TT 20 besides additional ones, i.e.:

- 9 measuring ranges with numerical interval to 0,01 μm or 0.000001 in.
- Memory for storing each extreme value «max.», «min.», «max. minus min.» plus the mean of both values «max.» and «min.».
- Dynamic measurement with acquisition of more than 10 single values per second.
- Value classification with output signals through contact relay for 5, 10, 20 or 40 good classes.
- Remote signal processing through the analogue output.

The specifications of the switchable TESATRONIC TT 90 are identical to those of the TT 80 model or the UPC mode, except for the following added features:

- 6 measuring ranges with numerical interval to 0,001 μm or 0.5 μin .
- Output for the control of the bolt retraction.
- Selectable waiting period for temperature stabilisation between the measurement cycles.
- RS data output for all values to the micron.



No

=

04430011

TESATRONIC TT 80

High-resolution electronic length measuring unit featuring a combined analogue/digital display. RS 232 interface with analogue output.

04430012

TESATRONIC TT 90

Same as the TT 80 model, except for the specific UPC mode providing improved resolution and additional external controls.

Furnished with:

04761054 1 Mains adapter, 100 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA

04761055 1 Mains adapter EU

Optional accessories

Adapter for 5, 10, 20 or 40 good classes available on request.
Accessories for UPC applications, see page L-11.

Output current: $\leq 2 \text{ mA}$

Permissible adjustment load:
 $\geq 5 \text{ k}\Omega$

Residual ripple (with probe at zero point): $\leq 1 \text{ mV}$

Reference voltage level:
analogue earth 0 V



Drive frequency:
13 $\pm 0,65 \text{ kHz}$

Additional data on the two TESATRONIC TT 80/TT 90



Response time of the analogue/digital display as well as the classification LEDs: $\leq 100 \text{ ms}$

Holding time of digital display: 100 ms

Response time of the signal of analogue output with reference to analogue display: $\leq 30 \text{ ms}$



Frequency limit for all types of display as well as the memory with reference to the signal input: 10 Hz



Limit values*:
2% for analogue display

0,15% for digital display

0,3% for analogue output

0,15% for digital output



Voltage range:
 $\pm 2 \text{ V}$ to $\pm 10 \text{ V}$

Output current: $\leq 2 \text{ mA}$

Permissible adjustment load:
 $\geq 5 \text{ k}\Omega$

Residual ripple (with probe at zero point): $\leq 1 \text{ mV}$

Reference voltage level:
analogue earth 0 V



Drive frequency:
13 $\text{kHz} \pm 0,5\%$

* With reference to 20°C as well as a relative humidity of $\leq 50\%$.

Measuring ranges with scale divisions or numerical intervals

TT 80 / TT 90



$\mu\text{m} / \text{in}$

$\pm 5000 / \pm 0.200$

$\pm 2000 / \pm 0.100$

$\pm 500 / \pm 0.020$

$\pm 200 / \pm 0.010$

$\pm 50 / \pm 0.002$

$\pm 20 / \pm 0.001$

$\pm 5 / \pm 0.0002$

$\pm 2 / \pm 0.0001$

$\pm 0,5 / \pm 0.00002$



$\mu\text{m} / \mu\text{in}$

0,01 / 1

0,01 / 1

0,01 / 1

0,01 / 1

0,01 / 1

0,01 / 1

0,01 / 1

0,01 / 1

0,01 / 1



$\mu\text{m} / \mu\text{in}$

200 / 0.010

100 / 0.005

20 / 0.001

10 / 0.0005

2 / 0.0001

1 / 0.00005

0,2 / 0.00001

0,1 / 0.000005

0,02 / 0.000001

TT 90 switched to the UPC mode



$\mu\text{m} / \text{in}$

$\pm 100 / \pm 0.005$

$\pm 50 / \pm 0.002$

$\pm 20 / \pm 0.001$

$\pm 5 / \pm 0.0002$

$\pm 2 / \pm 0.0001$

$\pm 0,5 / \pm 0.00002$



$\mu\text{m} / \mu\text{in}$

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5

0,001 / 0.5



$\mu\text{m} / \text{in}$

10 / 0.0005

2 / 0.0001

1 / 0.00005

0,2 / 0.00001

0,1 / 0.000005

0,02 / 0.000001

TESATRONIC TTA 20

Compact design with analogue indication and value classification facility – Aluminium housing for harsh shop floor environment – Easy Handling.

- Easy-to-read analogue display with mirror strip in order to avoid parallax error.
- 6 measuring ranges.
- Metric/Inch conversion.
- Easy display setting through electrical zero.
- 2 probe inputs for single, sum or difference measurements.
- 1 auxiliary signal input, e.g. for all correction values.
- LEDs for signalling the relevant quality class with green for «Good», yellow for «Rework» and red for «Scrap».
- Potentiometer for setting limit deviations.
- Polarity selector switch for the classification signals (internal or external dimensions).
- Switch for locking or unlocking a displayed value.
- Analogue output for the connection of a remote displaying or scribing unit.



04430003



TESATRONIC TTA 20

Electronic length measuring unit with analogue display; 6 measuring ranges; switchable from metric to inch; value classification with 1 good class; signal output through contact relay; 2 probe inputs.

Supplied with either of the following cables depending on the country where goods are to be delivered (must be specified on ordering):

03160015 Mains cable fitted with SEV connector, 3-wire cable type, 2 m long

03160016 Mains cable fitted with VDE connector, 3-wire cable type, 2 m long

03160017 Mains cable without connector, 3-wire cable type, 2 m long

Optional accessory

04460004 15-pin connector for the analogue output and classification signal

Measuring ranges and scale divisions

			
μm	μm	in	in
± 1000	50	± 0.1	0.005
± 300	10	± 0.03	0.001
± 100	5	± 0.01	0.0005
± 30	1	± 0.003	0.0001
± 10	0,5	± 0.001	0.00005
± 3	0,1	± 0.0003	0.00001



DIN 32876
Part 1

≈ 100 mm
scale length

Response
time:
 ≤ 1 s (display),
20 ms (analogue output),
10 ms (output signal of
classification)

Zero drift*
 $\leq \pm 0,005\%/^{\circ}\text{C}$
Frequency limit*:
1 Hz (display)
50 Hz (analogue output)
30 Hz (value classification)

Limit value*:
1,5% (display),
0,3% (analogue
output).

Negligible for
display or 5%
for classification
signals).

Voltage: ± 1 V,
output current
 ≤ 3 mA, perm.
adjustment load ≥ 2 k Ω .

Residual ripple (at zero):
 ≤ 1 mV.

Reference voltage level:
analogue earth (0 V)

230 or 115 V
 -10% to 20% ,
50 to 60 Hz

Power consumption:
 ≤ 20 VA

Drive voltage of
probe:
1,5 Veff -10% to 5%

Drive frequency:
 $13 \pm 0,65$ kHz

0°C to 50°C

-10°C to 70°C

IP40
(IEC 60529)

EN 50081-1,
EN 50081-2,
EN 50082-1,
EN 50082-2

258 x 190 x
158 mm
(W x D x H)

3,4 kg

Shipping
packaging

Identification
number

Declaration
of conformity

* With reference to 20°C
as well as a relative
humidity of $\leq 50\%$.

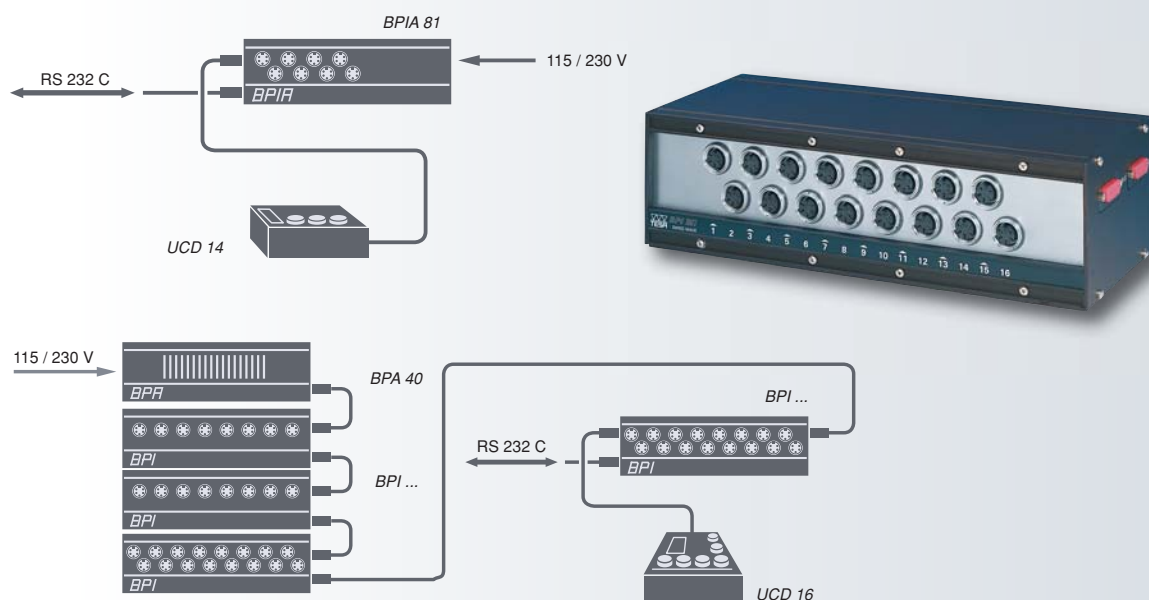
TESA Probe Interface Boxes

Modular system that consists of three basic models acting as probe interfaces for the preparation and further transmission of the measurement signals to a computer, whether in their digital or analogue form – All models are key components for multigauging fixtures applied in centralised process control.

BPI Series

Signal inputs – TESA standard probes (half-bridge)
Signal outputs – RS 232 digital outputs

- Direct connection to the computer's serial port.
- Programmable operating functions over the integrated microprocessor.
- Possible connection of up to 64 probes for optimum adaptation to your metrology applications.
- High functional reliability and precision.
- Total immunity to negative environmental effects, e.g. electrical interferences, liquid and solid contaminants.



RS232

2 mm, 0,2 mm

1 µm, 0,1 µm

± 0,3% with reference to each measuring span

7 ms per probe or 0,2 ms per probe for BPI 88

Housing cases in anodized aluminium except for stackable BPIA 81

0°C to 40°C

-10°C to 70°C

95%, non-condensing

IP51 (IEC 60529)

EN 50081-1
EN 50082-2

Shipping packaging

Identification number

Declaration of conformity



Number of probe inputs

Number of control inputs/outputs



Integrated power supply

05030004

BPIA 81

Probe interface box

8

6/8

●

05030002

BPI 161

Probe interface box

16

6/8

—

05030003

BPI 88

Probe interface box with quick signal processing in both static and dynamic measuring

8*

6/8

—

05031000

BPA 40

Power unit for 1 up to 4 interfaces BPI 161 and BPI 88

* Each measurement signal includes a demodulator.

					
	Number of inputs/outputs		Power supply	mm	kg
BPIA 81	6 / 8		220 ÷ 240 Vac, 100 ÷ 120 Vac, 50 ÷ 60 Hz, 25 VA	94 x 322 x 134	2,5
BPI 161	6 / 8		Via BPA 40	94 x 322 x 134	2,1
BPI 88	6 / 8		Via BPA 40	94 x 322 x 134	2,1
BPA 40			115 ÷ 230 Vac ± 20%, 50 ÷ 60 Hz, 140 VA	94 x 322 x 134	2,4

Accessories for BPI series

				
			mm	Number of pins
04866009	BSF 10	Stacking set for BPI 88 and BPI 161 interface boxes		
05061001	BSF 20	Stacking set for both BPA 40 and BPIA 81 power units		
Connecting cables				
05060007	BPI – BPI		0,3	
05060008			2	
05060003	BPI – PC		2	25 / 9
05060002			5	25 / 9



USB Interface

Allows for a quick and easy connection to any TESA's standard probe to a USB port.

Signal inputs – TESA standard probes (Half-bridge)
Signal outputs – digital



No						
03260500	USB-Adapter	± 2 mm	73,75	0,3% ± 0,1 µm*	Zero drift	± 0,01%/°C*
03260501	USB-Adapter	± 5 mm	29,5	0,3% ± 0,1 µm*		± 0,01%/°C*

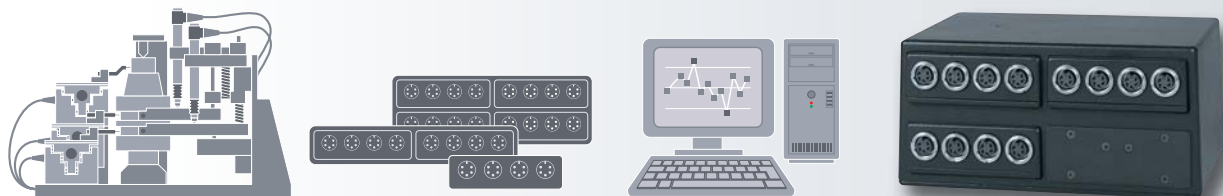
* With reference to the temperature of 20°C and relative humidity of ≤ 50%.

Note: Total deviation must include that of both the standard probe and adapter.

M4P-2 series

Signal inputs – TESA standard probes (Half-bridge)
Signal outputs – analogue

- System for connecting 32 TESA standard probes
- Can be linked to a PC through the A/D transducer



No					
			mm	kg	
S48001721	M4P-2	Probe interface			
		• 4 probe inputs with a demodulator included • Sensitivity: 73,75 mV/V/mm • Analogue outputs: ± 1 V/mm, ± 2,5 V/mm, ± 5 V/mm and ± 10 V/mm	36 x 100 x 120	0,6	
S48001722	R2M-1	Rack housing including 2 M4P-2 probe interfaces	55 x 212 x 144	0,9	
		• 2 x 4 = 8 probe inputs			
S48001723	R4M-1	Rack housing including 4 M4P-2 probe interfaces	160 x 212 x 144	1,2	
		• 4 x 4 = 16 probe inputs			
S48001724	MA4-2	Power unit	85 x 222 x 146	1,1	
		• 230 ± 10% Vac, 50 Hz • Output voltage: ± 15 V for 32 probes			
S48001731	MA4-2	Power unit	85 x 222 x 146	1,1	
		• 110 ± 10% Vac, 60 Hz • Output voltage: ± 15 V for 32 probes			
Accessories					
S48001725	CB37-1	Connection cable to host computer, 2 m long. Provided with two connectors, 37-pin male/female			



DIN 32876
Part 1



See table



Any position
of use



Distance between
both stops and
electrical zero can
not be set.

Cable length: 1,2 m.



0,1 µm



USB 2.0
RS232, virtual



2 Veff
13 kHz ± 0,5%



20 ± 0,5°C



-10°C to 40°C



80%



IP51
(IEC 60529)



Shipping
packaging



Identification
number



±0,5% with
reference to the
measuring span
≤ ±100 ppm/°C,
stability at zero =
≤ ±0,2 µm/°C



±10 to ±15 Vdc,
60 mA



15°C to 40°C



-10°C to 70°C



30 to 80%
(non-condensing)



IP50
(IEC 60529)

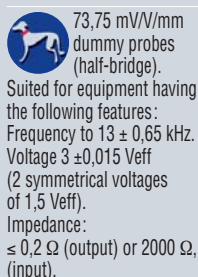


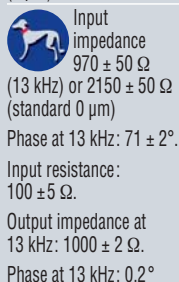
Shipping
packaging

TESATRONIC TT90
 Electronic unit


 Technical data
 and details:
 see page O-46

Calibration probes

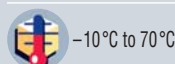

 73,75 mV/mm
 dummy probes
 (half-bridge).
 Suited for equipment having
 the following features:
 Frequency to $13 \pm 0,65$ kHz.
 Voltage $3 \pm 0,015$ Veff
 (2 symmetrical voltages
 of 1,5 Veff).
 Impedance:
 $\leq 0,2 \Omega$ (output) or 2000Ω ,
 (input).

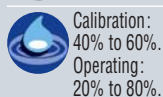

 Input
 impedance
 $970 \pm 50 \Omega$
 (13 kHz) or $2150 \pm 50 \Omega$
 (standard 0 μ m)
 Phase at 13 kHz: $71 \pm 2^\circ$.
 Input resistance:
 $100 \pm 5 \Omega$.
 Output impedance at
 13 kHz: $1000 \pm 2 \Omega$.
 Phase at 13 kHz: $0,2^\circ$

 ± 3 ppm/ $^\circ$ C.
 Ageing:
 ± 30 ppm/a


 $20 \pm 0,5^\circ$ C,
 stabilisation
 time = 8 h


 10° C to 35° C


 -10° C to 70° C


 Calibration:
 40% to 60%.
 Operating:
 20% to 80%.

 Storage: 5% to 95%.
 Non-condensing.


 18 mm dia.,
 118 mm long


 ≈ 45 g


 IP40
 (IEC 60529)


 Inspection report

Calibration devices

Designed for calibrating and setting TESA length measuring equipment fitted with standard TESA inductive probes (half-bridge).

Calibration of TESA inductive probes

The regular system consists of the following components:

- 1 TESATRONIC TT90 length measuring instrument (N° 04430012).
- 1 Set of calibration probes No. S41077249 with nominal values of $\pm 0 \mu$ m, $\pm 100 \mu$ m and $\pm 1000 \mu$ m.
- 1 Measuring support such as INTERAPID UP 160 (No. 01639041) equipped with the UPZ 40 measuring table (No. 01640405).
- 1 Set of gauge blocks, accurate to calibration grade K (see section K).
- 1 Precision digital voltmeter, min. 5 1/2 digits.


04430012


TESATRONIC TT90 length measuring instrument (see page O-46)

Calibration of measuring instruments

Calibration probes available as single or in sets


 μ m

Marked with

S41078077	± 0	03270700
S41078079	± 3	03270704
S41078228	± 100	03270701
S41078230	± 190	03270717
S41078087	± 300	03270707
S41078332	± 500	03270716
S41078751	± 1000	03270702
S41078752	± 1900	03270719


 μ m

 μ m

 μ m

Set of 3 calibrating standards

S41077249	± 0	± 100	± 1000
------------------	---------	-----------	------------

Set for calibrating TESATRONIC

S41078654	± 190	± 1900
------------------	-----------	------------

Calibration Probes

Also called «Dummy Probes», these probes serve as resistance dividers producing a given length dimension, electrically simulated with high accuracy.

The whole system provides both positive and negative values. All those given in the table are matching nominal values.

These products, which have been adequately calibrated, come with an inspection report that shows the values (actual values) as measured during calibration with related uncertainty of measurement.

Their connection to the instrument replaces that of a regular probe.

Calibration and setting operations, if needed, are subject to a number of criteria that must be respected.

For a further information with regard to this, refer to the instruction manual or ask for our specialists.

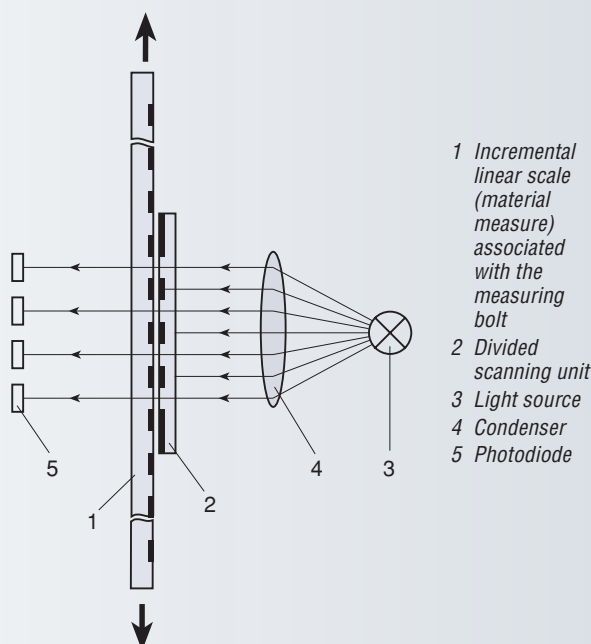


The way they work

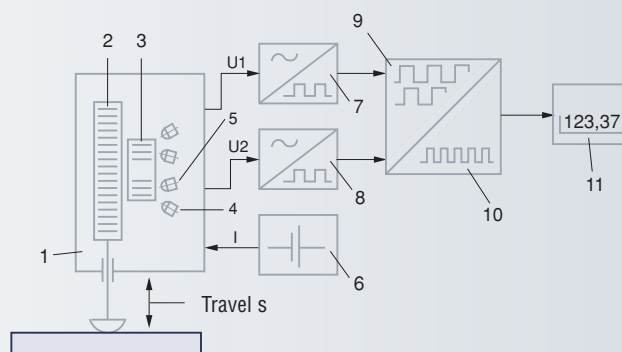
All electronic length measuring systems shown in this part of our catalogue work on the basis of value sensors in the form of digital probes with axial displacement. These probes generate the digital capture of measured physical quantities (i.e. measurands), which are changing as the incremental linear scale lying in front of the scanning unit and fitted with a reticle is moved. Divisions on both features are identical. The opto-electronic detection of these changes uses transmitted light.

Optical material measures are made up of quality glass gratings with a number of divisions distributed over the entire length. These divisions consist alternately of lines and blanks, which represent each individual increment. The distance from line to line or blank to blank is the dividing period, e.g. 20 μm or 40 μm .

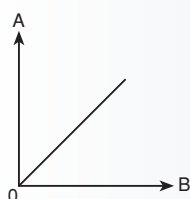
As the gratings of both the scale and reticle are moved in relation to one another, the opaque divisions on the scanning reticle are covered alternately by the lines and blanks on the linear scale, which serves as material measure. This provides a bright/dark information, which is then converted into electrical signals. After their analogue/digital conversion, these signals are shown on the computing counter as the sum of counting impulses equal to the amount of changes of the measured quantity. So as to increase the resolution that results from the dividing periods, the probe signals are split by the electronics (interpolation).



- 1 Incremental linear scale (material measure) associated with the measuring bolt
- 2 Divided scanning unit
- 3 Light source
- 4 Condenser
- 5 Photodiode



- 1 Probe housing
- 2 Linear scale divided into increments
- 3 Divided reticle
- 4 Light source
- 5 Photodiodes
- 6 Power supply
- 7 Conversion of U1 signal
- 8 Conversion of U2 signal
- 9 Signal scanning
- 10 Multiple evaluation of the signal (interpolation) plus direction discriminator
- 11 Numerical display



Typical linearity where digital capture of the measurands is based on incremental linear scales.

A Counting impulses
B Travel



TG Computing Counter

DIN 32876
Part 2Up/down
counter with one
probe inputLC display
with illuminated
colour back-
ground for value classi-
fication with green, amber
and red.37 x 37 mm display size.
6 decades plus minus sign0,001 mm and
0,0005 mm or
0,00001 in.For probes from another
maker with dividing periods
of $10\text{ }\mu\text{m} = 0,0002$ instead
of $0,0005\text{ mm}$ or of $2\text{ }\mu\text{m} =$
 $0,0001$ instead of $0,0005\text{ mm}$ 

9 x 4,5 mm

According
to chosen
tolerance range40 mm
scale length

25

20 keys available
for entering
values and
selecting functions.
Power supply 5 Vdc
(measuring system).Output:
 $\pm 5 \pm 1\%$ Vdc
depending on
selected tolerance range.Max. excess voltage:
25% in relation to $\pm 5\text{ Vdc}$ Output impedance:
< 100 Ω

Resolution: 12 bits

RS232,
bidirectionalPower supply:
7 Vdc. Power
consumption:
0,3 A

10 °C to 40 °C



-10 °C to 50 °C



80%

IP40
(IEC 60529)

Continued on next page

TESA TG Digital Measuring System

Ideal for long measuring travels – Incremental probes with a 30 or 60 mm measuring span – Numerical display to 0,001 or 0,0005 mm – Analogue display with illuminated colour background for value classification – Value storage – PRESET function – To name just a few.



TESA TG - C10 Computing Counter



04630004



TESA TG - C10 computing counter

Up/down computing counter with numerical display*, resolution to 0,001 and 0,0005 mm or 0,00001 in. Features 1 probe input. Also with value classification and value storage capabilities. RS232 data output.

04630009

TESA TG - C10 computing counter (HEIDENHAIN)

Same execution as above, but compatible with HEIDENHAIN probe MT-1201/2501 only*.

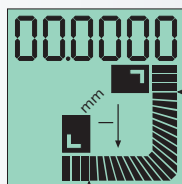
Each unit is supplied with the following accessories:

04761054 1 mains adapter 100 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA

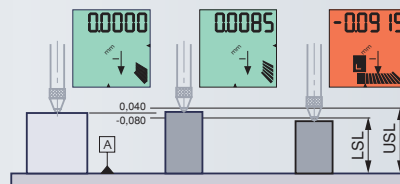
04761055 1 EU adapter cable

* Compatible with equivalent HEIDENHAIN probes with same connector shape and signal.

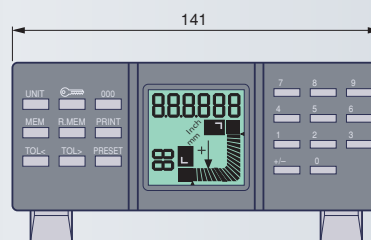
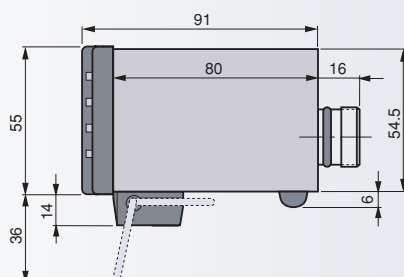
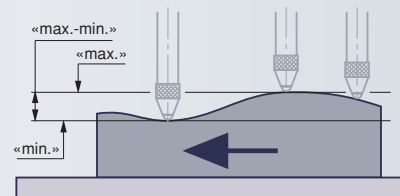




Input of
the lower and
upper
specification
limits
(LSL and USL)



Digital capture of
both extreme values
«max.» and «min.»
along with the
difference between
«max.-min.»
in dynamic
measurement



EN 50081-1,
EN 50081-2,
EN 50082-1,
EN 50082-2

TG - C10:
≈ 650 g

Shipping
packaging

Identification
number

Declaration
of conformity



TESA TG 30 and TG 60 Digital Probes



Digital Probes*

Axial probes with
incremental glass scale

04630006 **TESA TG 30**
30 mm measuring span

04630007 **TESA TG 60**
60 mm measuring span

Each probe is supplied with the following item:

01960005 1 Retract lever for the measuring bolt

* Compatible with equivalent HEIDENHAIN probes with same connector
shape and signal.

TG probes



✓
DIN 32876
Part 2
Axial probe usable
in any position.
Measuring bolt
guided on a plain bearing.
Probe insert with M2,5
mounting thread.
Measuring bolt retraction:
• mechanical retraction,
see under standard
accessories
• pneumatic retraction,
see table
4,3 mm dia. x 3 m cable.
Max. cable extension 10 m.



Incremental
glass scale
0,002%/°C



10°C to 40°C
-10°C to 50°C



80%,
non-condensing
IP54*
(IEC 60529)
*probe housing
only



5 ± 10% Vdc



Output signal
± 11 µApp,
sinusoidal



Shipping
packaging
Identification
number

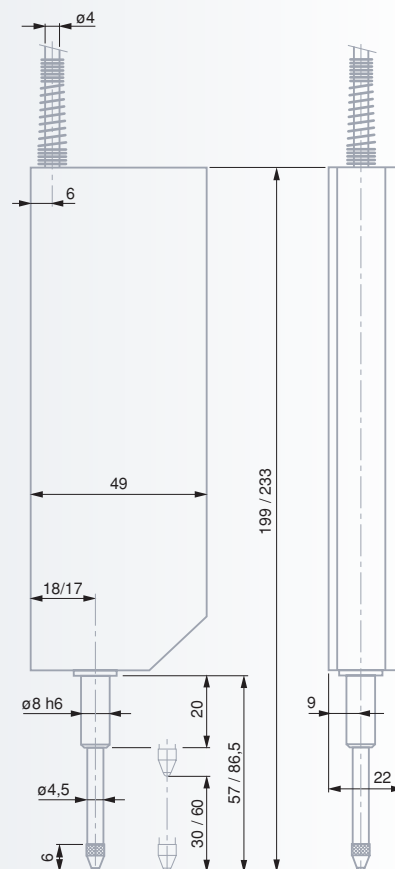


Inspection report
Declaration
of conformity

TESA electronic probes		TG 30	TG 60
	mm	30	60
	mm	30,4	60,4
	µm	20	40
	µm	1,0	2,0
	µm	1,0	1,0
	µm	1,0	1,0
	Close to		
	– lower stop of the measuring bolt*	N 0,85 N ± 0,15	0,90 ± 0,20
	– upper stop of the measuring bolt*	N 1,10 N ± 0,20	1,45 ± 0,25
	Force hysteresis*	N 0,1	0,15
	Max. transverse force	N 2,0	2,0
	Pneumatic retraction of the measuring bolt by vacuum or air pressure		
	Position of use		**
	– vertical	bar 0,55 ÷ 0,70	0,60 ÷ 0,75
	– horizontal	bar 0,42 ÷ 0,57	0,52 ÷ 0,67
	– vertical (in suspension)	bar 0,30 ÷ 0,45	0,45 ÷ 0,60
		m/s 1,4	2,0
	Moved mass	g 350 g 28	365 27

* Applicable with the probe used in vertical position with downward oriented measuring bolt, as well as in static measuring.

** TG 60 cannot be used with compressed air.



Optional accessories



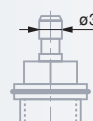
Connectors for lifting the measuring bolt by vacuum

01960009 Suitable for TESA TG 30
(No. 04630006)

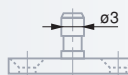
01960008 Suitable for TESA TG 60
(No. 04630007)

Connector for lifting the measuring bolt by air pressure

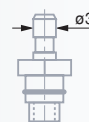
01960010 Suitable for TESA TG 30
(No. 04630006)



01960009



01960008



01960010





Optical Measurement



FAST ROUND PART INSPECTION

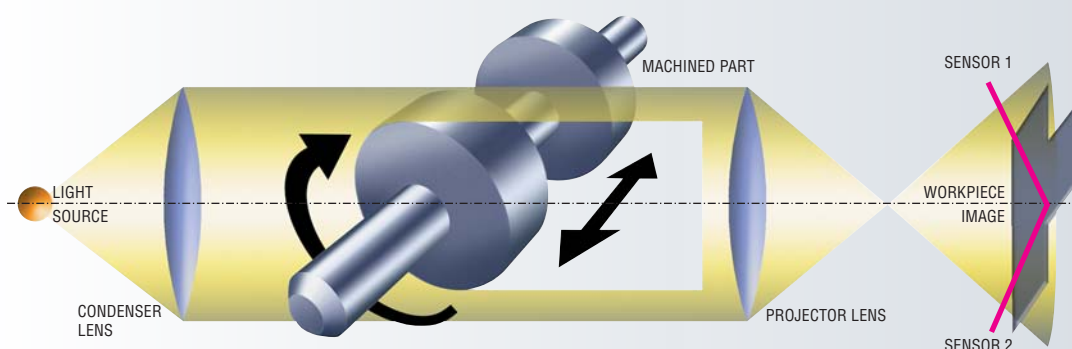
The whole TESA-SCAN family offers a complete solution for round part inspection. Various systems such as those used on profile projectors or measuring microscopes have been integrated into a single unit. This range of TESA's products are designed to measure round parts with diameters from 0,25 up to 52 mm and can be as long as 500 mm.



Operating Principle

All TESA-SCAN incorporate high-resolution CCD linear sensors that combine lines of 14 000 pixels (equivalent to a 200 megapixels CCD camera). As the part profile is projected, these sensors, which are capable to detect the slightest changes at pixel level, act as a light sensitive ruler.

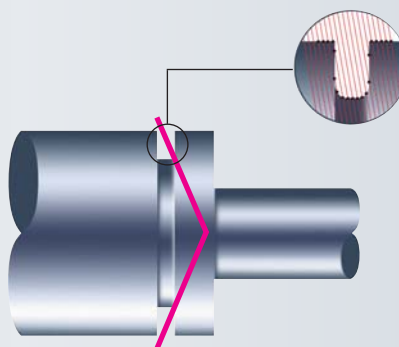
The part is scanned using a parallel green light. The part image is then projected onto the linear sensors, which get all needed information for analysis of the part geometry.



2D Measurement

The part profile is obtained from a scanning method applied along the part axis. Both diameter and length of the part are measured simultaneously, thus producing a 2D video image.

One of the main characteristics of the TESA's concept lies in the slanted position of the linear sensors. With an angle to 7,5° against the part axis, these sensors ensure a precise data capture when inspecting diameters, angles, radii and other geometric part features with parallel or sloped surfaces.

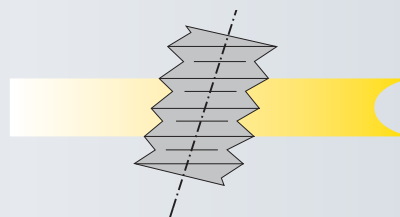


Dynamic Measurement

Rotation during the inspection process allows for a peripheral examination of the part geometry and contour, each being captured at high speed and high accuracy.

Thread Measurement

External threads are an important feature of round parts, and their measurement is an intensive labour operation. A true thread profile can be obtained from any TESA-SCAN.





H x L x D
840 x 1000 x
435 mm or
33 x 39,5 x 17 in

0,5 s for
lengths and
diameters

Performances:
see page P-4

24 VDC

10 to 40 °C

< 80%



103 kg

Max. workpiece
size (D x L):
100 x 300 mm.
Max. workpiece weight: 4 kg.

< 70 dB (A)

Shipping packaging

Inspection report
with a declaration
of conformity

Performances
are based on
the results obtained
from clean, ground
components
measured at 20 °C.
They may be
affected by the
component shape
and surface finish.

TESA-SCAN 52 REFLEX-Click

This model includes the ultimate power of all TESA-SCAN machines, offering high technological performances combined with unmatched ease of use and exceptional price/quality relationship.

Thanks to the added functionality for automatic recognition of the parts to be measured, the REFLEX-Click mode allows them to be quickly and reliably inspected with a single click. The colour coded classification of the measured values enables the analysis of the measurement results at a glance, rendering part inspection especially easy to execute.

Another unique function available in the REFLEX-Click mode is the ability to measure lengths and diameters speedily, making the machine ideally suited for use on the shop floor.



	 D	 L	 D	 L
	0,5 ÷ 52 mm	300 mm	0,02 ÷ 2.0 in	11.8 in
	0,0001 mm	0,0005 mm	0.000004 in	0.00002 in
 20 °C ± 1 °C	(2 + D/100) µm (D in mm)	(5 + L/100) µm (L in mm)	(0.08 + D/100) / 1000 in (D in in)	(0.2 + L/100) / 1000 in (L in in)
 2 σ	1 µm	2,5 µm	0.00004 in	0.0001 in
 02430090	TESA-SCAN 52 REFLEX-Click (Ø 52 x 300 mm). Measuring machine including 2 male centres TL02-0001. Supplied with PC, mouse, US keyboard, Windows XP Multilingual operating system, 20-inch TFT monitor.			
 02430091	TESA-SCAN 52 REFLEX-Click with rotary headstock			



TESA-REFLEX Scan Software

The TESA-REFLEX family has expanded through the addition of the Scan version provided with intuitive graphical interface. The use of the Composer mode allows complex measurements of geometrical part features such as those listed below to be carried out in a simple way.

- Diameters
- Lengths
- Radii
- Angles
- Chamfers
- Threads

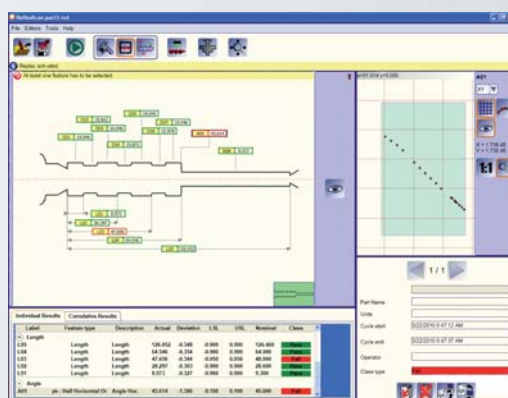
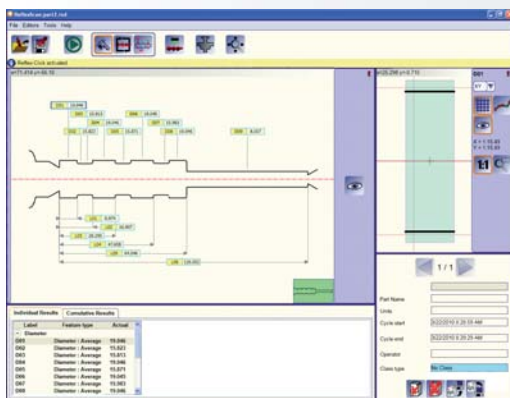
Equipped with a rotation axis available as an option, this machine will let you inspect additional features such as:

- Runout
- Coaxiality
- Across-flats



Key Features

- Automatic measurement of lengths and diameters using the REFLEX-Click function.
- Automatic recognition of the parts being measured or the programmes used.
- Intelligent detection of the relevant measurement zones.
- Management of the operator and programming modes.
- Value storage.
- Dynamic displaying of the measurement results.
- Flexible reporting.





TESA-SCAN 25:
H800 x L640 x
P500 mm,
H32 x L25 x P20 in
TESA-SCAN 50:
H1055 x L800 x
P580 mm,
H41 x L32 x P23 in

Diameter : 0,5 s
Length : 0,5 s

Performances:
see page P-8

100/110-
220/240 VAC
50/60 Hz

10 to 35°C
50 to 95°F

< 80%



TESA-SCAN 25:
67 kg, 148 lbs
TESA-SCAN 50:
130 kg, 290 lbs

Max. workpiece
size (D x L):
59 x 270 mm;
100 x 290 mm.

Max. workpiece weight:
2 kg; 4 kg.

< 70 dB (A)

Shipping packaging

Inspection report
with a declaration
of conformity

Performances
are based on
the results obtained
from clean, ground
components
measured at 20°C.
They may be
affected by the
component shape
and surface finish.

For information
on Pro-Measure,
see page P-9.

TESA-SCAN 25

TESA-SCAN 50



Technical Data

TESA-SCAN 25	D	L	D	L
	0,25 ÷ 25 mm	200 mm	0,01 ÷ 1.0 in	8.0 in
	0,0001 mm	0,001 mm	0.000004 in	0.00004 in
20°C ± 1°C	(1,5 + D/100) µm (D in mm)	(5 + L/100) µm (L in mm)	(0.06 + D/100)/ 1000 in (D in in)	(0.2 + D/100)/ 1000 in (L in in)
2 σ	1 µm	2,5 µm	0.00004 in	0.0001 in

TESA-SCAN 50	D	L	D	L
	0,5 ÷ 50 mm	275 mm	0,02 ÷ 1.96 in	10.8 in
	0,0001 mm	0,001 mm	0.000004 in	0.00004 in
20°C ± 1°C	(2 + D/100) µm (D in mm)	(5 + L/100) µm (L in mm)	(0.08 + D/100)/ 1000 in (D in in)	(0.2 + D/100)/ 1000 in (L in in)
2 σ	1 µm	2,5 µm	0.00004 in	0.0001 in



02430000

TESA-SCAN 25 (Ø 25 x 200 mm). Measuring machine with part rotation, including 1 rotary headstock, 1 tailstock, 2 male centres TL02-0001.
Supplied with PC, mouse, **Windows XP Multilingual** operating system, 20-inch TFT monitor, US keyboard, Pro-Measure software with User's manual E-F-D on a CD (order No. 02460011).

02430010

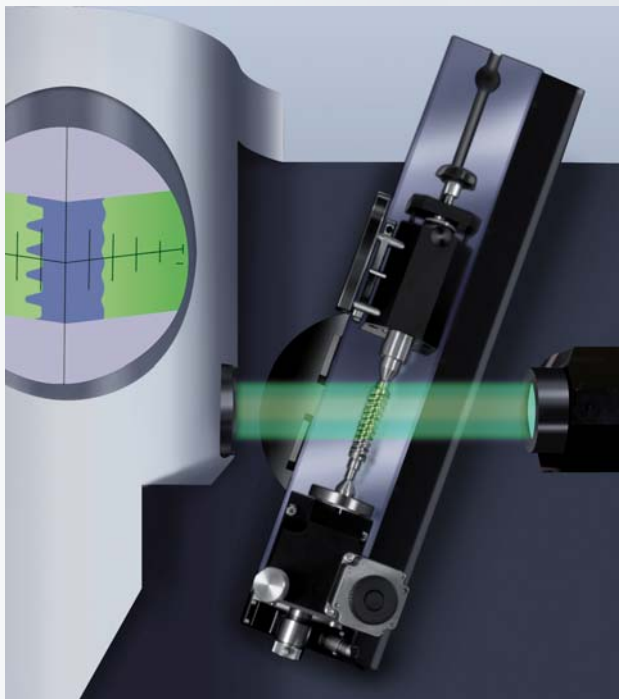
TESA-SCAN 50 (Ø 50 x 275 mm). Measuring machine with part rotation, main part including 1 rotary headstock, 1 tailstock, 2 male centres TL02-0002.
Supplied with PC, mouse, **Windows XP Multilingual** operating system, 20-inch TFT monitor, US keyboard, Pro-Measure software with User's manual E-F-D on a CD (order No. 02460011).



TESA-SCAN 50 CE Plus

Measuring capacity: D = 50 mm, L = 275 mm

Equipped with slewing mechanism for thread measurement through advanced functions (slide tilted through 30°) .



H 1055 x L 800 x P 580 mm
H 41 x L 32 x P 23 in



Diameter : 0,5 s
Length : 0,5 s



Performances :
see page P-8



100/110-
220/240 VAC
50/60 Hz



10 to 35 °C
50 to 95 °F



< 80%



140 kg, 310 lbs



Max. workpiece
size (D x L):
100 x 290 mm.

Max. workpiece weight: 4 kg.



< 70 dB (A)



Shipping packaging



Inspection report
with a declaration
of conformity

Technical Data

	 D	 L	 D	 L
	0.5 ÷ 50 mm	275 mm	0,02 ÷ 1.96 in	10.8 in
 Tilting for thread measurement	max. 30°			
	0,0001 mm	0,001 mm	0.000004 in	0.00004 in
 20°C ± 1°C	(2 + D/100) µm (D in mm)	(5 + L/100) µm (L in mm)	(0.08 + D/100)/ 1000 in (D in in)	(0.2 + D/100)/ 1000 in (L in in)
 2 σ	1 µm	2,5 µm	0.00004 in	0.0001 in

Performances
are based on
the results obtained
from clean, ground
components
measured at 20 °C.
They may be
affected by the
component shape
and surface finish.



02430030



TESA-SCAN 50 CE Plus (Ø 50 x 275 mm). Measuring machine with part rotation and slewing mechanism for thread measurement. Main part including 1 rotary headstock, 1 tailstock, 2 male centres TL02-0002.
Supplied with PC, mouse, **Windows XP Multilingual** operating system, 20-inch TFT monitor, US keyboard, Pro-Measure software with User's manual E-F-D on a CD (order No. 02460011).

For information
on Pro-Measure,
see page P-9.

TESA-SCAN 50 Plus

Measuring volume: D = 50 mm, L = 500 mm

Equipped with a slewing mechanism acting on the slide for thread measurement through advanced functions.



H1455 x L800 x
P580 mm
H57 x L32 x P23 in

Diameter : 0,5 s
Length : 0,5 s

Performances:
see page P-8

100/110-
220/240 VAC
50/60 Hz

10 to 35 °C
50 to 95 °F

10 to 80%



180 kg, 398 lbs

Max. workpiece
size (D x L):
100 x 515 mm.
Max. workpiece weight: 6 kg

< 70 dB (A)

Shipping packaging

Inspection report
with a declaration
of conformity

Performances
are based on
the results obtained
from clean, ground
components
measured at 20 °C.
They may be
affected by the
component shape
and surface finish.

Technical Data

	 D	 L	 D	 L
	0,5 ÷ 50 mm	500 mm	0,02 ÷ 1.96 in	19.7 in
 Tilting for thread measurement	max. 15°			
	0,0001 mm	0,001 mm	0.000004 in	0.00004 in
 20 °C ± 1 °C	(2 + D/100) µm (D in mm)	(5 + L/100) µm (L in mm)	(0.08 + D/100)/ 1000 in (D in in)	(0.2 + D/100)/ 1000 in (L in in)
 2 σ	1 µm	2,5 µm	0.00004 in	0.0001 in



02430040



TESA-SCAN 50 Plus (Ø 50 x 500 mm). Measuring machine with part rotation and slewing mechanism for thread measurement. Main part including 1 rotary headstock, 1 tailstock, 2 male centres TL02-0002.

Supplied with PC, mouse, **Windows XP Multilingual** operating system, 20-inch TFT monitor, US keyboard, Pro-Measure software with User's manual E-F-D on a CD (order No. 02460011).

For information
on Pro-Measure,
see page P-9.



Performances

(Valid for the TESA-SCAN 25 or TESA-SCAN 50 product range)

Static measurement

Diameters, lengths, intersection points, gauge diameters, radii, angles etc.

Two-axes workpiece alignment – Creating a workpiece axis based on two datum diameters.

Dynamic measurement

Concentricity – Parallel or interrupted diameters, tapers, parallel thread profiles or on maxi form.

Runout – Plain or interrupted diameters.

Diameters with rotation, ovality, max, min and average diameters of plain or interrupted diameters.

Hexagon – Across-flats, symmetry of flats to axis, max. dimension across corners.

Section analysis with rotation – Longest and shortest section of radii, angular location.

Three-axes workpiece alignment – Creating a workpiece axis with reference to plain diameters or thread lengths.

Thread measurement – With no mechanical slewing – Main Features (TESA-SCAN 25 or TESA-SCAN 50)

- Parallel, vee-shaped threads
 - Major diameter
 - Flank diameter
 - Flank angle
 - Pitch
- Taper threads
 - Pitch
 - Flank angle
 - Included taper angle
 - Gauge length
 - Usable thread length
 - Pitch diameter
 - Major diameter
 - Conicity on diameter

Thread and worm thread measurement – With mechanical slewing – Main Features (TESA-SCAN 50 CE plus or TESA-SCAN 50 plus)

- Parallel threads
 - Major diameter
 - Flank diameter
 - Pitch
 - Minor diameter
 - Flank angle
 - Root radius
 - Crest radius
 - Circularity
 - Lead error
- Taper threads
 - Pitch diameter
 - Major diameter
 - Minor diameter
 - Taper
 - Crest diameter
- Double-threads, parallel
 - Major and minor diameters
 - Half pitch
 - Flank angle
 - Crest radius
 - Root radius
- Worm threads (on request)
 - Pitch
 - Major and minor diameters
 - Over Wire diameter
 - Tooth thickness
 - Pressure angle
 - Addendum
 - Dedendum
 - Thread depth
 - Runout
- Ball screws (on request)
 - Pitch
 - Lead error
 - Over wire diameter



Pro-Measure Software

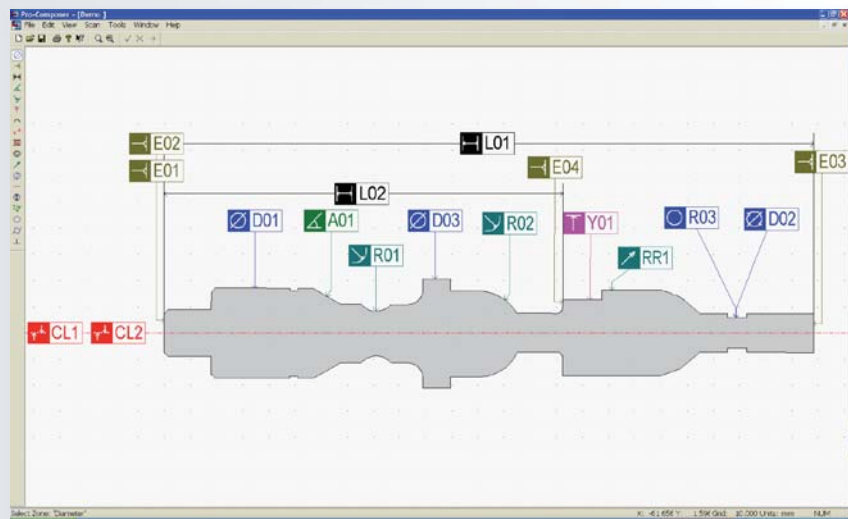
Complex metrology-based applications involving form and shape measurement are easily performed due to a flexible programming.

Pro-Measure enables a visual comparison of the true form as captured. This function makes the analysis of any existing manufacturing problems easier. It also provides the operator with the needed assistance when creating part programs. This simple software tool can either be installed directly on the PC coupled with the machine or networked to a workstation enabling a part program to be prepared off-line.

Pro-Measure uses the graphic representation of the part profile, created by scanning the part or importing the required geometry from a CAD file. A library of icons, each representing a geometric function, guides the user throughout the part programming sequence. Tolerance and setting values for cylindrical parts or threads can be retrieved from a database of international standards in order to be entered, accordingly.

Key Features

- User-friendly interface for part programming.
- Wide variety of measuring functions.
- Statistical follow up for optimum monitoring of the manufacturing process.
- Full control of multiple levels of use.
- Flexible reporting.



Pro-Measure - [Measurement - Demo]

File View Tools Debug Window Help

Individual Results Cumulative Results Batch Results Measurement Analysis Schematic

Part Name: Demo

Units: mm, Degree

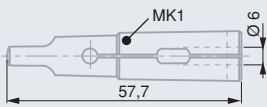
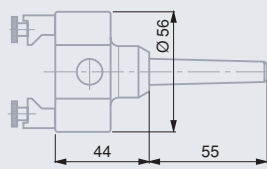
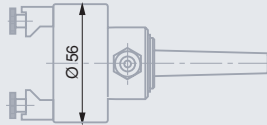
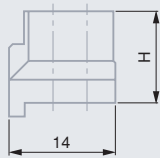
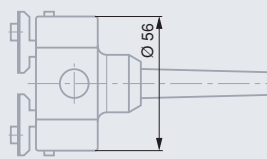
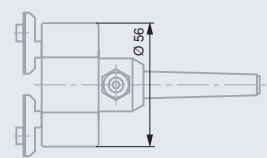
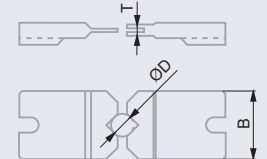
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Result: Fail Remarque: 1

PRO-MEASURE
TEST
TECHNOLOGY

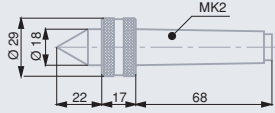
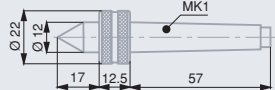
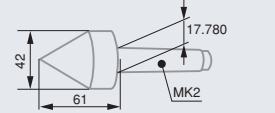
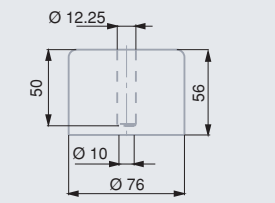
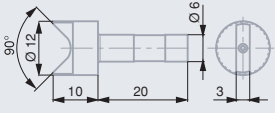
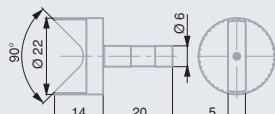
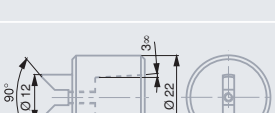
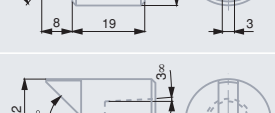
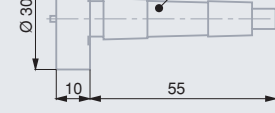
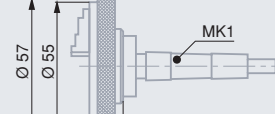
F.	L...	Description	Actual	Deviation	USL	LSL	Class	LSL/USL Chart	Nominal
L01	Length	248.363	0.013	248.400	248.300	Pass		248.350	
L02	Length	152.383	-0.017	152.450	152.350	Pass		152.400	
D01	Ø Average	34.500	0.000	34.550	34.450	Pass		34.500	
A01	Half Angle	30.139	-0.011	31.150	29.150	Pass		30.150	
R02	Radius	16.469	0.065	16.450	16.350	Fail		16.400	
R01	Radius	7.502	0.002	7.550	7.450	Pass		7.500	
D02	Rot. Ø Average	12.000	0.000	12.050	11.950	Pass		12.000	
R03	Roundedness	0.006	0.006	0.050	0.000	Pass		0.000	
RR1	Radial Run Out	0.006	0.006	0.050	0.000	Pass		0.000	
Y01	Average Height	12.837	-0.013	12.900	12.800	Pass		12.850	
D03	Ø Average	42.000	0.000	42.050	41.950	Pass		42.000	

Accessories

Order Number		Morse 1 TESA-SCAN 25	Morse 2 TESA-SCAN 50 TESA-SCAN 52 REFLEX-Click	Notes	Description
TL01-0002		●	—	—	Centre adapter with a 6 mm dia. coupling bore
TL01-0003		●	● Requires TL01-0027	External clamping for manual use	Two-jaw gripper
TL01-0004		●	● Requires TL01-0027	External clamping for use with air pressure	Two-jaw gripper
TL01-0005 H = 18 TL01-0006 H = 22		For TL01-0003 TL01-0004	—	—	Raising blocks for external jaws, in pairs
TL01-0007		●	● Requires TL01-0027	Internal clamping for manual use	Two-jaw gripper
TL01-0008		●	● Requires TL01-0027	Internal clamping for use with air pressure	Two-jaw gripper
TL01-0009 0÷6 mm T = 1,5 TL01-0010 0÷6 mm T = 3 TL01-0011 6÷12 mm T = 3 TL01-0012 12÷18 mm T = 6 TL01-0013 18÷24 mm T = 9 TL01-0038 0÷6 mm T = 6 TL01-0039 0÷6 mm T = 15 TL01-0040 6÷12 mm T = 15		For TL01-0003 TL01-0004	—	—	External jaws, in pairs
TL01-0021	Set of jaws including: TL01-0009 TL01-0010 TL01-0011 TL01-0012 TL01-0013	For TL01-0003 TL01-0004	—	—	External jaws, in pairs

Order Number		Morse 1 TESA-SCAN 25	Morse 2 TESA-SCAN 50 TESA-SCAN 52 REFLEX-Click	Notes	Description
TL01-0015 D = 4-5 mm H = 6,6 mm TL01-0016 D = 5-6 mm H = 8,6 mm TL01-0017 D = 6-8 mm H = 11,5 mm TL01-0018 D = 8-11 mm H = 17,5 mm TL01-0019 D = 11-15 mm H = 20 mm TL01-0020 D = 15-19 mm H = 20,2 mm		For TL01-0007 TL01-0008	—	—	Internal jaws, in pairs
TL01-0022	Set of jaws including: TL01-0015 TL01-0016 TL01-0017 TL01-0018 TL01-0019 TL01-0020	For TL01-0007	—	—	Internal jaws, in pairs
TL01-0026		—	●	—	Centre adapter with a 6 mm dia. coupling bore
TL01-0027		—	●	—	Reduction sleeve, Morse 2 to 1
TL02-0001		●	—	2 items provided with TESA-SCAN 25	Extra male centre, 10 mm
TL02-0002		—	●	2 items provided with TESA-SCAN 50 and TESA-SCAN 52 Reflex-Click	Extra male centre, 17 mm
TL02-0003		●	—	Diamond coated 10 mm	Drive centre
TL02-0016		●	—	For added sleeves Z173- 0922/0923	Rotation centre with a B12 male taper plus a Morse 1 taper shank



Order Number		Morse 1 TESA-SCAN 25	Morse 2 TESA-SCAN 50 TESA-SCAN 52 REFLEX-Click	Notes	Description
TL02-0017		—	●	—	Rotation centre, Morse 2
TL02-0018		—	●	—	Rotation centre with a B12 male taper plus a Morse 1 shank
TL02-0019		●	—	—	Rotation centre, Morse 1
TL02-0021		—	●	—	Rotation centre, Morse 2
Z173-0908		For TL01-0003 TL01-0004 TL01-0007 TL01-0008	—	Ensures stable positioning for mounting jaws	Vertical support
Z173-0920		● Requires TL01-0002	● Requires TL01-0026	—	Female centre, 10 mm dia.
Z173-0921		● Requires TL01-0002	● Requires TL01-0026	—	Female centre, 20 mm dia.
Z173-0922		● Requires TL02-0016	—	—	Female centre, 10 mm dia. Also with internal B12 taper
Z173-0923		● Requires TL02-0016	—	—	Female centre, 10 mm dia. Also with internal B12 taper
Z173-0961		●	—	—	Platten, 30 mm dia.
Z173-2020		●	● Requires TL01-0027	Clamping capacity: outside 1÷15 mm inside 11÷26 mm	3-jaw chuck, clamping range 1÷15 mm
Z173-2024		—	●	—	6-jaw chuck , clamping range 0,7÷15 mm
Z173-2025		●	—	—	

Order Number		Morse 1 TESA-SCAN 25	Morse 2 TESA-SCAN 50 TESA-SCAN 52 REFLEX-Click	Notes	Description
Z178-2009		—	●	Used to drive components between fixed centres. Directly fitted on the headstock.	Drive mechanism
Z178-2020		—	●	Clamping capacity: outside 2÷50 mm inside 23÷50 mm	3-jaw chuck with Morse 2 taper shank, clamping range 2÷50 mm
Z178-2025		—	●	—	Platten, 80 mm dia. Also with a Morse 2 taper shank
Z178-2026		—	●	Diamond coated	Drive centre, Ø 40 mm. Also with a Morse 2 taper shank
Z178-0607		—	●	—	Female centre, 40 mm dia. Also with a Morse 2 taper shank
Z178-0610		—	●	—	Male centre, 15÷40 mm dia. Also with a Morse 2 taper shank
Z178-0940		—	● Requires TL02-0018	—	Female centre, 10 mm dia., Also with a B12 internal taper
Z178-0941		—	● Requires TL02-0018	—	Female centre, 10 mm dia., Also with a B12 internal taper
Z178-0942		—	● Requires TL02-0018	—	Female centre, 10 mm dia., Also with a B12 internal taper
Z178-3028		—	●	—	Drive centre, 42 mm dia. max.



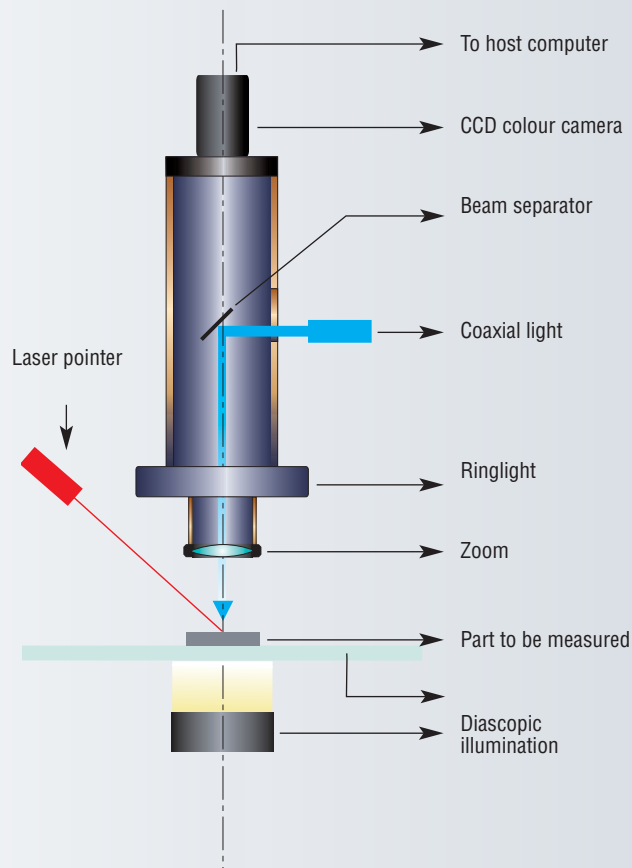
TESA-VISIO OPERATING PRINCIPLE

The Vision technology consists in inspecting a test object lying on a glass plate support by means of an optical system fitted with a camera besides additional zoom-like lenses. Since this technology is based on image analysis, light illumination of the part being inspected is crucial.

For this reason, three different light illuminations will be used:

- **Diascopic illumination** mounted under the glass plate, making it possible for the user to view the part profile.
- **Ringlight** for a detailed visualisation of the upper surface of the part being checked.
- **Coaxial light** to view inside a blind bore or a cavity or to measure cylindrical parts in upright position.

The laser pointer serves for locating, at a glance, the measurement area on the part lying in the object field of the camera. Using beam separators, the coaxial light can pass through the zoom.



Different Light Illuminations

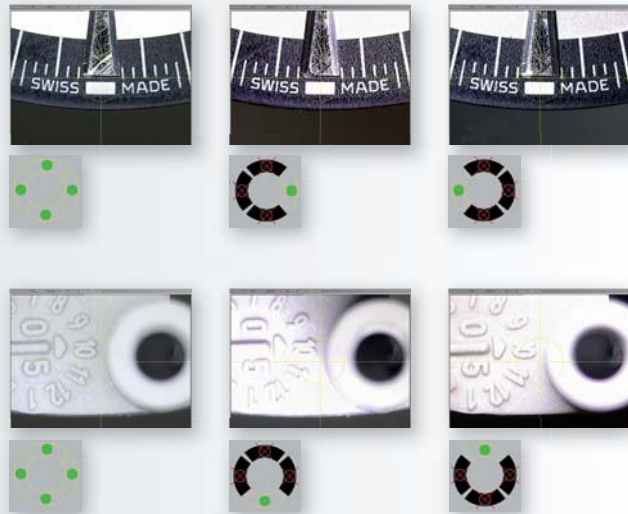
Episcopic illumination

The episcopic illumination, or incident light is particularly useful for inspecting part features such as millings, bores, chamfers and rounded edges.

This type of illumination may vary, according to the chosen machine version.

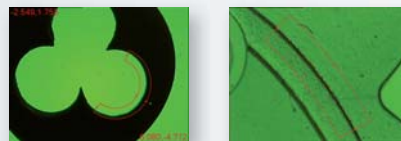
- On a TESA-VISIO 200 GL, the ringlight is divided into 4 segments of 90°.
- On a TESA-VISIO 300 GL, the ringlight includes two circular rows. The outer row is divided into 8 segments of 45° whilst the inner one has 4 segments of 90°.

Each segment is programmable separately over the software.



Diascopic illumination

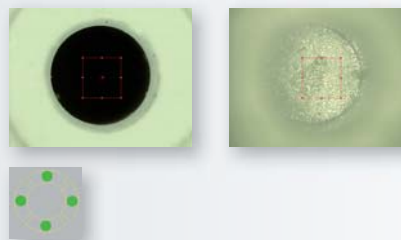
The diascopic illumination, or transmitted light is projected under the part being measured to create a silhouette image of the profile. Also used for the measurements based on transparency.



Illuminated contour

Coaxial light

This light is projected from above through the zoom. The collimated light beams produce an illuminated field useful for inspecting blind bores or cylindrical parts.

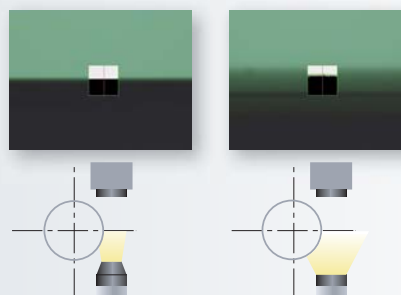


On the left, the inside of a blind bore cannot be inspected using the ringlight.

Parallel diascopic illumination

This illumination is projected from the bottom, using a special lens to create parallel light rays.

With this type of illumination, multiple light reflections can virtually be eliminated. This results in sharpe edges when checking round parts.



Visualisation with parallel diascopic illumination

Visualisation without parallel diascopic illumination



TESA-VISIO – THE VISION MACHINES FROM TESA FOR PRECISE OPTICAL MEASURING

The TESA-VISIO GL family provides Users with a full range of vision machines designed to meet their needs, from the simple inspection job to the sophisticated metrology application.

With a 200 x 100 mm measuring table, the manual TESA-VISIO 200 GL will fulfil the expectations of modern workshops.

Solidly built with a granite structure, TESA-VISIO 300 GL is worth investing in. This version has a 300 x 200 mm measuring table, and can either be operated manually or using the servomotors (DCC).



Main Features

- Compact, ergonomic design – Fruit of a thorough mechanical investigation.
- Machine base and column in granite – Ensure superior stability.
- TESA's patented system for optical reading.
- Intuitive, user-friendly Software tools made easily accessible.

TESA-VISIO sales programme



Machine version	200 GL	200 GL	300 GL	300 GL
Order number	06830401	06830428	06830601	06830634
Displacements	manual	manual	manual	motorised
Manual zoom, indexable	6,5x	–	–	–
Motorised zoom	–	6,5x	6,5x 12x (optional)	6,5x 12x (optional)
Software	TESA-REFLEX Vista	TESA-REFLEX Vista	TESA-REFLEX Vista	TESA-REFLEX Vision
Ringlight	4 x 90°	4 x 90°	4 x 90° + 8 x 45°	4 x 90° + 8 x 45°
Coaxial light	●	●	●	●



Two TESA-REFLEX programme versions

These two versions do not derogate from the rule to be the reference for simplicity, making the TESA-REFLEX software different. Easy to learn and to understand - it takes only a few hours - each version provides the reliability needed for visual part inspection.

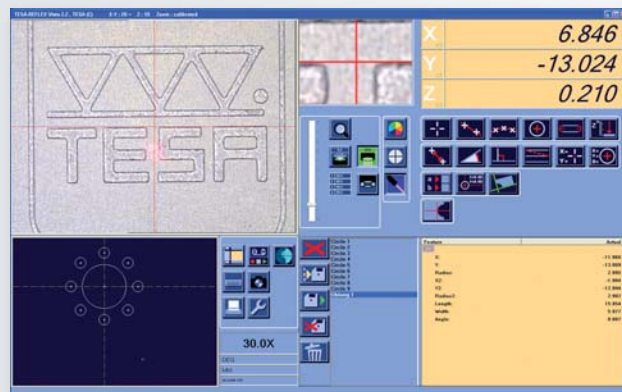
TESA-REFLEX Vista or TESA-REFLEX Vision will measure the highest number of geometrical elements quickly and accurately.

Main Features

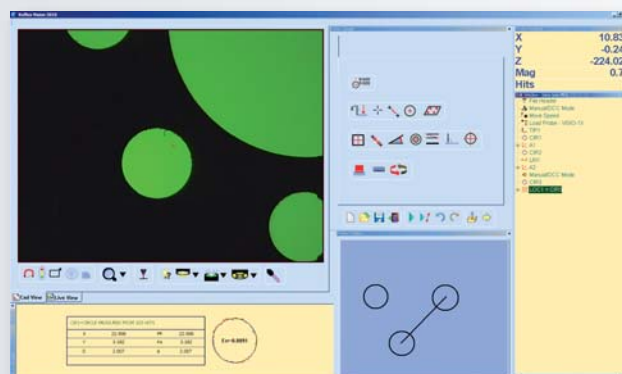
- Intuitive software tools.
- User-friendly, icon-based interface.
- Simple programming.
- Automatic measuring mode.
- On-line help in the Z-axis.
- True three-axis alignment.
- Visual comparison of the part against its CAO file
(Compar option available from TESA-REFLEX Vista).

The following two versions are supplied according to used machine type:

- TESA-REFLEX Vista for manual vision machines.
- TESA-REFLEX Vision for DCC vision machines.



TESA-REFLEX Vista



TESA-REFLEX Vision

Sales Programme



06860046	TESA-REFLEX Vista
06860187	Compar option for TESA-REFLEX Vista
06860380	TESA-REFLEX Vision



The ambitious TESA's programme initiated some years ago with the development of a full range of machines for non-contact measurement has resulted in a growing demand for systems capable to measure forms and shapes or soft materials where mechanical probing is just impossible. To meet this demand, the latest hand-operated TESA-VISIO 200 GL has been made smaller, but with no compromise on the metrological performances. Equipped with the TESA-REFLEX Vista programme version, learned in less than one day, this machine is the perfect multi-tasking, multi-users tool for part inspection.



Main Features

- **Exceptional Quality/Price ratio**

Each machine has been specially designed for highest quality standard and accuracy.

- **Optics**

Available with a manual indexable zoom or a motorised zoom for greater comfort. Also provided with a CCD colour camera.

- **Light illuminations**

All light sources are fitted with LEDs producing a cold light, also long-lasting.

- Diascopic illumination for checking profiles as well as for transparency-based measurements.
- Ringlight (4 x 90°) for millings, bores, chamfers and round edges.
- Coaxial light for blind bores and cylindrical parts.

Each light source can be set separately over the software.

- **Swiss mechanics**

Granite structure to ensure the rigidity and stability required for any high-precision measuring system.

Basic machine



Rigid granite structure



Opto-electronic measuring systems with incremental glass scales, resolution to 0,05 µm



$MPE_{X,Y}^* (E_X, E_Y) = (2 + 10 L/1000) \mu m$
 $MPE_{X,Y}^* (E_{XY}) = (2,9 + 10 L/1000) \mu m$
 $MPE_Z^{**} (E_Z) = (2,9 + 10 L/1000) \mu m$
 * L in mm
 ** Mechanical precision with no displacement in X-Y



Measuring volume (X/Y/Z):
 200 x 100 x 150 mm



Display resolution:
 0,001 mm



Manual



10°C to 40°C



20°C ±1°C



80%, non-condensing



115 to 230 Vac
 ±10%;
 50 to 60 Hz



98 kg



Calibration certificate



Declaration of conformity



Delivered fully assembled



Shipping packaging (W x D x H):
 800 x 1200 x 1100 mm

Measuring table



Anodised
aluminium



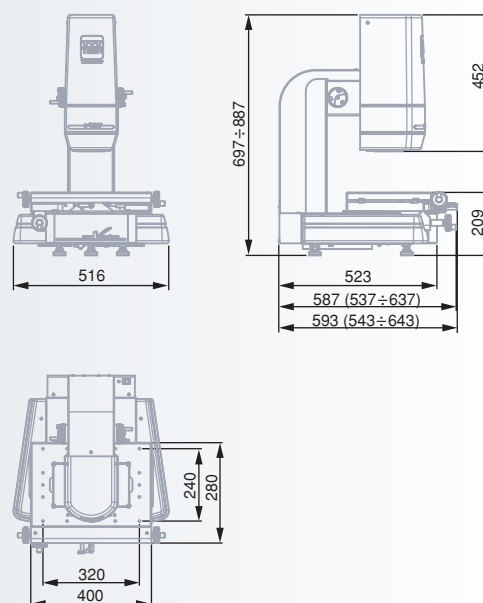
Table surface (X/Y):
400 x 280 mm



Max. load capacity:
10 kg

Indicative values for a 20-inch monitor with a 6,5x magnification (0,7x to 4,5x), also with additional lens

Order number	06860030	06860031	none	06860032	06860033
Lenses	0,5x	0,75x	—	1,5x	2x
Magnification	20 ÷ 70	26 ÷ 105	40 ÷ 140	60 ÷ 210	80 ÷ 280
Working distance (W) in mm	150	100	60	30	20
Max. height (H) in mm	0 ÷ 60	0 ÷ 120	0 ÷ 150	0 ÷ 180	15 ÷ 195
Max. field of view in mm	9,8 x 7,3	7,2 x 5,4	4,9 x 3,6	3,2 x 2,4	2,4 x 1,8
Min. field of view in mm	2,8 x 2,1	1,8 x 1,3	1,4 x 1	0,9 x 0,7	0,7 x 0,5



No	
04760079	PC DELL Optiplex
04760091	Monitor 20"
055074	Manual zoom, indexable (6,5x)
051638	Motorised zoom (6,5x)
054926	Coaxial light
054925	Ringlight (4 x 90°)
06860046	TESA-REFLEX Vista software

VISIO 200 GL
06830401
manual

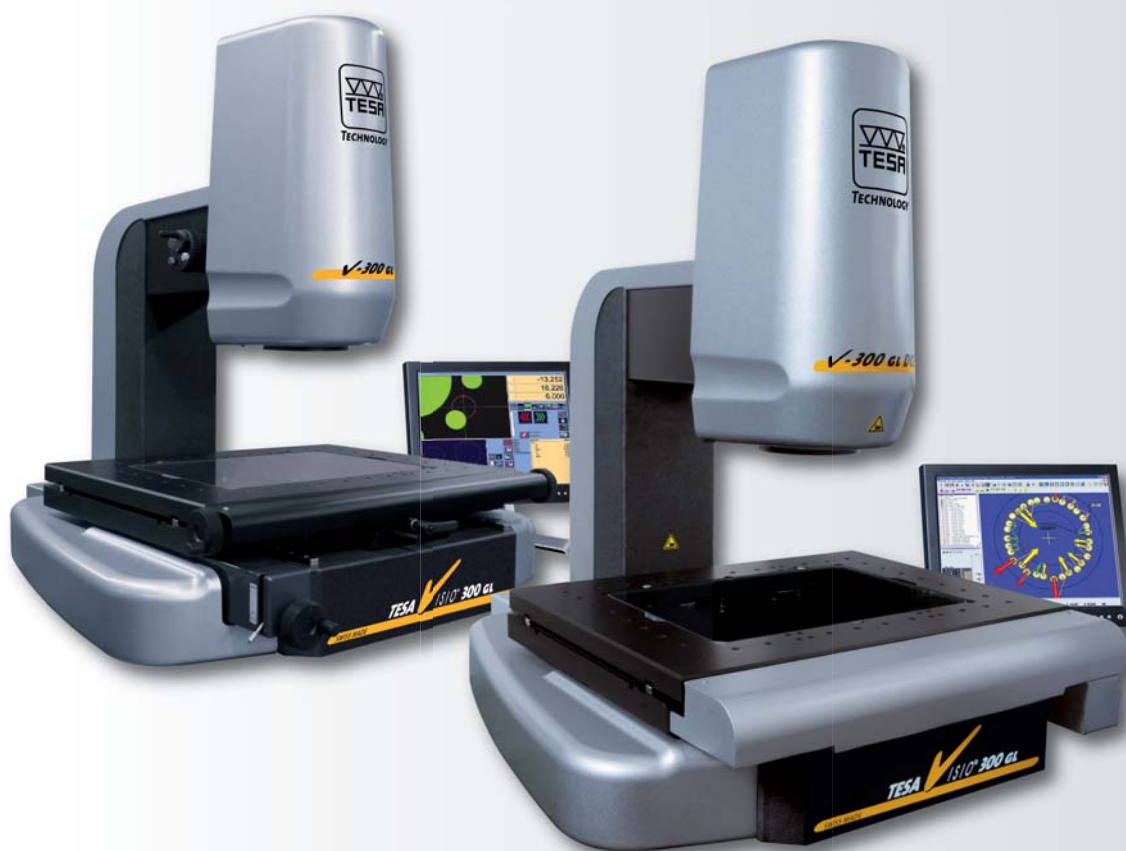
VISIO 200 GL
06830428
manual



TESA-VISIO 300 GL

The TESA-VISIO 300 GL reflects the expertise from TESA in vision machines. Besides a compact and ergonomic design, this version provides a 300 x 200 x 150 mm measuring volume that covers a large part of the demands from industry in this specific field.

Available in two distinct models for manual or motorised operations, the TESA-VISIO 300 GL offer to demanding metrologists all the functionalities they need for occasional or part series inspection. All hand-operated machine versions running the user-friendly TESA-REFLEX Vista are made for multi-tasking and multi-users operations. Running TESA-REFLEX Vision, your measurements will be rapidly and easily executed.



Main Features

• Optics

Includes a motorised zoom along with a CCD colour camera as standard equipment.

All light sources are fitted with LEDs producing a cold light, also long-lasting.

- Diascopic illumination for checking profiles as well as for transparency-based measurements.
- Ringlight (4 x 90° + 8 x 45°) for millings, bores, chamfers and round edges.
- Coaxial light for blind bores and cylindrical parts.

Each light source can be set separately over the software.

• Swiss mechanics

Granite structure to ensure the rigidity and stability required for any high-precision measuring system.

Basic machine



Rigid granite structure



Opto-electronic measuring systems with incremental glass scales, resolution to 0,05 µm



Manual version:
 $MPE_{X,Y}^* (E_X, E_Y) = (2 + 4 L/1000) \mu m$

$MPE_{X,Y}^* (E_{XY}) = (2,5 + 4 L/1000) \mu m$

$MPE_Z^{***} (E_Z) = (2,9 + 5 L/1000) \mu m$

Motorised version:
 $MPE_{X,Y}^* (E_X, E_Y) = (1,6 + 4 L/1000) \mu m$

$MPE_{X,Y}^* (E_{XY}) = (2 + 4 L/1000) \mu m$

$MPE_Z^{***} (E_Z) = (2,9 + 5 L/1000) \mu m$

* L in mm

** Mechanical precision



Measuring volume (X/Y/Z):
 300 x 200 x 150 mm



Display resolution:
 0,001 mm



10°C to 40°C



20°C ± 1°C



80%, non-condensing



115 to 230 Vac
 ± 10%;
 50 to 60 Hz



170 kg



CE



Calibration certificate



Declaration of conformity



Delivered fully assembled



Shipping packaging (W x D x H):
 1630 x 1140 x 1360 mm

Measuring table



Anodised aluminium



Table surface (X/Y):
550 x 430 mm



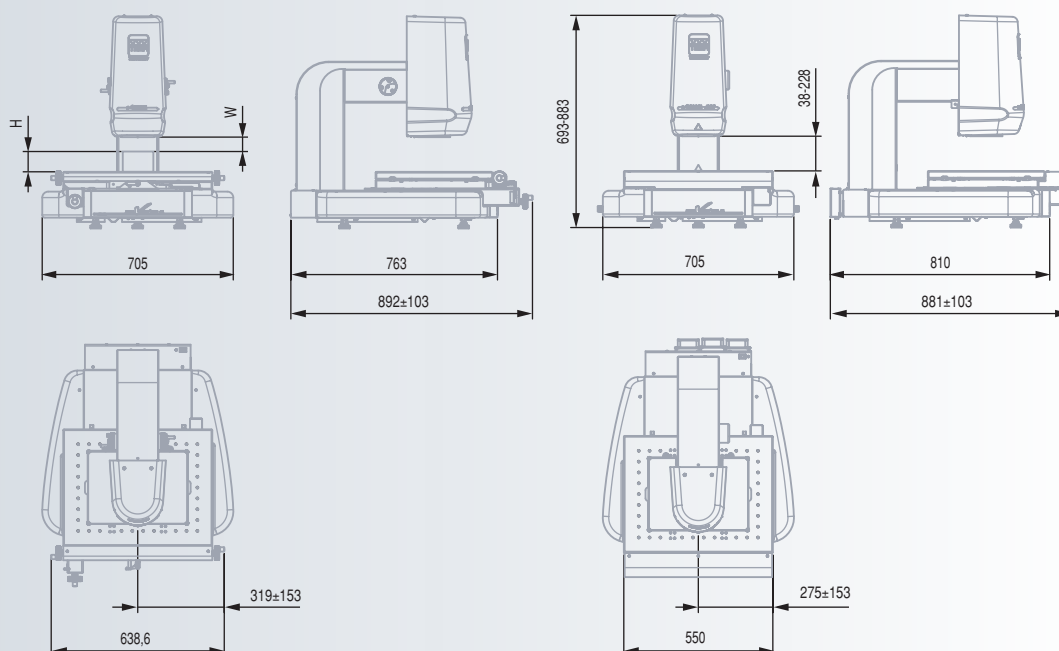
Max. load capacity:
20 kg

Indicative values for a 20-inch monitor with a 6,5x magnification (0,7x to 4,5x), also with additional lens

Order numbers	06860030	06860031	none	06860032	06860033
Lenses	0,5x	0,75x	—	1,5x	2x
Magnifications	20 ÷ 70	26 ÷ 105	40 ÷ 140	60 ÷ 210	80 ÷ 280
Working distance (W) in mm	150	100	60	30	20
Max. height (H) in mm	0 ÷ 60	0 ÷ 120	0 ÷ 150	0 ÷ 180	15 ÷ 190
Max. field of view in mm	9,8 x 7,3	7,2 x 5,4	4,9 x 3,6	3,2 x 2,4	2,4 x 1,8
Max. field of view in mm	2,8 x 2,1	1,8 x 1,3	1,4 x 1	0,9 x 0,7	0,7 x 0,5

Indicative values for a 20-inch monitor with a 12x magnification (0,58x to 7x), also with additional lens

Order numbers	06860287	06860288	none	06860289	06860290
Lenses	0,5x	0,75x	—	1,5x	2x
Magnifications	19 ÷ 190	25 ÷ 276	33 ÷ 367	50 ÷ 550	67 ÷ 74
Working distance (W) in mm	150	95	65	40	25
Max. height (H) in mm	0 ÷ 60	0 ÷ 120	0 ÷ 150	0 ÷ 180	15 ÷ 190
Max. field of view in mm	16 x 12	10,8 x 8	8,1 x 6,1	5,4 x 4	4 x 3
Max. field of view in mm	1,4 x 1	1 x 0,7	0,75 x 0,55	0,5 x 0,36	0,37 x 0,27



		VISIO 300 GL 06830601 manual	VISIO 300 GL 06830634 motorised
04760079	PC DELL Optiplex	●	—
04760053	PC DELL Precision	—	●
04760091	Monitor 20"	●	●
06860049	Motorised zoom (6,5x) + coaxial light	●	●
06860158	Ringlight, 4 x 90° + 8 x 45°	●	●
06860380	TESA-REFLEX Vision software	—	●
06860046	TESA-REFLEX Vista software	●	—



	06830401	06830428	06830601	06830634
				
TESA-VISIO 200 GL	●	●	–	–
TESA-VISIO 300 GL	–	–	●	●
Displacements	manual	manual	manual	motorised
TESA-REFLEX Vista	●	●	●	–
TESA-REFLEX Vision	–	–	–	●
Measuring volume X/Y/Z (mm)	200x100x150	200x100x150	300x200x150	300x200x150
Encoder resolution X/Y/Z (µm)	0,05	0,05	0,05	0,05
Joystick controlled servomotors in the 3 coordinate axes	–	–	–	●
Machine base and column in granite	●	●	●	●
Fine adjustment in the Z-axis	●	●	●	–
X/Y measuring table in anodised aluminium (mm)	400x280	400x280	550x430	550x430
Thickness of the glass plate (mm)	10	10	10	10
Stage with possible resting attachment and removable glass plate	●	●	●	●
Max. load capacity (kg)	10	10	20	20
<i>Precision</i>				
MPE _{X,Y} (E _X , E _Y) (µm) (L in mm)**	2+10 L/1000	2+10 L/1000	2+4 L/1000	1,6+4 L/1000
MPE _{XY} (E _{X,Y}) (µm) (L in mm)**	2,9+10 L/1000	2,9+10 L/1000	2,5+4 L/1000	2+4 L/1000
MPE _Z (E _Z) (µm) (L in mm)*/**	2,9+10 L/1000	2,9+10 L/1000	2,9+5 L/1000	2,9+5 L/1000
* Mechanical precision ** m ≤ 5 Kg				
<i>Camera and optics</i>				
CCD colour camera, 752 x 582 pixels	●	●	●	●
Manual zooms, indexable, 6,5x	●	–	–	–
Motorised zoom, 6,5x	–	●	●	●
Motorised zoom, 12x	–	–	Optional	Optional
Diascopic illumination, green LED	●	●	●	●
Diascopic illumination, parallel	Optional	Optional	Optional	Optional
Coaxial light	●	●	●	●
Segmented ringlight, (4 x 90°), white LEDs	●	●	–	–
Segmented ringlight, (4 x 90° + 8 x 45°), white LEDs	–	–	●	●
Laser pointer	●	●	●	●
<i>Additional data</i>				
Weight (machine alone) (kg)	98	98	170	170
Velocity in both XY coordinate axes (mm/s)	–	–	–	160
Acceleration in both XY coordinate axes (mm/s²)	–	–	–	640
Velocity in the Z-axis (mm/s)	–	–	–	160
Acceleration in the Z-axis (mm/s²)	–	–	–	500
Power supply	100 ÷ 240 V ± 10% 50 ÷ 60 Hz 5 ÷ 12V, continuous	100 ÷ 240 V ± 10% 50 ÷ 60 Hz 5 ÷ 12V, continuous	100 ÷ 240 V ± 10% 50 ÷ 60 Hz 5 ÷ 12V, continuous	110 ÷ 240 V ± 10% 50 ÷ 60 Hz 24 V, continuous
Masse (machine alone) (W x D x H) (in mm)	800x1200x1100	800x1200x1100	1630x1140x1360	1630x1140x1360
Reference temperature	20°C ± 1°C	20°C ± 1°C	20°C ± 1°C	20°C ± 1°C
Operating temperature range	10°C ÷ 40°C	10°C ÷ 40°C	10°C ÷ 40°C	10°C ÷ 40°C
Relative humidity (non-condensing)	≤ 80%	≤ 80%	≤ 80%	≤ 80%



Optional accessories

		TESA-VISIO	
		200 GL	300 GL
Light illumination			
06860145	Diascopic illumination, parallel	●	●
Optics			
06860323	Motorised zoom, 12x (on the purchase of a vision machine)	—	●
06860315	Zoom upgrade, 6,5x to 12x (machine retrofit)	—	●
06860030	Additional lens, 0,5x for a 6,5x zoom	●	●
06860031	Additional lens, 0,75x for a 6,5x zoom	●	●
06860032	Additional lens, 1 x for a 6,5x zoom	●	●
06860033	Additional lens, 2 x for a 6,5x zoom	●	●
06860287	Additional lens, 0,5x for a 12x zoom	—	●
06860288	Additional lens, 0,75x for a 12x zoom	—	●
06860289	Additional lens, 1 x for a 12x zoom	—	●
06860290	Additional lens, 2 x for a 12x zoom	—	●
Additional accessories			
S68900025	Monitor 22” instead of 20”	●	●
06860186	Foot switch for data point acquisition	●	Manual version
04760077	Joystick	—	Motorised version
06860317	Suited case for Visiofix light accessory set	●	●
06860316	Suited case for Visiofix standard accessory set	●	●
06860318	Visiofix accessory set, steel rails 200	●	—
06860320	Visiofix accessory set, steel rails 300	—	●



06860316



06860317



TESA-SCOPE II 300V or 300V Plus

Perfect for checking parts with flat surfaces or any other component used in precision mechanics.



- Profile projectors with vertical illumination.
 - 360° rotary viewing screen in frosted glass, 300 mm diameter. 30°, 60° or 90° crossline reticle along with 4 overlay chart clips.
 - Screen rotation with built-in sexagesimal and decimal reading, resolution in minutes – RAZ ABS/INC.
 - Profile illumination with green filter included. Enhances image contrast, makes the measurement easier, reduces all effects due to the operator.
 - Surface illumination through adjustable fibre optic for a perfect image projection.
 - Save Lamp system for automatic shut down of the lamps whenever the projector remains unused for several minutes (thus increasing the life of the lamps by 5).
 - Objectives with bayonet mount for quick exchange.
 - Coordinate table equipped with incremental glass scales, opto-electronic. Resolution to 0,001 mm.
- Measuring span:
- 200 x 100 for standard model
 - 300 x 150 for model **Plus**
 - X-axis fitted with a clutch mechanism for fast displacement.
 - Control handle for left hand and right hand operator (X-axis motion).
 - Workload capacity up to 10 kg.
- Lateral paper sheet holder.

Main Part



Heavy duty all steel structure



Measuring system with incremental glass, scale, opto-electronic. Resolution 0,001 mm.



Optics precision $\pm 0,05\%$ (profile illumination); $\pm 0,10\%$ (surface illumination).



Resolution 0,001 mm



Profile illumination: 24 V / 150 W bulb. Also with thermal filter included. Surface illumination: adjustable fibre optic, 24 V / 200 W bulb. Also with thermal filter included.



10°C to 40°C



19°C to 21°C



80%, non-condensing



115 to 230 Vac $\pm 10\%$; 50 to 60 Hz



110 kg



IP40



IEC 61010
EN 60204
EN 61326-1



Serial number



TESA Inspection report



Declaration of conformity



Provided fully mounted, but without objective (must be ordered separately).



Shipping packaging

Small Table

- Anodised aluminium
- Table surface 350 x 210 mm (X/Y)
- Measuring span: 200 x 100 mm (X/Y)
- In one coordinate direction: (4,5 + L/40) µm (L in mm)
- Max. workload capacity 10 kg

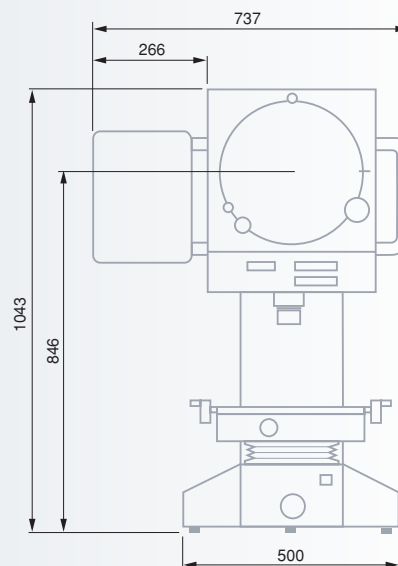
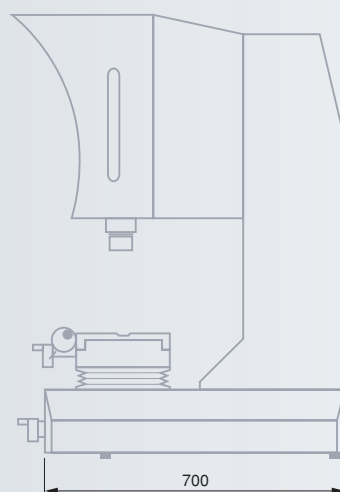
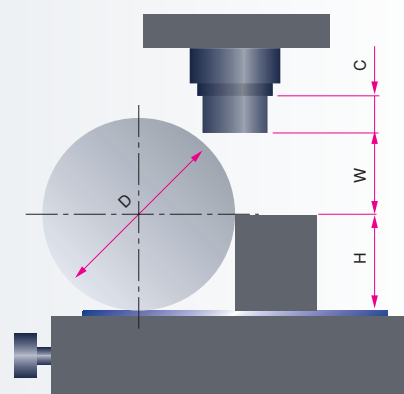
Large Table

- Anodised aluminium
- Table surface 440 x 282 mm (X/Y)
- Measuring span: 300 x 150 mm (X/Y)
- In one coordinate direction: ± 5,0 + L/20 (L in mm)
- Max. workload capacity 10 kg

		Base	Measuring Table		Digital Readout / Control Panel		
			X=200 mm Y=100 mm	X=300 mm Y=150 mm	TS100	TS300	TS300E
TESA-Scope II 300V	06830041	●	●	—	●	—	—
TESA-Scope II 300V	06830042	●	●	—	—	●	—
TESA-Scope II 300V	06830043	●	●	—	—	—	●
TESA-Scope II 300V Plus	06830044	●	—	●	●	—	—
TESA-Scope II 300V Plus	06830045	●	—	●	—	●	—
TESA-Scope II 300V Plus	06830046	●	—	●	—	—	●

Telecentric Objectives

	10x	20x	25x	31,25x	50x	100x
	06860001	06860002	06860003	06860004	06860005	06860006
Object-field	30 mm	15 mm	12 mm	9,6 mm	6 mm	3 mm
working distance (W)	80 mm	82 mm	70 mm	56 mm	53 mm	43 mm
Maximum height (H)	83 mm	83 mm	83 mm	83 mm	83 mm	83 mm
Maximum Diameter (D)	166 mm	166 mm	166 mm	166 mm	166 mm	166 mm
Objective length (C)	37 mm	35 mm	47 mm	61 mm	64 mm	74 mm

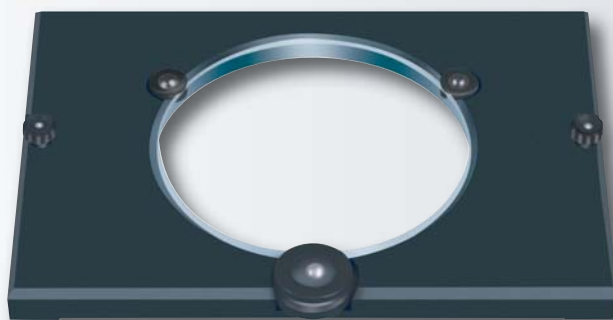


Accessories

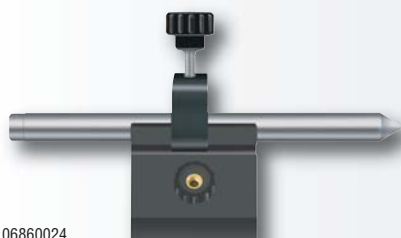
Nº



06860015	200 x 100 mm glass plate
06860016	300 x 150 mm glass plate
06860017	300 mm diameter viewing screen with 4 overlay chart clips
06860020	Profile lamp, 24 V – 150 W
06860021	Surface lamp, 24 V – 200 W
06860022	150 mm dia. rotary table. Used with the 200 x 100 mm measuring table.
06860029	150 mm dia. rotary table. Used with the 300 x 150 mm measuring table.
06860024	V-blocks and centres
06860025	Vise stage
06860027	TESA practice piece
06860060	90 mm rotary table. Used with the 200 x 100 mm measuring table.
06860061	90 mm rotary table. Used with the 300 x 150 mm measuring table.
06869055	Measuring foil, type RA, for radius, circle, bending radius
06869056	Measuring foil, type PO, for radius and angle
06869057	Measuring foil, type ISO M2, for thread measurement



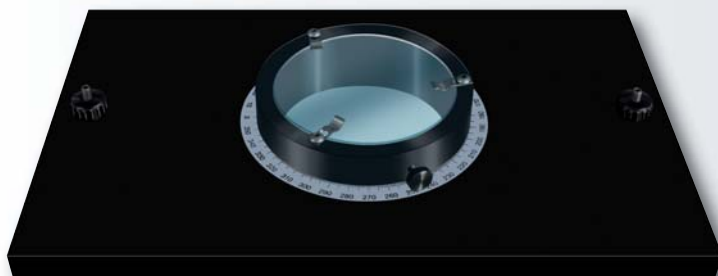
06860022/29



06860024



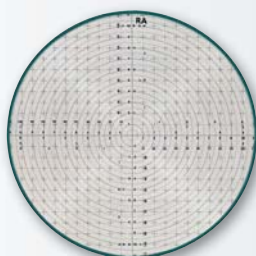
06860025



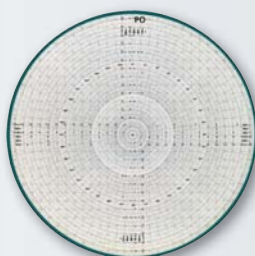
06860061



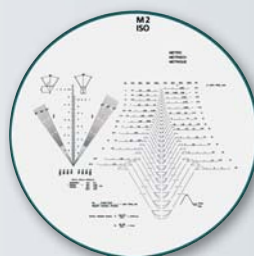
06860060



06869055



06869056



06869057

Main Part



Heavy duty
all steel
structure



Measuring
system with
incremental glass,
scale, opto-electronic.
Resolution 0,001 mm.



Optics precision
 $\pm 0,05\%$ (profile
illumination);
 $\pm 0,10\%$ (surface illumi-
nation).



Focusing
80 mm



Resolution
0,001 mm



Profile
illumination:
24 V / 150 W
bulb. Also with thermal filter
included.
Surface illumination:
adjustable fibre optic,
24 V / 200 W bulb. Also with
thermal filter included.



10°C to 40°C



19°C to 21°C



80%,
non-condensing



115 to 230 Vac
 $\pm 10\%$;
50 to 60 Hz



110 kg



IP40



IEC 61010
EN 60204
EN 61326-1



Serial
number



TESA
Inspection
report



Declaration
of conformity



Provided fully
mounted, but
w/o objective
(must be ordered separately)



Shipping
packaging

TESA-SCOPE II 355H or 355H Plus

Designed for checking round parts.



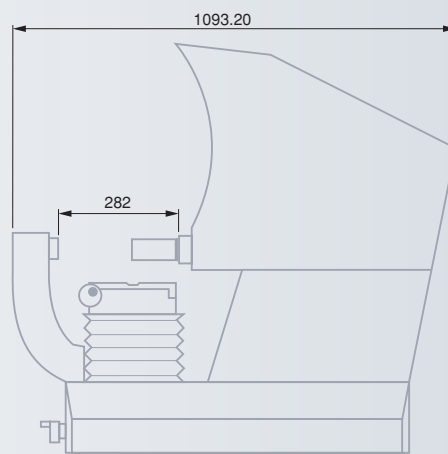
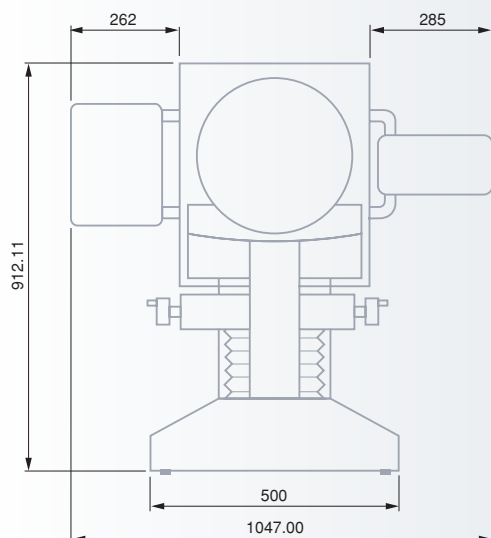
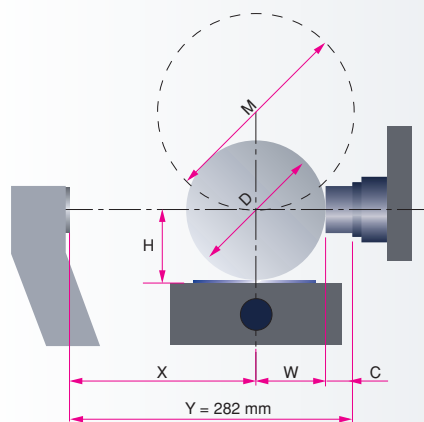
- Profile projectors with horizontal illumination.
- 360° rotary viewing screen in frosted glass, 355 mm diameter. 30°, 60° or 90° crossline reticle along with 4 overlay chart clips.
- Screen rotation with built-in sexagesimal and decimal reading, resolution in minutes – RAZ ABS/INC.
- Profile illumination with green filter included. Enhances image contrast, makes the measurement easier, reduces all effects due to the operator.
- Surface illumination through adjustable fibre optic for a perfect image projection.
- Save Lamp system for automatic shut down of the lamps whenever the projector remains unused for several minutes (thus increasing the life of the lamps by 5).
- Objectives with bayonet mount for quick exchange.
- Coordinate table equipped with incremental glass scales, opto-electronic. Resolution to 0,001 mm.
Measuring span:
 - 200 x 100 for the standard model
 - 300 x 100 for the model **Plus**
 - X-axis fitted with a clutch mechanism for fast displacement.
 - Control handle for left hand and right hand operator (X-axis motion).
 - Workload capacity up to 10 kg with no loss of accuracy.
- Lateral paper sheet holder.



		Base	Measuring table		Digital Readout / Control Panel		
			X=200 mm Y=100 mm	X=300 mm Y=100 mm	TS100	TS300	TS300E
							
TESA-Scope II 355H	06830051	●	●	—	●	—	—
TESA-Scope II 355H	06830052	●	●	—	—	●	—
TESA-Scope II 355H	06830053	●	●	—	—	—	●
							
TESA-Scope II 355H Plus	06830054	●	—	●	●	—	—
TESA-Scope II 355H Plus	06830055	●	—	●	—	●	—
TESA-Scope II 355H Plus	06830056	●	—	●	—	—	●

Telecentric Objectives

	10x	20x	25x	31,25x	50x	100x
	06860001	06860002	06860003	06860004	06860005	06860006
Object-field	35 mm	17,5 mm	14 mm	11,2 mm	7 mm	3,5 mm
working distance (W)	80 mm	82 mm	70 mm	56 mm	53 mm	43 mm
Maximum height (H)	100 mm	100 mm	100 mm	100 mm	100 mm	100 mm
Maximum diameter (D)	200 mm	200 mm	200 mm	200 mm	200 mm	200 mm
Objective length (C)	37 mm	35 mm	47 mm	61 mm	64 mm	74 mm
Max. width of component $X=Y-(W+C)$	165 mm	165 mm	165 mm	165 mm	165 mm	165 mm



Small Table

-  Anodized aluminium
-  Table surface
350 x 100 mm
(X/Y)
-  Measuring span
200 x 100 mm
(X/Y)
-  In one coordinate
direction:
(4,5 + L/40) µm
≤ 8 µm (L in mm)
-  Max.
workload capacity
10 kg

Large Table

-  Anodized aluminium
-  Table surface
440 x 100 mm
(X/Y)
-  Measuring span
300 x 100 mm
(X/Y)
-  In one coordinate
direction:
± 5,0 + L/20
(L in mm)
-  Max.
workload capacity
10 kg

Accessories



06860018	355 mm dia. viewing screen with 4 overlay chart clips
06860020	Profile lamp, 24 V – 150 W
06860021	Surface lamp 24 V – 200 W
06860024	V-blocks and centres
06860025	Vise stage
06860026	Vise stage with base
06860056	Rotary table for model 355H
06860057	Prism for rotary table N° 06860056
06860058	Vise for rotary table N° 06860056
06860059	Vertical support for glass plate



06860024



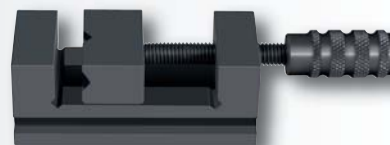
06860026 (Vise stage with base 06860025)



06860056



06860057



06860058



06860059



TS-300 or TS-300E Control Panel

Each unit is able to run TESA-REFLEX 2D – The Reference in terms of simplicity and reliability.

- Geometric form elements
 - Point – Line – Circle
- Measuring functions
 - Alignment – Input of reference values – Translation – Rotation
- Construction features
 - Intersection – Bolt hole circle – Line
- Result output
 - Data transfer through the RS232 output
 - Possible conversion into DXF format
 - Statistical data processing etc.



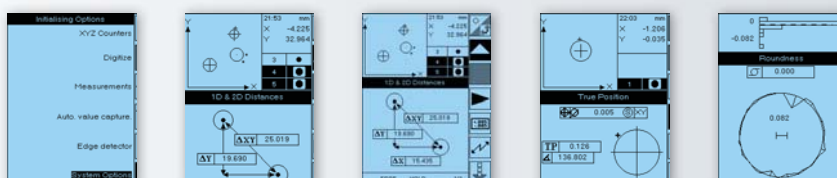
 89 x 118 mm display field with illuminated background

 7-decade digit display plus sign for all measured values.

 Icon-based User's guidance

 RS232

 Shipping packaging



- | | |
|-----------------|---|
| 06830031 | TS-100 Digital readout |
| 06830034 | TS-300 Control panel |
| 06830035 | TS-300-E Control panel with edge detector |





Brown & Sharpe V-Blocks and Clamps

V-Blocks have a frame for clamping cylindrical parts with diameters ranging from 0,7 to 40 mm– Used for workpiece inspection or machining.



Hardened steel



Ground resting faces and vee faces



Not available as single items



Suited plastic case



Clamping range
mm

06769007

Set of Brown & Sharpe V-blocks

0,7 ÷ 40

Supplied with:

1 Pair of V-blocks

5 ÷ 40

1 Extra V-block

3 ÷ 8

1 Extra V-block

1,5 ÷ 5

5 Extra V-blocks

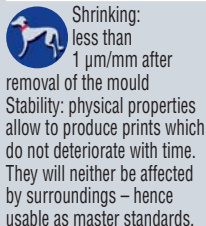
0,7 ÷ 3,5

2 In-between bridges

2 Large frames

1 Small frame





A collection of various plastic and metal components, including pipes, fittings, valves, and flanges, arranged on a reflective surface. The components are in various colors (orange, blue, green, white, grey) and shapes, demonstrating the versatility of injection molding.

The test object to be reproduced by print molding must be perfectly clean as well as non-greasy before applying Plastiform.



1 DS50 injection handle
1 Cutter, special with two parallel blades
1 PLASTIN (200 g)
50 Mixer-Injectors
10 Injector end pieces
1 DN1 spot remover, 400 ml
21 Rings for mould removal
3 PLASTIFORM BAD 50 ml
3 PLASTIFORM DAV 50 ml
2 PLASTIFORM RGX80 50 ml



	BAD	DAV	RGX80	LKAD
Consistency (max 15)	Fluid (2)	Fluid (4,5)	Pasty	Malleable
Hardness (shore A)	50	20	80	70
Cut using the dual-blade cutter	easy	uneasy	easy	easy
Check				
– with contact		–		
– without contact				
– Roughness	–	–		–
Elasticity	flexible	highly flexible	rigid	rigid



BAD ●

Fluid consistency best suited for moulding internal and full prints of small and medium sizes. Medium elasticity (10% of the core) allows prints to be removed in most cases. Reproduces the finest details and can be used for indirect inspection of the surface finish by sight comparison with use of master roughness specimens. Easily cut with the special cutter.

DAV ●

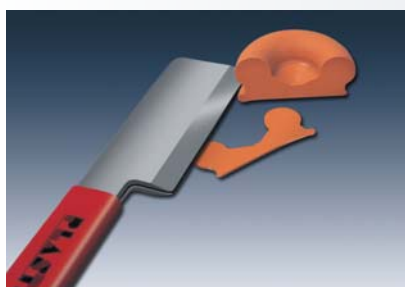
Fluid consistency best suited for moulding internal and full prints of small and medium sizes. High elasticity (20% of the core) allows hard prints to be removed such as large re-entrant angle, groove, complex internal shape. Reproduces fine details. Uneasy to cut with a cutter. Print will be preferably checked as a whole.

RGX80 ●

RGX80 is the hardest product of the cartridge range. Pasty consistency best suited for moulding whole internal prints having varying sizes. Weak stretching property and elasticity make it appropriate for easily removable moulding prints.

LKAD ●

Malleable consistency best suited for moulding internal, external and sectorial prints of small and medium sizes. Applied by hand. Low elasticity (from 1 to 2% of the core) makes it convenient for moulding prints that are removed with ease. Also appropriate for prints held mechanically if desired. Easily cut with the cutter.



Accessories



06869101	BAD PLASTIFORM, 8 double cartridges, 50 ml
06869102	DAV PLASTIFORM, 8 double cartridges, 50 ml
06869119	PLASTIFORM Test Kit BAD 10 double cartridges of 5 ml + 15 mixer-injectors + 2 rings for mould removal
06869120	PLASTIFORM Test Kit DAV 10 double cartridges of 5 ml + 15 mixer-injectors + 2 rings for mould removal
06869118	RGX80 PLASTIFORM S50, 8 double cartridges, 50 ml
06869121	LKAD PLASTIFORM in packs of 2 boxes, 750 g each
06869106	Mixer-injectors in packs of 50
06869107	Mixer-injectors in packs of 100
06869108	Mixer-injectors in packs of 200
06869109	Injector nozzles in packs of 20
06869110	PLASTIN (200 g). Malleable under normal conditions. Used to make «stops» or «retainers» when executing sectorial prints. Reusable.
06869111	Cutter, special with two parallel blades spaced 1 mm apart over a usable length of 60 mm.
06869112	DS 50 injection handle
06869113	DN1 spot remover, aerosol can, 400 ml

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

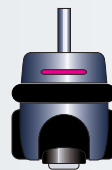


TESASTAR-i

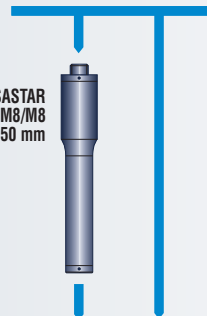


TESASTAR-i M8

TESASTAR-i M8



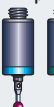
TESASTAR
M8/M8
50 mm



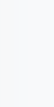
TESASTAR-rp



TESASTAR-p



TESASTAR-mp

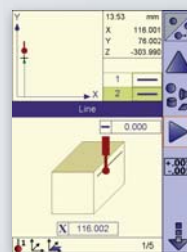
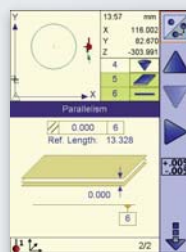
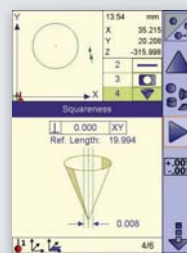
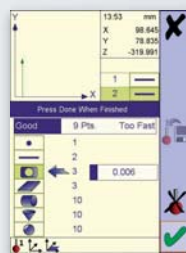


TESA Micro-Hite 3D manual Machine Version 454 or 474

- 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



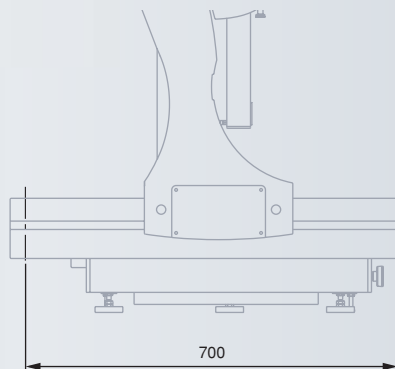
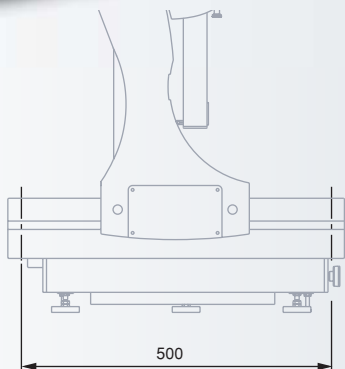
7-decade display (digits) plus sign for the measured values. Icon-based graphic User's interface.



RS232



$MPE_E^* = (3 + 4 L/1000) \mu m$
 $MPE_P = 3 \mu m$
* 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 NL/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

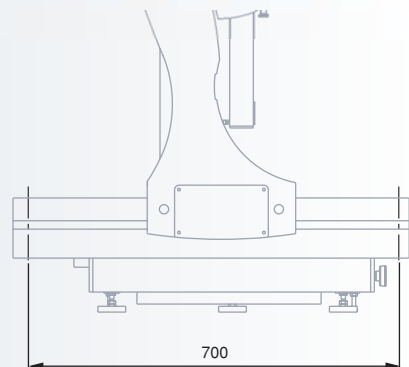
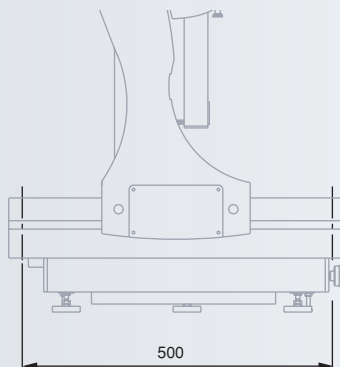
TESA Micro-Hite 3D 454 or 474, Remote Control Machine Version

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.



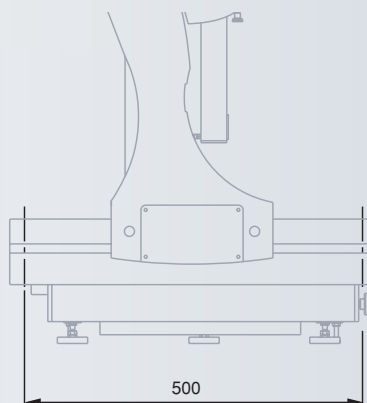
TESA Micro-Hite 3D 454, Recorder Machine Version

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 Nl/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

			03939042	03939242	03939043	03939243	03939120	03939122	03939169
		Machine version	MH3D F	MH3D F	MH3D Fi	MH3D Fi	MH3D RC	MH3D RC	MH3D Recorder
		Machine type	454	474	454	474	454	474	454
Consisting of:									
03939020	Fine adjust device	●	●	●	●	●	●	—	
	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

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.



Wireless



General



Glass fibre arm.
Plastic housing.

TESA-REFLEX MULTI-GAGE control panel



7-decade display (digits) plus sign for the measured values. Icon-based graphical User interface.



$MPE_E^* = (5 + L/40) \leq 18 \mu m$
 $MPE_P = 8 \mu m$
* L in mm

Additional technical Data on opposite page.



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.



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: $\pm X$, $\pm Y$, $\pm Z$



Free stylus travel: $X/Y \pm 20^\circ$, $Z + 6 \text{ mm}$



Shipping box



Inspection report with a declaration of conformity

TESASTAR-i



168 indexing positions



Indexation in increment of 15° clearly visible



Probe orientation: $A = 0^\circ$ up to 90° $B = \pm 180^\circ$



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



www.tesastar.com

TESASTAR, TESASTAR-i, TESASTAR-m Probe Heads



Unidirectional



μm



0,1 ÷ 0,3 N



M3



15°



Positions



Positioning

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



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
 $\pm X, \pm Y, \pm Z$



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



600 µA
(external supply)



Free
stylus
travel:
X/Y $\pm 14^\circ$, Z + 4 mm
(TESASTAR-p)
X/Y $\pm 22^\circ$, 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

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.



Unidirectional
µm

Styli length
mm

03939350

TESASTAR-rp

≤ 0,35

0,1 ÷ 0,3 N

≤ 100



TESASTAR-mp Magnetic Probes For Probe Heads

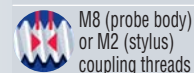
These touch trigger probes include two main parts, i.e. the stylus and the probe body. The isostatic and magnetic system coupling both parts provides a positioning repeatability that let the probe be changed either manually or automatically, without the need for requalification for the stylus.

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.



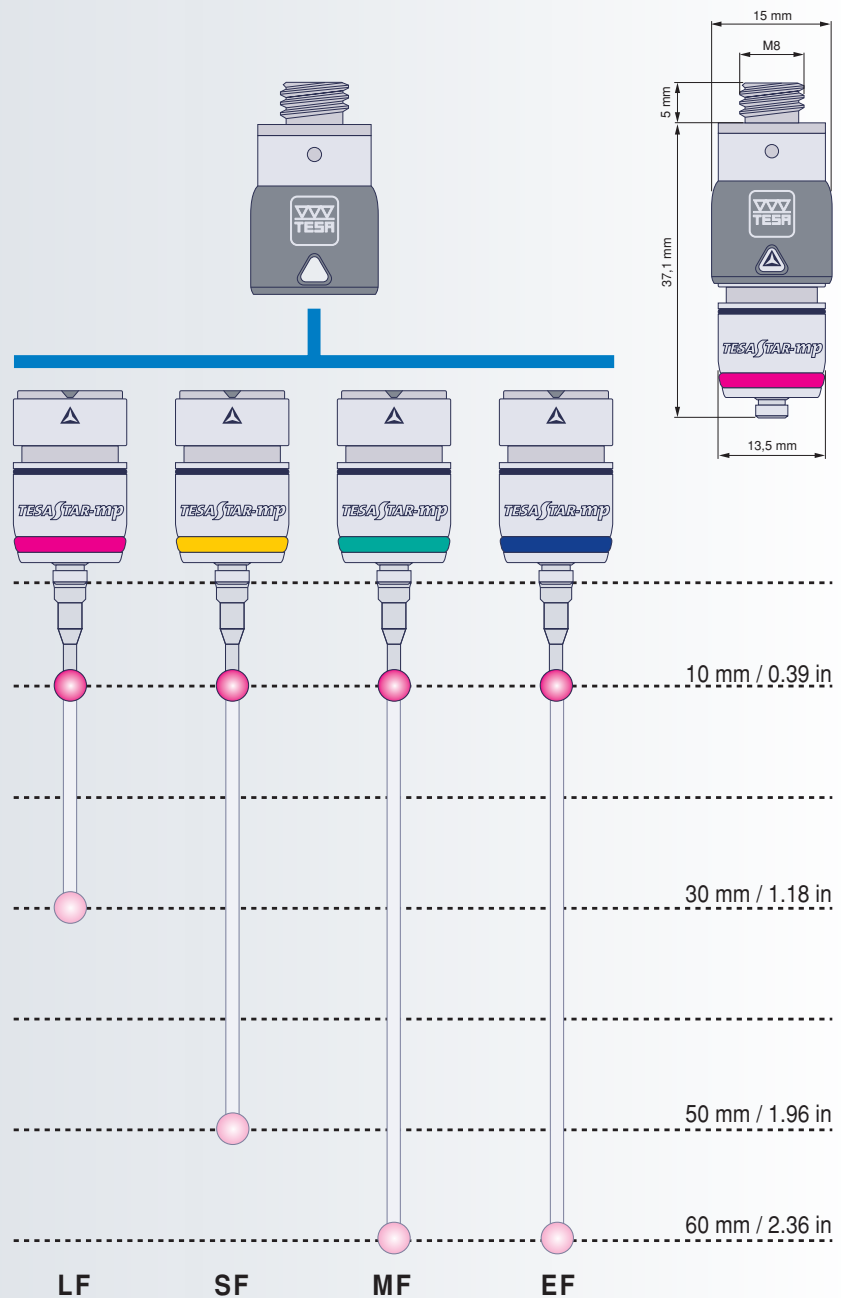
No					
03939170	TESASTAR-mp LF – Low Force	0,055 N, L = 10 mm	Red	0,35 μ m	
03939171	TESASTAR-mp SF – Standard Force	0,08 N, L = 10 mm	Yellow	0,35 μ m	
03939172	TESASTAR-mp MF – Medium Force	0,10 N, L = 25 mm	Green	0,5 μ m	
03939173	TESASTAR-mp EF – Extended Force	0,10 N, L = 50 mm	Blue	0,65 μ m	
03939174	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



www.tesastar.com

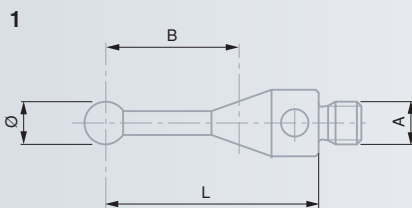
									
		Relevant drawing	A	mm Ø	L	B	g	Probe shaft	
1 M2 coupling thread, L = 10 mm									
03969201	Stylus with ruby ball tip, 1 mm dia.	1	M2	1	10	4,5	0,3	Stainl.steel	
03969202	Stylus with ruby ball tip, 2 mm dia.	1	M2	2	10	6	0,3	Stainl.steel	
03969203	Stylus with ruby ball tip, 3 mm dia.	1	M2	3	10	7,5	0,4	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	





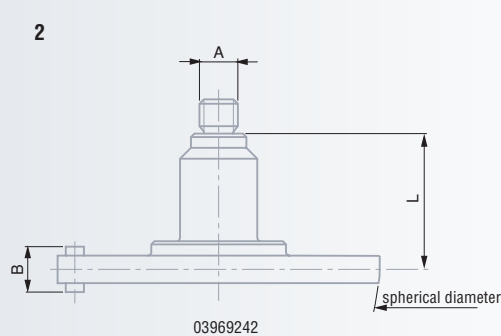
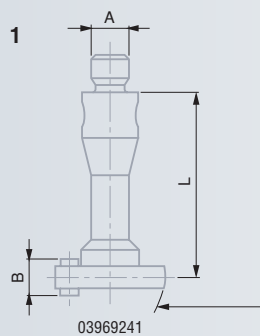
Probe styli for probe heads

		Relevant drawing		mm	L	B			Probe shaft
			A	Ø					
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

			Relevant drawing		mm	L	B	g	 Probe shaft
				A	Ø				
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	



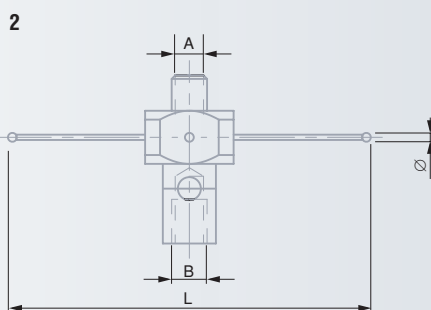
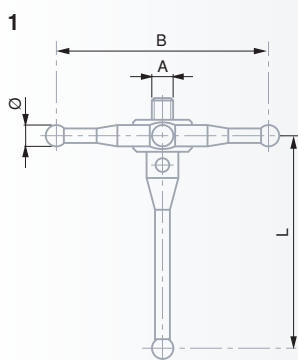
Pointer probe styli

			Relevant drawing	 mm A	Ø	L	B°	g	 Probe shaft
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



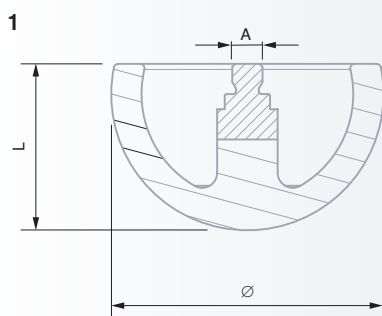
Star probe styli

		Drawing		mm	L	B		
			A	Ø			g	Probe shaft
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



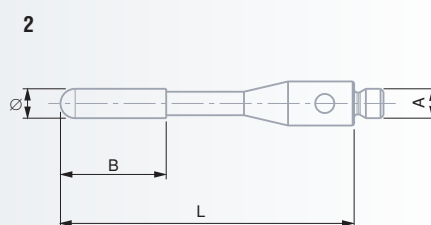
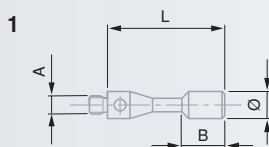
Hollow ball probe styli

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



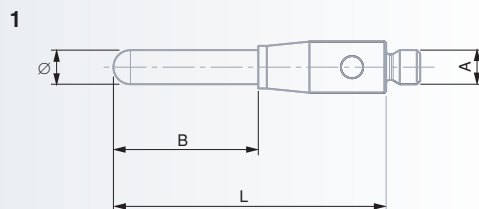
Cylindrical probe styli

№		Relevant drawing	A	mm		L	B	g	Probe shaft
				Ø					
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



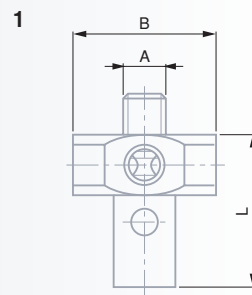
Parallel probe styli

№		Relevant drawing	A	mm		L	B	g	Probe shaft
				Ø					
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	A	mm		L	B	g	Probe shaft
				Ø					
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

		Relevant drawing		mm	L	B	 g	 Probe shaft
			A	Ø				
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

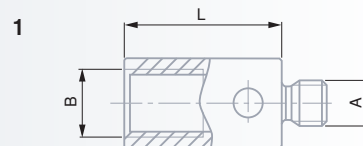


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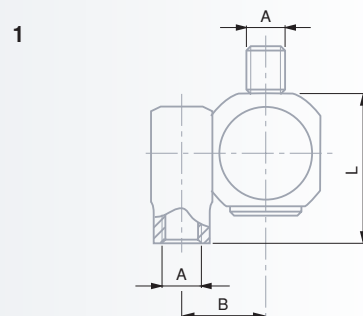
Adapters

№		Relevant drawing	mm		L	B	g	Probe shaft
			A	Ø				
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



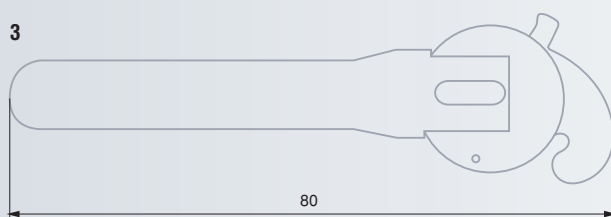
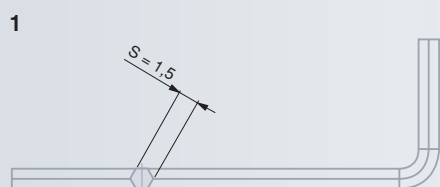
Articulations

№		Relevant drawing	mm		L	B	g	Probe shaft
			A	Ø				
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	–	–	–	–	–
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–	1	–	–	–	–
1	–	–	–	–	–
–	1	–	–	–	–
–	–	–	–	–	–
2	–	–	–	1	–
6	–	–	–	1	–
2	–	–	–	1	–
2	–	–	–	1	–
–	–	–	–	–	–
2	–	–	–	–	–
1	–	–	–	–	–
1	–	–	–	–	–
1	–	–	–	–	–
–	–	–	–	–	–
2	–	–	–	1	–
1	–	–	–	1	–
–	–	–	–	1	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	1	1	–	1
–	–	1	1	–	1
–	–	1	1	–	1



03969076



TRADEMARKS REGISTERED IN SWITZERLAND AND OTHER COUNTRIES



TECHNOLOGY

CARY

SWISS

compac[®]

Interapid
SWITZERLAND



- TESA
- TESA fig.
- CAPA μ SYSTEM fig.
- CARY
- COMPAC
- COMPAC fig.
- COMPAC GENEVE fig.
- COMPACLOG
- DIAMASTER
- DIGICO
- DIGIT-CAL
- DIGITMASTER
- ETALON fig.
- ETALON SWITZERLAND fig.
- IMICRO
- INOTEST
- INTERAPID
- INTERAPID fig.
- ISOMASTER
- JUNIOR fig.
- MAGNA μ SYSTEM fig.
- MESOBOR
- MICRO-HITE

- MICROMASTER
- μ HITE fig.
- POPCAL
- ROCH FRANCE fig.
- RUGOSURF fig.
- SHOP-CAL
- STANDARD GAGE fig.
- TESA DUOTAST
- TESA EAGLE fig.
- TESA-HITE
- TESA MEMO-HITE
- TESA MICRO-HITE
- TESA MULTI-GAGE
- TESA-REFLEX
- TESA STAT
- TESA SWISS SET
- TESA SWISSCAL
- TESA SWISSDIAL
- TESA SWISSLINE
- TESA SWISSTAST
- TESA-CAL
- TESADIA
- TESADIGIT

- TESAMASTER
- TESA- μ HITE fig.
- TESANORM fig.
- TESASCAN
- TESA-SCOPE
- TESASET
- TESASTAR
- TESASTAR fig.
- TESA-SWISSMASTER fig.
- TESATEST
- TESATEST
- TESATRONIC
- TESATRONIC MULTILINE
- TESA-VISIO
- TRI-O-BOR
- TRIOMATIC
- UNIMASTER
- UNITEST
- UNITEST fig.
- VALIDATOR fig.
- VERIBOR

TRADEMARKS REGISTERED IN VARIOUS COUNTRIES

- ALESOMETRE
- ALESOTEST
- DURA-CAL

- ETALON
- JUNIOR
- MERCER

- MICROMASTER
- ROCTEST
- TESA DIGITMASTER



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NOTES



LEXICON OF PICTOGRAMS



	TESA Design SWISS MADE		Height of signs/digits		Diameter		Maximum relative humidity
	TESA Design – Product from the European Community		Analogue/numerical indication		Thread pitch		Degree of protection
	TESA Design – Product produced outside Europe		Material measure Measuring system		Material Hardness		Electromagnetic compatibility
	Product from the European Community		Capacitive measuring system «capa μ system», patented		Measuring force		Mass
	Product produced outside Europe		Magnetic measuring system «magna μ system», patented		Shockproof design		Included in scope of supply
	Order number		Units of measurement		Maximum displacement speed		Packaging
	Standard		Metric/inch conversion		Product designation		Identification number
	Measuring range Measuring span		Maximum permissible errors Limit deviations		Execution		Declaration of conformity
	Range of indication Max. plunger travel		Deviation span of indication		Special features		Inspection report
	Displacement range		Repeatability limit		Notes		Inspection report with a declaration of conformity
	Application range		Hysteresis		Function mode		SCS calibration certificate
	Analogue indication Longitudinal scale		Maximum permissible straightness error		Floating zero		Certificate of another type
	Upper vernier		Maximum permissible flatness error		Blocking of display		Page
	Lower vernier		Maximum permissible roundness error		Locking of display		Centred lug back
	Circular scale		Maximum permissible parallelism error		Digital interface		Centred revolution counter
	Dial		Maximum permissible cylindricity error		Analogue interface		Reverse numbering or +left
	mm or in/revolution		Maximum permissible perpendicularity error		Control functions		Dial locking knob
	Number of scale divisions		Maximum permissible runout error		Power supply		TESA
	Scale spacing		Quality grade		Autonomy		MERCER
	Scale interval		Uncertainty of measurement Accuracy		Coefficient of linear expansion		ETALON
	Resolution Magnification		Frame		Working temperature range		ROCH
	Numerical scale		Measuring face or faces		Operating temperature range		COMPAC
	Numerical interval		Dimensions		Storage temperature range		HEXAGON