



**TESA**  
TECHNOLOGY

**S M A R T**  
**MEASUREMENT**  
**SOLUTIONS**

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**CATALOGUE**



**TESA**  
TECHNOLOGY

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### **Welcome to a new era at TESA Technology**

We're proud to return to our roots – a place where we can be bold once again and focus exclusively on what we do best: precision measurement. With complete dedication to meticulous design, engineering, and reliability, we continue a legacy of excellence that has distinguished us for over 80 years.

Each of our instruments is crafted to the highest standards, standing as a testament to our unwavering commitment to quality, reliability, and longevity. Our mission is to bridge the expertise of our past with today's pioneering spirit, blending tradition and innovation to create solutions that not only meet current demands but endures for generations.

This catalogue is more than a product lineup; it embodies TESA Technology's promise of excellence and our dedication to advancing precision measurement across industries worldwide. Whether you're seeking solutions for quality control, durability, or cutting-edge technology, you'll find in these pages the reliability and trustworthiness that make us the global benchmark in precision measurement.

We invite you to explore our catalogue and discover the lasting quality of TESA Technology – precision instruments crafted to perform today and inspire tomorrow.

— Uwe Burkardt, Marketing Director

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# OUR ESSENTIALS





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## Chapters

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Connectivity



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### ***Towards a connected company...***

Thanks to advancements in the field of information technology, robotics, and more, digital technologies are being increasingly utilized in workshops around the world. Even though some companies continue to employ the traditional pen-and-paper method to ensure traceability of the parts they produce, the boundary between the physical and digital worlds is gradually fading.

In the current context of Industry 4.0, competitiveness and flexibility go hand in hand with the digitalization of businesses. Productivity gains, cost reduction, and product and process improvement are generally discussed. Consequently, real-time monitoring and control of one's production become relatively important.

In this context, instrument connectivity becomes an indispensable feature. Connecting measurement instruments to a computer opens up powerful possibilities (reports, statistical analysis, etc.) and clearly fulfills data management expectations for both small enterprises and larger companies.



### ***A wide range of possibilities***

In this chapter, you will find several options for connecting TESA instruments to a peripheral device and receiving the data for further processing. To achieve this, TESA not only offers various types of connections between the measuring instrument and the computer, but also powerful and comprehensive data management software solutions.



## Connectivity

### **Send your data to a free software, DATA-VIEWER**

Data acquisition has never been easier! TESA digital instruments with Bluetooth® and USB connection are automatically recognized by the software, and the measured values are displayed in a user-friendly environment. Once the data is loaded into the TESA DATA-VIEWER software, it can be exported to other software such as STAT-EXPRESS, Q-DAS, or Excel, and customized to fit your own format.



### **A appreciated modular system**

With the flexibility provided by the TLC (TESA Link Connector) connector, the issue of data transmission is no longer a source of stress during the initial purchase of the instrument. Indeed, by externalizing the technology related to data management into this accessory, TESA enables updating its instruments at any time, whether for cable-based or wireless management.



The TLC cap comes in two versions: with cable or wireless transmission

Family	Model		Designation	Connector type
Calipers	Universal models		TWIN-CAL TWIN-CAL IP67	TLC
	Workshop models		TWIN-CAL IP67	TLC
	Workshop models with knife-edge internal jaws		TWIN-CAL IP67	TLC
	Depth models with short cut measuring face		TWIN-CAL IP67	TLC
	Depth models with fixed hook(s)		TWIN-CAL IP67	TLC
	Depth models with rotary stop plate		TWIN-CAL IP67	TLC
	Depth model with steel measuring tip		TWIN-CAL IP67	TLC
Micrometers	External models		MICROMASTER RS	Opto-RS232
	External model with fine inserts		MICROMASTER RS	Opto-RS232
	Internal models		IMICRO RS	Opto-RS232
Dial gauges			DIALTRONIC	Inductive USB
Display units	Portable display unit with 1 probe input		TWIN-T10	TLC
	Double display unit with 2 Heidenhain probe inputs		TWIN-T20	TLC, RS232
	Double display unit with 2 Heidenhain probe inputs		TWIN-T20 nano	TLC, RS232
Height gauges	1D manual		TESA-HITE MAGNA TESA-HITE	TLC
	2D manual		MICRO-HITE	TLC
	2D motorised		MICRO-HITE+M	TLC
Measuring station	2D motorised		μ-HITE	TLC
Clinometers			CLINOBEVEL 1	USB, RS-485
			CLINOBEVEL 3	USB, RS-485
Roughness gauges	Portable		RUGOSURF 20	Micro-USB
	Ultra-compact		TWIN-SURF	USB C
	Roughness and profile measurement		RUGOSURF 90G	Micro-USB

## Connectivity

### TLC-BLE emitter

- CONNECTOR
  - Guarantees an IP67 protection rating at all times
- MEASUREMENT
  - Allows users to connect TESA instruments to a computer
  - Paired with the free TESA DATA-VIEWER software, data is easily collected, analyzed, and stored



Range	12 m (depending on environment)
Degree of protection	IP67
Weight	7,2 g
Power supply	CR2032 button battery
Operating temperature	10 ÷ 40 °C
Countries/regions certified for Bluetooth® option use	DE, AT, BE, BG, CA, CN, CY, KR, HR, DK, ES, EE, US, FI, FR, GR, HU, IN, IE, IS, IT, JP, LV, LI, LT, LU, MT, NL, NO, PL, PT, CZ, RO, GB, SK, SI, SE, CH, TW, TR

Article number	Designation
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable

### TLC-BLE adapters

- CONNECTOR
  - Guarantees an IP67 protection rating at all times
- MEASUREMENT
  - Allows users to connect TESA instruments to a computer
  - Paired with the free TESA DATA-VIEWER software, data is easily collected, analyzed, and stored



04760178



04760179

Countries/regions certified for Bluetooth® option use: DE, AT, BE, BG, CA, CN, CY, KR, HR, DK, ES, EE, US, FI, FR, GR, HU, IN, IE, IS, IT, JP, LV, LI, LT, LU, MT, NL, NO, PL, PT, CZ, RO, GB, SK, SI, SE, CH, TW, TR

Article number	Designation
04760178	Opto-RS232 to TLC adapter
04760179	RS232 to TLC adapter

### TLC connection

- CONNECTOR
  - Guarantees an IP67 protection rating at all times
- MEASUREMENT
  - Allows users to connect TESA instruments to a computer
  - Paired with the free TESA DATA-VIEWER software, data is easily collected, analyzed, and stored



04760181



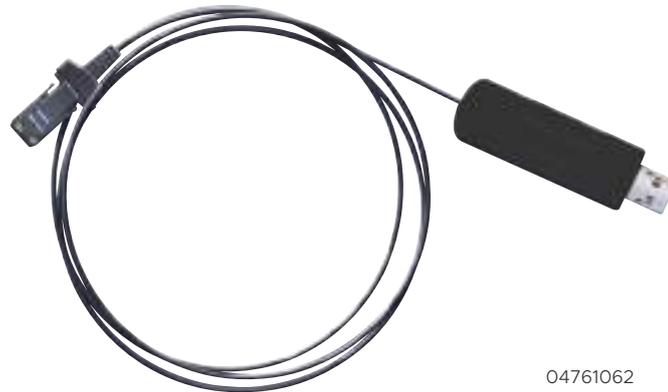
04760182

Degree of protection: IP67

Article number	Designation	Length m	Connector (instrument side)	Connector (PC or system side)
04760181	TLC-USB cable	2	TLC	USB
04760182	TLC-DIGIMATIC cable	2	TLC	Ansley 10p/f

## Cable connection

### Opto connection



04761062

Article number	Designation	Length m	Connector (instrument side)	Connector (PC or system side)
<b>04761062</b>	Opto-RS232 to USB cable, duplex, 2 m	2	Opto-RS232	USB
<b>04761049</b>	Opto-RS232 to Sub-D 9p/f cable, duplex, 2 m	2	Opto-RS232	Sub-D 9p/f
<b>04761027</b>	Opto-RS232 cable, without connector, 2 m	2	Opto-RS232	Without connector

### USB connection



Article number	Designation	Length m	Connector (instrument side)	Connector (PC or system side)
<b>04760099</b>	USB to micro-USB cable	2	Micro-USB	USB
<b>06960062</b>	USB cable, RUGOSOFT 90G to computer	1,8		USB
<b>04760151</b>	USB A to USB B cable, 1,8 m	1,8	USB A	USB B
<b>04760152</b>	USB A to USB C cable, 1 m	1	USB C	USB A
<b>04760160</b>	Cable inductive to USB, 3 m	3	Inductive	USB
<b>04760161</b>	Cable power to USB, 3 m	3	Power	USB
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m	3	Power (90 degrees)	USB

**Sub-D connection**



04761052

Article number	Designation	Length m	Connector (instrument side)	Connector (PC or system side)
<b>04761063</b>	Sub-D 9p/m to USB cable, 2 m	2	Sub-D 9p/m	USB
<b>04761052</b>	Sub-D 9p/f to Sub-D 9p/m cable, 2 m	2	Sub-D 9p/m	Sub-D 9p/f
<b>04761073</b>	Sub-D 9p/m to USB adapter	0,1	Sub-D 9p/m	USB
<b>03969007</b>	Sub-D 9p/f to Sub-D 9p/f cable, 3 m	3	Sub-D 9p/f	Sub-D 9p/f

## Batteries, power supplies and cables

### Power supplies and cables



04761054

Article number	Designation	Length m
<b>06960046</b>	Power supply 100 ÷ 240 V, 50 ÷ 60 Hz, 12 V, 400 ÷ 600 mAh for RUGOSURF 20	
<b>00760258</b>	Adapter + 14 V charger (cables not included)	
<b>04761054</b>	Power supply 100 ÷ 240 Vac, 50 ÷ 60 Hz, 6,6 Vdc, 750 mAh	
<b>04760153</b>	M4P-3 power supply + EU, UK, US, and CH adapters	
<b>04761055</b>	Power cable, UE	1,8
<b>04761056</b>	Power cable, US	1,8
<b>04761072</b>	Power cable, UK, 1,8 m	1,8
<b>04460016</b>	TWIN-T20 power supply + UE, UK, US and CH cables	1,2
<b>02160038</b>	Power supply 80 ÷ 240 Vac, 50 ÷ 60 Hz for TPS	

### Batteries



00760256

Article number	Designation
<b>00760256</b>	Rechargeable battery block
<b>06960063</b>	Battery NiMH 8,4V, 170 mAh, format PP3

### Printer for MICRO-HITE range

Together with instruments in the MICRO-HITE range as well as the TESA  $\mu$ -HITE measuring station, data can be automatically and directly sent to a printer connected to the control panel.

As the printer is optional, it can be connected to an instrument in this range at any time of its use.



00760235

Article number	Designation
00760235	USB printer

### Printer for TWIN-SURF roughness gauge



06960090

Article number	Designation
06960090	Bluetooth® printer

### Thermal paper



00760250

Article number	Designation
00760250	4x thermal paper, 58 mm, for TWIN-SURF and MICRO-HITE printers



# Software



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## ***Traceability, one of the new industrial challenges***

Industrial challenges no longer revolve solely around meeting delivery deadlines, reducing stocks, or optimizing productivity. Having accurate information about manufactured products is an essential step for industries. They must be able to track the manufactured product, ensure its quality, and guarantee its traceability throughout its lifecycle.



## ***Retrieve data with ease***

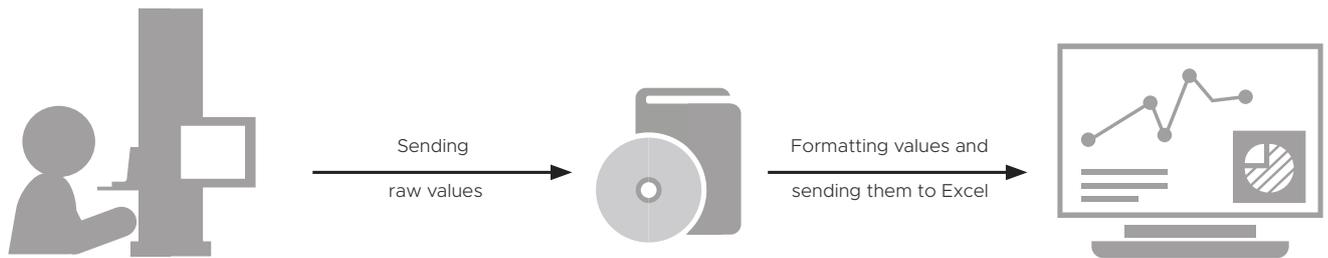
Most of the TESA instruments are compatible with the free TESA DATA-VIEWER software, allowing a quick and easy handling of all measurement data. The data is then automatically transferred to files in known formats such as \*.xls, \*.csv, or Q-DAS.



## Software

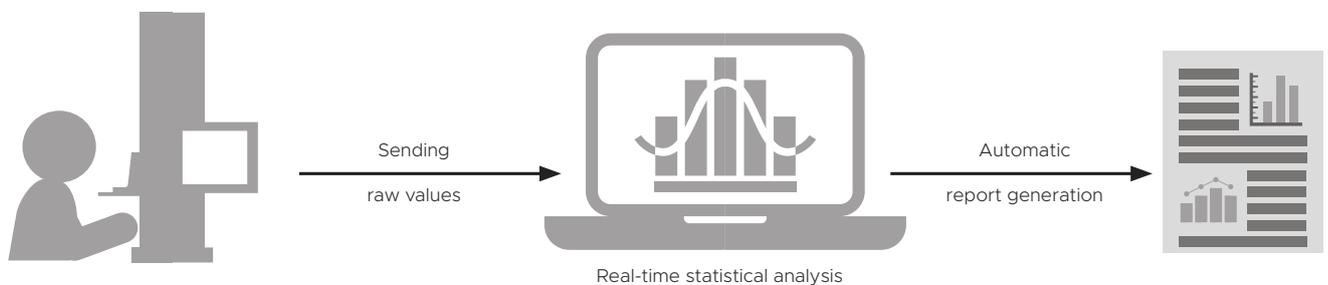
### ***Fill out a report template in real time***

With the TESA DATA-DIRECT software, one or several mechanical parts can be measured and the data can be automatically formatted in a previously prepared report template (for example Excel). Once the measurement has been recorded, the report is directly accessible.



### ***The quick and easy statistical software***

The SPC (Statistical Process Control) TESA STAT-EXPRESS software is the way to calculate in real time all the important characteristics during statistical analyses. Quick to learn, it manages also automatically the measuring reports.



## DATA-VIEWER

- AVAILABILITY
  - Software downloadable free of charge from the TESA website
- CONNECTIVITY
  - For receiving data via cable (USB)
  - For receiving data via Bluetooth®
  - Instruments automatically recognized and connected
  - Reception via USB dongle or integrated computer dongle (from Windows 10)
  - Possibility to connect up to 40 instruments simultaneously
  - Compatible with a USB foot pedal for sending values
- INTERFACE
  - Clear interface for easy handling without confusion
- DATA MANAGEMENT
  - Transmission of measured values from the measuring instrument or from DATA-VIEWER
  - Real-time export of results to EXCEL or Q-DAS software
  - Automatic creation of files in \*.csv or \*.txt formats
  - Data transmission format to an active field or a virtual port
- MEASUREMENT REPORT
  - Real-time filling of report templates created in external program (e.g. Excel)



Compatibility	<ul style="list-style-type: none"> <li>- Wired connection TLC-USB</li> <li>- Bluetooth® connection TLC-BLE</li> <li>- DIALTRONIC serie</li> <li>- USB pedal</li> <li>- All instruments with an opto-RS232 output using the 04760178 adapter</li> <li>- All instruments with a Sub-D 9p-RS232 output using the 04760179 adapter</li> </ul>
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Article number	Designation
<b>DATA-VIEWER</b>	Free data acquisition software

## Data processing software

### DATA-DIRECT

- AVAILABILITY
  - Free limited version downloadable from the TESA website
- CONNECTIVITY
  - For data reception via cable (USB)
  - For data reception via Bluetooth® (through the use together with DATA-VIEWER)
  - Compatible with a USB foot pedal for sending values
- DATA MANAGEMENT
  - Transmission of measured values from the measuring instrument or from DATA-DIRECT
  - Real-time export of results to third-party processing software
  - Configurable data transmission format (Cells management)
  - Continuous transmission at a configurable regular interval (Data pooling)
  - Automatic creation of files in .csv format
- MEASUREMENT REPORT
  - Allows for real-time filling of report templates created in external program (e.g. Excel)



Compatibility

- All instruments connectable to DATA-VIEWER
- Customizable RS232 connection for all instruments on the market

Included in delivery

- Installation file and user manual provided on a USB drive
- USB license key (dongle)
- Declaration of conformity

Article number

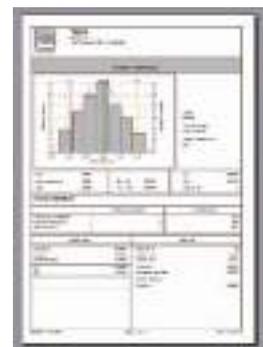
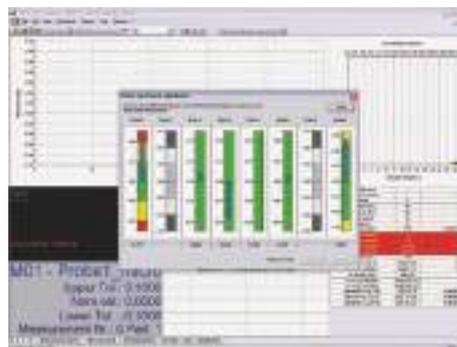
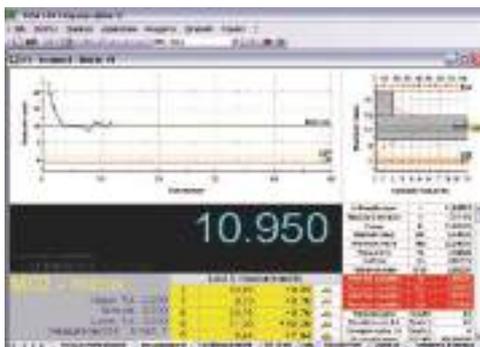
Designation

04981001

DATA-DIRECT software

## STAT-EXPRESS

- AVAILABILITY
  - Free limited version downloadable from the TESA website
- CONNECTIVITY
  - For data reception via cable (USB)
  - For data reception via Bluetooth® (through the use together with DATA-VIEWER)
- MEASUREMENT
  - Measurements by part or by characteristic
  - Unlimited creation of measurement programs
  - Simultaneous acquisition of several measurement programs
  - PASS/FAIL classification on the display of the digital TWIN-CAL caliper
- DATA MANAGEMENT
  - Measured value is displayed in real time
  - Statistics calculation and XR control card in real time
  - Accesses protected by user level
  - Import/export of \*.csv file
- MEASUREMENT REPORT
  - Report per measured characteristic or per measured part
  - Automatic creation of measurement protocols with photo and operational instruction
  - Complete report with statistics
  - Measurement report in \*.pdf, \*.html or other format



Compatibility	<ul style="list-style-type: none"> <li>- All instruments connectable to DATA-VIEWER</li> <li>- Customizable RS232 connection for all instruments on the market</li> </ul>
Included in delivery	<ul style="list-style-type: none"> <li>Installation file and user manual provided on a USB flash drive</li> <li>USB license key (dongle)</li> <li>DATA-DIRECT software (included in STAT-EXPRESS)</li> </ul>

Article number	Designation
<b>04981002</b>	STAT-EXPRESS software

## Software for gauge block comparators

### TESA UP

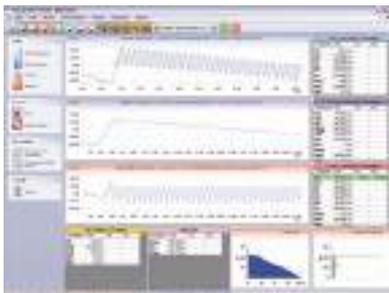
- RESULTS AND MEASUREMENT REPORTS
  - Customized measurement report templates
  - Real-time completion of measurement reports
  - Assignment of standard gauge blocks to their respective classes
  - Automatic sending of measurement reports via email
- FEATURES
  - Wide range of measurement methods
  - Selection of standard or custom quality classes
  - Customizable certificate templates
  - Automatic calculations and classifications based on inspection conditions
  - Client records and order management
  - Unlimited database
  - Data backup for gauge block sets
  - Automatic execution of all corrections (e.g., accounting for the actual dimension of reference standards and flattening due to the use of different types of materials (steel, carbide, ceramic), temperature compensation based on linear expansion coefficients)
  - Processing of metric and imperial values

Standard	ISO 3650
Units	mm / in
Software min. requirements	Windows 10 (32 or 64 bits) or later version
Hardware min. requirements	Processor: Intel core I3 or higher RAM minimum: 8 MB Hard disk: 500 GB
Compatibility	For any system upgrade to TESA UP 3.x please contact your local dealer to confirm the compatibility of TESA UP with your instrument.

Article number	Designation
<b>05960042</b>	TESA UP software, V3.x
<b>05960043</b>	TESA UP software, V3.x + computer

## MEASUREMENT STUDIO

- COMPATIBILITY
  - For RUGOSURF 90G
- FUNCTIONS
  - Remote management of measurement start-up and calibration
  - Visualization of the measured parameters
  - Visualization of roughness profiles R, primary P and waviness W
  - Calculation of roughness parameters, including VDA parameters
  - Calculation of statistics from a set of measurements
  - Adjustable upper and lower tolerance for each parameter
  - Creation and storage of measurement programs (instrument settings and parameters to be measured)
  - Transferable measurement programs on the instrument
  - Measurement report with customizable header
  - 51 parameters available
- DATA MANAGEMENT
  - Connection to the instrument via USB
  - Import of saved measurements from the instrument to the computer, for the management of a database
  - Measurement report in \*.xls, \*.pdf, \*.doc, \*.rpt or \*.rtf format



Per VDA 2007			
Parameter	Value	Tol	Tol+
WDSm	0.273 µm		
WDe	0.971 µm		
WDI	2.243 µm		

Included in delivery

License key (dongle)  
 USB-PC connection cable, 1,8 m  
 Installation file and user manual provided on a USB drive

Article number	Designation
06960048	MEASUREMENT STUDIO software

## Software for roughness gauges

### DATA-STUDIO

- COMPATIBILITY
  - RUGOSURF 20 (wired connection)
  - TWIN-SURF (wired and Bluetooth® connection)
  - Wireless printer (Bluetooth®)
- FUNCTIONS
  - Remote management of measurement start and calibration
  - Visualization of the measured parameters
  - Visualization of the measured roughness profiles R, primary P and RK
  - Calculation of roughness parameters, including VDA parameters
  - Statistical calculations from several measurements
  - Adjustable upper and lower tolerance for each parameter
  - Creation and archiving of measurement programs (instrument settings and parameters to be measured)
  - Measurement programs transferable to the instrument
  - Measurement report for each parameter head
  - 57 parameters available with the Premium version
- DATA MANAGEMENT
  - Connection to the instrument via USB or Bluetooth® (depending on the instrument)
  - Import of measurements saved from the instrument to the computer for data base management
  - Printing of results with printer accessory
  - Measurement report in . xls and .pdf format



Included in delivery

USB key including:  
Licence key  
User manual  
Software installation file

Article number	Designation
06960091	DATA-STUDIO software



# Calipers



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## The essential instrument

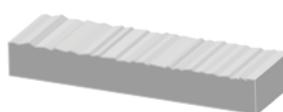
Calipers are the most popular measuring instruments used worldwide. Owing to their simple construction, ease of handling and secure operation, they are highly appreciated by all kinds of users.

With its wide variety of models, TESA wishes to offer everyone the opportunity to find the right instrument and thus, more generally, to meet all the requirements that modern metrology needs. Dial, digital or vernier? With or without data sending management? For which application types? These are typical requests that the range of calipers tries to satisfy by offering products that are as close as possible to the daily needs of the different users.



## Smooth operation of the slider

The beam of each instrument is specially ground in order to obtain a sliding quality higher than the average of the instruments available on the market. Therefore, the flawless guide of the slider on the beam ensures a silky-smooth operation allowing a much more precise positioning whilst preventing the measuring jaws from tilting.



Smooth gliding of the slider for optimum operating comfort with ground beams (left) compared to standard rectified beams (right).

## Calipers

### ***A robust construction***

All models incorporate industry accepted materials perfectly suited to the production of traditional components. Since these instruments are generally used frequently, it is essential that their resistance is guaranteed on the long term. A judicious choice of material combined with appropriate thermal treatments, ensures high resistance to abrasion and corrosion.

Furthermore, in harsh environments such as workshops, the instruments are often subject to all kinds of substances (oil, water, etc). Such conditions are not optimal for instruments containing electronic components. This is the reason why some of the digital models in the range have been designed with a high degree of protection (IP67) to guarantee the longevity of the instrument despite its possible exposure to various projections and intense solicitations.

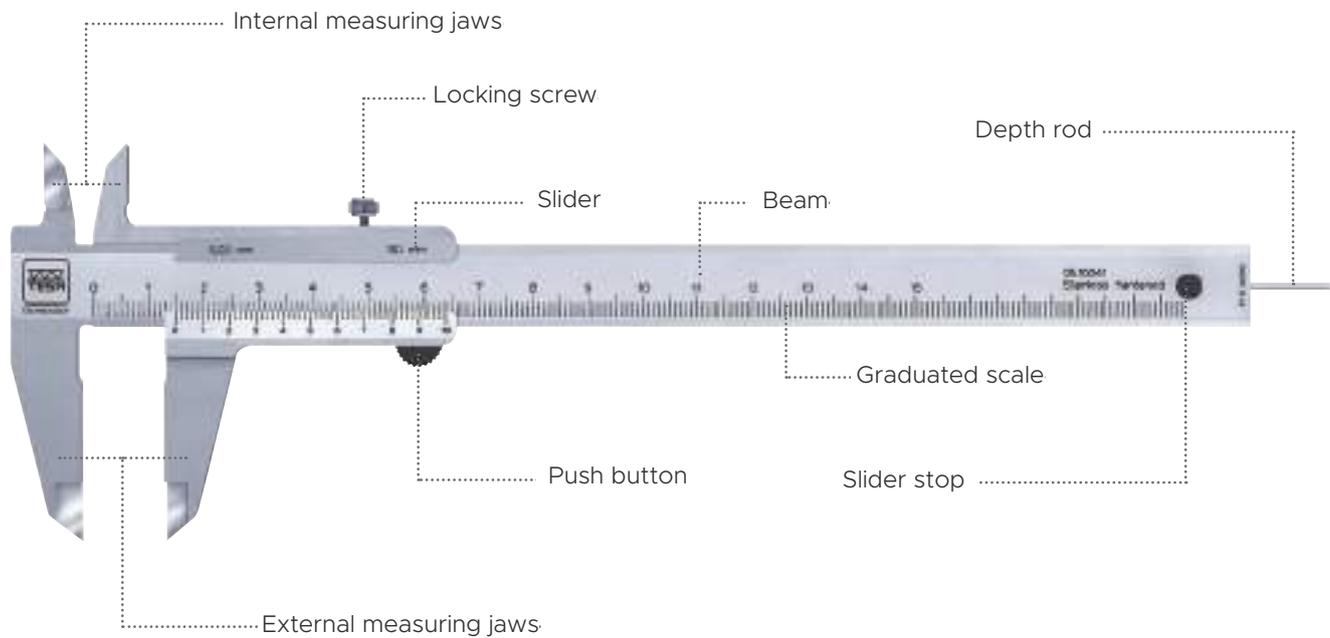


### ***Comfortable handling***

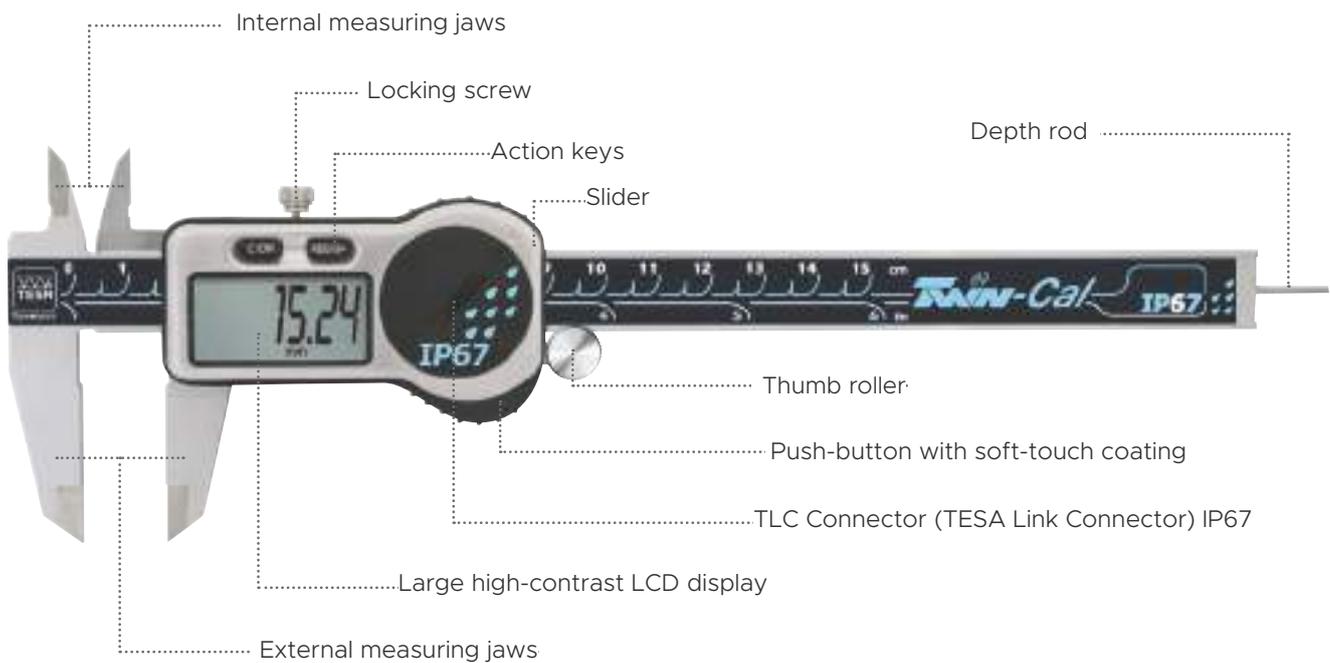
Such instruments are generally used several times a day. Therefore, user comfort is definitely an important factor! Most of our instruments have a ergonomic grip for ease of use.



### Vernier caliper

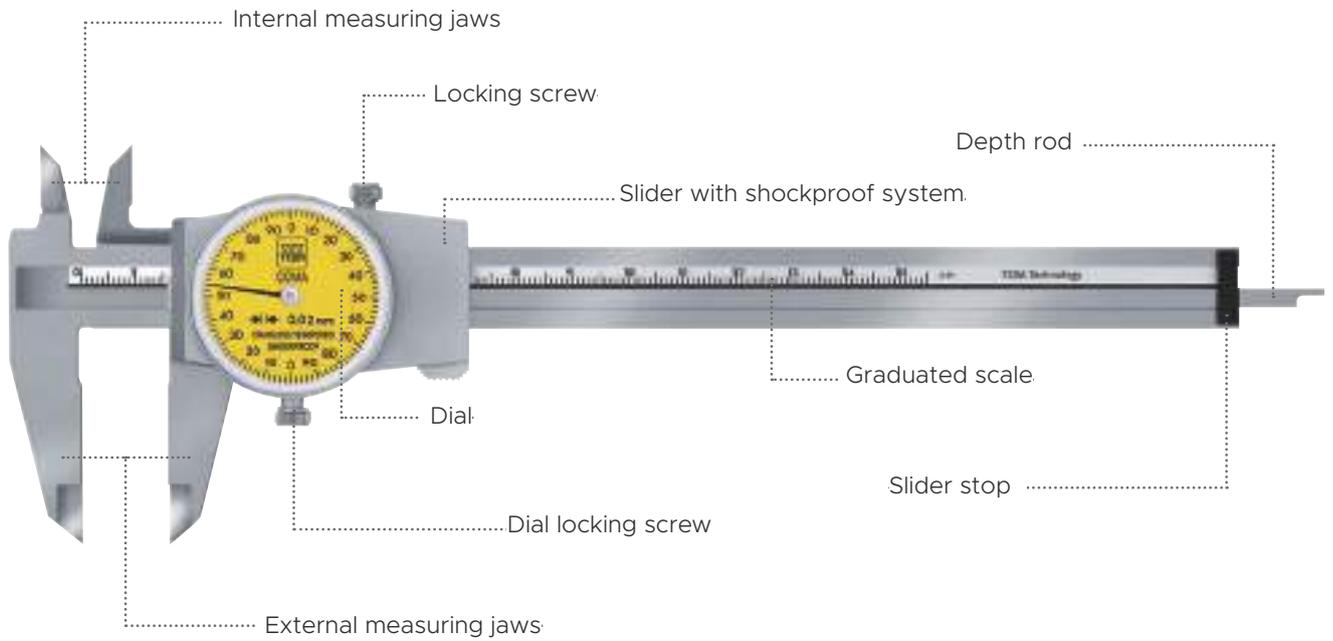


### Digital caliper (TWIN-CAL IP67)



# Calipers

## Dial caliper



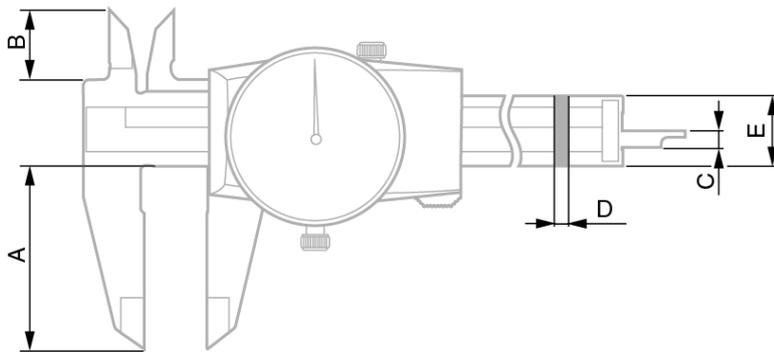
## Universal dial models, metric

- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Robust construction with housing and protection of the gear mechanism
  - Integrated shockproof system guaranteeing longevity and stability of results over time
- MEASUREMENT
  - Good reading with big high-contrast dial



Standard	ISO 13385-1:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 20 \mu\text{m}$ $100 < L \leq 300: \pm 30 \mu\text{m}$
Material	Hardened stainless steel Gear mechanism made of hardened, ground steel
Dial	$\varnothing$ 32 mm Rotary With locking screw
Particular characteristic(s)	Integrated shockproof system With locking screw
Included in delivery	Measuring report Declaration of conformity

## Universal calipers



Part number	Measuring range, mm	Resolution mm	Travel / revolution, mm	Thumb roller	Material	A mm	B mm	C mm	D mm	E mm
<b>00510050</b>	150	0,01	1	Without	Metal	40	13	1,5 x 1,8	3,2	15,5
<b>075115821</b>	150	0,02	1	Without	Metal	40	13	1,5 x 1,8	3,2	15,5
<b>00510008</b>	150	0,02	2	Without	Metal	40	13	1,5 x 1,8	3,2	15,5
<b>00510004</b>	150	0,02	2	Without	Plastic	40	13	1,5 x 1,8	3,2	15,5
<b>00510045</b>	200	0,02	2	With	Metal	50	18,6	1,5 x 1,8	3,6	15,5
<b>00510046</b>	300	0,02	2	With	Metal	64	20,6	1,5 x 1,8	4	15,5

### Accessories

Part number	Designation
<b>00560013</b>	Depth foot for universal digital or dial calipers of 150 mm

## Universal dial models, imperial

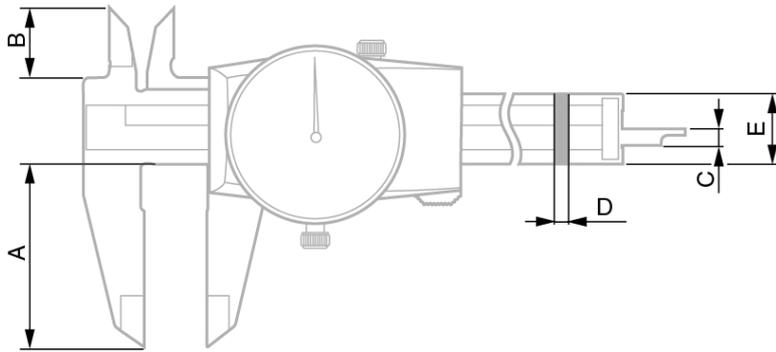
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Robust construction with housing and protection of the gear mechanism
  - Integrated shockproof system guaranteeing longevity and stability of results over time
- MEASUREMENT
  - Good reading with big high-contrast dial



075115811

Standard	ISO 13385-1:2019
Maximum permissible errors	L = length in in $0 < L \leq 4: \pm 20 \mu\text{m}$ $4 < L: \pm 30 \mu\text{m}$
Material	Hardened stainless steel Gear mechanism made of hardened, ground steel
Dial	$\varnothing$ 1.2 in Rotary With locking screw
Particular characteristic(s)	Integrated shockproof system With locking screw
Included in delivery	Measuring report Declaration of conformity

## Universal calipers



Part number	Measuring range, in	Resolution in	Travel / revolution, in	Thumb roller	Execution	A mm	B mm	C mm	D mm	E mm
<b>075115811</b>	6	.001	.1	With	Silver dial	40	13	1,5 x 1,9	3,2	15,5
<b>075116550</b>	6	.001	.1	With	Black dial	40	13	1,5 x 1,9	3,2	15,5

### Accessories

Part number	Designation
<b>00560013</b>	Depth foot for universal digital or dial calipers of 150 mm

## Universal vernier models

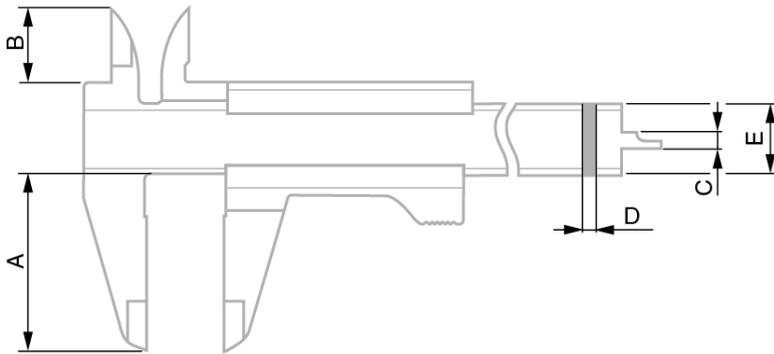
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading



00530110

Standard	ISO 13385-1:2019
Maximum permissible errors	<p>L = length in mm</p> <p>For 0,02 resolution:</p> <p>0 &lt; L ≤ 200: ± 30 μm</p> <p>200 &lt; L ≤ 300: ± 40 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 300: ± 50 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	Locking screw
Included in delivery	Measuring report Declaration of conformity

## Universal calipers



Part number	Measuring range, mm	Measuring range, in	Resolution mm	Resolution in	Self-locking	A mm	B mm	C mm	D mm	E mm
<b>00510070</b>	150		0,02		Without	40	21	1,3 x 1,8	3	16
<b>00530110</b>	150	6	0,02	.001	Without	40	21	1,3 x 1,8	3	16
<b>00530121</b>	150	6	0,02	.001	With	40	21	1,3 x 1,8	3	16
<b>00510073</b>	150		0,05		Without	40	21	1,3 x 1,8	3	16
<b>00530103</b>	150	6	0,02	1/128	Without	40	21	1,3 x 1,8	3	16
<b>00530120</b>	150	6	0,05	1/128	With	40	21	1,3 x 1,8	3	16
<b>00510071</b>	200		0,02		Without	50	23,5	1,3 x 1,8	3,5	17
<b>00530111</b>	200	8	0,02	.001	Without	50	23,5	1,3 x 1,8	3,5	17
<b>00510074</b>	200		0,05		Without	50	23,5	1,3 x 1,8	3,5	17
<b>00530104</b>	200	8	0,05	1/128	Without	50	23,5	1,3 x 1,8	3,5	17
<b>00510072</b>	300		0,02		Without	64	27,5	1,8 x 1,9	4	20
<b>00530112</b>	300	12	0,02	.001	Without	64	27,5	1,8 x 1,9	4	20
<b>00510075</b>	300		0,05		Without	64	27,5	1,8 x 1,9	4	20
<b>00530105</b>	300	12	0,05	1/128	Without	64	27,5	1,8 x 1,9	4	20

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification
<b>00560055</b>	Depth foot for universal vernier calipers of 150 mm

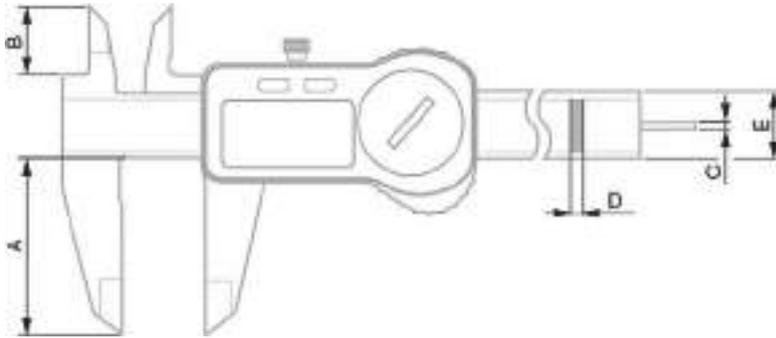
## Universal digital models

- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use (TWIN-CAL models)
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



Standard	ISO 13385-1:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 20 \mu\text{m}$ $100 < L \leq 300: \pm 30 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67 or IP40
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	With or without TLC port
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Universal calipers



Part number	Measuring range, mm	Measuring range, in	Thumb roller	Data output	Degree of protection	A mm	B mm	C mm	D mm	E mm
<b>00530094</b>	150	6	With	TLC		40	16	∅ 1,6	3,2	15,5
<b>00530097</b>	150	6	Without	TLC		40	16	1,3 x 1,8	3,2	15,5
<b>00530140</b>	150	6	Without		IP67	40	16	1,3 x 1,8	3,2	15,5
<b>00530141</b>	150	6	Without		IP67	40	16	∅ 1,6	3,2	15,5
<b>00530319</b>	150	6	Without	TLC	IP67	40	16	1,3 x 1,8	3,2	15,5
<b>00530320</b>	150	6	Without	TLC	IP67	40	16	∅ 1,6	3,2	15,5
<b>00530321</b>	150	6	With	TLC	IP67	40	16	∅ 1,6	3,2	15,5
<b>00530095</b>	200	8	With	TLC		50	20	1,3 x 1,8	3,6	15,5
<b>00530142</b>	200	8	With		IP67	50	20	1,3 x 1,8	3,6	15,5
<b>00530322</b>	200	8	With	TLC	IP67	50	20	1,3 x 1,8	3,6	15,5
<b>00530096</b>	300	12	With	TLC		64	22	1,4 x 1,8	4	15,5
<b>00530143</b>	300	12	With		IP67	64	22	1,4 x 1,8	4	15,5
<b>00530323</b>	300	12	With	TLC	IP67	64	22	1,4 x 1,8	4	15,5

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>00560013</b>	Depth foot for universal digital or dial calipers of 150 mm
<b>01961000</b>	3 V battery, type CR2032

### Workshop vernier models

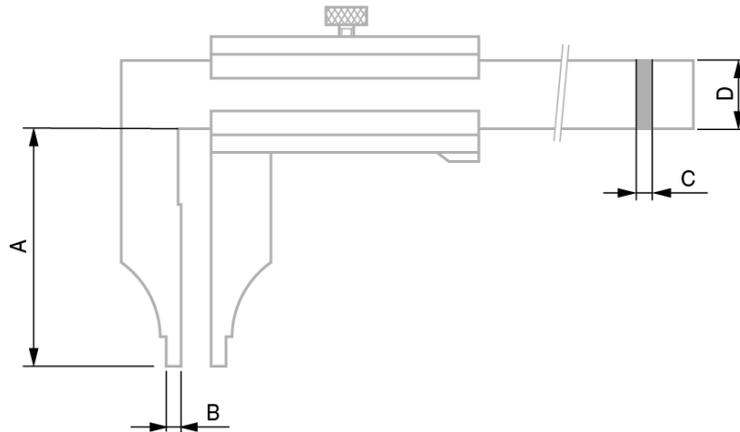
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading
  - With or without fine adjustment



00510601

Standard	ISO 13385-1:2019
Maximum permissible errors	<p>L = length in mm</p> <p>For 0,02 resolution:</p> <p>0 &lt; L ≤ 250: ± 30 μm</p> <p>250 &lt; L ≤ 400: ± 40 μm</p> <p>400 &lt; L ≤ 500: ± 50 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 300: ± 50 μm</p> <p>300 &lt; L ≤ 400: ± 60 μm</p> <p>400 &lt; L ≤ 500: ± 70 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	With or without fine adjustment Locking screw
Included in delivery	Measuring report Declaration of conformity

## Workshop calipers



Part number	Measuring range, mm	Measuring range, in	Resolution mm	Resolution in	Fine adjustment	A mm	B mm	C mm	D mm
<b>00510509</b>	200		0,02		Without	60	5	3,5	17
<b>00510601</b>	200		0,02		With	60	5	3,5	17
<b>00510506</b>	200		0,05		Without	60	5	3,5	17
<b>00510602</b>	200		0,05		With	60	5	3,5	17
<b>00530506</b>	200	8	0,05	1/128	Without	60	5	3,5	17
<b>00530602</b>	200	8	0,05	1/128	With	60	5	3,5	17
<b>00510521</b>	300		0,02		Without	90	5	4	20
<b>00510621</b>	300		0,02		With	90	5	4	20
<b>00510522</b>	300		0,05		Without	90	5	4	20
<b>00510622</b>	300		0,05		With	90	5	4	20
<b>00530522</b>	300	12	0,05	1/128	Without	90	5	4	20
<b>00530622</b>	300	12	0,05	1/128	With	90	5	4	20
<b>00510541</b>	500		0,02		Without	150	10	6	28
<b>00510641</b>	500		0,02		With	150	10	6	28
<b>00510542</b>	500		0,05		Without	150	10	6	28
<b>00510642</b>	500		0,05		With	150	10	6	28
<b>00530542</b>	500	20	0,05	1/128	Without	150	10	6	28
<b>00530642</b>	500	20	0,05	1/128	With	150	10	6	28

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification

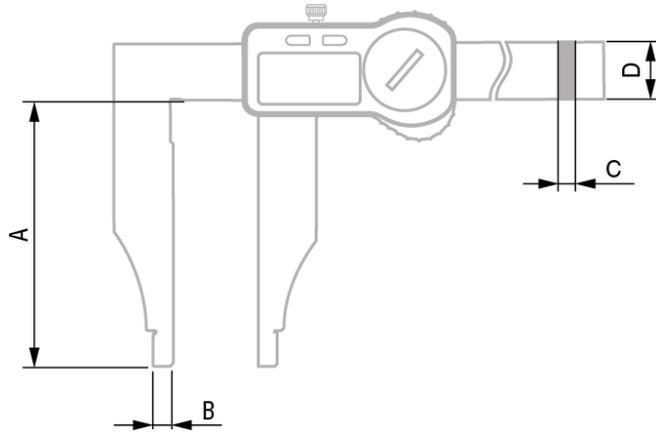
### Digital workshop models

- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



Standard	ISO 13385-1:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 30 \mu\text{m}$ $100 < L \leq 600: \pm 40 \mu\text{m}$ $600 < L \leq 1000: \pm 50 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Workshop calipers



Part number	Measuring range, mm	Measuring range, in	Data output	Degree of protection	A mm	B mm	C mm	D mm
<b>00530421</b>	200	8	TLC	IP67	80	5	4	20
<b>00530422</b>	250	10	TLC	IP67	80	5	4	20
<b>00530423</b>	300	12	TLC	IP67	80	5	4	20
<b>00530424</b>	500	20	TLC	IP67	150	10	6	28
<b>00530425</b>	600	24	TLC	IP67	150	10	6	28
<b>00530426</b>	800	32	TLC	IP67	150	10	8	32
<b>00530427</b>	1000	39	TLC	IP67	150	10	8	32

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>01961000</b>	3 V battery, type CR2032

### Workshop vernier models with knife-edge external jaws

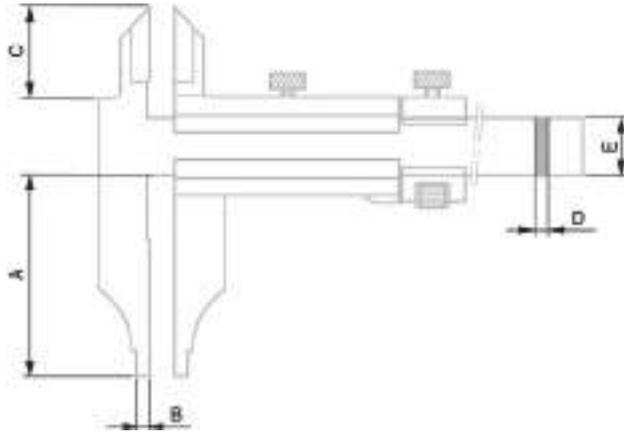
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading
  - With or without fine adjustment



00510701

Standard	ISO 13385-1:2019
Maximum permissible errors	<p>L = length in mm</p> <p>For 0,02 resolution:</p> <p>0 &lt; L ≤ 250: ± 30 μm</p> <p>250 &lt; L ≤ 400: ± 40 μm</p> <p>400 &lt; L ≤ 500: ± 50 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 300: ± 50 μm</p> <p>300 &lt; L ≤ 400: ± 60 μm</p> <p>400 &lt; L ≤ 500: ± 70 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	With or without fine adjustment Locking screw
Included in delivery	Measuring report Declaration of conformity

## Workshop calipers



Part number	Measuring range, mm	Measuring range, in	Resolution mm	Resolution in	Fine adjustment	A mm	B mm	C mm	D mm	E mm
<b>00510701</b>	200		0,02		Without	60	5	30	3,5	17
<b>00510801</b>	200		0,02		With	60	5	30	3,5	17
<b>00510702</b>	200		0,05		Without	60	5	30	3,5	17
<b>00510802</b>	200		0,05		With	60	5	30	3,5	17
<b>00530702</b>	200	8	0,05	1/128	Without	60	5	30	3,5	17
<b>00530802</b>	200	8	0,05	1/128	With	60	5	30	3,5	17
<b>00510721</b>	300		0,02		Without	90	5	38	4	20
<b>00510821</b>	300		0,02		With	90	5	38	4	20
<b>00510722</b>	300		0,05		Without	90	5	38	4	20
<b>00510822</b>	300		0,05		With	90	5	38	4	20
<b>00530722</b>	300	12	0,05	1/128	Without	90	5	38	4	20
<b>00530822</b>	300	12	0,05	1/128	With	90	5	38	4	20
<b>00510741</b>	500		0,02		Without	150	10	60	6	28
<b>00510841</b>	500		0,02		With	150	10	60	6	28
<b>00510742</b>	500		0,05		Without	150	10	60	6	28
<b>00510842</b>	500		0,05		With	150	10	60	6	28
<b>00530742</b>	500	20	0,05	1/128	Without	150	10	60	6	28
<b>00530842</b>	500	20	0,05	1/128	With	150	10	60	6	28

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification

### Digital workshop models with knife-edge external jaws

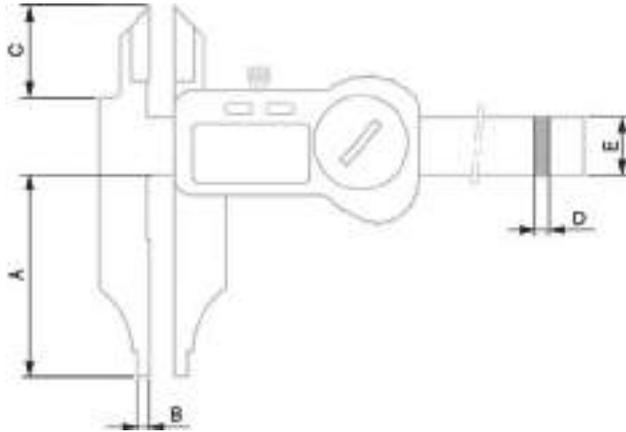
- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



00530431

Standard	ISO 13385-1:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 30 \mu\text{m}$ $100 < L \leq 600: \pm 40 \mu\text{m}$ $600 < L \leq 1000: \pm 50 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Workshop calipers



Part number	Measuring range, mm	Measuring range, in	Data output	Degree of protection	A mm	B mm	C mm	D mm	E mm
<b>00530431</b>	200	8	TLC	IP67	80	5	30	4	20
<b>00530432</b>	250	10	TLC	IP67	80	5	37	4	20
<b>00530433</b>	300	12	TLC	IP67	90	5	37	4	20
<b>00530434</b>	500	20	TLC	IP67	150	10	60	6	28
<b>00530435</b>	600	24	TLC	IP67	150	10	60	6	28
<b>00530436</b>	800	32	TLC	IP67	150	10	56	8	32
<b>00530437</b>	1000	39	TLC	IP67	150	10	56	8	32

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>01961000</b>	3 V battery, type CR2032

### Vernier depth models with short cut measuring face

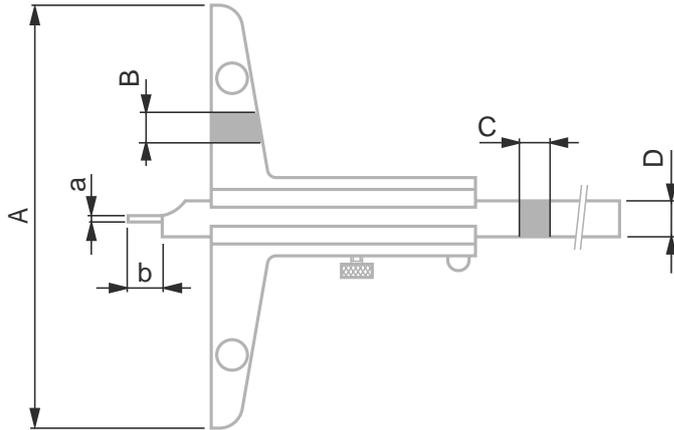
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading
  - With or without steel tip



00510233

Standard	ISO 13385-2:2019
Maximum permissible errors	<p>L = length in mm</p> <p>For 0,02 resolution:</p> <p>0 &lt; L ≤ 100: ± 30 μm</p> <p>100 &lt; L ≤ 300: ± 40 μm</p> <p>300 &lt; L ≤ 500: ± 50 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 500: ± 50 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	<p>With or without fine adjustment</p> <p>With or without steel tip</p> <p>Locking screw</p>
Included in delivery	<p>Measuring report</p> <p>Declaration of conformity</p>

## Depth calipers



Part number	Measuring range, mm	Resolution mm	Steel tip	A mm	B mm	C mm	D mm	a mm	b mm
<b>00510233</b>	150	0,02	Without	100	6,5	3	8		
<b>00510234</b>	150	0,05	Without	100	6,5	3	8		
<b>00510223</b>	150	0,02	With	100	6,5	3	8	Ø 1,5	8
<b>00510224</b>	150	0,05	With	100	6,5	3	8	Ø 1,5	8
<b>00510243</b>	200	0,02	Without	100	6,5	3	8		
<b>00510244</b>	200	0,05	Without	100	6,5	3	8		
<b>00510225</b>	200	0,02	With	100	6,5	3	8	Ø 1,5	8
<b>00510226</b>	200	0,05	With	100	6,5	3	8	Ø 1,5	8
<b>00510253</b>	300	0,02	With	150	8	4	12		
<b>00510254</b>	300	0,05	Without	150	8	4	12		
<b>00510227</b>	300	0,02	With	150	8	4	12	Ø 2	8
<b>00510228</b>	300	0,05	With	150	8	4	12	Ø 2	8
<b>00510263</b>	500	0,02	Without	150	8	4	12		
<b>00510264</b>	500	0,05	Without	150	8	4	12		

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification
<b>00560108</b>	Removable bridge, 180 mm
<b>00560109</b>	Removable bridge, 260 mm
<b>00560110</b>	Removable bridge, 320 mm

### Digital depth models with short cut measuring face

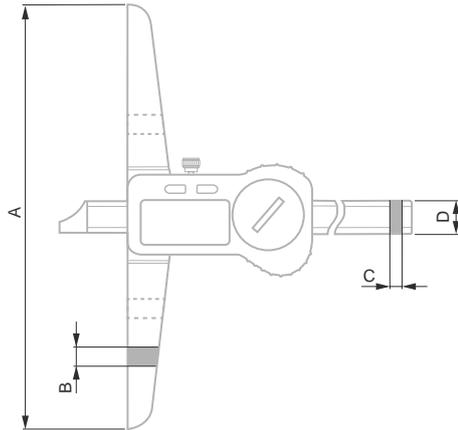
- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



00530441

Standard	ISO 13385-2:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 20 \mu\text{m}$ $100 < L \leq 500: \pm 30 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Depth calipers



Part number	Measuring range, mm	Measuring range, in	Data output	Degree of protection	A mm	B mm	C mm	D mm
<b>00530441</b>	200	8	TLC	IP67	100	8,5	4	15
<b>00530442</b>	250	10	TLC	IP67	100	8,5	4	15
<b>00530443</b>	300	12	TLC	IP67	150	8,5	4	15
<b>00530444</b>	500	20	TLC	IP67	150	8,5	4	15

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>00560103</b>	Removable bridge, 200 mm
<b>00560104</b>	Removable bridge, 300 mm
<b>00560105</b>	Removable bridge, 400 mm
<b>01961000</b>	3 V battery, type CR2032

## Vernier depth models with fixed hook

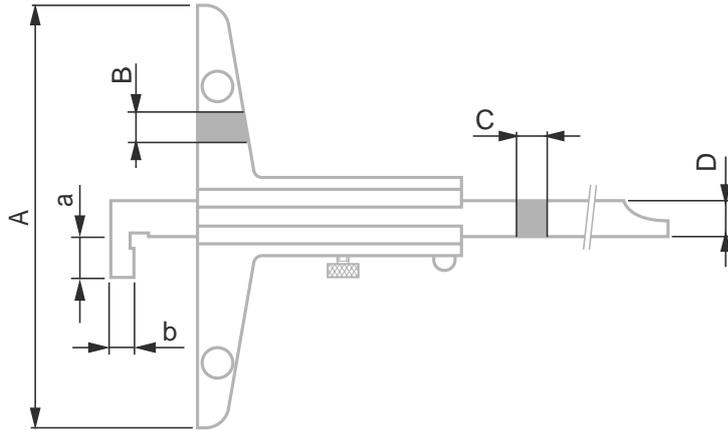
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading



00510280

Standard	ISO 13385-2:2019
Maximum permissible errors	<p>L = length in mm</p> <p>For 0,02 resolution:</p> <p>0 &lt; L ≤ 100: ± 30 μm</p> <p>100 &lt; L ≤ 300: ± 40 μm</p> <p>300 &lt; L ≤ 500: ± 50 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 500: ± 50 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	Locking screw
Included in delivery	Measuring report Declaration of conformity

## Depth calipers



Part number	Measuring range, mm	Resolution mm	Number of hook(s)	A mm	B mm	C mm	D mm	a mm	b mm
<b>00510275</b>	150	0,02	1	100	6,5	3	8	12	5
<b>00510276</b>	150	0,05	1	100	6,5	3	8	12	5
<b>00510277</b>	200	0,02	1	100	6,5	3	8	12	5
<b>00510278</b>	200	0,05	1	100	6,5	3	8	12	5
<b>00510279</b>	300	0,02	1	150	8	4	10	16	10
<b>00510280</b>	300	0,05	1	150	8	4	10	16	10
<b>00510281</b>	500	0,02	1	150	8	4	10	16	10
<b>00510282</b>	500	0,05	1	150	8	4	10	16	10

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification
<b>00560108</b>	Removable bridge, 180 mm
<b>00560109</b>	Removable bridge, 260 mm
<b>00560110</b>	Removable bridge, 320 mm

## Digital depth models with fixed hook(s)

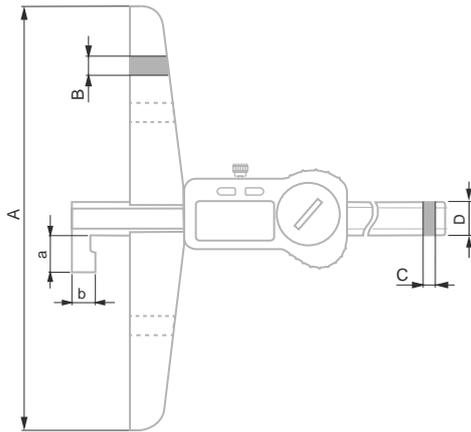
- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



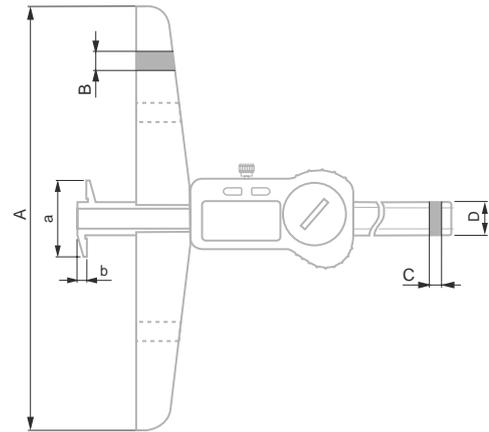
00530445

Standard	ISO 13385-2:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 20 \mu\text{m}$ $100 < L \leq 500: \pm 30 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Depth calipers



00530445 and 00530446



00530447

Part number	Measuring range, mm	Measuring range, in	Number of hook(s)	Data output	Degree of protection	A mm	B mm	C mm	D mm	a mm	b mm
<b>00530445</b>	300	12	1	TLC	IP67	150	8,5	4	15	15,5	10
<b>00530446</b>	500	20	1	TLC	IP67	150	8,5	4	15	15,5	10
<b>00530447</b>	300	12	2	TLC	IP67	150	8,5	4	15	27,5	5

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>00560103</b>	Removable bridge, 200 mm, for digital depth caliper
<b>00560104</b>	Removable bridge, 300 mm, for digital depth caliper
<b>00560105</b>	Removable bridge, 400 mm, for digital depth caliper
<b>01961000</b>	CR2032 button battery

### Vernier depth models with rotary stop plate

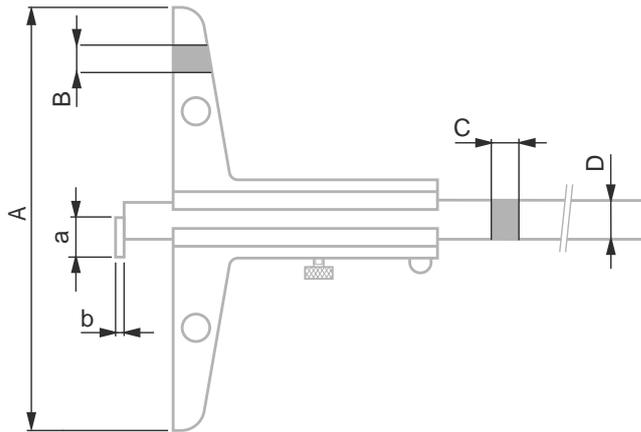
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading



00510294

Standard	ISO 13385-2:2019
Maximum permissible errors	<p>L = length in mm</p> <p>For 0,02 resolution:</p> <p>0 &lt; L ≤ 100: ± 30 μm</p> <p>100 &lt; L ≤ 300: ± 40 μm</p> <p>300 &lt; L ≤ 500: ± 50 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 500: ± 50 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	Locking screw
Included in delivery	Measuring report Declaration of conformity

## Depth calipers



Part number	Measuring range mm	Resolution mm	A mm	B mm	C mm	D mm	a mm	b mm
<b>00510291</b>	150	0,02	150	8,5	4	12	5,3	2
<b>00510292</b>	150	0,05	150	8,5	4	12	5,3	2
<b>00510293</b>	250	0,02	150	8,5	4	12	5,3	2
<b>00510294</b>	250	0,05	150	8,5	4	12	5,3	2
<b>00510295</b>	500	0,02	150	8,5	4	12	5,3	2
<b>00510296</b>	500	0,05	150	8,5	4	12	5,3	2

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification
<b>00560108</b>	Removable bridge, 180 mm
<b>00560109</b>	Removable bridge, 260 mm
<b>00560110</b>	Removable bridge, 320 mm

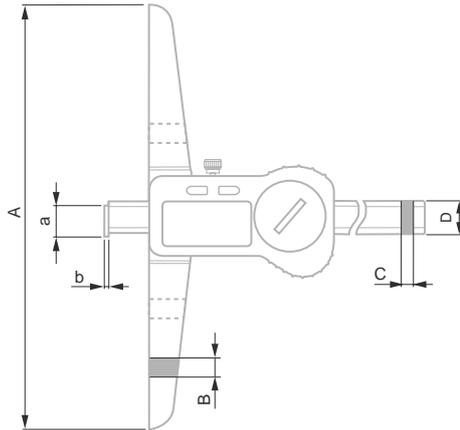
### ***Digital depth models with rotary stop plate***

- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



Standard	ISO 13385-2:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 20 \mu\text{m}$ $100 < L \leq 500: \pm 30 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Depth calipers



Part number	Measuring range, mm	Measuring range, in	Data output	Degree of protection	A mm	B mm	C mm	D mm	a mm	b mm
<b>00530448</b>	250	10	TLC	IP67	150	8,5	4	15	15,7	2
<b>00530449</b>	350	14	TLC	IP67	150	8,5	4	15	15,7	2
<b>00530450</b>	500	20	TLC	IP67	150	8,5	4	15	15,7	2

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>00560103</b>	Removable bridge, 200 mm
<b>00560104</b>	Removable bridge, 300 mm
<b>00560105</b>	Removable bridge, 400 mm
<b>01961000</b>	3 V battery, type CR2032

### Special vernier models for groove measurement

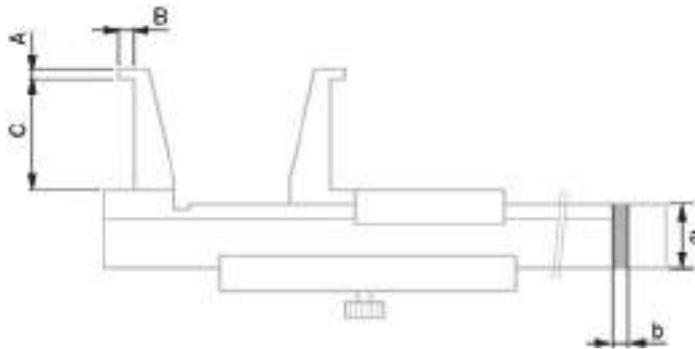
- INSTRUMENT
  - Perfect operation of the slider for a silky-smooth operation
  - Main scale slightly set back for protection against wear
- MEASUREMENT
  - Satin-chrome scale and vernier for good reading



00510371

Standard	Factory standard
Maximum permissible errors	<p>L = length of the jaws in mm</p> <p>For 0,02 resolution:</p> <p>40 &lt; L ≤ 60: ± 80 μm</p> <p>60 &lt; L ≤ 80: ± 100 μm</p> <p>80 &lt; L ≤ 100: ± 120 μm</p> <p>For resolution 0,05:</p> <p>0 &lt; L ≤ 40: ± 50 μm</p>
Material	Hardened stainless steel
Particular characteristic(s)	Locking screw
Included in delivery	Measuring report Declaration of conformity

## Special calipers



Part number	Measuring range mm	Resolution mm	A mm	B mm	C mm	a mm	b mm
<b>00510371</b>	10 ÷ 160	0,05	0,9	3	25	16	3
<b>00510375</b>	20 ÷ 160	0,05	2	5	40	16	3
<b>00510383</b>	26 ÷ 200	0,02	3	7	60	16	3
<b>00510387</b>	30 ÷ 250	0,02	4	8,5	80	20	4
<b>00510393</b>	35 ÷ 300	0,02	5	10	100	20	4

### Accessories

Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification

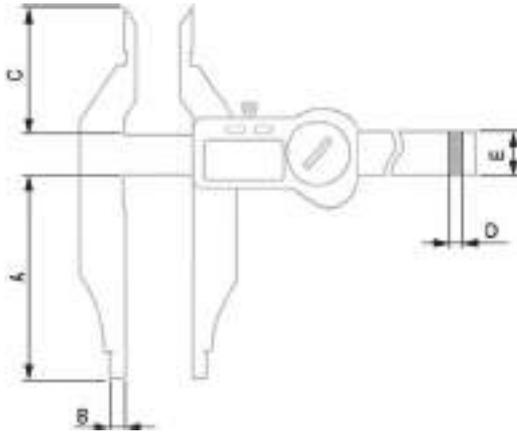
### Special digital model and knife-edge internal jaws

- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



Standard	ISO 13385-1:2019
Maximum permissible errors	L = length in mm $0 < L \leq 100: \pm 30 \mu\text{m}$ $100 < L \leq 600: \pm 40 \mu\text{m}$
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Special calipers



Part number	Measuring range, mm	Measuring range, in	Data output	Degree of protection	A mm	B mm	C mm	D mm	E mm
<b>00530430</b>	250	10	TLC	IP67	80	5	54	4	20

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>01961000</b>	3 V battery, type CR2032

### Special model with steel measuring tip

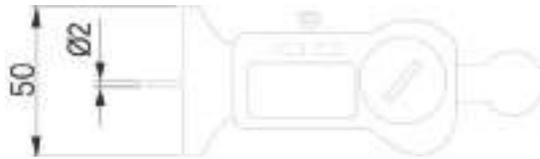
- INSTRUMENT
  - Robust construction to ensure longevity and stability of results over time
  - High degree of protection against dust and liquids (even when the data sending cap is connected)
- MEASUREMENT
  - Reading comfort with large high-contrast display
  - Comfortable handling with ergonomic grip for ease of use
- AUTONOMY
  - Long battery life avoiding too frequent battery changes
- DATA MANAGEMENT
  - Sending values to computer via TLC port (cable or wireless)



00530451

Standard	ISO 13385-2:2019
Maximum permissible errors	± 30 µm
Material	Stainless steel
Particular characteristic(s)	Locking screw
Resolution	0,01 mm / .0005 in
Zero	Fixed
Degree of protection	IP67
Display	LCD, 11 mm
Power supply	Lithium battery, 3 V CR2032
Data output	TLC
Function(s)	Stand-by after 10 min ABS or DIFF mode Low battery indicator
Autonomy	12'000 h
Units	mm / in
Included in delivery	Battery (1x) Measuring report Declaration of conformity

## Special calipers



Part number	Measuring range mm	Measuring range in	Data output	Degree of protection
<b>00530451</b>	25	1	TLC	IP67

### Accessories

Part number	Designation
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>01961000</b>	3 V battery, type CR2032

**Tools sets, metric**


00531007

Family	Part number	Model	Dimension, mm	Resolution mm	00530020	00511005	00511002	00511006	00511003	00531004	00511009	00511015	00531004	00511016	00531007	00511013	00511012	00510033	00511004	00511001	00511017
Calipers	<b>00510008</b>	Universal dial model Serie 2 mm/t	150	0,02	1	1	1														
	<b>075115821</b>	Universal dial model Serie 1 mm/t	150	0,02				1	1												
	<b>00530319</b>	Universal digital model Serie TWIN-CAL IP67	150	0,01						1	1	1									
	<b>00530320</b>	Universal digital model Serie TWIN-CAL IP67	150	0,01									1	1							1
	<b>00530094</b>	Universal digital model Serie TWIN-CAL	150	0,01											1						
	<b>00530140</b>	Universal digital model Serie TESA-CAL IP67	150	0,01												1	1				
	<b>00510070</b>	Universal vernier model	150	0,02														1	1	1	
Internal micrometers	<b>06030010</b>	Digital model MICROMASTER EASY	0 ÷ 30	0,001											1	1	1				
	<b>06030020</b>	Digital model MICROMASTER	0 ÷ 30	0,001					1		1										
	<b>00110101</b>	Vernier model ISOMASTER	0 ÷ 25	0,01	1	1	1	1	1		1	1	1					1	1	1	1
	<b>00110102</b>	Vernier model ISOMASTER	25 ÷ 50	0,01																	1
Accessories	<b>00560013</b>	Depth foot			1				1		1	1		1	1	1	1				
	-	Flexible stainless steel rule	150			1	1	1	1		1	1		1				1	1		
	-	Flexible stainless steel rule	200																		1
	-	Bevelled edge steel squares	100 x 70			1	1	1	1		1	1				1			1	1	
	-	Try square, class 0	75 x 50																		1
	-	Radius gauge concav/convex	R1 ÷ R7					1	1		1	1									1
	-	Thread pitch gauges, metric/Withworth						1	1		1	1									1
	-	Metal scriber						1	1		1	1									1
	-	Setting standard for external micrometers	25																		

# Tool sets



00530319



00510070



00530320



00510008



00530094



075115821



00530140



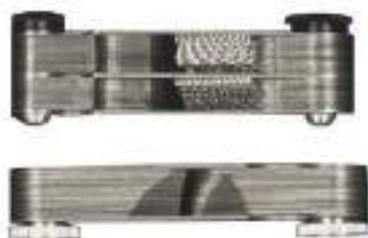
00110101



06030010



06030020



00560013



### Magnetic magnifying glass for vernier instruments

Magnifying glass for easier reading of vernier scales on sliding instruments.



0051610365



Part number	Designation
<b>0051610365</b>	Magnetic magnifying glass, 3 x magnification

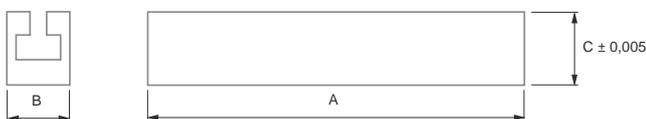
### Removable bridge for depth calipers



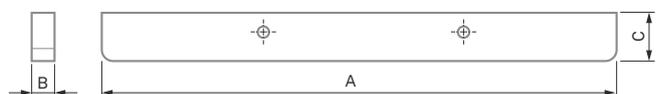
00560103



Part number	Designation	A mm	B mm	C mm
<b>00560103</b>	Removable bridge for digital depth caliper, 200 mm	200	11,5	10
<b>00560104</b>	Removable bridge for digital depth caliper, 300 mm	300	16	16
<b>00560105</b>	Removable bridge for digital depth caliper, 400 mm	400	16	16
<b>00560108</b>	Removable bridge for vernier depth caliper, 180 mm	180	8	17
<b>00560109</b>	Removable bridge for vernier depth caliper, 260 mm	260	8	17
<b>00560110</b>	Removable bridge for vernier depth caliper, 320 mm	320	8	17



00560103



00560108

## Accessories for calipers

### Thumb roller for universal caliper TWIN-CAL 150 mm



00560106



Part number	Designation
<b>00560106</b>	Thumb roller for universal calipers TWIN-CAL 150 mm

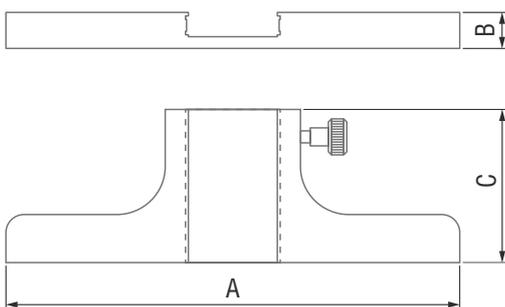
### Depth foot for universal digital calipers



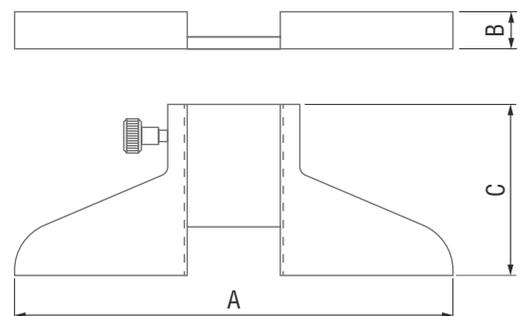
00560013



Part number	Designation	A mm	B mm	C mm
<b>00560013</b>	Depth foot for universal digital or dial calipers of 150 mm	75	6	25,5
<b>00560055</b>	Depth foot for universal vernier calipers of 150 mm	76,2	6,5	30



00560013



00560055





# External micrometers



**TESA**  
TECHNOLOGY

### The everyday reference

Like calipers, the external micrometer is generally found on the tables of workshops around the world. A true reference in metrology, this instrument is a 'must' for those who want to equip themselves with an easy-to-use tool.

Without compromising the stability of the instrument, the weight of the TESA micrometer is reduced to a minimum in order to make it easier to handle, especially when measuring with one hand. The functional shape of the instrument, the smooth running of the micrometer screw, the secure locking and the friction ratchet also contribute to this.

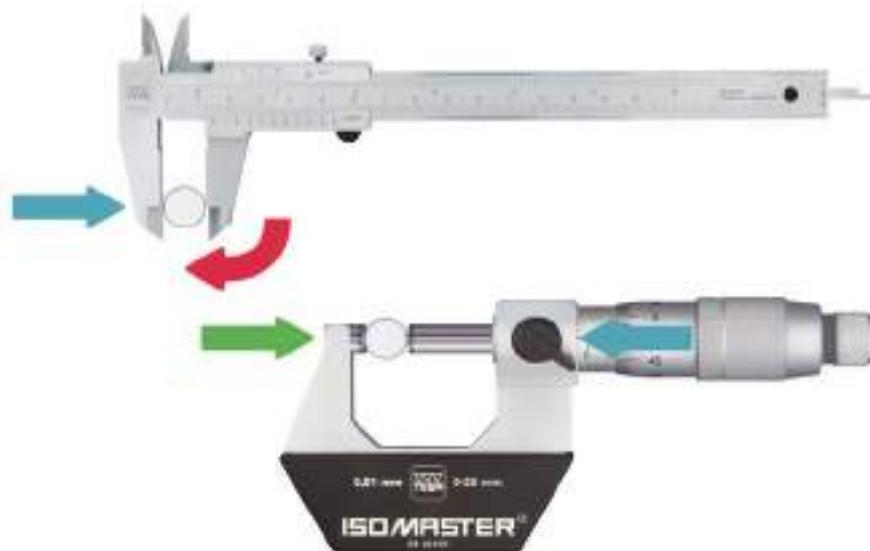
The robustness of the micrometer ensures that its accuracy is maintained over time.



### An instrument based on the Abbe principle

Unlike calipers, micrometers have an axial configuration corresponding to the Abbe principle. By having the measurement as well as the reading at the same level, on a single axis, they allow much more accurate measurements than other types of standard instruments on the market.

When a measuring force (blue) is applied to the part to be measured, a torque (red) is created on the caliper slide, creating a bias in the measurement results. On a micrometer, a force (green) opposite to the measuring force is created on the same axis as the measuring force. This state guarantees a better accuracy.



## External micrometers

### *Vernier external micrometer*



### *Digital external micrometer*



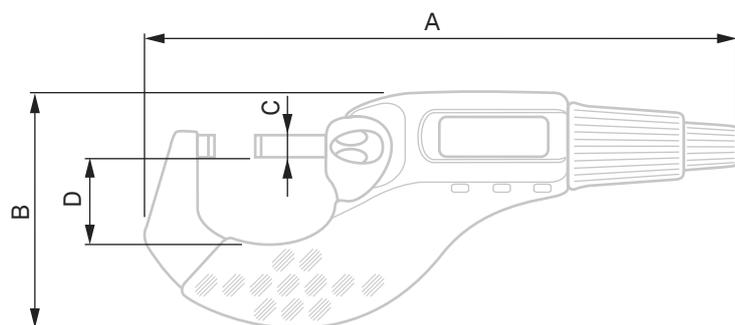
### Digital models



06030030

Standard	DIN 863 T1
Resolution	0,001 mm / .00005 in
Zero	Floating
Material	Inserts: tungsten carbide
Thread pitch	0,5 mm
Degree of protection	IP54 IP40 (with opto-RS232)
Display	LCD Digit size: 7 mm
Power supply	CR2032 button battery
Data output(s)	With or without opto-RS232
Function(s)	Standby after 10 min Display locking (except EASY)
Autonomy	2'000 ÷ 4'000 hours
Measuring force	≤ 10 N
Included in delivery	Micrometer Battery (1x) Measuring report Declaration of conformity

## Digital external micrometers



Article number	Measuring range, mm	Measuring range, in	Max. perm. errors, $\mu\text{m}$	Max. perm. parallelism error, $\mu\text{m}$	Data output	Degree of protection	A mm	B mm	C mm	D mm
<b>06030010</b>	0 ÷ 30	0 ÷ 1.2	4	2		IP40	163	66	Ø 6,5	22
<b>06030020</b>	0 ÷ 30	0 ÷ 1.2	4	2		IP54	163	66	Ø 6,5	22
<b>06030021</b>	25 ÷ 50	1 ÷ 2	4	2		IP54	189	72	Ø 6,5	26
<b>06030022</b>	50 ÷ 75	2 ÷ 3	5	3		IP54	216	91	Ø 6,5	41
<b>06030023</b>	75 ÷ 100	3 ÷ 4	5	3		IP54	245	108	Ø 6,5	52
<b>06030030</b>	0 ÷ 30	0 ÷ 1.2	4	2	Opto-RS232	IP54	163	66	Ø 6,5	22
<b>06030031</b>	25 ÷ 50	1 ÷ 2	4	2	Opto-RS232	IP54	189	72	Ø 6,5	26
<b>06030032</b>	50 ÷ 75	2 ÷ 3	5	3	Opto-RS232	IP54	216	91	Ø 6,5	41
<b>06030033</b>	75 ÷ 100	3 ÷ 4	5	3	Opto-RS232	IP54	245	108	Ø 6,5	52

### Accessories

Article number	Designation
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04981002</b>	STAT-EXPRESS software
<b>04981001</b>	DATA-DIRECT software
<b>04760183</b>	TLD-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLD-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04760178</b>	Opto-RS232 to TLC adapter
<b>00160201</b>	Micrometer stand with 16 mm clamp aperture
<b>072110123</b>	Micrometer stand with 20 mm clamp aperture
<b>04761062</b>	Opto-RS232 to USB cable, duplex, 2 m
<b>04761049</b>	Opto-RS232 to Sub-D 9p/f cable, duplex, 2 m
<b>04761046</b>	Opto-RS232 to Sub-D 9p/f cable, simplex, 2 m
<b>02510000</b>	Set of optical flats, 12 ÷ 12,375 mm
<b>02510100</b>	Set of optical flats, 27 ÷ 27,335 mm
<b>02510200</b>	Set of optical flats, 52 ÷ 52,335 mm
<b>02510300</b>	Set of optical flats, 77 ÷ 77,335 mm

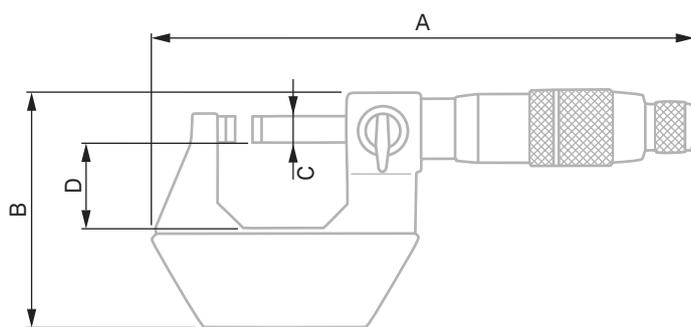
**Vernier models, metric**



00110101

Standard	DIN 863 T1 / NF E 11-095
Resolution	0,01 mm
Material	Inserts: tungsten carbide
Measuring force	≤ 10 N
Included in delivery	Micrometer Measurement report Declaration of conformity

## Analogue external micrometers



Article number	Measuring range, mm	Travel / revolution, mm	Max. perm. errors, $\mu\text{m}$	Max. perm. parallelism error, $\mu\text{m}$	A mm	B mm	C mm	D mm
<b>00110101</b>	0 ÷ 25	0,5	4	2	127	56	Ø 6,5	21
<b>00110102</b>	25 ÷ 50	0,5	4	2	155	64	Ø 6,5	26
<b>00110103</b>	50 ÷ 75	0,5	5	3	181	83	Ø 6,5	41
<b>00110104</b>	75 ÷ 100	0,5	5	3	209	99	Ø 6,5	52

### Accessories

Article number	Designation
<b>00160201</b>	Micrometer stand with 16 mm clamp aperture
<b>072110123</b>	Micrometer stand with 20 mm clamp aperture
<b>02510000</b>	Set of optical flats, 12 ÷ 12,375 mm
<b>02510100</b>	Set of optical flats, 27 ÷ 27,335 mm
<b>02510200</b>	Set of optical flats, 52 ÷ 52,335 mm
<b>02510300</b>	Set of optical flats, 77 ÷ 77,335 mm

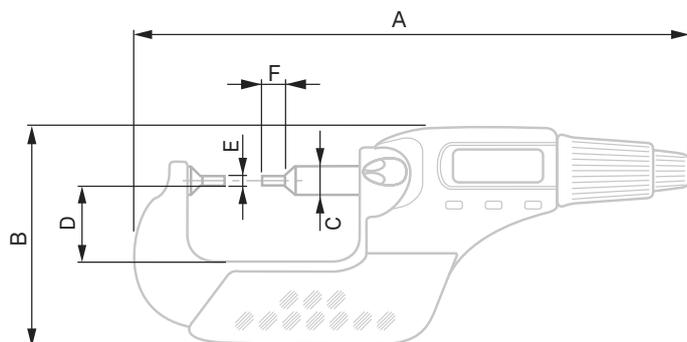
**Digital models with fine inserts**



06030034

Standard	DIN 863 T3
Resolution	0,001 mm / .00005 in
Zero	Floating
Material	Inserts: tungsten carbide
Thread pitch	0,5 mm
Degree of protection	IP54 IP40 (with opto-RS232)
Display	LCD Digit size: 7 mm
Power supply	CR2032 button battery
Data output(s)	Opto-RS232
Function(s)	Standby after 10 min Display locking
Autonomy	2'000 ÷ 4'000 hours
Measuring force	≤ 10 N
Included in delivery	Micrometer Battery (1x) Measuring report Declaration of conformity

## Special external micrometers



Article number	Measuring range, mm	Measuring range, in	Max. perm. errors, $\mu\text{m}$	Max. perm. parallelism error, $\mu\text{m}$	Data output	Degree of protection	A mm	B mm	C mm	D mm	E mm	F mm
<b>06030034</b>	0 ÷ 30	0 ÷ 1.2	4	2	Opto-to-RS232	IP54	189	72	$\varnothing$ 6,5	28	$\varnothing$ 2	5

### Accessories

Article number	Designation
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04981002</b>	STAT-EXPRESS software
<b>04981001</b>	DATA-DIRECT software
<b>04760183</b>	TLD-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLD-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04760178</b>	Opto-RS232 to TLC adapter
<b>00160201</b>	Micrometer stand with 16 mm clamp aperture
<b>072110123</b>	Micrometer stand with 20 mm clamp aperture
<b>04761062</b>	Opto-RS232 to USB cable, duplex, 2 m
<b>04761049</b>	Opto-RS232 to Sub-D 9p/f cable, duplex, 2 m
<b>04761046</b>	Opto-RS232 to Sub-D 9p/f cable, simplex, 2 m

### Micrometer supports

For external micrometers up to 300 mm and other instruments



00160201

Article number	Designation
<b>00160201</b>	Micrometer stand with 16 mm clamp aperture
<b>072110123</b>	Micrometer stand with 20 mm clamp aperture

### Guide collars for setting standards

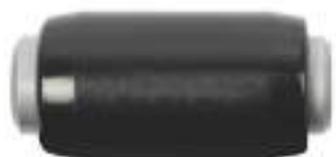
Facilitate the positioning of adjustment standards



Article number	Designation
<b>02140103</b>	Guide collars, 100 ÷ 175 mm
<b>02140108</b>	Guide collars, 200 ÷ 1475 mm

## Accessories for external micrometers

### Setting standards, metric



Article number	Designation
<b>02140001</b>	Setting standard, 25 mm
<b>02140002</b>	Setting standard, 50 mm
<b>02140003</b>	Setting standard, 75 mm
<b>02140004</b>	Setting standard, 100 mm
<b>02140005</b>	Setting standard, 125 mm
<b>02140006</b>	Setting standard, 150 mm
<b>02140007</b>	Setting standard, 175 mm
<b>02140008</b>	Setting standard, 200 mm
<b>02140009</b>	Setting standard, 225 mm
<b>02140010</b>	Setting standard, 250 mm
<b>02140011</b>	Setting standard, 275 mm
<b>02140012</b>	Setting standard, 300 mm

## Optical flats with two parallel faces

- APPLICATION
  - For checking the flatness and parallelism of the measuring faces of external micrometers and similar instruments
- TESTING PROCESS
  - The difference in length of the interference lenses corresponds to one quarter or one third of the micrometer screw pitch (0,5 mm) respectively



Article number	Designation
<b>02510000</b>	Set of optical flats, 12 ÷ 12,375 mm
<b>02510100</b>	Set of optical flats, 27 ÷ 27,335 mm
<b>02510200</b>	Set of optical flats, 52 ÷ 52,335 mm
<b>02510300</b>	Set of optical flats, 77 ÷ 77,335 mm
<b>02510001</b>	Optical flat, 12 mm
<b>02510002</b>	Optical flat, 12,125 mm
<b>02510003</b>	Optical flat, 12,25 mm
<b>02510004</b>	Optical flat, 12,375 mm
<b>02510101</b>	Optical flat, 27 mm
<b>02510102</b>	Optical flat, 27,165 mm
<b>02510103</b>	Optical flat, 27,335 mm
<b>02510201</b>	Optical flat, 52 mm
<b>02510202</b>	Optical flat, 52,165 mm
<b>02510203</b>	Optical flat, 52,335 mm
<b>02510301</b>	Optical flat, 77 mm
<b>02510302</b>	Optical flat, 77,165 mm
<b>02510303</b>	Optical flat, 77,335 mm

## External micrometers sets

### *Set of digital external micrometers*



Article number	Designation
<b>06030029</b>	Set of 3 digital external micrometers, 0 ÷ 75 mm, MICROMASTER RS IP54

### *Set of vernier external micrometers, metric*



Article number	Designation
<b>00110113</b>	Set of 4 vernier external micrometers, 0 ÷ 100 mm, ISOMASTER

**Tools sets, metric**


00531007

Family	Part number	Model	Dimension mm	Resolution mm	00530020	00511005	00511002	00511006	00511003	00531004	00511009	00511015	00511018	00511016	00531007	00511013	00511012	00511004	00511001	00511017
Callipers	<b>00510008</b>	Universal dial model Serie 2 mm/t	150	0,02	1	1	1													
	<b>075115821</b>	Universal dial model Serie 1 mm/t	150	0,02				1	1											
	<b>00530319</b>	Universal digital model Serie TWIN-CAL IP67	150	0,01						1	1	1								
	<b>00530320</b>	Universal digital model Serie TWIN-CAL IP67	150	0,01									1	1						1
	<b>00530094</b>	Universal digital model Serie TWIN-CAL	150	0,01											1					
	<b>00530140</b>	Universal digital model Serie TESA-CAL IP67	150	0,01												1	1			
	<b>00510070</b>	Universal vernier model	150	0,02														1	1	
Internal micrometers	<b>06030010</b>	Digital model MICROMASTER EASY	0 ÷ 30	0,001											1	1	1			
	<b>06030020</b>	Digital model MICROMASTER	0 ÷ 30	0,001						1			1							
	<b>00110101</b>	Vernier model ISOMASTER	0 ÷ 25	0,01	1	1	1	1	1		1	1	1					1	1	1
	<b>00110102</b>	Vernier model ISOMASTER	25 ÷ 50	0,01																1
Accessories	<b>00560013</b>	Depth foot			1					1	1	1		1	1	1				
	-	Flexible stainless steel rule	150			1	1	1	1		1	1		1			1	1	1	
	-	Flexible stainless steel rule	200																	1
	-	Bevelled edge steel squares	100 x 70			1	1	1	1		1	1		1			1	1	1	
	-	Try square, class 0	75 x 50																	1
	-	Radius gauge concav/convex	R1 ÷ R7					1	1			1	1							1
	-	Thread pitch gauges, metric/Withworth						1	1			1	1							1
	-	Metal scribe						1	1			1	1							1
	-	Setting standard for external micrometers	25																	

# Tools sets



00530319



00510070



00530320



00510008



00530094



075115821



00530140



00110101



06030010



06030020



00560013





# Internal micrometers

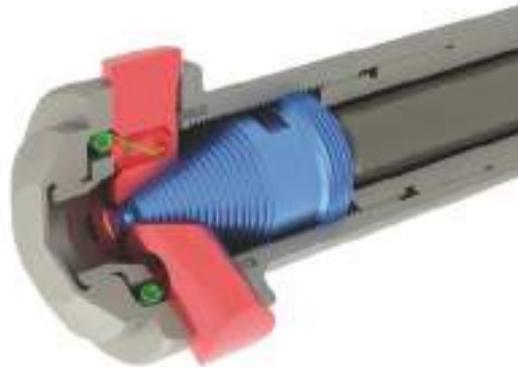


**TESA**  
TECHNOLOGY

## ***A constant measure***

The 3 measuring inserts (red) are arranged symmetrically on the circumference of the measuring head and perpendicular to the axis of the instrument. Springs (green) keep them in constant contact with the threaded cone (micrometric thread), considered as the heart of the instrument. The inserts and the cone (blue) thus form a rigid and stable unit in the bore.

The three measuring inserts rest on the wall of the bore in three lines and not on three points. The ratchet ensures a constant measuring pressure.



## ***Self-centering***

The ideal 120° arrangement of the measuring inserts produces maximum centering force. Due to its line contact, the instrument always finds the correct measuring position and automatically centers itself in the bore, thanks to the longitudinal vibrations transmitted by the ratchet.



## Internal micrometers

### ***A single tool can replace multiple plug gauges***

As plug gauges have fixed dimensions, they can be used for the verification of a single dimension. On the contrary, the instruments in the range all have a variable measuring range. Each of them is therefore suitable for measuring many different bore diameters, where several plug gauges would be required.



### Digital IMICRO models



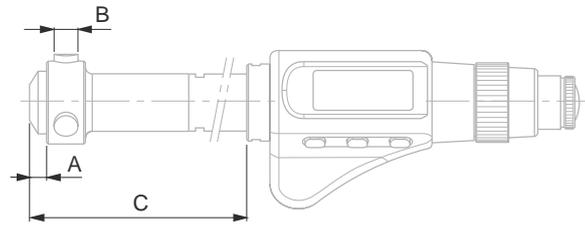
06130101

Article number	Measuring range, mm	Measuring range in	Max. perm. errors, $\mu\text{m}$	Max. perm. errors, in	Resolution mm	Resolution in	Repeatability limit, $\mu\text{m}$	Repeatability limit, in	A mm	B mm	C mm
06130101	3,5 ÷ 4	.1377 ÷ .1574	4	.0002	0,001	.00005	4	.0002	2	1,5	20
06130102	4 ÷ 4,5	.1574 ÷ .1771	4	.0002	0,001	.00005	4	.0002	2	1,5	20
06130103	4,5 ÷ 5,5	.1771 ÷ .2165	4	.0002	0,001	.00005	4	.0002	2	1,5	25
06130104	5,5 ÷ 6,5	.2165 ÷ .2559	4	.0002	0,001	.00005	4	.0002	2	1,5	25
06130105	6 ÷ 8	.2362 ÷ .315	4	.0002	0,001	.00005	4	.0002	2,5	2,5	58
06130106	8 ÷ 10	.315 ÷ .397	4	.0002	0,001	.00005	4	.0002	2,5	2,5	58
06130107	10 ÷ 12	.397 ÷ .4724	4	.0002	0,001	.00005	4	.0002	2,5	2,5	58
06130108	11 ÷ 14	.433 ÷ .5512	4	.0002	0,001	.00005	4	.0002	3,5	4	72
06130109	14 ÷ 17	.5512 ÷ .6693	4	.0002	0,001	.00005	4	.0002	3,5	4	72
06130110	17 ÷ 20	.6693 ÷ .7874	4	.0002	0,001	.00005	4	.0002	3,5	4	72
06130111	20 ÷ 25	.7874 ÷ .9843	4	.0002	0,001	.00005	4	.0002	7	7	91
06130112	25 ÷ 30	.9843 ÷ 1.1811	4	.0002	0,001	.00005	4	.0002	7	7	91
06130113	30 ÷ 35	1.1811 ÷ 1.378	4	.0002	0,001	.00005	4	.0002	7	7	91
06130114	35 ÷ 40	1.378 ÷ 1.5748	4	.0002	0,001	.00005	4	.0002	7	7	91
06130115	40 ÷ 50	1.5748 ÷ 1.9685	4	.0002	0,001	.00005	4	.0002	11	12	104
06130116	50 ÷ 60	1.9685 ÷ 2.3622	5	.00025	0,001	.00005	5	.00025	11	12	104
06130117	60 ÷ 70	2.3622 ÷ 2.756	5	.00025	0,001	.00005	5	.00025	11	12	104
06130118	70 ÷ 80	2.756 ÷ 3.1496	5	.00025	0,001	.00005	5	.00025	11	12	104
06130119	80 ÷ 90	3.1496 ÷ 3.5433	5	.00025	0,001	.00005	5	.00025	11	12	104
06130120	90 ÷ 100	3.5433 ÷ 3.937	5	.00025	0,001	.00005	5	.00025	11	12	104
06130121	100 ÷ 125	3.937 ÷ 4.9212	6	.00025	0,001	.00005	6	.00025	26	18	100
06130122	125 ÷ 150	4.9212 ÷ 5.9055	6	.00025	0,001	.00005	6	.00025	26	18	100
06130123	150 ÷ 175	5.9055 ÷ 6.8897	7	.0003	0,001	.00005	7	.0003	26	18	100
06130124	175 ÷ 200	6.8897 ÷ 7.874	7	.0003	0,001	.00005	7	.0003	26	18	100
06130125	200 ÷ 225	7.874 ÷ 8.8582	8	.00035	0,001	.00005	8	.00035	26	18	100
06130126	225 ÷ 250	8.8582 ÷ 9.8425	8	.00035	0,001	.00005	8	.00035	26	18	100
06130127	250 ÷ 275	9.8425 ÷ 10.8267	8	.00035	0,001	.00005	8	.00035	26	18	100
06130128	275 ÷ 300	10.8267 ÷ 11.811	8	.00035	0,001	.00005	8	.00035	26	18	100

### Accessories

Article number	Designation
04760178	Opto-RS232 to TLC adapter
04760183	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
04760184	TLC-BLE Bluetooth® emitter
04760185	USB receiver + 1,5 m extension cable
04761062	Opto-RS232 to USB cable, duplex, 2 m
04761046	Opto-RS232 to Sub-D 9p/f cable, simplex, 2 m
04761049	Opto-RS232 to Sub-D 9p/f cable, duplex, 2 m
DATA-VIEWER	Free data acquisition software
04981001	DATA-DIRECT software
04981002	STAT-EXPRESS software
00860001	Centering device for IMICRO 40 ÷ 100 mm, 150 mm
00862601	Centering device for IMICRO 100 ÷ 200 mm, 200 mm

## Digital internal micrometers



Standard	DIN 863 T4
Measuring face(s)	Models (mm) 3,5 ÷ 12: hardened steel 11 ÷ 100: titanium nitride hard-coating 100 ÷ 300: tungsten carbide tipped
Resolution	0,001 mm / .00005 in
Zero	Floating
Degree of protection	IP54 IP40 (with opto-RS232)
Display	LCD Digit size: 7 mm
Power supply	CR2032 button battery
Data output(s)	Opto-RS232
Autonomy	1 ÷ 2 years
Units	mm / in
Included in delivery	Micrometer Battery (1x) Measuring report Declaration of conformity

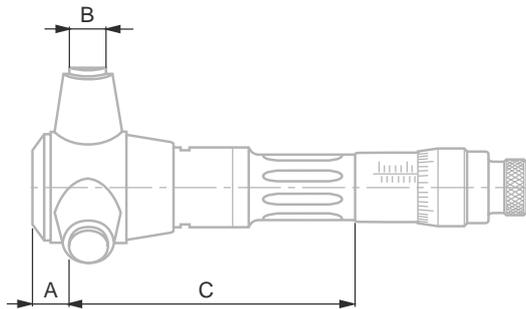
**Analogue IMICRO models, metric**



00812304

Standard	DIN 863 T4 / NF E 11-099
Measuring face(s)	Models (mm) 3,5 ÷ 12: hardened steel 11 ÷ 100: titanium nitride hard-coating 100 ÷ 300: tungsten carbide tipped
Units	mm
Included in delivery	Micrometer Measurement report Declaration of conformity

## Analogue internal micrometers



Article number	Serie	Measuring range mm	Max. perm. errors, $\mu\text{m}$	Resolution mm	Repeatability limit, $\mu\text{m}$	A mm	B mm	C mm
00813410	BAE1	3,5 ÷ 4	4	0,001	4	2	1,5	20
00813411	BAE2	4 ÷ 4,5	4	0,001	4	2	1,5	20
00813412	BAE3	4,5 ÷ 5,5	4	0,001	4	2	1,5	25
00813413	BAE4	5,5 ÷ 6,5	4	0,001	4	2	1,5	25
00810001	BAF1	6 ÷ 8	4	0,001	4	2,5	2,5	52
00810002	BAF2	8 ÷ 10	4	0,001	4	2,5	2,5	52
00810003	BAF3	10 ÷ 12	4	0,001	4	2,5	2,5	52
00810801	BAG1	11 ÷ 14	4	0,005	4	3,5	4	77
00810802	BAG2	14 ÷ 17	4	0,005	4	3,5	4	77
00810803	BAG3	17 ÷ 20	4	0,005	4	3,5	4	77
00811501	BAH1	20 ÷ 25	4	0,005	4	7	7	78
00811502	BAH2	25 ÷ 30	4	0,005	4	7	7	78
00811503	BAH3	30 ÷ 35	4	0,005	4	7	7	78
00811504	BAH4	35 ÷ 40	4	0,005	4	7	7	78
00812301	BAJ1	40 ÷ 50	4	0,005	4	11	12	84
00812302	BAJ2	50 ÷ 60	5	0,005	5	11	12	84
00812303	BAJ3	60 ÷ 70	5	0,005	5	11	12	84
00812304	BAJ4	70 ÷ 80	5	0,005	5	11	12	84
00812305	BAJ5	80 ÷ 90	5	0,005	5	11	12	84
00812306	BAJ6	90 ÷ 100	5	0,005	5	11	12	84
00812601	BAK1W	100 ÷ 125	6	0,01	6	26	18	81
00812602	BAK2W	125 ÷ 150	6	0,01	6	26	18	81
00812603	BAK3W	150 ÷ 175	7	0,01	7	26	18	81
00812604	BAK4W	175 ÷ 200	7	0,01	7	26	18	81
00813101	BAL1	200 ÷ 225	8	0,01	8	26	18	81
00813102	BAL2	225 ÷ 250	8	0,01	8	26	18	81
00813103	BAL3	250 ÷ 275	8	0,01	8	26	18	81
00813104	BAL4	275 ÷ 300	8	0,01	8	26	18	81

### Accessories

Article number	Designation
00860001	Centering device for IMICRO 40 ÷ 100 mm, 150 mm
00862601	Centering device for IMICRO 100 ÷ 200 mm, 200 mm
00860002	Key for analogue IMICRO BAJ 1/2/3/4/5/6
00862802	Key for analogue IMICRO BAG 1/2/3
00862702	Key for analogue IMICRO BAF 1/2/3
00862901	Key for analogue IMICRO BAH 1/2/3/4 and BAK 1/2/3/4
00862801	Screwdriver, 2,5 x 5 mm

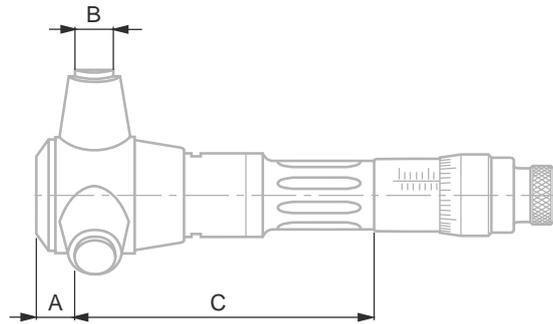
**Analogue IMICRO models, imperial**



00881905

Standard	DIN 863 T4 / NF E 11-099
Measuring face(s)	Models (in) .275 ÷ 4: hardened steel 4 ÷ 8: tungsten carbide tipped
Units	in
Included in delivery	Micrometer Measurement report Declaration of conformity

## Analogue internal micrometers



Article number	Serie	Measuring range in	Max. perm. errors in	Resolution in	Repeatability limit, in	A mm	B mm	C mm
00880101	BAF1E	.275 ÷ .35	.0002	.0001	.0002	2,5	2,5	52
00880102	BAF2E	.35 ÷ .425	.0002	.0001	.0002	2,5	2,5	52
00880103	BAF3E	.425 ÷ .5	.0002	.0001	.0002	2,5	2,5	52
00880401	BAG1E	.5 ÷ .6	.0002	.0002	.0002	3,5	4	77
00880402	BAG2E	.6 ÷ .7	.0002	.0002	.0002	3,5	4	77
00880403	BAG3E	.7 ÷ .8	.0002	.0002	.0002	3,5	4	77
00881201	BAH1E	.8 ÷ 1	.0002	.0002	.0002	7	7	78
00881202	BAH2E	1 ÷ 1.2	.0002	.0002	.0002	7	7	78
00881203	BAH3E	1.2 ÷ 1.4	.0002	.0002	.0002	7	7	78
00881204	BAH4E	1.4 ÷ 1.6	.0002	.0002	.0002	7	7	78
00881901	BAJ1E	1.6 ÷ 2	.0002	.0002	.0002	11	12	84
00881902	BAJ2E	2 ÷ 2.4	.0002	.0002	.0002	11	12	84
00881903	BAJ3E	2.4 ÷ 2.8	.0002	.0002	.0002	11	12	84
00881904	BAJ4E	2.8 ÷ 3.2	.0002	.0002	.0002	11	12	84
00881905	BAJ5E	3.2 ÷ 3.6	.0002	.0002	.0002	11	12	84
00881906	BAJ6E	3.6 ÷ 4	.0002	.0002	.0002	11	12	84
00882701	BAK1WE	4 ÷ 5	.0005	.0005	.0005	26	18	95
00882702	BAK2WE	5 ÷ 6	.0005	.0005	.0005	26	18	95
00882703	BAK3WE	6 ÷ 7	.0005	.0005	.0005	26	18	95
00882704	BAK4WE	7 ÷ 8	.0005	.0005	.0005	26	18	95

### Accessories

Article number	Designation
00862802	Key for analogue IMICRO BAG 1/2/3
00862702	Key for analogue IMICRO BAF 1/2/3
00862901	Key for analogue IMICRO BAH 1/2/3/4 and BAK 1/2/3/4
00860002	Key for analogue IMICRO BAJ 1/2/3/4/5/6
00862801	Screwdriver, 2,5 x 5 mm

Sets of digital internal micrometers, complete



06130223

Family	Part number	Dimension mm	06130220 3,5 ÷ 6,5	06130221 6 ÷ 12	06130222 11 ÷ 20	06130223 20 ÷ 40	06130224 40 ÷ 100	06130225 100 ÷ 200
<b>Micrometers</b>	06130101	3,5 ÷ 4	1					
	06130102	4 ÷ 4,5	1					
	06130103	4,5 ÷ 5,5	1					
	06130104	5,5 ÷ 6,5	1					
	06130105	6 ÷ 8		1				
	06130106	8 ÷ 10		1				
	06130107	10 ÷ 12		1				
	06130108	11 ÷ 14			1			
	06130109	14 ÷ 17			1			
	06130110	17 ÷ 20			1			
	06130111	20 ÷ 25				1		
	06130112	25 ÷ 30				1		
	06130113	30 ÷ 35				1		
	06130114	35 ÷ 40				1		
	06130115	40 ÷ 50					1	
	06130116	50 ÷ 60					1	
	06130117	60 ÷ 70					1	
	06130118	70 ÷ 80					1	
	06130119	80 ÷ 90					1	
	06130120	90 ÷ 100					1	
	06130121	100 ÷ 125						1
	06130122	125 ÷ 150						1
	06130123	150 ÷ 175						1
	06130124	175 ÷ 200						1
<b>Setting rings</b>	00843200	4	1					
	00843201	5,5	1					
	00840101	8		1				
	00840102	10		1				
	00840103	11			1			
	00840104	17			1			
	00840106	25				1		
	00840107	35				1		
	00840108	50					1	
	00840109	70					1	
	00840110	90					1	
	00840112	125						1
	00840113	175						1
<b>Extensions</b>	00840001	100		1				
	00840301	150			1			
	00841100	150				1		
	00841800	150					1	
	00842600	150						1

## Internal micrometer sets

### Sets of digital internal micrometers, partial



06130233

Family	Dimension mm	Dimension in	<b>06130230</b> 3,5 ÷ 6,5 mm .1377 ÷ .2559 in	<b>06130231</b> 6 ÷ 12 mm .2362 ÷ .4724 in	<b>06130232</b> 11 ÷ 20 mm .4330 ÷ .7874 in	<b>06130233</b> 20 ÷ 40 mm .7874 ÷ 1.5748 in	<b>06130234</b> 40 ÷ 100 mm 1.5748 ÷ 3.9370 in	<b>06130235</b> 100 ÷ 200 mm 3.9370 ÷ 7.8740 in
<b>Micrometers</b>	3,5 ÷ 4	.1377 ÷ .1574	1					
	4 ÷ 4,5	.1574 ÷ .1771	1					
	4,5 ÷ 5,5	.1771 ÷ .2165	1					
	5,5 ÷ 6,5	.2165 ÷ .2559	1					
	6 ÷ 8	.2362 ÷ .3150		1				
	8 ÷ 10	.3150 ÷ .3970		1				
	10 ÷ 12	.3970 ÷ .4724		1				
	11 ÷ 14	.4330 ÷ .5512			1			
	14 ÷ 17	.5512 ÷ .6693				1		
	17 ÷ 20	.6693 ÷ .7874				1		
	20 ÷ 25	.7874 ÷ .9843					1	
	25 ÷ 30	.9843 ÷ 1.1811					1	
	30 ÷ 35	1.1811 ÷ 1.3780					1	
	35 ÷ 40	1.3780 ÷ 1.5748					1	
	40 ÷ 50	1.5748 ÷ 1.9685						1
	50 ÷ 60	1.9685 ÷ 2.3622						1
	60 ÷ 70	2.3622 ÷ 2.7560						1
	70 ÷ 80	2.7560 ÷ 3.1496						1
	80 ÷ 90	3.1496 ÷ 3.5433						1
	90 ÷ 100	3.5433 ÷ 3.9370						1
100 ÷ 125	3.9370 ÷ 4.9212							1
125 ÷ 150	4.9212 ÷ 5.9055							1
150 ÷ 175	5.9055 ÷ 6.8897							1
175 ÷ 200	6.8897 ÷ 7.8740							1
<b>Setting rings</b>	4	.1574	1					
	5,5	.2165	1					
	8	.3150		1				
	10	.3970		1				
	11	.4330			1			
	17	.6693				1		
	25	.9843					1	
	35	1.3780					1	
	50	1.9685						1
	70	2.7560						1
	90	3.5433						1
	125	4.9212						
175	6.8897							1
<b>Extensions</b>	100	3.9370		1				
	150	5.9055			1			
	150	5.9055				1		
	150	5.9055					1	
	150	5.9055						1

Sets of analogue internal micrometers, metric



00811500

Family	Dimension mm	00813409 BAE 3,5 ÷ 6,5	00810000 BAF 6 ÷ 12	00810800 BAG 11 ÷ 20	00811500 BAH 20 ÷ 40	00812300 BAJ 40 ÷ 100	00812600 BAK 100 ÷ 200
<b>Micrometers</b>	3,5 ÷ 4	1					
	4 ÷ 4,5	1					
	4,5 ÷ 5,5	1					
	5,5 ÷ 6,5	1					
	6 ÷ 8		1				
	8 ÷ 10		1				
	10 ÷ 12		1				
	11 ÷ 14				1		
	14 ÷ 17				1		
	17 ÷ 20				1		
	20 ÷ 25					1	
	25 ÷ 30					1	
	30 ÷ 35					1	
	35 ÷ 40					1	
	40 ÷ 50						1
	50 ÷ 60						1
	60 ÷ 70						1
	70 ÷ 80						1
	80 ÷ 90						1
	90 ÷ 100						1
100 ÷ 125							1
125 ÷ 150							1
150 ÷ 175							1
175 ÷ 200							1
<b>Setting rings</b>	4	1					
	5,5	1					
	8		1				
	10		1				
	11				1		
	17				1		
	25					1	
	35					1	
	50						1
	70						1
	90						1
125							1
175							1
<b>Extensions</b>	100		1				
	150			1			
	150				1		
	150					1	
	150						1

## Internal micrometer sets

### Sets of analogue internal micrometers, imperial



00881200

Family	Dimension in	00880100 BAFE .275 ÷ .5	00880400 BAGE .5 ÷ .8	00881200 BAHE .8 ÷ 1.6	00881900 BAJE 1.6 ÷ 4	00882700 BAKE 4 ÷ 8
Micrometers	.275 ÷ .350	1				
	.350 ÷ .425	1				
	.425 ÷ .500	1				
	.500 ÷ .600		1			
	.600 ÷ .700		1			
	.700 ÷ .800		1			
	.800 ÷ 1.0				1	
	1.0 ÷ 1.2				1	
	1.2 ÷ 1.4				1	
	1.4 ÷ 1.6				1	
	1.6 ÷ 2.0					1
	2.0 ÷ 2.4					1
	2.4 ÷ 2.8					1
	2.8 ÷ 3.2					1
	3.2 ÷ 3.6					1
	3.6 ÷ 4.0					1
	4.0 ÷ 5.0					
5.0 ÷ 6.0						1
6.0 ÷ 7.0						1
7.0 ÷ 8.0						1
Setting rings	.35	1				
	.43	1				
	.50		1			
	.70		1			
	1.0			1		
	1.4			1		
	2.0				1	
	2.8				1	
	3.6				1	
	5.0					1
7.0					1	
Extensions	4.0	1				
	6.0		1			
	6.0			1		
	6.0				1	
	6.0					1

**Extensions for metric internal micrometer**



Article number	Dimensions mm	Dimensions in	Compatibility
00840001	100	4	for micrometer with a measuring range of 6 ÷ 12 mm
00840301	150	6	for micrometer with a measuring range of 11 ÷ 20 mm
00840302	500	20	for micrometer with a measuring range of 11 ÷ 20 mm
00841100	150	6	for micrometer with a measuring range of 20 ÷ 40 mm
00841101	500	20	for micrometer with a measuring range of 20 ÷ 40 mm
00841102	1000	52	for micrometer with a measuring range of 20 ÷ 40 mm
00841800	150	6	for micrometer with a measuring range of 40 ÷ 100 mm
00841801	500	20	for micrometer with a measuring range of 40 ÷ 100 mm
00841802	1000	52	for micrometer with a measuring range of 40 ÷ 100 mm
00842600	150	6	for micrometer with a measuring range of 100 ÷ 300 mm
00842601	500	20	for micrometer with a measuring range of 100 ÷ 300 mm
00842602	1000	52	for micrometer with a measuring range of 100 ÷ 300 mm

**Extensions for imperial internal micrometer**



Article number	Dimensions mm	Dimensions in	Compatibility
00850001	100	4	for micrometer with a measuring range of .275 ÷ .5 in
00850301	150	6	for micrometer with a measuring range of .5 ÷ .8 in
00850302	500	20	for micrometer with a measuring range of .5 ÷ .8 in
00851100	150	6	for micrometer with a measuring range of .8 ÷ 1.6 in
00851101	500	20	for micrometer with a measuring range of .8 ÷ 1.6 in
00851800	1000	6	for micrometer with a measuring range of 1.6 ÷ 4 in
00851801	500	20	for micrometer with a measuring range of 1.6 ÷ 4 in
00851802	1000	40	for micrometer with a measuring range of 1.6 ÷ 4 in
00852600	150	6	for micrometer with a measuring range of 4 ÷ 12 in
00852601	500	20	for micrometer with a measuring range of 4 ÷ 12 in
00852602	1000	40	for micrometer with a measuring range of 4 ÷ 12 in

## Accessories for internal micrometers

### Centring devices for metric internal micrometers



Article number	Dimensions mm	Compatibility
<b>00860001</b>	150	for micrometer with a measuring range of 40 ÷ 100 mm
<b>00862601</b>	200	for micrometer with a measuring range of 100 ÷ 200 mm

### Setting rings, metric



Max. perm. errors

The cylindricity errors make no allowance for a rim of 1 mm.

Particular characteristic(s)

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.

Article number	Max. perm. cylindricity error µm	Uncertainty of measurement µm	Diameter mm
00843200	1,5	1,5	4
00843201	1,5	1,5	5,5
00840114	1,5	1,5	6
00840101	1,5	1,5	8
00840115	1,5	1,5	8,5
00840102	1,5	1,5	10
00840103	1,5	1,5	11
00840116	1,5	1,5	12,5
00840104	1,5	1,5	15
00840105	1,5	1,5	17
00840117	1,5	1,5	17,5
00840106	1,5	1,5	25
00840107	2	2	35
00843230	2	2	45
00840108	2	2	50
00843239	2	2	60
00840109	2	2	70
00840118	2	2	85
00840110	2	2	90
00840111	2,5	2,5	110
00840112	2,5	2,5	125
00840113	2,5	4	175

## Setting rings and setting standards

### Setting rings, imperial



00850106

Max. perm. errors

The cylindricity errors make no allowance for a rim of 1 mm.

Particular characteristic(s)

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.

Article number	Max. perm. cylindricity error $\mu\text{m}$	Uncertainty of measurement $\mu\text{m}$	Diameter in
00850101	1,5	1,5	.35
00850102	1,5	1,5	.425
00850103	1,5	1,5	.5
00850104	1,5	1,5	.6
00850105	1,5	1,5	.7
00850106	1,5	1,5	1
00850107	2	2	1.4
00850108	2	2	2
00850109	2	2	2.8
00850110	2	2	3.6
00850111	2,5	2,5	4.4
00850112	2,5	2,5	5
00850113	2,5	4	7



# Dial gauges



**TESA**  
TECHNOLOGY

The wide range of analog and digital dial gauges, easy to use and versatile, offers a great selection of models in various configurations.

### Digital Models

The operator can easily switch from standard functionalities (EASY model) to advanced features, with a measurement range of up to 150 mm.

Traceability is ensured through the connection to the DATA-VIEWER software.

The display of tolerance results via colored LED indicators allows for clear and visible production control.

Versions with IP67 protective bellows are also available for use in challenging environments.

### Analog Models

Resolutions from 0.1 mm to 0.001 mm, combined with measurement ranges up to 50 mm, cover a wide range of applications.

The yellow outline of the dial enhances contrast for better readability.

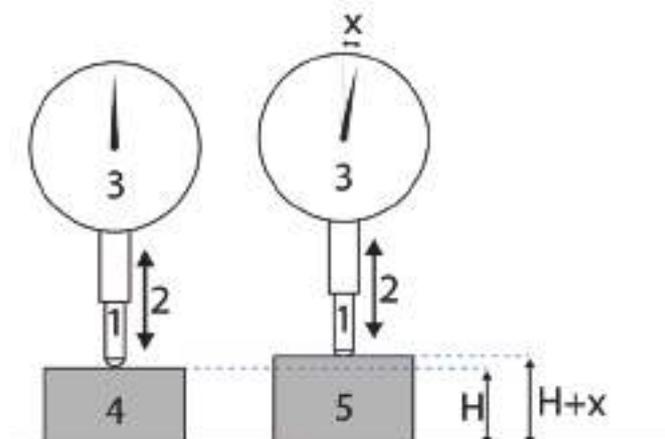
Versions protected by a bellows and a sealed screwed dial are also available for use in harsh environments.

## Principle

A comparator is a measuring instrument consisting of two main parts: a movable translational rod (1) whose displacement (2) is transformed by a mechanical device into a measurement value displayed on an analog (3) or digital dial.

The comparator is not an absolute device. All measurements taken are relative to a reference point.

The instrument is then «zeroed» (H) relative to a reference piece (4). The measured length variation (x) on another identical piece (5) is then read on the dial. This value helps determine whether the piece has been correctly manufactured, if it requires adjustment, or if it should be rejected.



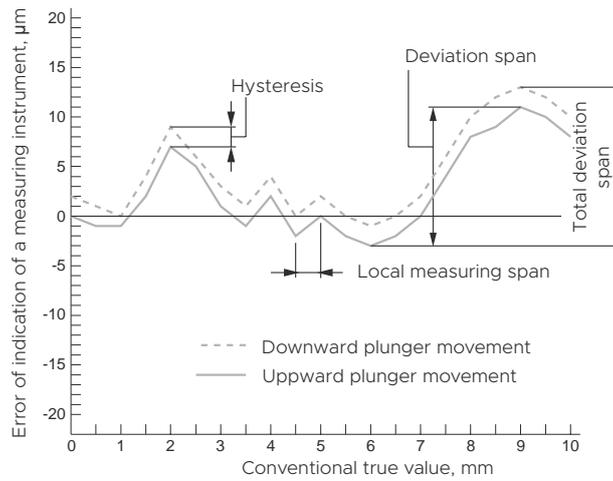
## Metrological definitions

International standard ISO 463:2006, is the main standard used for the metrological and dimensional characteristics of dial gauges.

Indication errors for:

- Measuring range (retractable plunger): MPEe
- Partial measuring range: MPEp
  - over 1 revolution
  - over 1/2 revolution
  - over 1/10 revolution
  - over 1 mm
- Hysteresis: MPEh
- Repeatability: MPEr

## Dial gauges



## Digital dial gauges



## Analog dial gauge



**Digital dial gauges**

Series	Article number	Dial, Ø mm	Measuring range, mm	Resolution mm	Degree of protection	Measuring force, N	Number of buttons	Functions	Data output
DIALTRONIC COMPACT	<b>01930260</b>	45	12.5	0.01	IP54	0,5 ÷ 0,9	1	Standard	RS232
	<b>01930261</b>	45	12.5	0.001	IP54	0,5 ÷ 0,9	1	Standard	RS232
	<b>01930263</b>	45	12.5	0.001	IP67	0,6 ÷ 1,3	1	Standard	RS232
DIALTRONIC EASY	<b>01930320</b>	60	12.5	0.01	IP51	0,65 ÷ 0,9	3	Standard	RS232
	<b>01930321</b>	60	12.5	0.001	IP51	0,65 ÷ 0,9	3	Standard	RS232
DIALTRONIC	<b>01930300</b>	60	12.5	0.01	IP54	0,65 ÷ 0,9	3	Advanced	RS232
	<b>01930301</b>	60	12.5	0.001	IP54	0,65 ÷ 0,9	3	Advanced	RS232
	<b>01930303</b>	60	12.5	0.001	IP67	0,7 ÷ 1,4	3	Advanced	RS232
	<b>01930304</b>	60	25	0.01	IP54	0,65 ÷ 1,15	3	Advanced	RS232
	<b>01930305</b>	60	25	0.001	IP54	0,65 ÷ 1,15	3	Advanced	RS232
	<b>01930307</b>	60	25	0.001	IP67	0,65 ÷ 1,8	3	Advanced	RS232
	<b>01930309</b>	60	50	0.001	IP54	1,1 ÷ 2,6	3	Advanced	RS232
	<b>01930311</b>	60	100	0.001	IP54	1,8 ÷ 3,8	3	Advanced	RS232
	<b>01930313</b>	60	150	0.001	IP54	2,6 ÷ 5,7	3	Advanced	RS232
DIALTRONIC BT	<b>01930315</b>	60	12.5	0.001	IP54	0,65 ÷ 0,9	3	Advanced	RS232, Bluetooth®
	<b>01930317</b>	60	25	0.001	IP54	0,65 ÷ 1,15	3	Advanced	RS232, Bluetooth®

## Dial gauges

### Analogue metric dial gauges

Article number	Resolution, mm	Measuring range, mm	Dial Ø	Travel / revolution, mm	Circular scale	Reading direction	Degree of protection	Shockproof mechanism	Rotating dial	Type
<b>0141760500</b>	0.1	10	40	10	0 ÷ 5 ÷ 10	Clockwise	IP40		•	Standard
<b>0141760501</b>	0.1	10	58	10	0 ÷ 5 ÷ 10	Clockwise	IP40		•	Standard
<b>0141760503</b>	0.1	30	58	10	0 ÷ 5 ÷ 10	Clockwise	IP40		•	Standard
<b>0141760566</b>	0.01	3	40	0.5	0 ÷ 25 ÷ 50	Clockwise	IP40	•	•	Back mounted plunger
<b>01419080</b>	0.01	3.5	28	0.5	0 ÷ 25 ÷ 50	Clockwise	IP40		•	Standard
<b>01419047</b>	0.01	5	40	0.5	0 ÷ 25 ÷ 50	Clockwise	IP40	•	•	Standard
<b>01419081</b>	0.01	5	44.5	0.5	0 ÷ 25 ÷ 50	Clockwise	IP67	•	•	Standard
<b>01419048</b>	0.01	10	58	1	0 ÷ 50 ÷ 100	Clockwise	IP40	•	•	Standard
<b>01419082</b>	0.01	10	61.5	1	0 ÷ 50 ÷ 100	Clockwise	IP67	•	•	Standard
<b>0141760651</b>	0.01	30	58	1	0 ÷ 50 ÷ 100	Clockwise	IP40		•	Standard
<b>0141760661</b>	0.01	50	58	1	0 ÷ 50 ÷ 100	Clockwise	IP40		•	Standard
<b>01419056</b>	0,002	3	44.5	0.2	0 ÷ 10 ÷ 20	Clockwise	IP40	•	•	Standard
<b>01419057</b>	0,002	3	44.5	0.2	0 ÷ 10 ÷ 20	Clockwise	IP67	•	•	Standard
<b>01419058</b>	0,002	5	58	0.2	0 ÷ 10 ÷ 20	Clockwise	IP40	•	•	Standard
<b>01419051</b>	0.001	0.1	62		50 ÷ 0 ÷ 50	Clockwise and anti-clockwise	IP40	•		Standard
<b>01419052</b>	0.001	0.1	62		50 ÷ 0 ÷ 50	Clockwise and anti-clockwise	IP54	•		Standard
<b>01419053</b>	0.001	1	40	0.2	0 ÷ 10 ÷ 20	Clockwise	IP40	•	•	Standard
<b>01419054</b>	0.001	1	58	0.2	0 ÷ 10 ÷ 20	Clockwise	IP40	•	•	Standard
<b>01419055</b>	0.001	5	58	0.2	0 ÷ 10 ÷ 20	Clockwise	IP40	•	•	Standard

### DIALTRONIC COMPACT series

- FUNCTIONS
  - Zeroing
  - Adjustable PRESET with Computer connection
  - Data transmission
  - mm/in selection
  - Selection of measurement direction
  - Automatic switch-off



01930260



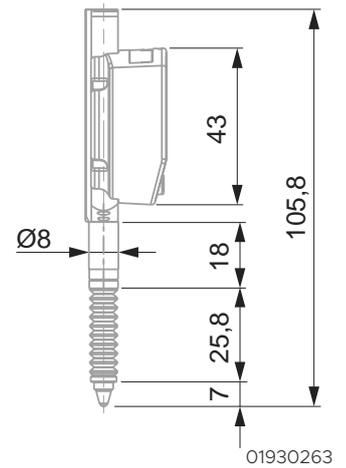
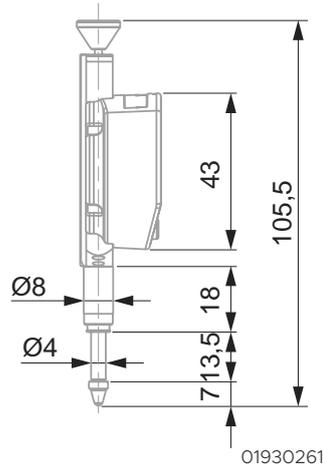
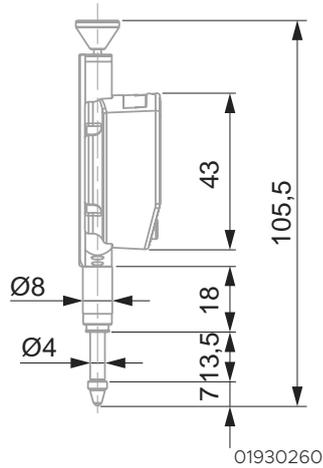
01930261



01930263

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	12,5 mm / .5 in
Resolution	0,01 or 0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP54 or IP67
Data output(s)	RS232
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

## Digital dial gauges



Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930260</b>	45	1.77	IP54	RS232	0,5 ÷ 0,9	1
<b>01930261</b>	45	1.77	IP54	RS232	0,5 ÷ 0,9	1
<b>01930263</b>	45	1.77	IP67	RS232	0,6 ÷ 1,3	1

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930260</b>	10 ± 1 digit	.0005 ± 1 digit	8	.0003	2	.0001
<b>01930261</b>	4	.0002	3	.0001	2	.0001
<b>01930263</b>	4	.0002	3	.0001	2	.0001

MPEe: indication error on the measuring range (retractable plunger)

MPEp: indication error on partial measuring range

MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01961012</b>	Device for plunger retraction for DIALTRONIC COMPACT dial gauge
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

## DIALTRONIC EASY series

• FUNCTIONS

- Zeroing / Preset
- Data transmission
- mm/in selection
- Selection of measurement direction
- Automatic or manual switch-off
- Locking of the measured value



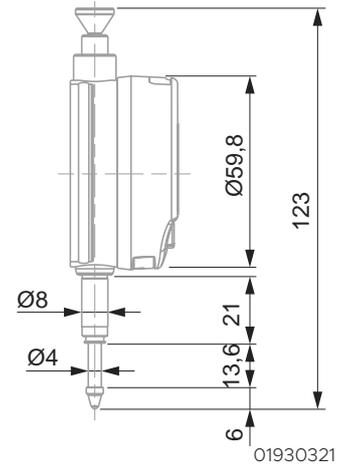
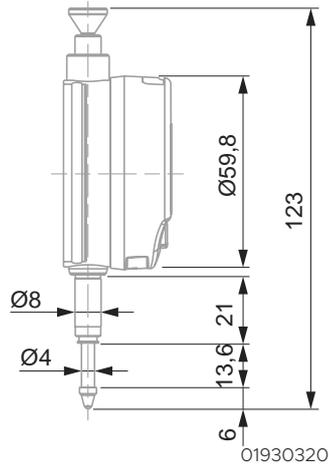
01930320



01930321

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	12,5 mm / .5 in
Resolution	0,01 or 0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP51
Data output(s)	RS232
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

## Digital dial gauges



Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930320</b>	60	2.36	IP51	RS232	0,65 ÷ 0,9	3
<b>01930321</b>	60	2.36	IP51	RS232	0,65 ÷ 0,9	3

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930320</b>	10 ± 1 digit	.0005 ± 1 digit	8	.0003	2	.0001
<b>01930321</b>	4	.0002	3	.0001	2	.0001

MPEe: indication error on the measuring range (retractable plunger)

MPEp: indication error on partial measuring range

MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01960101</b>	Device for plunger retraction for DIALTRONIC dial gauge
<b>01960100</b>	Back with central lug for DIALTRONIC dial gauge
<b>04760160</b>	Cable inductive to USB, 3 m
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

## DIALTRONIC series, measuring range 12,5 mm

• FUNCTIONS

- Switching of the counting direction
- Automatic sleep mode
- RS232 data output
- PRESET mode
- 2 storable references
- MAX, MIN, MAX-MIN (TIR)
- Change of resolution
- Multiplication factor
- Locking of the keys
- Storage of the measured value
- Reset of the value
- Button for recall of PRESET value
- Setting of tolerances
- Wireless data output (01930315)



01930300



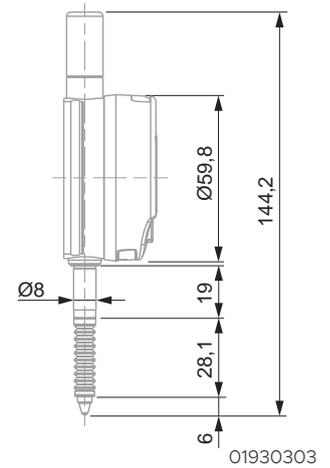
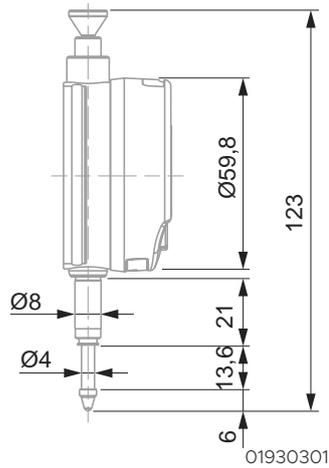
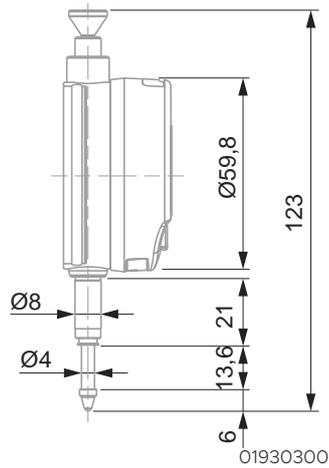
01930301



01930303

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	12,5 mm / .5 in
Resolution	0,01 or 0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP54 or IP67
Data output(s)	RS232 or Bluetooth®
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

## Digital dial gauges



Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930300</b>	60	2.36	IP54	RS232	0,65 ÷ 0,9	3
<b>01930301</b>	60	2.36	IP54	RS232	0,65 ÷ 0,9	3
<b>01930303</b>	60	2.36	IP67	RS232	0,7 ÷ 1,4	3
<b>01930315</b>	60	2.36	IP54	RS232 and Bluetooth®	0,65 ÷ 0,9	3

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930300</b>	10 ± 1 digit	.0005 ± 1 digit	8	.0003	2	.0001
<b>01930301</b>	3	.0001	2,6	.0001	2	.0001
<b>01930303</b>	3	.0001	2,6	.0001	2	.0001
<b>01930315</b>	3	.0001	2,6	.0001	2	.0001

MPEe: indication error on the measuring range (retractable plunger)

MPEp: indication error on partial measuring range

MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01960101</b>	Device for plunger retraction for DIALTRONIC dial gauge
<b>01960100</b>	Back with central lug for DIALTRONIC dial gauge
<b>04760160</b>	Cable inductive to USB, 3 m
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

## DIALTRONIC series, measuring range 25 mm

• FUNCTIONS

- Switching of the counting direction
- Automatic sleep mode
- RS232 data output
- PRESET mode
- 2 storable references
- MAX, MIN, MAX-MIN (TIR)
- Change of resolution
- Multiplication factor
- Locking of the keys
- Storage of the measured value
- Reset of the value
- Button for recall of PRESET value
- Setting of tolerances



01930304



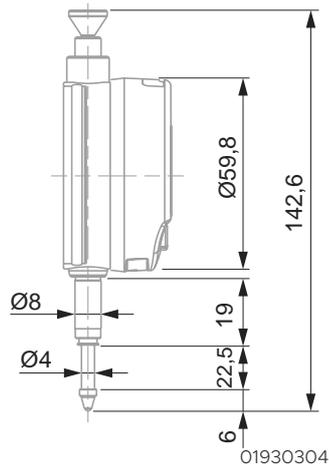
01930305



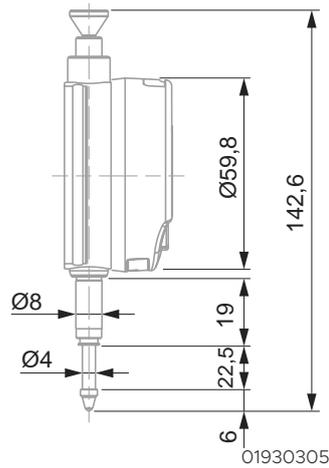
01930307

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	25 mm / 1 in
Resolution	0,01 or 0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP54 or IP67
Data output(s)	RS232 or Bluetooth®
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

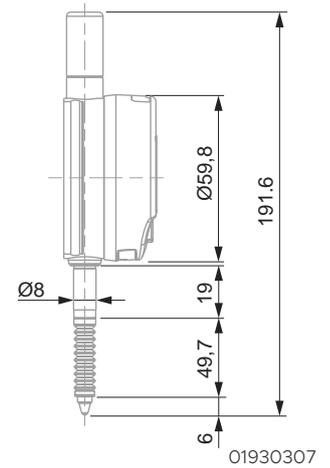
## Digital dial gauges



01930304



01930305



01930307

Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930304</b>	60	2.36	IP54	RS232	0,65 ÷ 1,15	3
<b>01930305</b>	60	2.36	IP54	RS232	0,65 ÷ 1,15	3
<b>01930307</b>	60	2.36	IP67	RS232	0,65 ÷ 1,8	3
<b>01930317</b>	60	2.36	IP54	RS232 and Bluetooth®	0,65 ÷ 1,15	3

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930304</b>	10 ± 1 digit	.0005 ± 1 digit	2,6	.0001	2	.0001
<b>01930305</b>	4	.0002	2,6	.0001	2	.0001
<b>01930307</b>	4	.0002	2,6	.0001	2	.0001
<b>01930317</b>	4	.0002	2,6	.0001	2	.0001

MPEe: indication error on the measuring range (retractable plunger)  
MPEp: indication error on partial measuring range  
MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01960102</b>	Device for plunger retraction for DIALTRONIC dial gauge
<b>01960100</b>	Back with central lug for DIALTRONIC dial gauge
<b>04760160</b>	Cable inductive to USB, 3 m
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

## DIALTRONIC series, measuring range 50 mm

• FUNCTIONS

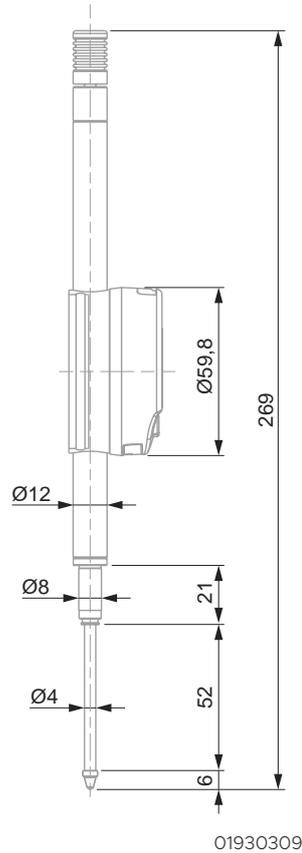
- Switching of the counting direction
- Automatic sleep mode
- RS232 data output
- PRESET mode
- 2 storable references
- MAX, MIN, MAX-MIN (TIR)
- Change of resolution
- Multiplication factor
- Locking of the keys
- Storage of the measured value
- Reset of the value
- Button for recall of PRESET value
- Setting of tolerances



01930309

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	50 mm / 2 in
Resolution	0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP54
Data output(s)	RS232
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

## Digital dial gauges



Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930309</b>	60	2.36	IP54	RS232	1,1 ÷ 2,6	3

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930309</b>	5	.0002	3,2	.00015	2	.0001

MPEe: indication error on the measuring range (retractable plunger)

MPEp: indication error on partial measuring range

MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01960100</b>	Back with central lug for DIALTRONIC dial gauge
<b>04760160</b>	Cable inductive to USB, 3 m
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

## DIALTRONIC series, measuring range 100 mm

### • FUNCTIONS

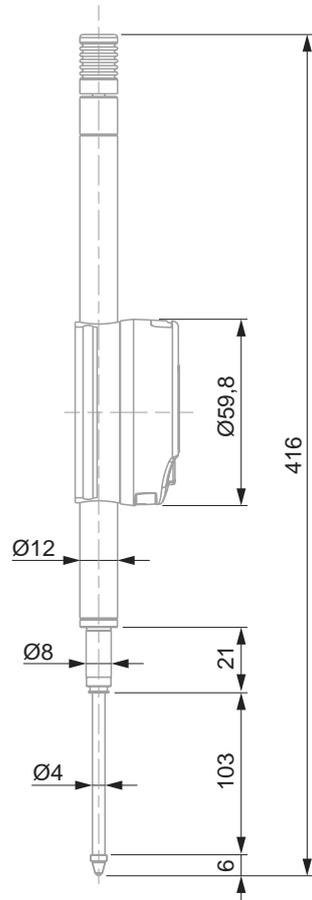
- Switching of the counting direction
- Automatic sleep mode
- RS232 data output
- PRESET mode
- 2 storable references
- MAX, MIN, MAX-MIN (TIR)
- Change of resolution
- Multiplication factor
- Locking of the keys
- Storage of the measured value
- Reset of the value
- Button for recall of PRESET value
- Setting of tolerances



01930311

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	100 mm / 4 in
Resolution	0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP54
Data output(s)	RS232
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

## Digital dial gauges



01930311

Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930311</b>	60	2.36	IP54	RS232	1,8 ÷ 3,8	3

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930311</b>	6	.00025	3,2	.00015	2	.0001

MPEe: indication error on the measuring range (retractable plunger)

MPEp: indication error on partial measuring range

MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01960100</b>	Back with central lug for DIALTRONIC dial gauge
<b>04760160</b>	Cable inductive to USB, 3 m
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

## DIALTRONIC series, measuring range 150 mm

### • FUNCTIONS

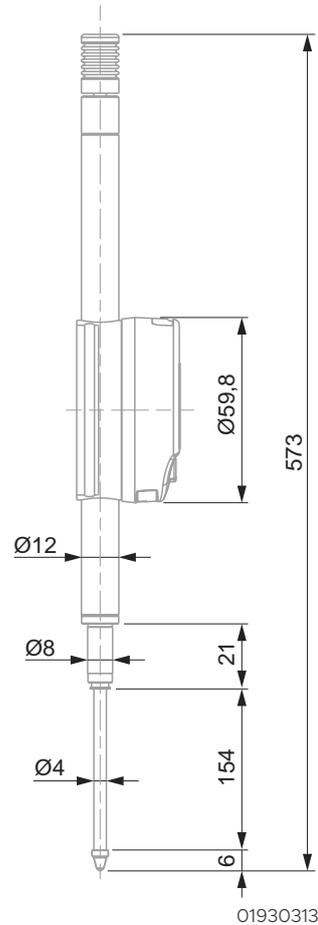
- Switching of the counting direction
- Automatic sleep mode
- RS232 data output
- PRESET mode
- 2 storable references
- MAX, MIN, MAX-MIN (TIR)
- Change of resolution
- Multiplication factor
- Locking of the keys
- Storage of the measured value
- Reset of the value
- Button for recall of PRESET value
- Setting of tolerances



Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	150 mm / 6 in
Resolution	0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP54
Data output(s)	RS232
Units	mm / in
Included in delivery	Dial gauge with mounted ball insert Ø 3 mm Measurement report Quickstart guide

01930313

## Digital dial gauges



Article number	Ø Dial mm	Ø Dial in	Degree of protection	Data output	Measuring force N	Number of buttons
<b>01930313</b>	60	2.36	IP54	RS232	2,6 ÷ 5,7	3

Article number	MPEe, retractable plunger, µm	MPEe, retractable plunger, in	MPEp, 1 mm µm	MPEp, 1 mm in	MPEr µm	MPEr in
<b>01930313</b>	10	.0004	3,2	.00015	2	.0001

MPEe: indication error on the measuring range (retractable plunger)  
MPEp: indication error on partial measuring range  
MPEr: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>01960100</b>	Back with central lug for DIALTRONIC dial gauge
<b>04760160</b>	Cable inductive to USB, 3 m
<b>04760161</b>	Cable power to USB, 3 m
<b>04760162</b>	Cable power (90 degrees) to USB, 3 m

**Standard models, resolution 0,1 mm, measuring range 10 mm**



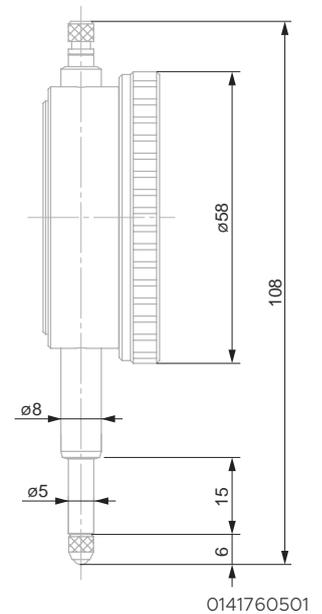
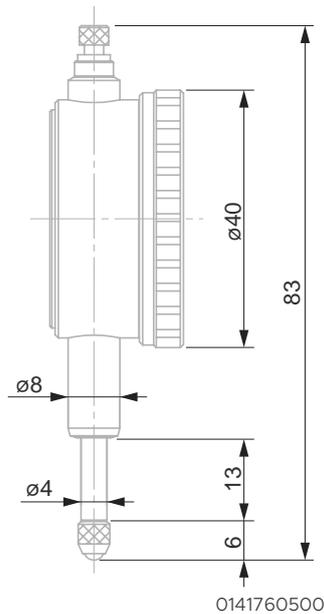
0141760500



0141760501

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	10 mm
Resolution	0,1 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>0141760500</b>	40	10	0 ÷ 5 ÷ 10	IP40	Without	1 ± 20%	Internal dial: white External dial: white Numerals: black
<b>0141760501</b>	58	10	0 ÷ 5 ÷ 10	IP40	Without	0,7 ± 20%	Internal dial: white External dial: white Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>0141760500</b>	50	40	30	15	15
<b>0141760501</b>	50	40	30	15	15

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01462004</b>	Back with central lug for IP40 dial gauges with Ø 40 or Ø 44,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial
<b>03560004</b>	Device for plunger retraction for dial gauge with a Ø 40 or Ø 44,5 mm dial
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01960005</b>	Device for plunger retraction

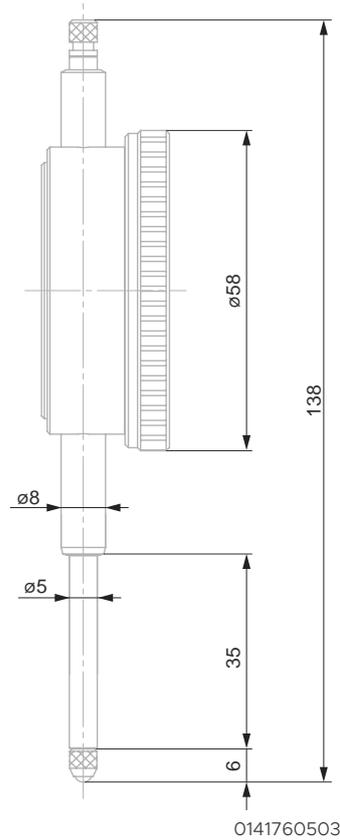
**Standard model, resolution 0,1 mm, measuring range 30 mm**



0141760503

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	30 mm
Resolution	0,1 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>0141760503</b>	58	10	0 ÷ 5 ÷ 10	IP40	Without	0,8 ± 20%	Internal dial: white External dial: white Numerals: black and red

Article number	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> 1/2 µm	MPE <sub>p</sub> 1/10 µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>0141760503</b>	50	40	30	15	15

MPE<sub>e</sub>: indication error on the measuring range (retractable plunger)  
MPE<sub>p</sub> 1/10: indication error on 1/10 rotation  
MPE<sub>p</sub> 1/2: indication error on 1/2 rotation  
MPE<sub>r</sub>: repeatability of the indication error  
MPE<sub>h</sub>: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462005</b>	Back with central lug, for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial

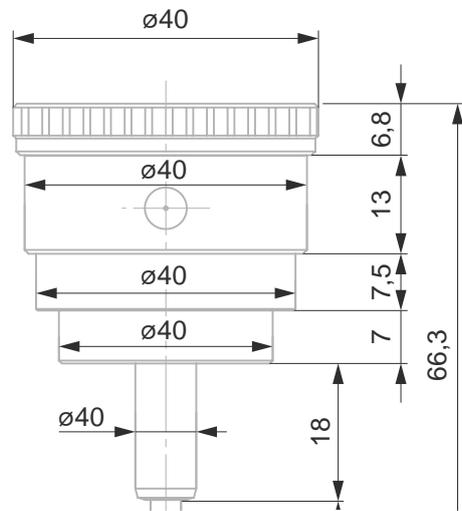
**Model with back mounted plunger, resolution 0,01 mm, measuring range 3 mm**



0141760566

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	3 mm
Resolution	0,01 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



0141760566

Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>0141760566</b>	40	0,5	0 ÷ 25 ÷ 50	IP40	With	1,5 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>0141760566</b>	12	8	5	5	3

MPEe: indication error on the measuring range (retractable plunger)

MPEp 1/10: indication error on 1/10 rotation

MPEp 1/2: indication error on 1/2 rotation

MPEr: repeatability of the indication error

MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560004</b>	Device for plunger retraction for dial gauge with a Ø 40 or Ø 44,5 mm dial

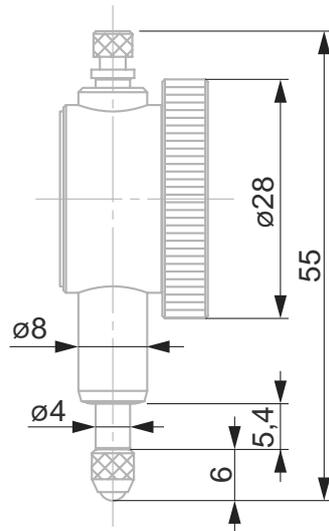
**Standard model, resolution 0,01 mm, measuring range 3,5 mm**



01419080

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	3,5 mm
Resolution	0,01 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



01419080

Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>01419080</b>	28	0,5	0 ÷ 25 ÷ 50	IP40	Without	0,8 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419080</b>	17	9	5	5	3

MPEe: indication error on the measuring range (retractable plunger)

MPEp 1/10: indication error on 1/10 rotation

MPEp 1/2: indication error on 1/2 rotation

MPEr: repeatability of the indication error

MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction

**Standard models, resolution 0,01 mm, measuring range 5 mm**



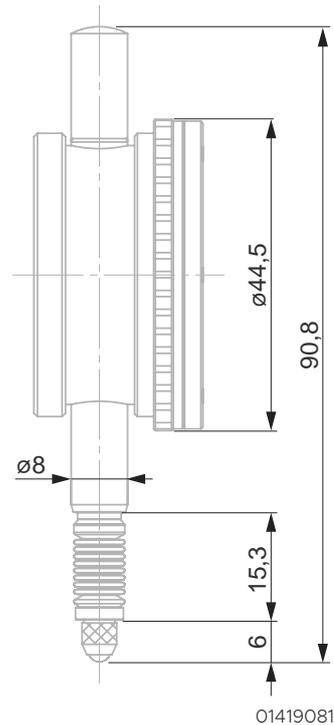
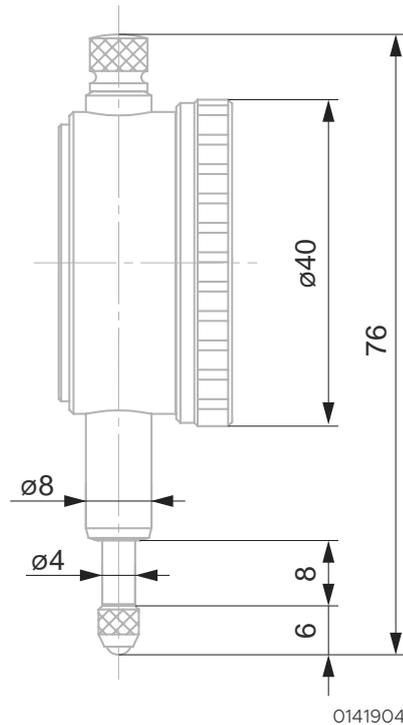
01419047



01419081

Standard	Dimensions: ISO 463 (01419047), factory standard (01419081) Performances: DIN 878
Measuring range	5 mm
Resolution	0,01 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force, N	Color
<b>01419047</b>	40	0,5	0 ÷ 25 ÷ 50	IP40	With	0,7 ± 10%	Internal dial: white External dial: yellow Numerals: black
<b>01419081</b>	44,5	0,5	0 ÷ 20 ÷ 50	IP67	With	0,9 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419047</b>	12	9	5	3	3
<b>01419081</b>	12	9	5	3	3

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560004</b>	Device for plunger retraction for dial gauge with a Ø 40 or Ø 44,5 mm dial
<b>01462004</b>	Back with central lug for IP40 dial gauges with Ø 40 or Ø 44,5 mm dial
<b>01460020</b>	Back with central lug for IP67 dial gauges with Ø 40 or Ø 44,5 mm dial

**Standard models, resolution 0,01 mm, measuring range 10 mm**



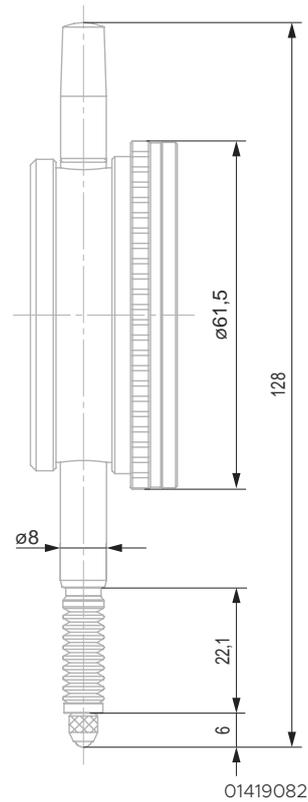
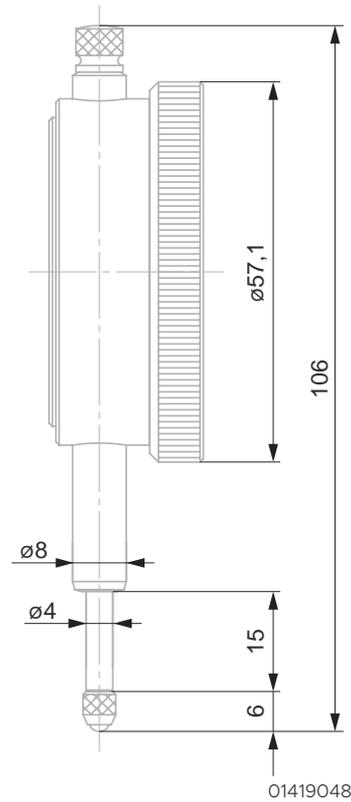
01419048



01419082

Standard	Dimensions: ISO 463 (01419048), factory standard (01419082) Performances: DIN 878
Measuring range	10 mm
Resolution	0,01 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40 or IP67
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force, N	Color
<b>01419048</b>	58	1	0 ÷ 50 ÷ 100	IP40	With	0,7 ± 20%	Internal dial: white External dial: yellow Numerals: black
<b>01419082</b>	61,5	1	0 ÷ 50 ÷ 100	IP67	With	1,3 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419048</b>	15	9	5	3	3
<b>01419082</b>	15	9	5	3	3

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial
<b>01460021</b>	Back with central lug for IP67 dial gauges with Ø 58 or Ø 61,5 mm dial

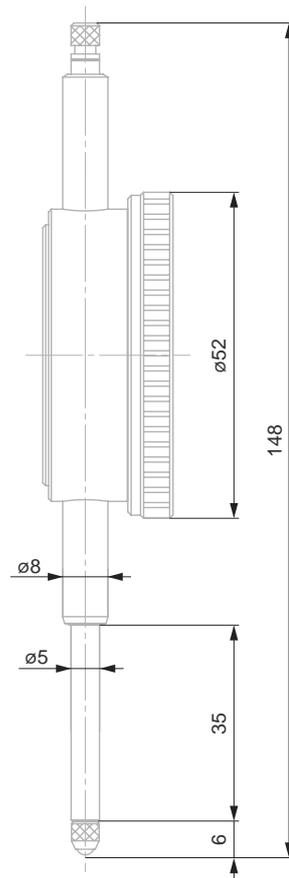
**Standard model, resolution 0,01 mm, measuring range 30 mm**



0141760651

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	30 mm
Resolution	0,01 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



0141760651

Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force, N	Color
<b>0141760651</b>	58	1	0 ÷ 50 ÷ 100	IP40	Without	0,8 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>0141760651</b>	20	10	5	5	3

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial

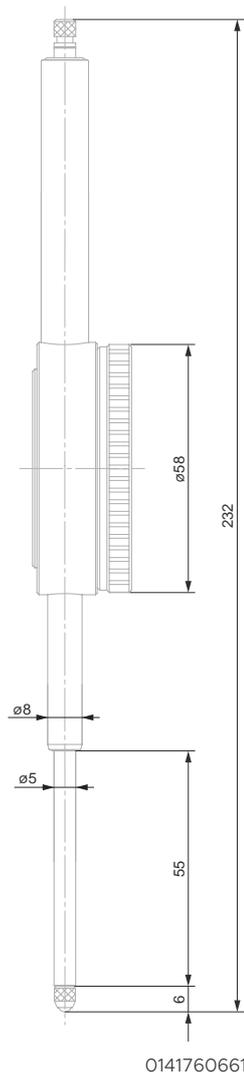
**Standard model, resolution 0,01 mm, measuring range 50 mm**



0141760661

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	50 mm
Resolution	0,01 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>0141760661</b>	58	1	0 ÷ 50 ÷ 100	IP40	Without	1 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEr µm
<b>0141760661</b>	25	10	5	3

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial

**Standard models, resolution 0,002 mm, measuring range 3 mm**



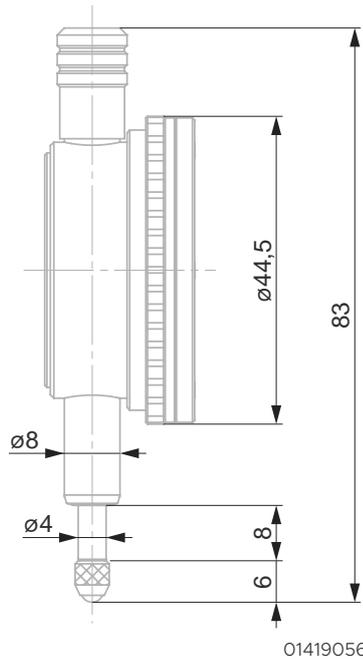
01419056



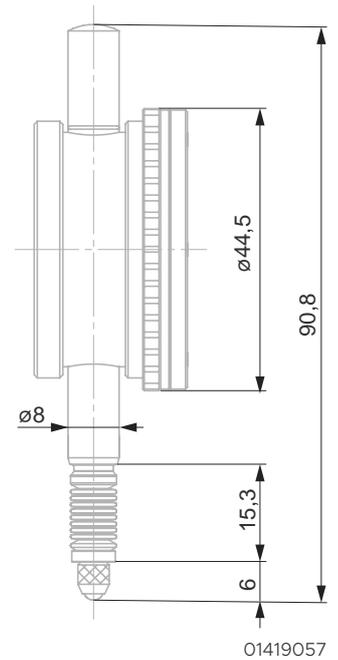
01419057

Standard	Dimensions: ISO 463 (01419056), factory standard (01419057) Performances: factory standard
Measuring range	3 mm
Resolution	0,002 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40 or IP67
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise and anti-clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



01419056



01419057

Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force, N	Color
<b>01419056</b>	44,5	0,2	0 ÷ 10 ÷ 20	IP40	With	1,1 ± 20%	Internal dial: white External dial: yellow Numerals: black and red
<b>01419057</b>	44,5	0,2	0 ÷ 10 ÷ 20	IP67	With	1,3 ± 20%	Internal dial: white External dial: yellow Numerals: black and red

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419056</b>	7	4	3	3	0,5
<b>01419057</b>	7	4	3	3	0,5

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560004</b>	Device for plunger retraction for dial gauge with a Ø 40 or Ø 44,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial
<b>01460020</b>	Back with central lug for IP67 dial gauges with Ø 40 or Ø 44,5 mm dial

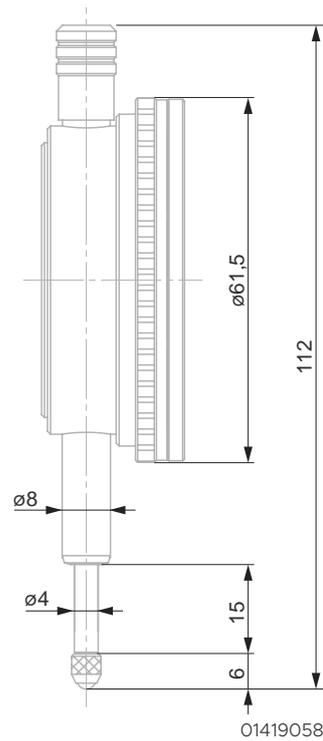
**Standard model, resolution 0,002 mm, measuring range 5 mm**



01419058

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	5 mm
Resolution	0,002 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force, N	Color
<b>01419058</b>	58	0,2	0 ÷ 10 ÷ 20	IP40	With	1,4 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419058</b>	10	4	3	3	0,5

MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial

### Standard models, resolution 0,001 mm, measuring range 0,1 mm

• INSTRUMENT

- High precision comparators
- Short stroke
- Movement protected from shocks
- Stroke limited to less than one needle turn
- Fine adjustment of the indication with a protective cap against accidental movement of the needle
- Large dead travel

- MEASUREMENT

- Designed for comparative measurement with very low measurement uncertainty
- Very low hysteresis when checking axial and radial runout



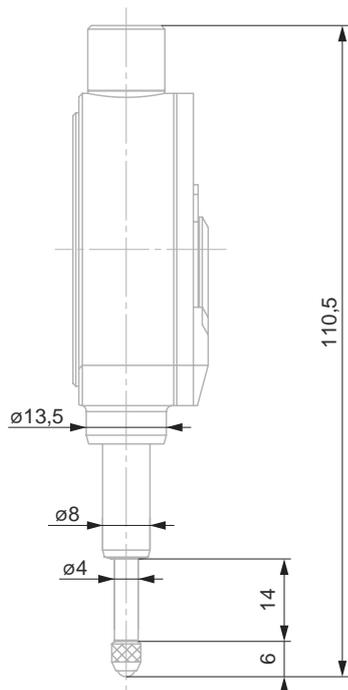
01419051



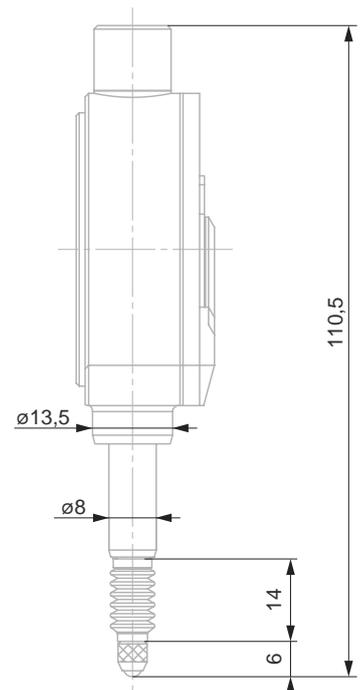
01419052

Standard	Dimensions: DIN 879-1 Performances: DIN 879-1
Measuring range	0,1 mm
Resolution	0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40 or IP54
Dial	Moving tolerances indexes
Reading direction	Clockwise and anti-clockwise
Units	mm
Remark(s)	Measuring bolt mounted on a ball bearing Thread for lifting cable
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



01419051



01419052

Article number	Ø Dial mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>01419051</b>	62	50 ÷ 0 ÷ 50	IP40	With	1 ± 20%	Internal dial: white Numerals: black
<b>01419052</b>	62	50 ÷ 0 ÷ 50	IP54	With	1,1 ± 20%	Internal dial: white Numerals: black

Article number	Ge µm	Gt µm	Fu µm	Rw µm
<b>01419051</b>	1	0,7	0,5	0,5
<b>01419052</b>	1	0,7	0,5	0,5

Gges: indication error on the measuring range (retractable and extendable plunger)

Ge: indication error on the measuring range (retractable plunger)

Gt: indication error over any local area including 10 divisions

Fu: hysteresis of indication error

Rw: repeatability of the indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial

**Standard models, resolution 0,001 mm, measuring range 1 mm**



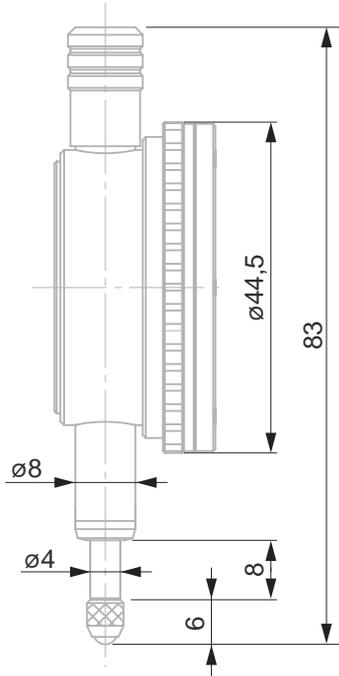
01419053



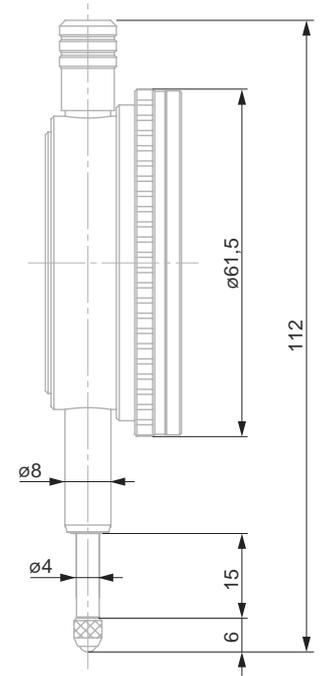
01419054

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	1 mm
Resolution	0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



01419053



01419054

Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force, N	Color
<b>01419053</b>	44,5	0,2	0 ÷ 10 ÷ 20	IP40	With	1 ± 20%	Internal dial: white External dial: yellow Numerals: black
<b>01419054</b>	61,5	0,2	0 ÷ 10 ÷ 20	IP40	With	1,4 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419053</b>	5	3	2	3	0,5
<b>01419054</b>	5	3	2	3	0,5

MPEe: indication error on the measuring range (retractable plunger)

MPEp 1/10: indication error on 1/10 rotation

MPEp 1/2: indication error on 1/2 rotation

MPEr: repeatability of the indication error

MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560004</b>	Device for plunger retraction for dial gauge with a Ø 40 or Ø 44,5 mm dial
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462004</b>	Back with central lug for IP40 dial gauges with Ø 40 or Ø 44,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial

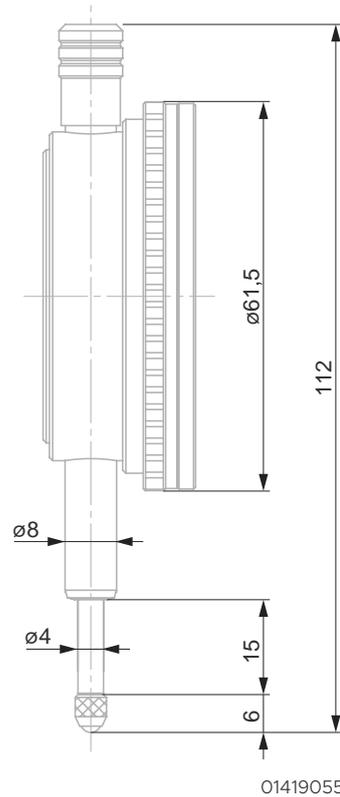
**Standard model, resolution 0,001 mm, measuring range 5 mm**



01419055

Standard	Dimensions: ISO 463 Performances: factory standard
Measuring range	5 mm
Resolution	0,001 mm
Material	Casing: metallic Mounting shank: stainless steel Plunger: stainless steel
Dimensions	Insert thread: M2,5 Mounting shank: Ø 8 mm
Degree of protection	IP40
Dial	Rotating dial Moving tolerances indexes
Reading direction	Clockwise
Units	mm
Included in delivery	Dial gauge with mounted ball insert Ø 3,175 mm Declaration of conformity

## Analogue dial gauges, metric



Article number	Ø Dial mm	Travel / revolution, mm	Circular scale	Degree of protection	Shockproof mechanism	Measuring force N	Color
<b>01419055</b>	61,5	0,2	0 ÷ 10 ÷ 20	IP40	With	1,4 ± 20%	Internal dial: white External dial: yellow Numerals: black

Article number	MPEe, retractable plunger, µm	MPEp 1/2 µm	MPEp 1/10 µm	MPEh µm	MPEr µm
<b>01419055</b>	10	4	3	3	0,5

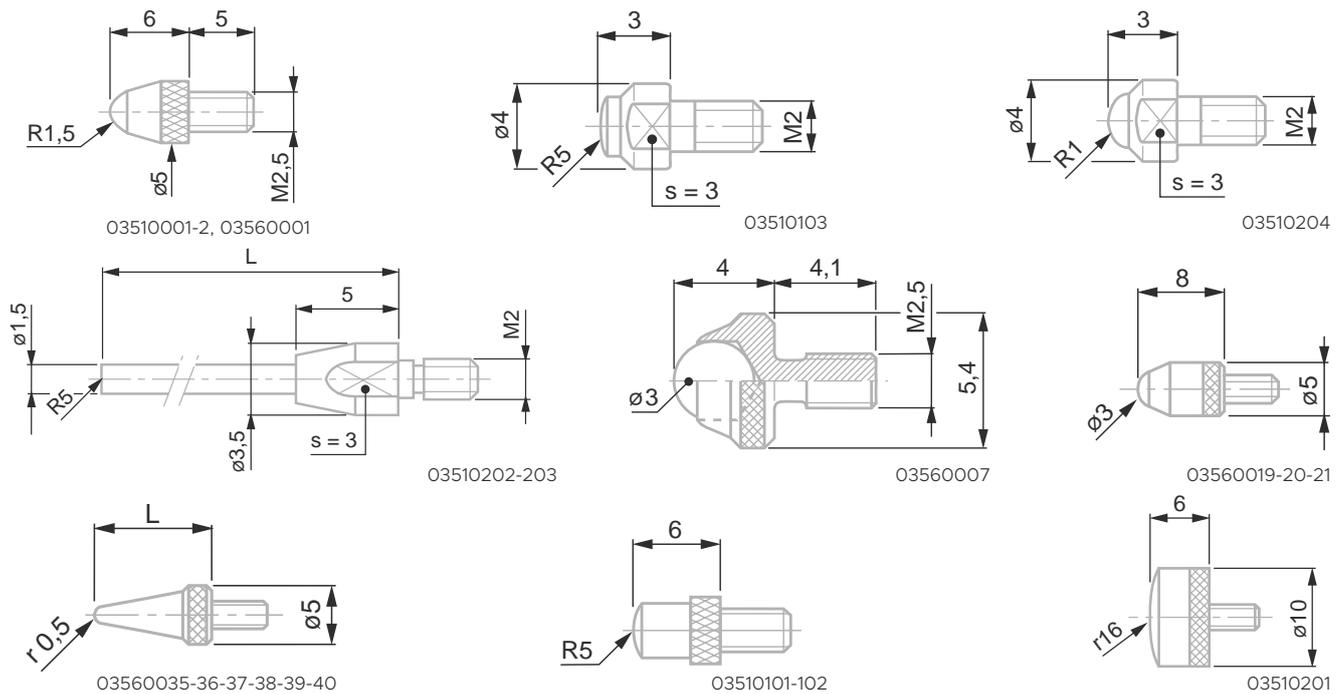
MPEe: indication error on the measuring range (retractable plunger)  
MPEp 1/10: indication error on 1/10 rotation  
MPEp 1/2: indication error on 1/2 rotation  
MPEr: repeatability of the indication error  
MPEh: hysteresis of indication error

### Accessories

Article number	Designation
<b>01960005</b>	Device for plunger retraction
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial
<b>01462005</b>	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial

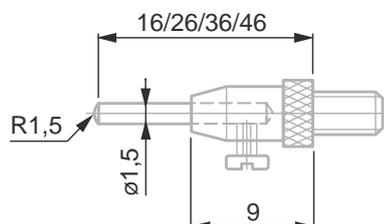
## Hemispherical inserts

Article number	Designation	Fixing mm	Radius mm	Probe length mm	Diameter mm	Material
03510103	Hemispherical insert	M2	1	3	4	Tungsten carbide
03510204	Hemispherical insert	M2	1	3	4	Tungsten carbide
03510202	Hemispherical insert	M2	5	16	1,5	Tungsten carbide
03510203	Hemispherical insert	M2	5	26	1,5	Tungsten carbide
03560035	Hemispherical insert	M2,5	0,5	5	5	Steel
03560036	Hemispherical insert	M2,5	0,5	5	5	Steel
03560037	Hemispherical insert	M2,5	0,5	15	5	Steel
03560038	Hemispherical insert	M2,5	0,5	20	5	Steel
03560039	Hemispherical insert	M2,5	0,5	30	5	Steel
03560040	Hemispherical insert	M2,5	0,5	40	5	Steel
03560007	Hemispherical insert	M2,5	1,5	4	5,4	Tungsten carbide
03510001	Hemispherical insert	M2,5	1,5	6	5	Steel
03510002	Hemispherical insert	M2,5	1,5	6	5	Tungsten carbide
03560001	Hemispherical insert	M2,5	1,5	6	5	Sapphire
03560019	Hemispherical insert	M2,5	1,5	8	8	Steel
03560020	Hemispherical insert	M2,5	1,5	8	8	Tungsten carbide
03560021	Hemispherical insert	M2,5	1,5	8	8	Ruby
03510101	Hemispherical insert	M2,5	5	6	5	Steel
03510102	Hemispherical insert	M2,5	5	6	5	Tungsten carbide
03560017	Hemispherical insert	M2,5	16	6	10	Steel
03560018	Hemispherical insert	M2,5	16	6	10	Tungsten carbide



## Hemispherical measuring insert with 4 interchangeable pins

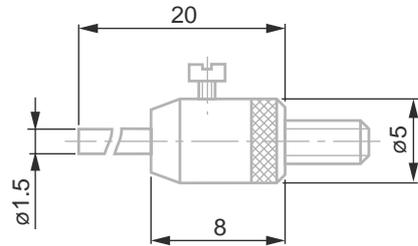
Article number	Designation	Fixing mm	Measuring face(s)	Probe length mm	Diameter mm	Material
03510201	Hemispherical insert with interchangeable pins	M2,5	R1,5	16, 26, 36, 46	1,5	Steel



## Inserts for dial gauges

### Inserts with flat measuring face and interchangeable pins

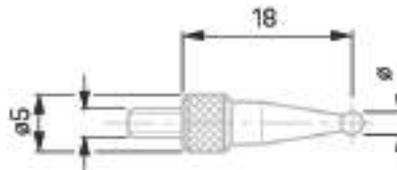
Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
03560008	Insert with exchangeable contact pin	M2,5	20	1,5	Steel	Flat measuring face
03560009	Insert with exchangeable contact pin	M2,5	20	1,5	Tungsten carbide	Flat measuring face



03560008

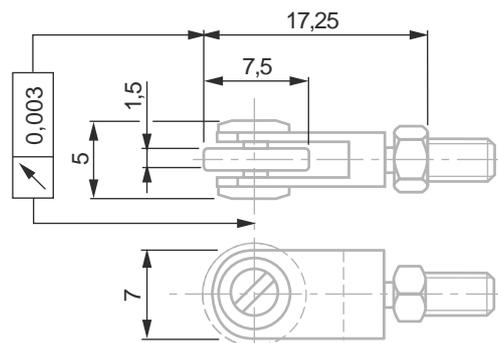
### Ball tip inserts

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
03560051	Ball insert	M2,5	18	1	Tungsten carbide
03560052	Ball insert	M2,5	18	2	Tungsten carbide
03560053	Ball insert	M2,5	18	3	Tungsten carbide
03560054	Ball insert	M2,5	18	4	Tungsten carbide
03560055	Ball insert	M2,5	18	5	Tungsten carbide
03560056	Ball insert	M2,5	18	6	Tungsten carbide
03560057	Ball insert	M2,5	18	7	Tungsten carbide
03560058	Ball insert	M2,5	18	8	Tungsten carbide



### Inserts with rollers

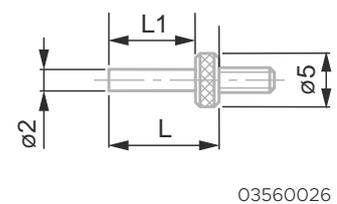
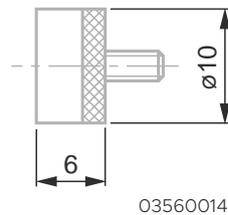
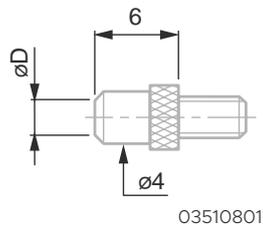
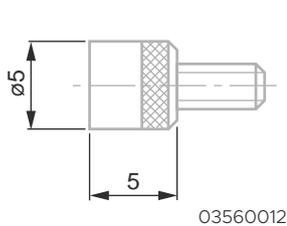
Article number	Designation	Fixing mm	Probe length mm	Material	Particular characteristic(s)
03560010	Insert with ball-bearing roller	M2,5	17,25	Steel	Cylindrical shape Locknut for radial alignment
03560011	Insert with ball-bearing roller	M2,5	17,25	Steel	Domed shape Locknut for radial alignment



03560010

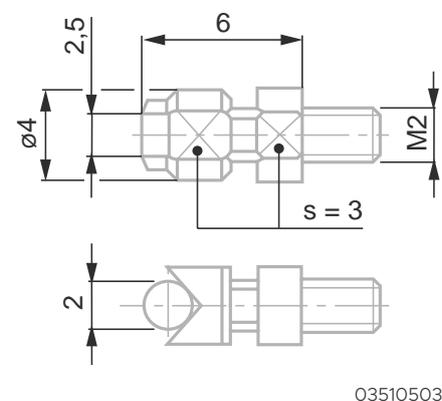
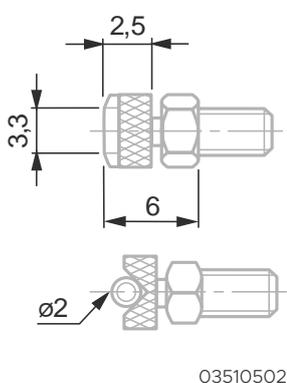
### Inserts with flat measuring face

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
03560026	Insert with a flat measuring face	M2,5	L=5, L1=2,8	2	Steel
03560027	Insert with a flat measuring face	M2,5	L=10, L1=7,8	2	Steel
03560028	Insert with a flat measuring face	M2,5	L=15, L1=12,8	2	Steel
03560029	Insert with a flat measuring face	M2,5	L=20, L1=17,8	2	Steel
03510801	Insert with a flat measuring face	M2,5	6	2,5	Steel
03510802	Insert with a flat measuring face	M2,5	6	2,5	Tungsten carbide
03560022	Insert with a flat measuring face	M2,5	6	3,4	Steel
03560023	Insert with a flat measuring face	M2,5	6	3,4	Tungsten carbide
03560012	Insert with a flat measuring face	M2,5	5	5	Steel
03560013	Insert with a flat measuring face	M2,5	5	5	Tungsten carbide
03560014	Insert with a flat measuring face	M2,5	6	10	Steel
03560015	Insert with a flat measuring face	M2,5	6	10	Tungsten carbide
03560016	Insert with a flat measuring face	M2,5	3,6	20	Steel



### Cylindrical inserts

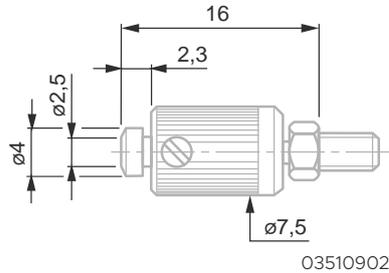
Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
03510502	Insert with cylindrical face	M2,5	6	Ø 2 x 3,3	Tungsten carbide	Lock nut for radial alignment
03510503	Insert with cylindrical face	M2	6	Ø 2 x 2,5	Tungsten carbide	Lock nut for radial alignment



## Inserts for dial gauges

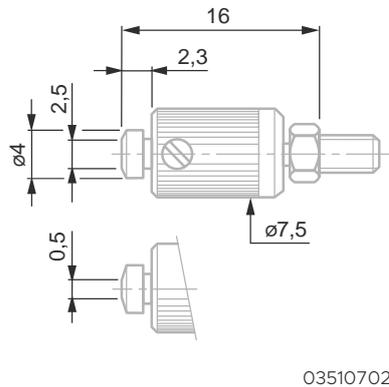
### Insert with a flat measuring face and adjustable parallelism

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
<b>03510902</b>	Insert with a flat measuring face	M2,5	16	4	Tungsten carbide	Flat face Locknut for radial alignment



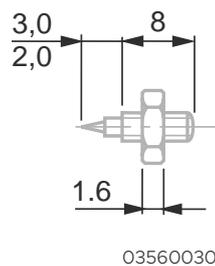
### Narrow insert with adjustable parallelism

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
<b>03510702</b>	Insert with adjustable parallelism	M2,5	16	4	Tungsten carbide	Narrow face Locknut for radial alignment



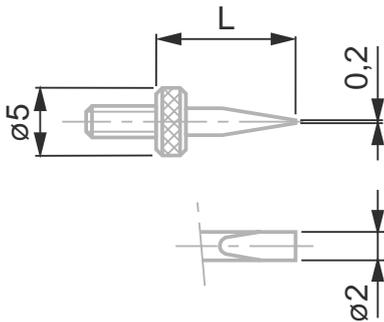
### Needle insert

Article number	Designation	Fixing mm	Probe length mm	Material
<b>03560030</b>	Needle insert, steel, $\varnothing$ 0,6 x 2,5 mm	M2,5	7	Steel

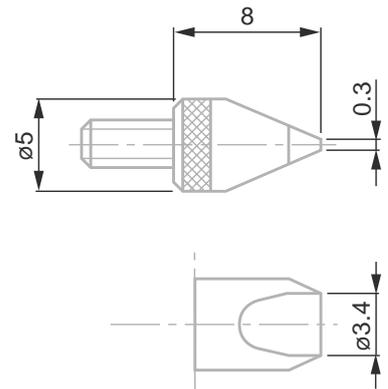


**Inserts with knife blade shape**

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
<b>03560031</b>	Insert with knife blade face	M2,5	5	Ø 2 x 0,2	Steel	Locknut for radial alignment
<b>03560032</b>	Insert with knife blade face	M2,5	10	Ø 2 x 0,2	Steel	Locknut for radial alignment
<b>03560033</b>	Insert with knife blade face	M2,5	15	Ø 2 x 0,2	Steel	Locknut for radial alignment
<b>03560034</b>	Insert with knife blade face	M2,5	20	Ø 2 x 0,2	Steel	Locknut for radial alignment
<b>03560024</b>	Insert with knife blade face	M2,5	8	Ø 3,4 x 0,3	Steel	Locknut for radial alignment
<b>03560025</b>	Insert with knife blade face	M2,5	8	Ø 3,4 x 0,3	Tungsten carbide	Locknut for radial alignment



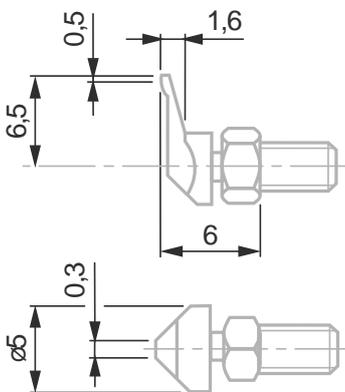
03560031



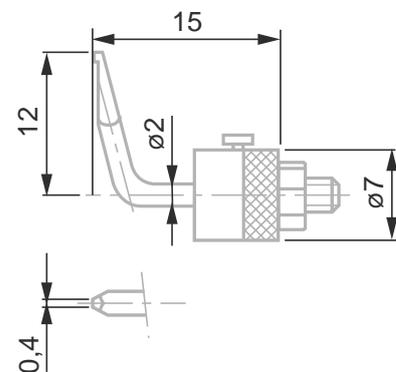
03560024

**Pointed offset inserts**

Article number	Designation	Fixing, mm	Material	Particular characteristic(s)
<b>03510401</b>	Insert with offset	M2,5	Steel	Pointed face Locknut for radial alignment
<b>03560063</b>	Insert with offset	M2,5	Steel	Pointed face Locknut for radial alignment



03510401

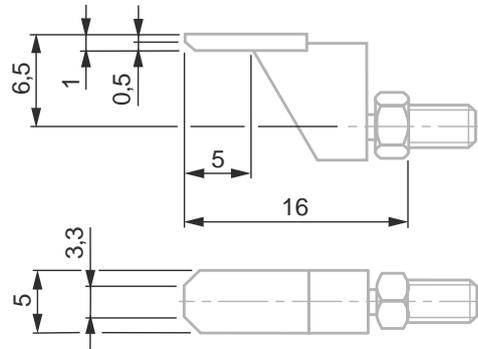


03560063

## Inserts for dial gauges

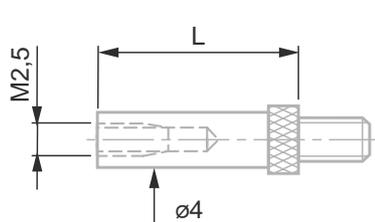
### Narrow insert with offset

Article number	Designation	Fixing mm	Probe length mm	Material	Particular characteristic(s)
03510602	Insert with narrow and off-centre face	M2,5	16	Tungsten carbide	Lock nut for radial alignment

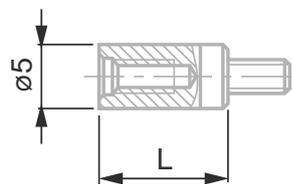


### Extensions

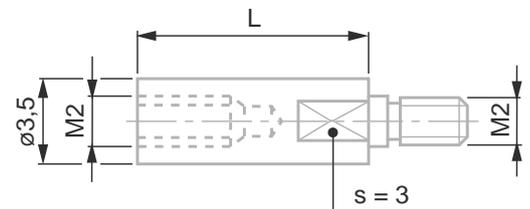
Article number	Designation	Fixing mm	Probe length mm
03540505	Extension	M2	10
03540506	Extension	M2	15
03540501	Extension	M2,5	10
03540502	Extension	M2,5	15
03540503	Extension	M2,5	20
03540504	Extension	M2,5	40
03560042	Extension	M2,5	10
03560043	Extension	M2,5	15
03560044	Extension	M2,5	20
03560045	Extension	M2,5	25
03560046	Extension	M2,5	30
03560047	Extension	M2,5	35
03560048	Extension	M2,5	40
03560049	Extension	M2,5	45
03560050	Extension	M2,5	50



03540501 to 03540504



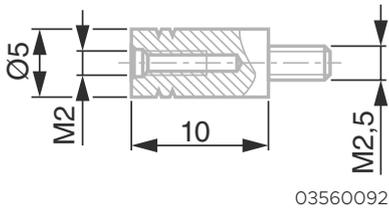
03560042 to 03560050



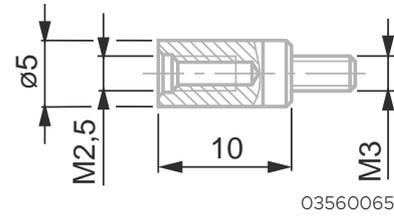
03540505 and 03540506

## Adapters

Article number	Designation	Fixing mm	Probe length mm	Particular characteristic(s)
<b>03560092</b>	Adapter	M2,5	10	For M2 inserts
<b>03560065</b>	Adapter	M3	10	For M2,5 inserts



03560092



03560065

## Accessories for dial gauges

### Device for plunger retraction



01960005

Article number	Designation	Compatibility
<b>03540104</b>	Device for plunger retraction for dial gauge with stroke < 5 mm	For dial gauge with stroke < 5 mm
<b>01961012</b>	Device for plunger retraction for DIALTRONIC COMPACT dial gauge	For DIALTRONIC COMPACT dial gauge
<b>01960005</b>	Device for plunger retraction	
<b>03560004</b>	Device for plunger retraction for dial gauge with a Ø 40 or Ø 44,5 mm dial	For dial gauge with Ø 40 or Ø 44,5 mm dial
<b>03560005</b>	Device for plunger retraction for dial gauge with a Ø 58 or Ø 61,5 mm dial	For dial gauge with Ø 58 or Ø 61,5 mm dial
<b>01960101</b>	Device for plunger retraction for DIALTRONIC dial gauge	For DIALTRONIC dial gauge 12,5 mm
<b>01960102</b>	Device for plunger retraction for DIALTRONIC dial gauge	For DIALTRONIC dial gauge 25 mm



03540104



01961012



03560004 and 03560005



01960101



01960102



01960005

### Mounting backs for DIALTRONIC dial gauges



01960100

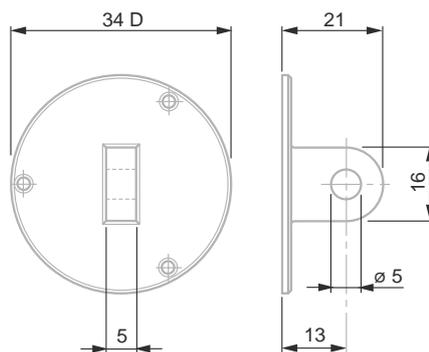
Article number	Designation	Compatibility	Particular characteristic(s)
01960100	Back with central lug for DIALTRONIC dial gauge	For DIALTRONIC dial gauges	Central lug

### Mounting backs for analogue dial gauges



01462004

Article number	Designation	Diameter mm	Compatibility	Composed of	Particular characteristic(s)
01462004	Back with central lug for IP40 dial gauges with Ø 40 or Ø 44,5 mm dial	34	For IP40 dial gauges, Ø 40 or Ø 44,5 mm dial	Mounting back 3x M1,5 x 4 mm screw	Central lug
01462005	Back with central lug for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial	46	For IP40 dial gauges, Ø 58 or Ø 61,5 mm dial	Mounting back 3x M2 x 4 mm screw	Central lug
01460020	Back with central lug for IP67 dial gauges with Ø 40 or Ø 44,5 mm dial	41	For IP67 dial gauges, Ø 40 or Ø 44,5 mm dial	Mounting back 3x M2 x 6 mm screw	Central lug
01460021	Back with central lug for IP67 dial gauges with Ø 58 or Ø 61,5 mm dial	55	For IP67 dial gauges, Ø 58 or Ø 61,5 mm dial	Mounting back 3x M3 x 5,5 mm screw	Central lug



01462004

## Accessories for dial gauges

### 90° angular probe

90° angle probe. For the transmission of movements of the measuring plunger. Max. travel up to 10 mm. For dial gauges of 0,01 mm.



Article number	Designation	Compatibility	Measuring range, mm	Composed of
<b>03560006</b>	90° angular probe	For dial gauge with 0,01 mm resolution	≤ 10 mm	Probe Flat insert Ø 5 mm





# Lever-type dial test indicators



**TESA**  
TECHNOLOGY

## Lever-type dial test indicators

Lever indicators are essential instruments for both workshops and measurement laboratories. They are ideally suited for positioning/alignment in the adjustment of machine tools, for measuring axial or radial runout, or for comparative measurements on a calibration plate.

The bidirectional measurement and the lever system on a ball bearing with a tilt of  $210^\circ$  offer total freedom of measurement direction. The precision movement mounted on rubies minimizes wear and enhances the longevity of the instruments.

Our wide range of indicators each has its specific features to best meet user needs:

The TESATAST (metric) / BESTEST (imperial) range allows continuous clockwise pointer rotation providing error-free reading in every measuring directions. Its fully metallic construction, including three dovetail mountings, ensures robust build quality.

The RUBYTAST range uses a ruby ball insert for improved longevity. The contrast is enhanced with its circular segment dial.

The INTERRAPID 312 range allows for easy attachment with a pivoting stem with a  $\varnothing 4$  mm swivelling shank. These lever indicators are designed to read the measured value without correction when the probe is positioned at an angle  $\alpha$  of  $12^\circ$  relative to the surface of the workpiece.

The P-LINE range reflects all the quality and high precision of the renowned COMPAC brand, with a long measuring range of up to 3 mm.



TESATAST	RUBYTAST	INTERRAPID 312	P-LINE
Short travel	Short travel	Long travel	Long travel
$0,2 \div 0,8$ mm	$0,2 \div 0,8$ mm	$0,4 \div 1,6$ mm	$0,6 \div 3,0$ mm

## Lever-type dial test indicators

### The three types of TESA lever-type Dial Indicators

Standard model (left)

The dial is parallel to the axis of the measuring insert and mounted frontally on the casing.

Perpendicular model (center)

The dial is mounted perpendicularly to the axis of the measuring insert.

Lateral model (right)

The dial is parallel to the axis of the measuring insert and mounted laterally on the casing.



### The importance of the measuring insert position

When using a lever-type dial indicator, if the position of the measuring insert is parallel to the surface of the workpiece (left figure), meaning that the measuring force is perpendicular to the surface ( $F$ ), the 1.1 ratio is accurate. This means that the reading on the instrument is correct and does not require adjustment.

In the opposite case (right figure), the lever length is reduced ( $L$ ), and the readings on the indicator dial must be corrected. The result given by the instrument should then be multiplied by a correction factor, which depends on the tilt angle  $\alpha$  between the probe and the surface of the workpiece.

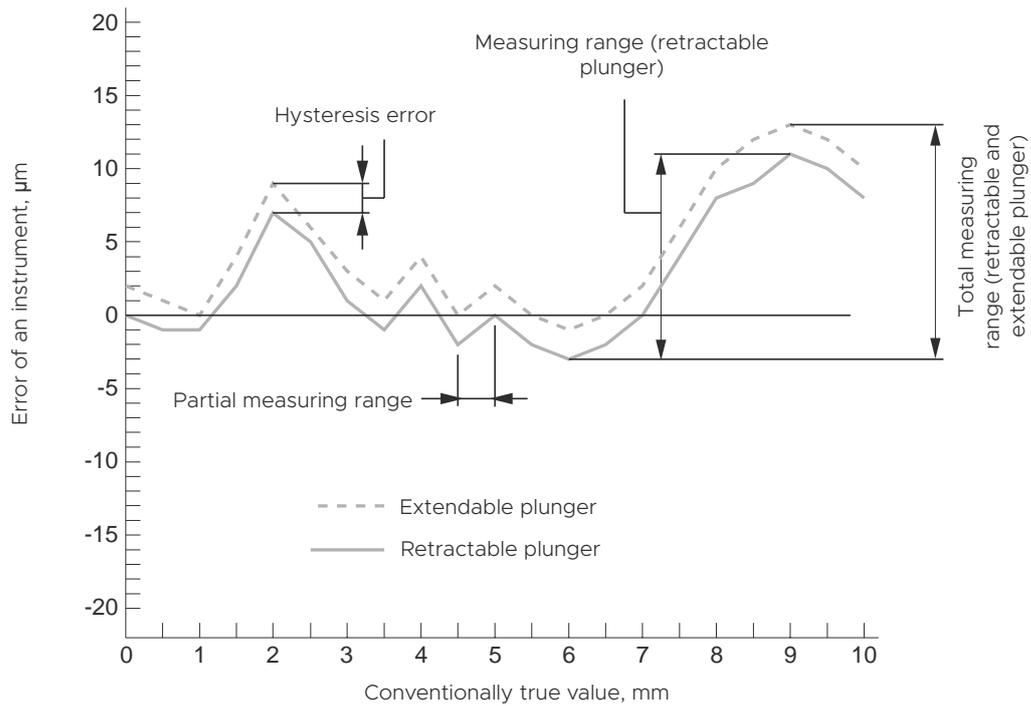


### Metrological definitions

The international standard ISO 9493: 2011 is the main standard used for the metrological and dimensional characteristics of lever indicators.

Indication errors for:

- Total measuring range (retractable and extending stem):  $MPE_{tot}$
- Measuring range (retractable stem):  $MPE_e$
- Partial measuring range:  $MPE_p$ 
  - over 1 full turn
  - over 1/2 turn
  - over 1/10 turn
  - over 10 divisions
- Hysteresis:  $MPE_h$
- Repeatability:  $MPE_r$



# Lever-type dial test indicators

## Digital lever-type dial test indicator



## Analogue lever-type dial test indicator



**Metric analogue lever-type dial test indicators, short travel**

Model	Article number	Type	Resolution mm	Measuring range, mm	Dial, Ø mm	Circular scale	Probe length mm
TESATAST	<b>01810007</b>	Standard	0,01	0,5	28	0 ÷ 0,25 ÷ 0	36,53
TESATAST	<b>01810008</b>	Standard	0,01	0,5	38	0 ÷ 0,25 ÷ 0	36,53
TESATAST	<b>01810005</b>	Standard	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
TESATAST	<b>01810006</b>	Standard	0,01	0,8	38	0 ÷ 0,4 ÷ 0	12,53
TESATAST	<b>01810009</b>	Standard	0,002	0,2	28	0 ÷ 100 ÷ 0	12,53
TESATAST	<b>01810010</b>	Standard	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53
TESATAST	<b>S18001695</b>	Standard	0,001	0,2	38	0 ÷ 100 ÷ 0	12,53
RUBYTAST	<b>01811000</b>	Standard	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
RUBYTAST	<b>01811001</b>	Standard	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53
TESATAST	<b>01810205</b>	Perpendicular	0,01	0,5	28	0 ÷ 0,25 ÷ 0	36,53
TESATAST	<b>01810204</b>	Perpendicular	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
TESATAST	<b>01810304</b>	Perpendicular	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53
TESATAST	<b>01810011</b>	Lateral	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53
TESATAST	<b>01810012</b>	Lateral	0,02	2	38	0 ÷ 1 ÷ 0	36,53
TESATAST	<b>01810013</b>	Lateral	0,002	0,2	28	0 ÷ 100 ÷ 0	12,53

**Imperial analogue lever-type dial test indicators, short travel**

Model	Article number	Type	Resolution in	Measuring range, in	Dial, Ø in	Circular scale	Probe length in
TESATAST	<b>01820010</b>	Standard	.001	.03	1.1	0 ÷ 15 ÷ 0	1/2
TESATAST	<b>01820009</b>	Standard	.0005	.02	1.5	0 ÷ 10 ÷ 0	1-7/16
TESATAST	<b>01820006</b>	Standard	.0005	.03	1.1	0 ÷ 15 ÷ 0	1/2
TESATAST	<b>01820007</b>	Standard	.0005	.03	1.5	0 ÷ 15 ÷ 0	1/2
TESATAST	<b>01820011</b>	Standard	.0001	.008	1.1	0 ÷ 4 ÷ 0	1/2
TESATAST	<b>01820012</b>	Standard	.0001	.008	1.5	0 ÷ 4 ÷ 0	1/2
TESATAST	<b>01820013</b>	Standard	.00005	.008	1.5	0 ÷ 4 ÷ 0	1/2
TESATAST	<b>01820014</b>	Lateral	.0005	.03	1.1	0 ÷ 15 ÷ 0	1/2

**Metric analogue lever-type dial test indicators, long travel**

Model	Article number	Type	Resolution mm	Measuring range, mm	Dial, Ø mm	Circular scale	Probe length mm
P-LINE	<b>01810400</b>	Standard	0,01	1,5	27	0 ÷ 25 ÷ 50	18
P-LINE	<b>01810401</b>	Standard	0,01	1,5	40	0 ÷ 25 ÷ 50	18
P-LINE	<b>01810402</b>	Standard	0,01	3	27	0 ÷ 50 ÷ 100	36
P-LINE	<b>01810403</b>	Standard	0,01	3	40	0 ÷ 50 ÷ 100	36
P-LINE	<b>01810404</b>	Standard	0,002	0,6	27	0 ÷ 5 ÷ 10	18
P-LINE	<b>01810405</b>	Standard	0,002	0,6	40	0 ÷ 5 ÷ 10	18
P-LINE	<b>01810406</b>	Standard	0,002	1,2	40	0 ÷ 10 ÷ 20	36
P-LINE	<b>01810407</b>	Standard	0,001	0,6	40	0 ÷ 5 ÷ 10	18
P-LINE	<b>01810408</b>	Perpendicular	0,01	3	40	0 ÷ 50 ÷ 100	36
P-LINE	<b>01810409</b>	Lateral	0,01	3	40	0 ÷ 50 ÷ 100	36

## Lever-type dial test indicators

### *Metric analogue lever-type dial test indicators, robust construction*

Model	Article number	Type	Resolution mm	Measuring range, mm	Dial, Ø mm	Circular scale	Probe length mm
INTERAPID 312	<b>074111366</b>	Standard	0.01	1,6	37,5	0 ÷ 40 ÷ 0	16,5
INTERAPID 312	<b>074111367</b>	Standard	0.01	1,6	30	0 ÷ 40 ÷ 0	16,5
INTERAPID 312	<b>074111368</b>	Standard	0.002	0,4	37,5	0 ÷ 10 ÷ 0	15,2
INTERAPID 312	<b>074111369</b>	Standard	0.002	0,4	30	0 ÷ 10 ÷ 0	15,2
INTERAPID 312	<b>074111375</b>	Perpendicular	0.01	1,6	37,5	0 ÷ 40 ÷ 0	16,5
INTERAPID 312	<b>074111376</b>	Perpendicular	0.01	1,6	30	0 ÷ 40 ÷ 0	16,5

### *Imperial analogue lever-type dial test indicators, robust construction*

Model	Article number	Type	Resolution in	Measuring range	Dial, Ø in	Circular scale	Probe length in
INTERAPID 312	<b>074111374</b>	Standard	.001	.06	1-1/5	0 ÷ 15 ÷ 0	.65
INTERAPID 312	<b>074111370</b>	Standard	.0005	.06	1-1/2	0 ÷ 15 ÷ 0	.65
INTERAPID 312	<b>074111371</b>	Standard	.0005	.06	1-1/5	0 ÷ 15 ÷ 0	.65
INTERAPID 312	<b>074111965</b>	Standard	.0005	.06	1-1/2	0 ÷ 15 ÷ 0	2.675
INTERAPID 312	<b>074111372</b>	Standard	.0001	.016	1-1/2	0 ÷ 4 ÷ 0	.65
INTERAPID 312	<b>074111373</b>	Standard	.0001	.016	1-1/5	0 ÷ 4 ÷ 0	.65
INTERAPID 312	<b>074111379</b>	Perpendicular	.001	.06	1-1/5	0 ÷ 15 ÷ 0	.65
INTERAPID 312	<b>074111377</b>	Perpendicular	.0005	.06	1-1/2	0 ÷ 15 ÷ 0	.65
INTERAPID 312	<b>074111378</b>	Perpendicular	.0005	.06	1-1/5	0 ÷ 15 ÷ 0	.65
INTERAPID 312	<b>074111958</b>	Perpendicular	.0005	.06	1-1/2	0 ÷ 15 ÷ 0	2.77
INTERAPID 312	<b>074111957</b>	Perpendicular	.0001	.016	1-1/2	0 ÷ 4 ÷ 0	.65

### *Digital lever-type dial test indicator*

Model	Article number	Type	Resolution mm	Measuring range, mm	Dial, Ø mm	Degree of protection	Number of buttons
DIALTRONIC BT	<b>01830004</b>	Standard	0,001	0,8	45	IP54	3

## DIALTRONIC series

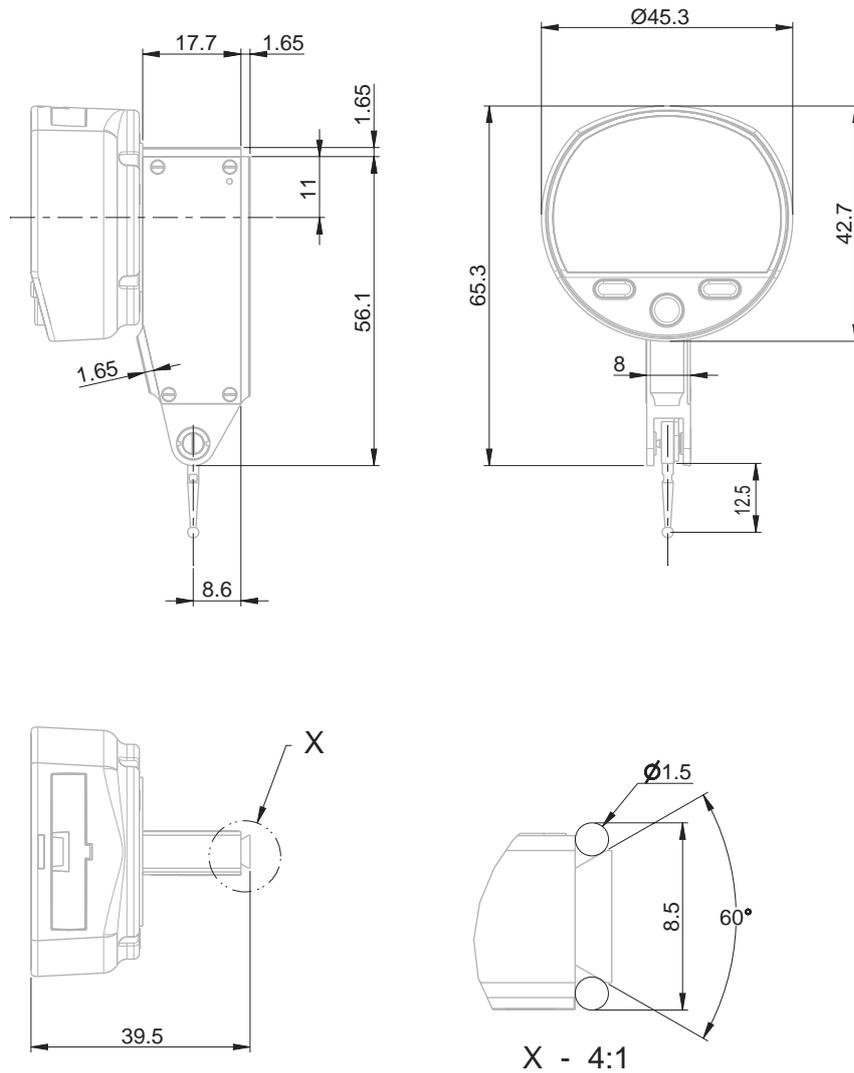


01830004

Standard	Dimensions: Factory standard Performances: Factory standard
Measuring range	0,8 mm
Units	mm / in
Resolution	0,001 mm / .00005 in
Material	Housing: Metal Inserts: Tungsten carbide
Dimensions	Insert thread: M1,4
Degree of protection	IP54
Data output(s)	Bluetooth®
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert Ø 2 mm Wrench for insert mounting Rigid stem Ø 8 mm Measurement report Quick start manual</p>



## Digital lever-type dial test indicators



01830004

Article number	Series	Resolution mm	Measuring range mm	Ø Dial mm	Degree of protection	Probe length mm	Measuring force N
<b>01830004</b>	DIALTRONIC	0,001	0,8	45	IP54	12,5	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01830004</b>	4	3	2	1

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
 MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
 MPE<sub>r</sub>: Repeatability of the indication error  
 MPE<sub>h</sub>: Hysteresis of indication error

### **TESATAST series, standard, metric**

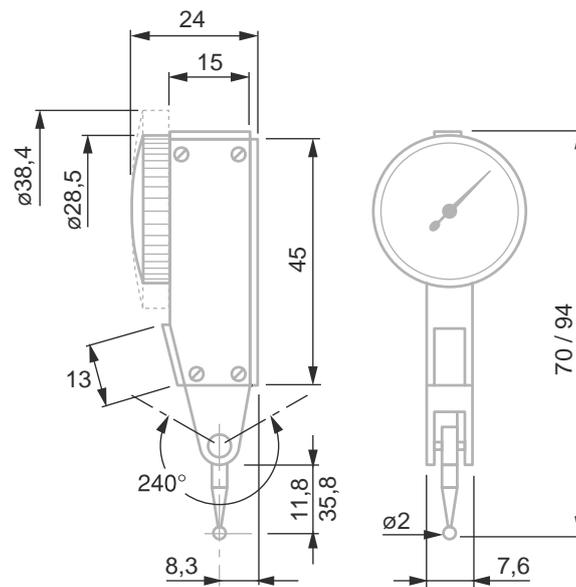


01810010

Standard	Dimensions : ISO 9493 Performances : DIN 2270
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,4
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Shockproof mechanism	With
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm Wrench for insert mounting Rigid stem <math>\varnothing</math> 8 mm User manual Declaration of conformity</p>



## Analogue lever-type dial test indicators, short travel



Article number	Series	Resolution mm	Measuring range mm	Ø Dial mm	Circular scale	Probe length mm	Measuring force N
<b>01810005</b>	TESATAST	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53	0,15
<b>01810006</b>	TESATAST	0,01	0,8	38	0 ÷ 0,4 ÷ 0	12,53	0,15
<b>01810007</b>	TESATAST	0,01	0,5	28	0 ÷ 0,25 ÷ 0	36,53	0,06
<b>01810008</b>	TESATAST	0,01	0,5	38	0 ÷ 0,25 ÷ 0	36,53	0,06
<b>01810009</b>	TESATAST	0,002	0,2	28	0 ÷ 100 ÷ 0	12,53	0,15
<b>01810010</b>	TESATAST	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53	0,15
<b>S18001695</b>	TESATAST	0,001	0,2	38	0 ÷ 100 ÷ 0	12,53	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> , 10 div µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01810005</b>	13	10	5	3	3
<b>01810006</b>	13	10	5	3	3
<b>01810007</b>	13	10	5	3	3
<b>01810008</b>	13	10	5	3	3
<b>01810009</b>	3,5	2	1	1,5	1
<b>01810010</b>	3,5	2	1	1,5	1
<b>S18001695</b>	3,5	2	1	1,5	1

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
MPE<sub>p</sub> 10 div: Deviation span within the local measuring span  
MPE<sub>r</sub>: Repeatability of the indication error  
MPE<sub>h</sub>: Hysteresis of indication error

### ***TESATAST series, standard, imperial***

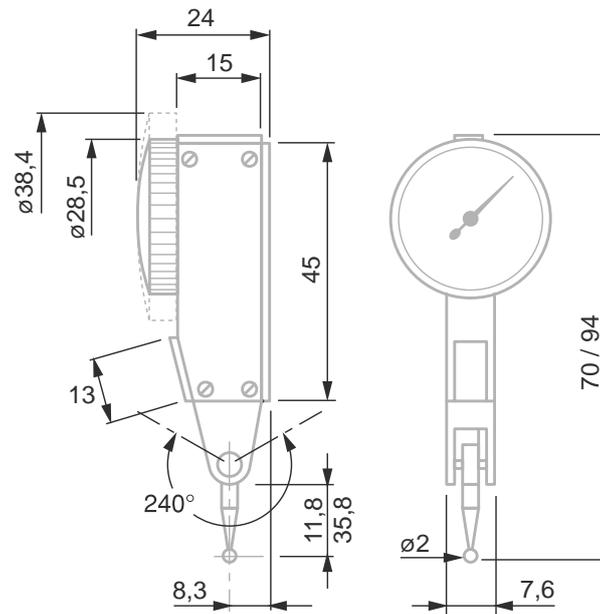


01820007

Standard	Dimensions : ISO 9493 Performances : DIN 2270
Units	in
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,4
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Shockproof mechanism	With
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert Ø 2 mm Wrench for insert mounting Rigid stem Ø 8 mm User manual Declaration of conformity</p>



## Analogue lever-type dial test indicators, short travel



Article number	Series	Resolution in	Measuring range in	Ø Dial in	Circular scale	Probe length in	Measuring force N
01820006	TESATAST	.0005	.03	1.1	0 ÷ 15 ÷ 0	1/2	0,15
01820007	TESATAST	.0005	.03	1.5	0 ÷ 15 ÷ 0	1/2	0,15
01820009	TESATAST	.0005	.02	1.5	0 ÷ 10 ÷ 0	1-7/16	0,06
01820010	TESATAST	.001	.03	1.1	0 ÷ 15 ÷ 0	1/2	0,15
01820011	TESATAST	.0001	.008	1.1	0 ÷ 4 ÷ 0	1/2	0,15
01820012	TESATAST	.0001	.008	1.5	0 ÷ 4 ÷ 0	1/2	0,15
01820013	TESATAST	.00005	.008	1.5	0 ÷ 4 ÷ 0	1/2	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µ-in	MPE <sub>e</sub> , retractable plunger, µ-in	MPE <sub>p</sub> , 10 div µ-in	MPE <sub>h</sub> µ-in	MPE <sub>r</sub> µ-in
01820006	650	500	250	150	150
01820007	650	500	250	150	150
01820009	650	500	250	150	150
01820010	650	500	250	150	150
01820011	160	110	40	60	40
01820012	160	110	40	60	40
01820013	160	110	40	60	40

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)

MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)

MPE<sub>p</sub> 10 div: Deviation span within the local measuring span

MPE<sub>r</sub>: Repeatability of the indication error

MPE<sub>h</sub>: Hysteresis of indication error

### TESATAST series, lateral, metric

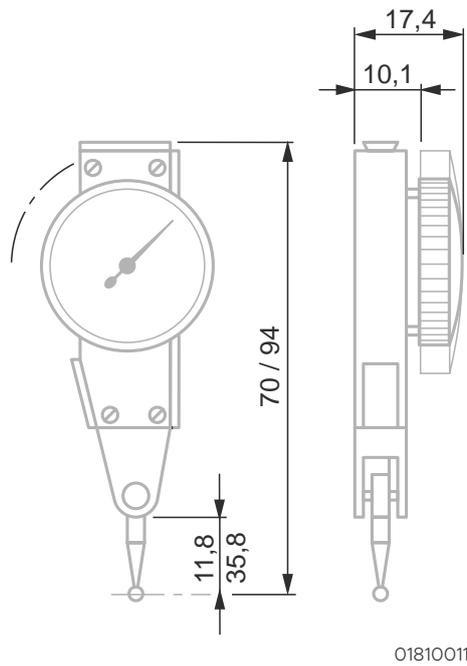


01810011

Standard	Dimensions : ISO 9493 Performances : DIN 2270
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,4
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Shockproof mechanism	With
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm Wrench for insert mounting Rigid stem <math>\varnothing</math> 8 mm User manual Declaration of conformity</p>



## Analogue lever-type dial test indicators, short travel



Article number	Series	Resolution mm	Measuring range mm	Ø Dial mm	Circular scale	Probe length mm	Measuring force N
<b>01810011</b>	TESATAST	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53	0,15
<b>01810012</b>	TESATAST	0,02	2	38	0 ÷ 1,0 ÷ 0	36,53	0,06
<b>01810013</b>	TESATAST	0,002	0,2	28	0 ÷ 100 ÷ 0	12,53	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> , 10 div µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01810011</b>	13	10	5	3	3
<b>01810012</b>	31	27	12	10	4
<b>01810013</b>	3,5	2	1	1,5	1

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
MPE<sub>p</sub> 10 div: Deviation span within the local measuring span  
MPE<sub>r</sub>: Repeatability of the indication error  
MPE<sub>h</sub>: Hysteresis of indication error

### *TESATAST series, lateral, imperial*

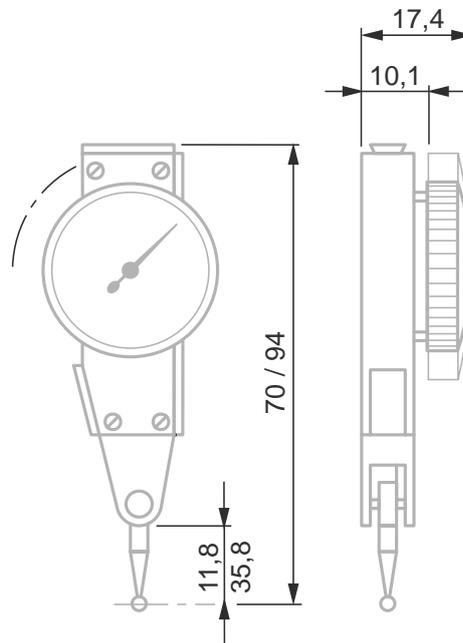


01820014

Standard	Dimensions : ISO 9493 Performances : DIN 2270
Units	in
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,4
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Shockproof mechanism	With
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert Ø 2 mm Rigid stem Ø 8 mm User manual Declaration of conformity</p>



## Analogue lever-type dial test indicators, short travel



Article number	Series	Resolution in	Measuring range in	Ø Dial in	Circular scale	Probe length in	Measuring force N
<b>01820014</b>	TESATAST	.0005	.03	1.1	0 ÷ 15 ÷ 0	1/2	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, μ-in	MPE <sub>e</sub> , retractable plunger, μ-in	MPE <sub>p</sub> , 10 div μ-in	MPE <sub>h</sub> μ-in	MPE <sub>r</sub> μ-in
<b>01820014</b>	650	500	250	150	150

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
MPE<sub>p</sub> 10 div: Deviation span within the local measuring span  
MPE<sub>r</sub>: Repeatability of the indication error  
MPE<sub>h</sub>: Hysteresis of indication error

**TESATAST series, perpendicular, metric**

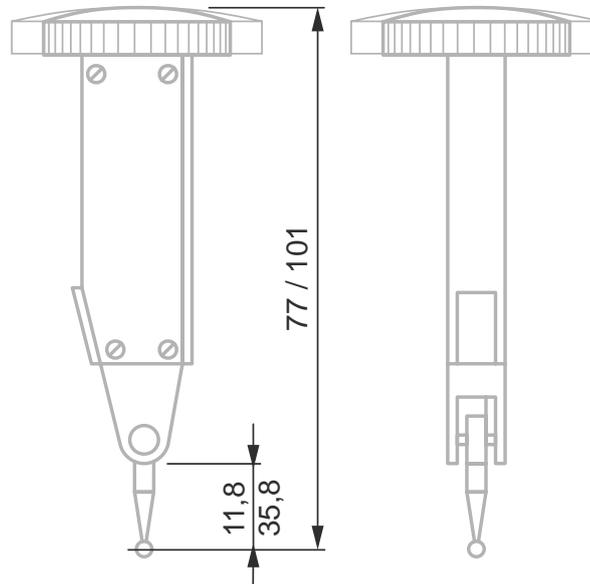


01810204

Standard	Dimensions : ISO 9493 Performances : DIN 2270
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,4
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Shockproof mechanism	With
Remark(s)	If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.
Included in delivery	Lever-type dial test indicator with mounted ball insert Ø 2 mm Rigid stem Ø 8 mm User manual Declaration of conformity



## Analogue lever-type dial test indicators, short travel



Article number	Series	Resolution mm	Measuring range mm	Ø Dial mm	Circular scale	Probe length mm	Measuring force N
<b>01810204</b>	TESATAST	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53	0,15
<b>01810205</b>	TESATAST	0,01	0,5	28	0 ÷ 0,25 ÷ 0	36,53	0,06
<b>01810304</b>	TESATAST	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> , 10 div µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01810204</b>	13	10	5	3	3
<b>01810205</b>	13	10	5	3	3
<b>01810304</b>	3,5	2	1	1,5	1

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
 MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
 MPE<sub>p</sub> 10 div: Deviation span within the local measuring span  
 MPE<sub>r</sub>: Repeatability of the indication error  
 MPE<sub>h</sub>: Hysteresis of indication error

### **RUBYTAST series, standard, metric**

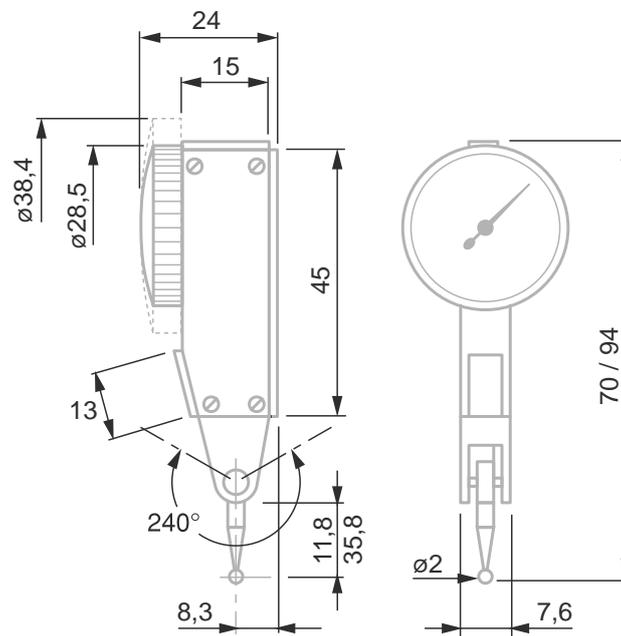


01811001

Standard	Dimensions : ISO 9493 Performances : DIN 2270
Units	mm
Material	Housing: Metal Ball inserts: Ruby
Dimensions	Insert thread: M1,4
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Shockproof mechanism	With
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm Rigid stem <math>\varnothing</math> 8 mm User manual Declaration of conformity</p>



## Analogue lever-type dial test indicators, short travel



Article number	Series	Resolution mm	Measuring range mm	Ø Dial mm	Circular scale	Probe length mm	Measuring force N
<b>01811000</b>	RUBYTAST	0,01	0,8	28	0 ÷ 0,4 ÷ 0	12,53	0,15
<b>01811001</b>	RUBYTAST	0,002	0,2	38	0 ÷ 100 ÷ 0	12,53	0,15

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> , 10 div µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01811000</b>	13	10	5	3	3
<b>01811001</b>	3,5	2	1	1,5	1

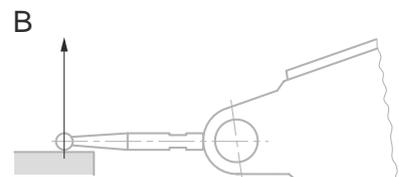
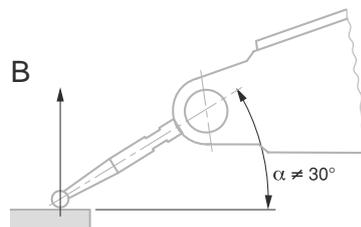
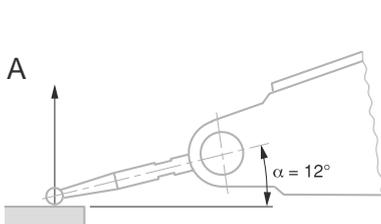
MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
 MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
 MPE<sub>p</sub> 10 div: Deviation span within the local measuring span  
 MPE<sub>r</sub>: Repeatability of the indication error  
 MPE<sub>h</sub>: Hysteresis of indication error

**INTERAPID 312 series, standard, metric**

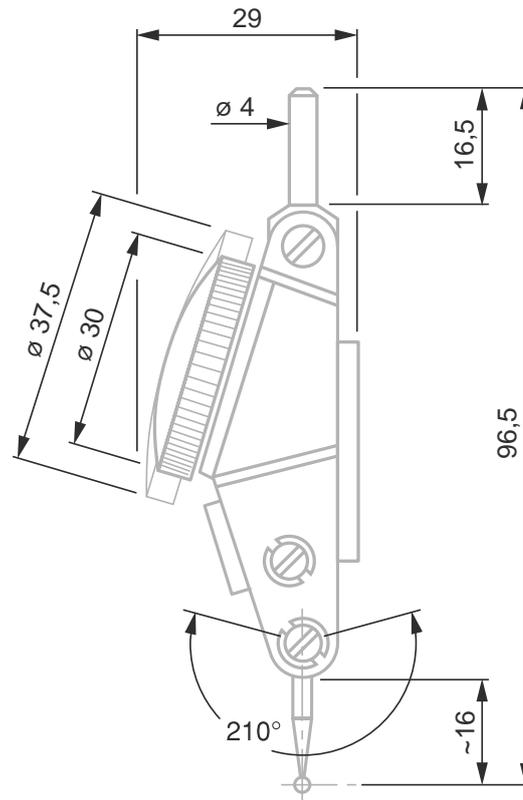


074111366

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Remark(s)	<p>The INTERAPID 312 indicators are designed to read the measured value without correction when the probe is positioned at an angle <math>\alpha</math> of <math>12^\circ</math> relative to the surface of the workpiece (Fig. A). For any other angle, including the parallel position of the insert, the readings require correction (Fig. B). Please refer to the user manual on this subject.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm Wrench for insert mounting Measurement report Declaration of conformity</p>



## Analogue lever-type dial test indicators, robust construction



Article number	Series	Resolution mm	Measuring range mm	Ø Dial mm	Travel / revolution, mm	Circular scale	Probe length mm	Measuring force, N
<b>074111366</b>	INTERAPID 312-1	0,01	1,6	37,5	0,8	0 ÷ 40 ÷ 0	16,5	0,12
<b>074111367</b>	INTERAPID 312-2	0,01	1,6	30	0,8	0 ÷ 40 ÷ 0	16,5	0,12
<b>074111368</b>	INTERAPID 312-3	0,002	0,4	37,5	0,2	0 ÷ 10 ÷ 0	15,2	0,25
<b>074111369</b>	INTERAPID 312-4	0,002	0,4	30	0,2	0 ÷ 10 ÷ 0	15,2	0,25

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>p</sub> 2 µm	MPE <sub>p</sub> 1 µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>074111366</b>	23	20	10	3	3
<b>074111367</b>	23	20	10	3	3
<b>074111368</b>	10	8	4	2	1
<b>074111369</b>	10	8	4	2	1

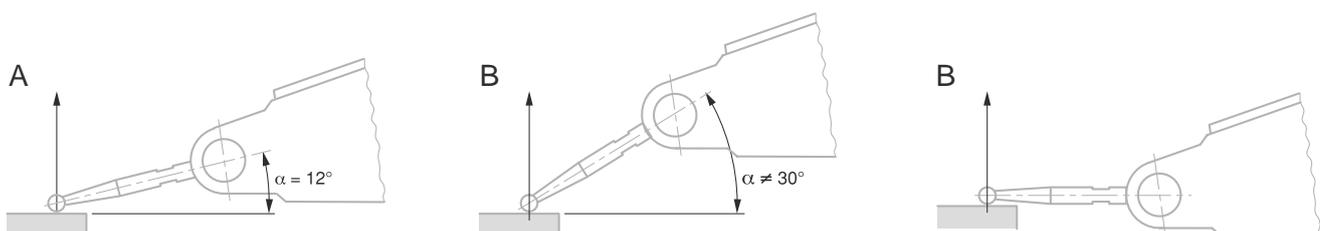
MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
MPE<sub>p</sub> 1: Indication error on 1 rotation  
MPE<sub>p</sub> 2: Indication error on 2 rotations  
MPE<sub>r</sub>: Repeatability of the indication error  
MPE<sub>h</sub>: Hysteresis of indication error

**INTERAPID 312 series, standard, imperial**

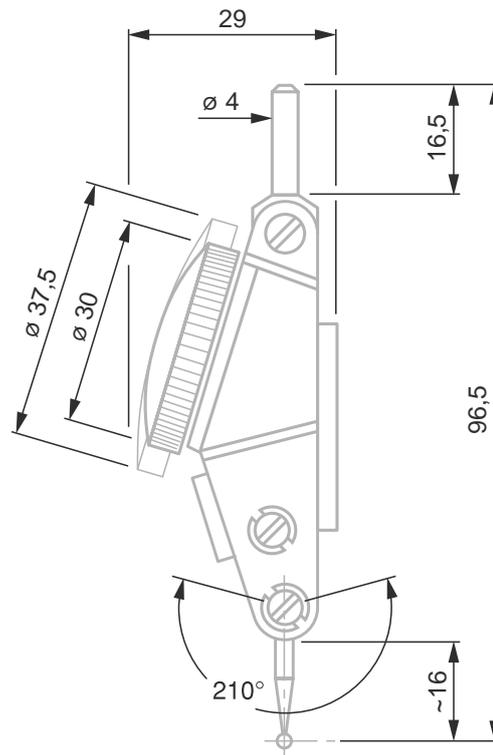


074111370

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	in
Material	Housing: Metal Ball inserts: Tungsten carbide
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Remark(s)	<p>The INTERAPID 312 indicators are designed to read the measured value without correction when the probe is positioned at an angle <math>\alpha</math> of <math>12^\circ</math> relative to the surface of the workpiece (Fig. A). For any other angle, including the parallel position of the insert, the readings require correction (Fig. B). Please refer to the user manual regarding this.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm Wrench for insert mounting Measurement report Declaration of conformity</p>



## Analogue lever-type dial test indicators, robust construction



Article number	Series	Resolution in	Measuring range in	Ø Dial in	Travel / revolution, in	Circular scale	Probe length, in	Measuring force, N
<b>074111370</b>	INTERAPID 312 B-1	.0005	.06	1-1/2	.03	0 ÷ 15 ÷ 0	.65	0,12
<b>074111371</b>	INTERAPID 312 B-2	.0005	.06	1-1/5	.03	0 ÷ 15 ÷ 0	.65	0,12
<b>074111965</b>	INTERAPID 312 B-15	.0005	.06	1-1/2	.03	0 ÷ 15 ÷ 0	2.675	0,12
<b>074111374</b>	INTERAPID 312 B-20	.001	.06	1-1/5	.03	0 ÷ 15 ÷ 0	.65	0,12
<b>074111372</b>	INTERAPID 312 B-3	.0001	.016	1-1/2	.008	0 ÷ 4 ÷ 0	.65	0,25
<b>074111373</b>	INTERAPID 312 B-4	.0001	.016	1-1/5	.008	0 ÷ 4 ÷ 0	.65	0,25

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, μ-in	MPE <sub>p 2</sub> μ-in	MPE <sub>p 1</sub> μ-in	MPE <sub>h</sub> μ-in	MPE <sub>r</sub> μ-in
<b>074111370</b>	920	800	400	120	120
<b>074111371</b>	920	800	400	120	120
<b>074111965</b>	1600	800	600	800	120
<b>074111374</b>	920	800	400	120	120
<b>074111372</b>	400	320	160	80	40
<b>074111373</b>	400	320	160	80	40

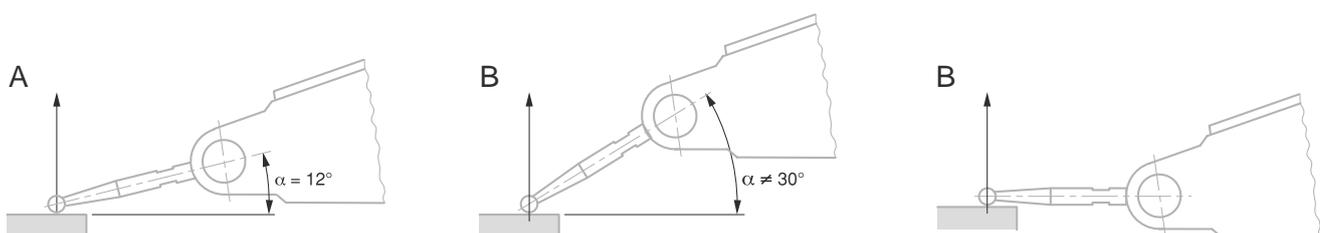
MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
MPE<sub>p 1</sub>: Indication error on 1 rotation  
MPE<sub>p 2</sub>: Indication error on 2 rotations  
MPE<sub>r</sub>: Repeatability of the indication error  
MPE<sub>h</sub>: Hysteresis of indication error

**INTERAPID 312 series, perpendicular, metric**

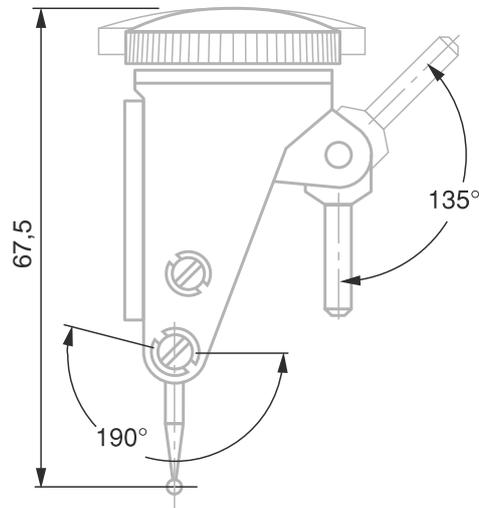


074111375

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Remark(s)	The INTERAPID 312 indicators are designed to read the measured value without correction when the probe is positioned at an angle $\alpha$ of $12^\circ$ relative to the surface of the workpiece (Fig. A). For any other angle, including the parallel position of the insert, the readings require correction (Fig. B). Please refer to the user manual on this subject.
Included in delivery	The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained. Lever-type dial test indicator with mounted ball insert $\varnothing$ 2 mm Wrench for insert mounting Measurement report Declaration of conformity



## Analogue lever-type dial test indicators, robust construction



074111375

Article number	Series	Resolution mm	Measuring range, mm	Ø Dial mm	Travel / revolution, mm	Circular scale	Probe length, mm	Measuring force, N
<b>074111375</b>	INTERAPID 312-1V	0,01	1,6	37,5	0,8	0 ÷ 40 ÷ 0	16,5	0,12
<b>074111376</b>	INTERAPID 312-2V	0,01	1,6	30	0,8	0 ÷ 40 ÷ 0	16,5	0,12

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>p</sub> 2 µm	MPE <sub>p</sub> 1 µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>074111375</b>	23	20	10	3	3
<b>074111376</b>	23	20	10	3	3

MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)

MPE<sub>p</sub> 1: Indication error on 1 rotation

MPE<sub>p</sub> 2: Indication error on 2 rotations

MPE<sub>r</sub>: Repeatability of the indication error

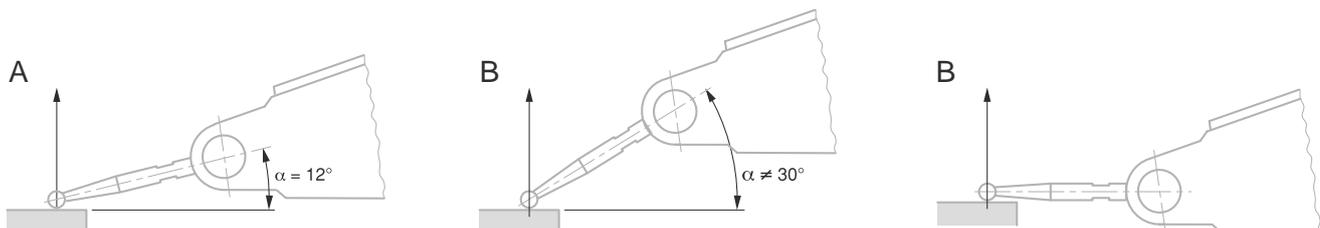
MPE<sub>h</sub>: Hysteresis of indication error

**INTERAPID 312 serie, perpendicular, imperial**

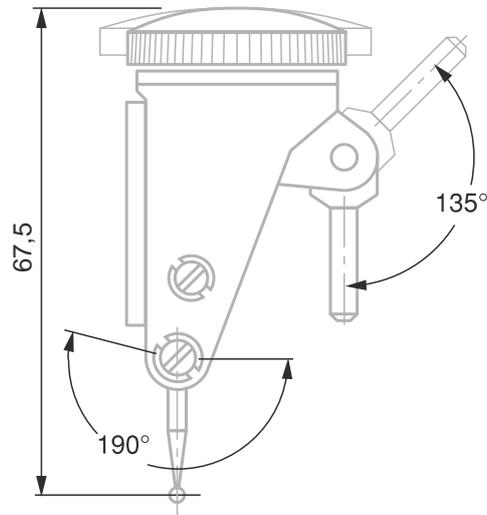


074111377

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	in
Material	Housing: Metal Ball inserts: Tungsten carbide
Reading direction	Clockwise and anti-clockwise
Dial	Rotating dial
Remark(s)	The INTERAPID 312 indicators are designed so that the measured value can be read without correction when the insert is positioned at an angle of 12° relative to the surface of the workpiece (Fig. A). For any other angle, including the parallel position of the insert, the readings require correction (Fig. B). Please refer to the user manual regarding this.
Included in delivery	The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained. Lever-type dial test indicator with mounted ball insert Ø 2 mm Wrench for insert mounting Measurement report Declaration of conformity



## Analogue lever-type dial test indicators, robust construction



074111375

Article number	Series	Resolution in	Measuring range, in	Ø Dial in	Travel / revolution, in	Circular scale	Probe lengthn, in	Measuring force, N
<b>074111377</b>	INTERAPID 312 B-1V	.0005	.06	1-1/2	.03	0 ÷ 15 ÷ 0	.65	0,12
<b>074111378</b>	INTERAPID 312 B-2V	.0005	.06	1-1/5	.03	0 ÷ 15 ÷ 0	.65	0,12
<b>074111958</b>	INTERAPID 312 B-15V	.0005	.06	1-1/2	.03	0 ÷ 15 ÷ 0	2.77	0,12
<b>074111379</b>	INTERAPID 312 B-20V	.001	.06	1-1/5	.03	0 ÷ 15 ÷ 0	.65	0,12
<b>074111957</b>	INTERAPID 312 B-3V	.0001	.016	1-1/2	.008	0 ÷ 4 ÷ 0	.65	0,25

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, μ-in	MPE <sub>p 2</sub> μ-in	MPE <sub>p 1</sub> μ-in	MPE <sub>h</sub> μ-in	MPE <sub>r</sub> μ-in
<b>074111377</b>	920	800	400	120	120
<b>074111378</b>	920	800	400	120	120
<b>074111958</b>	1600	800	600	800	120
<b>074111379</b>	920	800	400	120	120
<b>074111957</b>	400	320	160	80	400

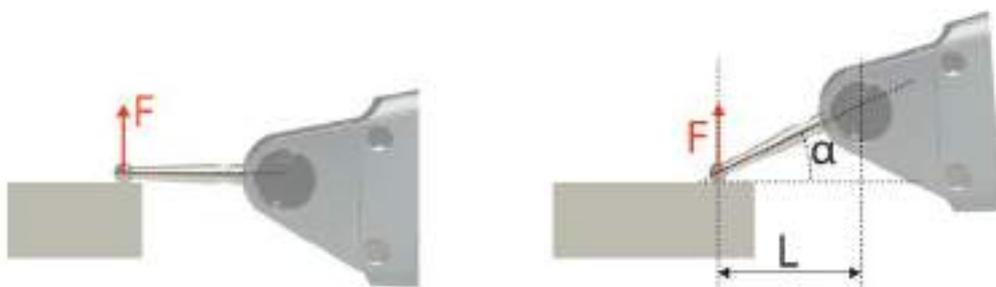
MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
MPE<sub>p 1</sub>: Indication error on 1 rotation  
MPE<sub>p 2</sub>: Indication error on 2 rotations  
MPE<sub>r</sub>: Repeatability of the indication error  
MPE<sub>h</sub>: Hysteresis of indication error

### *P-LINE series, standard, metric*

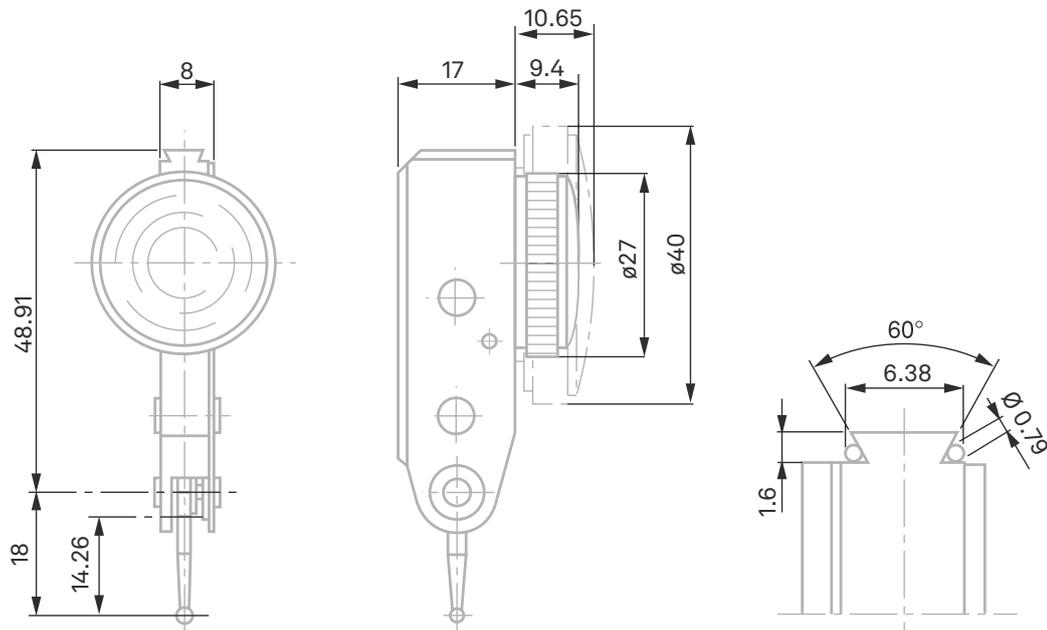


01810400

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,6
Reading direction	Clockwise
Dial	Rotating dial
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p> <p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p>
Included in delivery	<p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm Wrench for insert mounting Rigid stem <math>\varnothing</math> 8 mm Rigid stem <math>\varnothing</math> 4 mm User manual Measurement report Declaration of conformity</p>



## Analogue lever-type dial test indicators, long travel



Article number	Series	Resolution mm	Measuring range, mm	Ø Dial mm	Travel / revolution, mm	Circular scale	Probe length, mm	Measuring force, N
01810400	P-LINE 213	0,01	1,5	27	0,5	0 ÷ 25 ÷ 50	18	0,35
01810401	P-LINE 213G	0,01	1,5	40	0,5	0 ÷ 25 ÷ 50	18	0,35
01810402	P-LINE 212L	0,01	3	27	1	0 ÷ 50 ÷ 100	36	0,2
01810403	P-LINE 212GL	0,01	3	40	1	0 ÷ 50 ÷ 100	36	0,2
01810404	P-LINE 215	0,002	0,6	27	0,1	0 ÷ 5 ÷ 10	18	0,3
01810405	P-LINE 215G	0,002	0,6	40	0,1	0 ÷ 5 ÷ 10	18	0,3
01810406	P-LINE 215GL	0,002	1,2	40	0,2	0 ÷ 10 ÷ 20	36	0,2
01810407	P-LINE 216G	0,001	0,6	40	0,1	0 ÷ 5 ÷ 10	18	0,3

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> 1 µm	MPE <sub>p</sub> 1/2 µm	MPE <sub>p</sub> 1/10 µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
01810400	13	10	6	5	3	3	3
01810401	13	10	6	5	3	3	3
01810402	26	20	12	10	6	7	3
01810403	26	20	12	10	6	7	3
01810404	13	10	5	3	1	4,5	1,5
01810405	13	10	5	3	1	4,5	1,5
01810406	26	20	10	6	2	8	1,5
01810407	13	10	5	3	1	4,5	1,5

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
 MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
 MPE<sub>p</sub> 1/10: Indication error on 1/10 rotation  
 MPE<sub>p</sub> 1/2: Indication error on 1/2 rotation  
 MPE<sub>p</sub> 1: Indication error on 1 rotation  
 MPE<sub>r</sub>: Repeatability of the indication error  
 MPE<sub>h</sub>: Hysteresis of indication error

### *P-LINE series, perpendicular, metric*

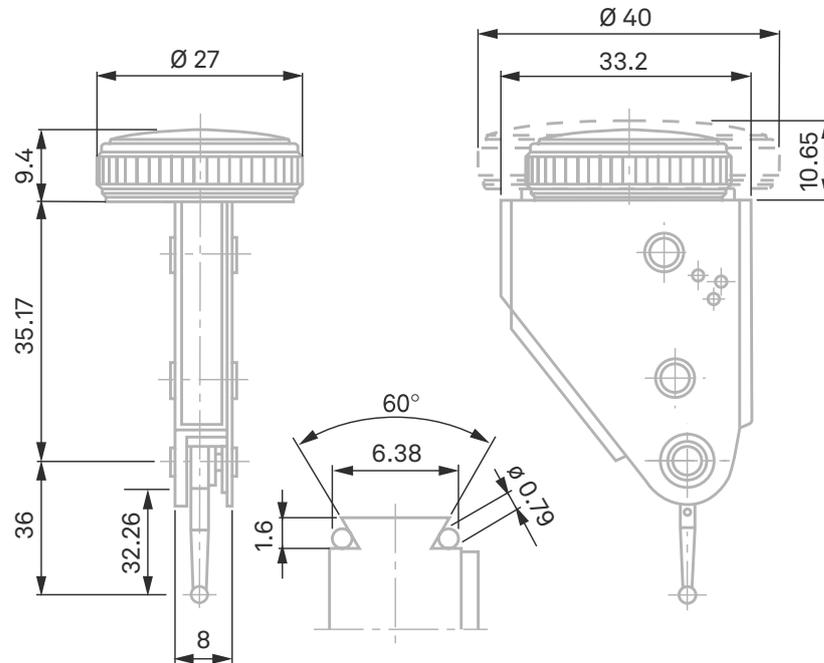


01810408

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,6
Reading direction	Clockwise
Dial	Rotating dial
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p>
Included in delivery	<p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p> <p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm  Wrench for insert mounting  Rigid stem <math>\varnothing</math> 8 mm  Rigid stem <math>\varnothing</math> 4 mm  User manual  Measurement report  Declaration of conformity</p>



## Analogue lever-type dial test indicators, long travel



Article number	Series	Resolution mm	Measuring range, mm	Ø Dial mm	Travel / revolution, mm	Circular scale	Probe length mm	Measuring force, N
<b>01810408</b>	P-LINE 222GL	0,01	3	40	1	0 ÷ 50 ÷ 100	36	0,2

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> 1 µm	MPE <sub>p</sub> 1/2 µm	MPE <sub>p</sub> 1/10 µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01810408</b>	26	20	12	10	3	7	3

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
 MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
 MPE<sub>p</sub> 1/10: Indication error on 1/10 rotation  
 MPE<sub>p</sub> 1/2: Indication error on 1/2 rotation  
 MPE<sub>p</sub> 1: Indication error on 1 rotation  
 MPE<sub>r</sub>: Repeatability of the indication error  
 MPE<sub>h</sub>: Hysteresis of indication error

### *P-LINE series, lateral, metric*

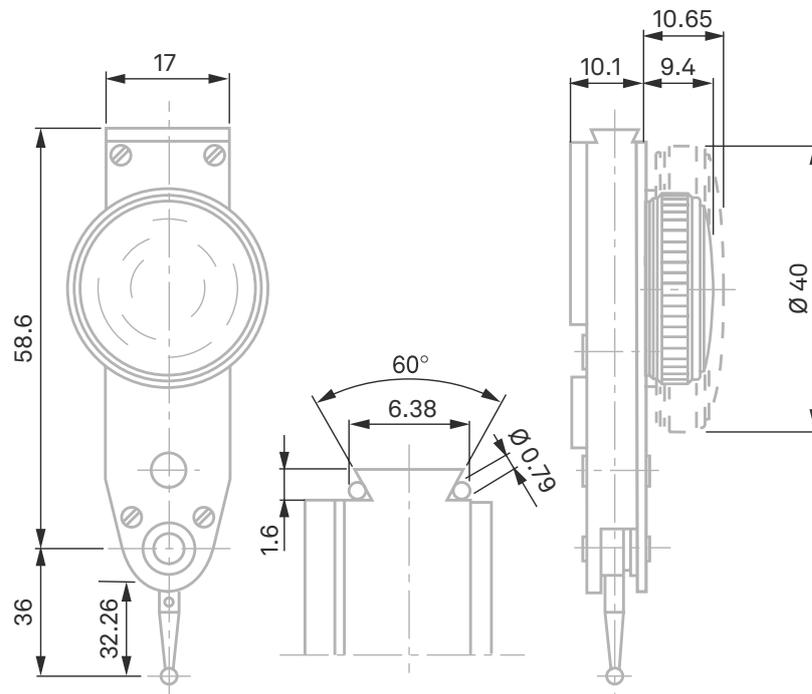


01810409

Standard	Dimensions : ISO 9493 Performances : Factory standard
Units	mm
Material	Housing: Metal Ball inserts: Tungsten carbide
Dimensions	Insert thread: M1,6
Reading direction	Clockwise
Dial	Rotating dial
Remark(s)	<p>If the position of the insert is parallel to the surface of the workpiece (left figure), the 1.1 ratio is accurate. Therefore, the reading does not require any correction. In the opposite case (right figure), the effective length of the lever changes. The readings must then be corrected. In this regard, please refer to the user manual.</p>
Included in delivery	<p>The original inserts mounted on the instrument can be replaced with inserts that have either the same or a different ball diameter, provided that the nominal length of the insert is maintained.</p> <p>Lever-type dial test indicator with mounted ball insert <math>\varnothing</math> 2 mm  Wrench for insert mounting  Rigid stem <math>\varnothing</math> 8 mm  Rigid stem <math>\varnothing</math> 4 mm  User manual  Measurement report  Declaration of conformity</p>



## Analogue lever-type dial test indicators, long travel



Article number	Series	Resolution mm	Measuring range, mm	Ø Dial mm	Travel / revolution, mm	Circular scale	Probe length mm	Measuring force, N
<b>01810409</b>	P-LINE 232GL	0,01	3	40	1	0 ÷ 50 ÷ 100	36	0,2

Article number	MPE <sub>tot</sub> , retractable and extendable plunger, µm	MPE <sub>e</sub> , retractable plunger, µm	MPE <sub>p</sub> 1 µm	MPE <sub>p</sub> 1/2 µm	MPE <sub>p</sub> 1/10 µm	MPE <sub>h</sub> µm	MPE <sub>r</sub> µm
<b>01810409</b>	26	20	12	10	3	7	3

MPE<sub>e</sub>: Indication error on the measuring range (retractable plunger)  
 MPE<sub>tot</sub>: Indication error on the measuring range (retractable and extendable plunger)  
 MPE<sub>p</sub> 1/10: Indication error on 1/10 rotation  
 MPE<sub>p</sub> 1/2: Indication error on 1/2 rotation  
 MPE<sub>p</sub> 1: Indication error on 1 rotation  
 MPE<sub>r</sub>: Repeatability of the indication error  
 MPE<sub>h</sub>: Hysteresis of indication error

## Ball tip inserts for TESATAST and RUBYTAST indicators



01860203

Article number	Material	Fixing mm	Diameter mm	Probe length mm
<b>01860704</b>	Tungsten carbide	M1,4	0,5	12,53
<b>01860201</b>	Tungsten carbide	M1,4	1	12,53
<b>01860202</b>	Tungsten carbide	M1,4	2	12,53
<b>01860203</b>	Tungsten carbide	M1,4	3	12,53
<b>01860211</b>	Tungsten carbide	M1,4	1	36,53
<b>01860212</b>	Tungsten carbide	M1,4	2	36,53
<b>01860213</b>	Tungsten carbide	M1,4	3	36,53
<b>01860301</b>	Ruby	M1,4	1	12,53
<b>01860302</b>	Ruby	M1,4	2	12,53
<b>01860303</b>	Ruby	M1,4	3	12,53
<b>01860304</b>	Ruby	M1,4	1	36,53
<b>01860305</b>	Ruby	M1,4	2	36,53

The original inserts mounted on TESATAST and RUBYTAST indicators can be replaced without issue by inserts with either the same or different ball diameter, provided that the nominal length is respected.

### Accessories

Article number	Designation
<b>01860307</b>	Key for lever-type indicator

## Inserts

### Ball tip inserts for metric INTERAPID 312 indicators



074107893

Article number	Material	Fixing mm	Diameter mm	Probe length mm	Compatibility
<b>074107897</b>	Steel	M1,7	0,8	16,5	INTERAPID 312, resolution 0,01 mm
<b>074107895</b>	Steel	M1,7	1,5	16,5	INTERAPID 312, resolution 0,01 mm
<b>074107893</b>	Steel	M1,7	2	16,5	INTERAPID 312, resolution 0,01 mm
<b>074110493</b>	Steel	M1,7	0,8	15,2	INTERAPID 312, resolution 0,002 mm
<b>074105995</b>	Tungsten carbide	M1,7	0,8	16,5	INTERAPID 312, resolution 0,01 mm
<b>074105994</b>	Tungsten carbide	M1,7	1,5	16,5	INTERAPID 312, resolution 0,01 mm
<b>074105993</b>	Tungsten carbide	M1,7	2	16,5	INTERAPID 312, resolution 0,01 mm
<b>074106360</b>	Tungsten carbide	M1,7	0,8	36,6	INTERAPID 312, resolution 0,01 mm
<b>074106358</b>	Tungsten carbide	M1,7	2	36,6	INTERAPID 312, resolution 0,01 mm
<b>074110507</b>	Tungsten carbide	M1,7	0,8	15,2	INTERAPID 312, resolution 0,002 mm
<b>074110491</b>	Tungsten carbide	M1,7	1,5	15,2	INTERAPID 312, resolution 0,002 mm
<b>074110482</b>	Tungsten carbide	M1,7	2	15,2	INTERAPID 312, resolution 0,002 mm
<b>074110508</b>	Tungsten carbide	M1,7	0,8	34	INTERAPID 312, resolution 0,002 mm
<b>074110494</b>	Tungsten carbide	M1,7	2	34	INTERAPID 312, resolution 0,002 mm

The original inserts mounted on INTERAPID 312 indicators can be replaced without issue by inserts with either the same or different ball diameter, provided that the nominal length is respected.

The length of inserts 074106358, 074106360, 074110494 and 074110508 modifies the amplification factor of the lever system. Therefore, the read values must be doubled.

### Accessories

Article number	Designation
<b>01860307</b>	Key for lever-type indicator

## Ball tip inserts for imperial INTERRAPID 312 indicators



074107899

Article number	Material	Fixing mm	Compatibility
<b>074116284</b>	Tungsten carbide	M1,7	All INTERRAPID 312 indicators
<b>074107903</b>	Steel	M1,7	All INTERRAPID 312 indicators
<b>074107901</b>	Steel	M1,7	All INTERRAPID 312 indicators
<b>074107899</b>	Steel	M1,7	All INTERRAPID 312 indicators
<b>074105998</b>	Tungsten carbide	M1,7	All INTERRAPID 312 indicators
<b>074105997</b>	Tungsten carbide	M1,7	All INTERRAPID 312 indicators
<b>074105996</b>	Tungsten carbide	M1,7	All INTERRAPID 312 indicators
<b>074106363</b>	Tungsten carbide	M1,7	All INTERRAPID 312 indicators
<b>074106361</b>	Tungsten carbide	M1,7	All INTERRAPID 312 indicators
<b>074111913</b>	Tungsten carbide	M1,7	Indicator 074111965
<b>074111912</b>	Tungsten carbide	M1,7	Indicator 074111958

The original inserts mounted on INTERRAPID 312 can be replaced without issue by inserts with either the same or different ball diameter, provided that the nominal length is respected.

The length of inserts 074106361 and 074106363 modifies the amplification factor of the lever system. Therefore, the read values must be doubled.

### Accessories

Article number	Designation
<b>01860307</b>	Key for lever-type indicator

## Inserts

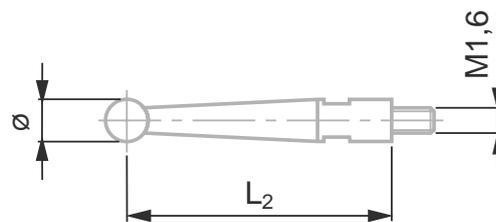
### Ball tip inserts for metric P-LINE indicators



01866014

Article number	Material	Fixing mm	Diameter mm	L1 mm	L2 mm
<b>01866014</b>	Tungsten carbide	M1,6	0,8	18	14,26
<b>01866003</b>	Tungsten carbide	M1,6	2	18	14,26
<b>01866021</b>	Tungsten carbide	M1,6	3	18	14,26
<b>01866016</b>	Tungsten carbide	M1,6	0,8	36	32,26
<b>01866004</b>	Tungsten carbide	M1,6	2	36	32,26
<b>01866023</b>	Tungsten carbide	M1,6	3	36	32,26
<b>01866015</b>	Tungsten carbide	M1,6	0,8	45	41,26
<b>01866006</b>	Tungsten carbide	M1,6	2	45	41,26
<b>01866026</b>	Tungsten carbide	M1,6	2	18	14,26
<b>01866027</b>	Ruby	M1,6	2	36	32,26

The original insert mounted on P-LINE indicators can be replaced without issue by inserts with either the same or different ball diameter, provided that the nominal length is respected.



L1 = axial length from ball to pivot

**TESATAST indicator, standard, metric + magnetic support**



01639055

Article number	Designation	Composed of
<b>01639055</b>	Set with magnetic support + TESATAST	01810005 TESATAST analogue lever-type dial test indicator, standard, 0,8 mm, 0,01 mm, Ø 28 mm 01639010 Support with magnetic base, articulated arm

**RUBYTAST indicator, standard, metric + magnetic support**



01639056

Article number	Designation	Composed of
<b>01639056</b>	Set with magnetic support + RUBYTAST	01811001 RUBYTAST analogue lever-type dial test indicator, standard, 0,2 mm, 0,002 mm, Ø 38 mm 01639010 Support with magnetic base, articulated arm

## Sets of lever-type test indicator + accessories

### Sets with INTERAPID 312 and accessories, imperial



Family	Part number	Description	With standard indicator				With perpendicular indicator	
			07411508	07411509	07411510	07411511	07411513	07411514
Lever-type dial test indicator	07411370	INTERAPID 312, standard, with ball insert $\varnothing$ 2 mm Dial, $\varnothing$ : 1-1/2 in Application range: .06 in Resolution: .0005 in	•					
	07411371	INTERAPID 312, standard, with ball insert $\varnothing$ 2 mm Dial, $\varnothing$ : 1-1/5 in Application range: .06 in Resolution: .0005 in		•				
	07411372	INTERAPID 312, standard, with ball insert $\varnothing$ 2 mm Dial, $\varnothing$ : 1-1/2 in Application range: .016 in Resolution: .0001 in			•			
	07411373	INTERAPID 312, standard, with ball insert $\varnothing$ 2 mm Dial, $\varnothing$ : 1-1/5 in Application range: .016 in Resolution: .0001 in				•		
	07411377	INTERAPID 312, perpendicular, with ball insert $\varnothing$ 2 mm Dial, $\varnothing$ : 1-1/2 in Application range: .06 in Resolution: .0005 in					•	
	07411378	INTERAPID 312, perpendicular, with ball insert $\varnothing$ 2 mm Dial, $\varnothing$ : 1-1/5 in Application range: .06 in Resolution: .0005 in						•
Accessories	074106331	Swivel holder with dovetail grip, $\varnothing$ 4 and $\varnothing$ 5,5 mm, bar = 6 x 12,6 x 76 mm	•	•	•	•	•	•
	074106931	Swivel holder with dovetail grip, $\varnothing$ 4 and $\varnothing$ 7 mm, shaft = $\varnothing$ 3/8 x 5-1/4 in	•	•	•	•	•	•
	074108943	Reducing sleeve, $\varnothing$ 3/8 in - $\varnothing$ 5/32 in	•	•	•	•	•	•
	074111474	Case for measuring inserts	•	•	•	•	•	•
	01860307	Key for inserts	•	•	•	•	•	•

**Sets with INTERRAPID 312 and accessories, metric**



Family	Part number	Description	With standard indicator			
			074111502	074111503	074111504	074111505
Lever-type dial test indicator	074111366	INTERRAPID 312, standard, with ball insert Ø 2 mm Dial, Ø: 37,5 mm Application range: 1,6 mm Resolution: 0,01 mm	•			
	074111367	INTERRAPID 312, standard, with ball insert Ø 2 mm Dial, Ø: 30 mm Application range: 1,6 mm Resolution: 0,01 mm		•		
	074111368	INTERRAPID 312, standard, with ball insert Ø 2 mm Dial, Ø: 37,5 mm Application range: 0,4 mm Resolution: 0,002 mm			•	
	074111369	INTERRAPID 312, standard, with ball insert Ø 2 mm Dial, Ø: 30 mm Application range: 0,4 mm Resolution: 0,002 mm				•
Accessories	074106331	Swivel holder with dovetail grip, Ø 4 and Ø 5,5 mm, bar = 6 x 12,6 x 76 mm	•	•	•	•
	074106026	Swivel holder with dovetail grip, Ø 4 and Ø 7 mm, shaft = Ø 8 x 133 mm	•	•	•	•
	074108942	Reducing sleeve, Ø 8 mm - Ø 4 mm	•	•	•	•
	074111474	Case for measuring inserts	•	•	•	•
	01860307	Key for inserts	•	•	•	•

## Fixing accessories

### Rigid fixing rods with dovetail attachment



01840105



01840104

Article number	Designation
<b>01840104</b>	Mounting rod with dovetail clamp, shaft = Ø 4 x 13 mm
<b>01840105</b>	Mounting rod with dovetail clamp, shaft = Ø 8 x 13 mm
<b>01850104</b>	Mounting rod with dovetail clamp, shaft = Ø 5,55 x 13 mm
<b>01850105</b>	Mounting rod with dovetail clamp, shaft = Ø 6,35 x 13 mm
<b>01860008</b>	Mounting rod with dovetail clamp, shaft = Ø 6 x 13 mm

### Rigid fixing rods with dovetail attachment



01850107

Article number	Designation
<b>01840107</b>	Knurled mounting rod with dovetail clamp, shaft = Ø 8 x 16,5 mm
<b>01840109</b>	Knurled mounting rod with dovetail clamp, shaft = Ø 4 x 16,4 mm

## Swivelling fixing rods with dovetail attachment



01840408

Article number	Designation
<b>01840408</b>	Mounting rod with dovetail clamp, swivelling, shaft = Ø 4 x 64,35 mm
<b>01840409</b>	Mounting rod with dovetail clamp, swivelling, shaft = Ø 8 x 64,35 mm

## Swivel holders



01840404



01840407



01850404



01840405

Article number	Designation
<b>01840404</b>	Swivel holder with dovetail grip, shaft = Ø 8 x 25 mm
<b>01850404</b>	Swivel holder with dovetail grip, shaft = Ø 3/8 x 1 in
<b>01840405</b>	Swivel holder with dovetail grip, shaft = Ø 8 x 90 mm
<b>01850405</b>	Swivel holder with dovetail grip, shaft = Ø 3/8 x 3-5/8 in
<b>01840407</b>	Swivel holder with dovetail grip, fine adjustment device, shaft = Ø 8 x 125 mm
<b>074106026</b>	Swivel holder with dovetail grip, Ø 4 and Ø 7 mm, shaft = Ø 8 x 133 mm
<b>074106931</b>	Swivel holder with dovetail grip, Ø 4 and Ø 7 mm, shaft = Ø 3/8 x 5-1/4 in
<b>074106331</b>	Swivel holder with dovetail grip, Ø 4 and Ø 5,5 mm, bar = 6 x 12,6 x 76 mm

## Fixing accessories

### Squares holders



01840406



01850406

Article number	Designation
<b>01840406</b>	Angular swivel holder, shaft = $\varnothing$ 8 x 25 mm, clamping $\varnothing$ 8 mm
<b>01850406</b>	Angle holder with cylindrical shank, $\varnothing$ 3/8 in, shaft = $\varnothing$ 3/8 x 3.5 in

### Fixing rod with pin



01840202



01850203



074111481

Article number	Designation
<b>01840202</b>	Mounting rod, pin = $\varnothing$ 5,6 mm, shaft = 8 x 80 mm
<b>01850202</b>	Fixing shank, pin $\varnothing$ 7/32 in, shank = $\varnothing$ 3/8 x 3.5 in
<b>01850203</b>	Fixing shank, pin $\varnothing$ .22 in, bar = 1/4 x 1/2 x 3 in
<b>074111481</b>	Fixing shank, pin $\varnothing$ 5/32 in, bar = 3/16 x 5/16 in

## Clamps



01860401

Article number	Designation
<b>01860401</b>	Dovetail clamp with dovetail clamp, clamping = Ø 5,6 and Ø 9,5 mm
<b>01860402</b>	Dovetail clamp with dovetail clamp, clamping = Ø 7 and 9,5 mm
<b>074108603</b>	Dovetail clamp with dovetail clamp, clamping = Ø 7/32 and 5/32 in

## Rotating holder



SPT

Article number	Designation
<b>SPT</b>	Swivel clamp, Ø 4,1 mm, axis = Ø 8 x 25 mm

## Fixing accessories

### Centring holder



01840501

Article number	Designation
01840501	Centering holder, $\varnothing$ 4 mm, shaft = $\varnothing$ 4 x 25 mm

### Mounting backs for lever-type test indicators



03238013

Article number	Designation
03238013	Mounting lug

## Reducing sleeves



074108942

Article number	Designation
<b>074108942</b>	Reducing sleeve, Ø 8 mm - Ø 4 mm
<b>074108943</b>	Reducing sleeve, Ø 3/8 in - Ø 5/32 in
<b>03560101</b>	Reducing sleeve, Ø .375 in - Ø 8 mm



# Measuring probes



**TESA**  
TECHNOLOGY

## ***A necessary indicator to guarantee high quality parts in the long term***

The ability to remain competitive depends on the successful and timely delivery of orders. In a challenging environment, the use of industrial resources needs to be closely monitored to understand the causes of potential performance drops and to monitor the production on a daily basis. Even if the structures are currently very efficient, monitoring is still necessary in order to control the processes as much as possible in terms of use and costs. To this purpose, multiple performance indicators generally give a real-time view of the production in progress.

Multi-gauging dimensional control is globally integrated in this approach of process optimisation in order to guarantee a high quality in the long term and to avoid a high reject rate. The measurement of medium and large series parts is a major application challenge today, where both measurement speed and high accuracy are required.



## ***A wide range, numerous application possibilities***

TESA probes are designed for applications that rely on the combined use of internal or external measuring instruments, supports or specific measurement systems. Various versions are available for these applications, such as probes with axial or parallel guided measuring bolt or even lever angle probes.

### **Lever probe**

For quick and easy measurement of straightness, parallelism or perpendicularity in the micron level during alignment or assembly control operations.

### **Axial probes**

Standard probes mounted on a ball bearing are insensitive to any radial force exerted on the measuring rod. These probes are effectively protected against the penetration of liquids or solids and can withstand heat, fuels and chemicals.

### **FMS probes**

Where access to the measurement area is difficult, it is often necessary to use offset inserts. The robust, modular design of this probe ensures accurate measurement and can withstand a higher torque generated by the measuring insert.

## Measuring probes



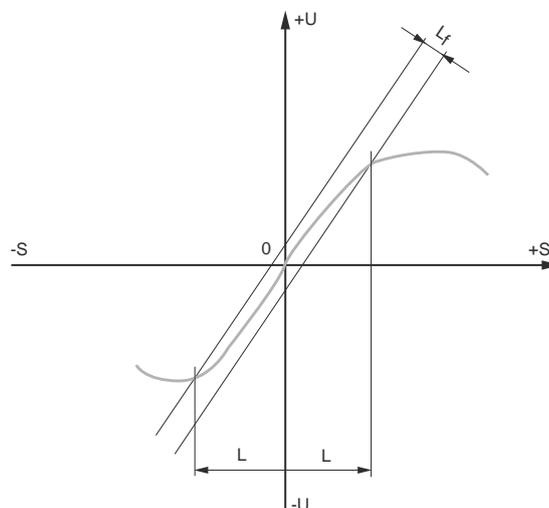
### Operating principle

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 ferro magnetic 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 voltmetre or a numerical display after a digital transformation.

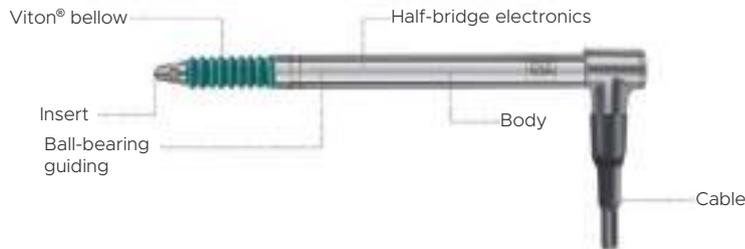
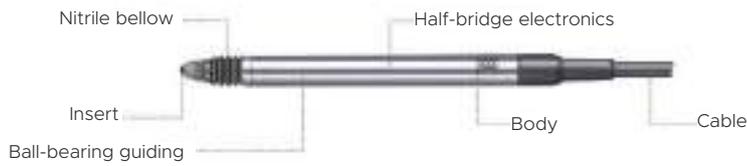
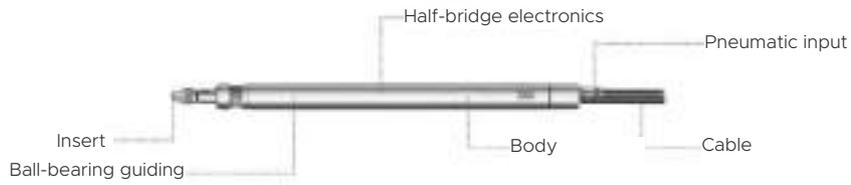
Unambiguous assessment of the measurand (at bolt position) to the signal (displayed value) is the main characteristic of analogue value acquisition. One of its distinct advantages lies in the value primarily displayed, which will be reproduced in the event of a power cut (switch-off or power failure).

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.

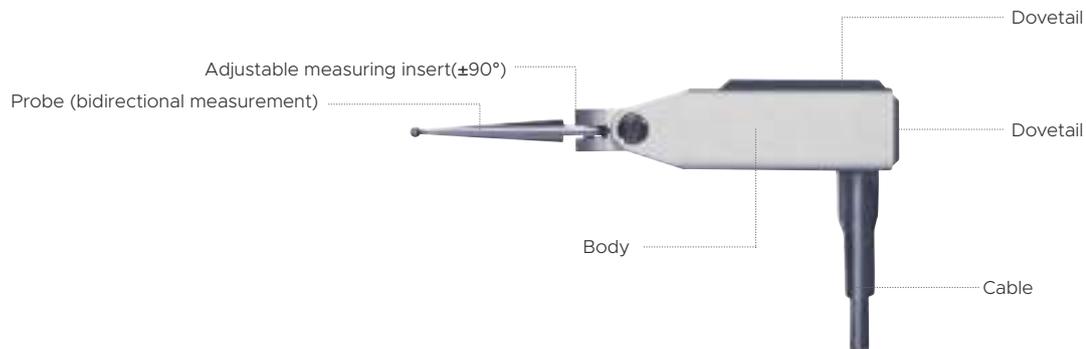


S: Stroke, U: Output Voltage, 0: Electrical Zero, L: Linearity Range, Lf: Linearity Deviation

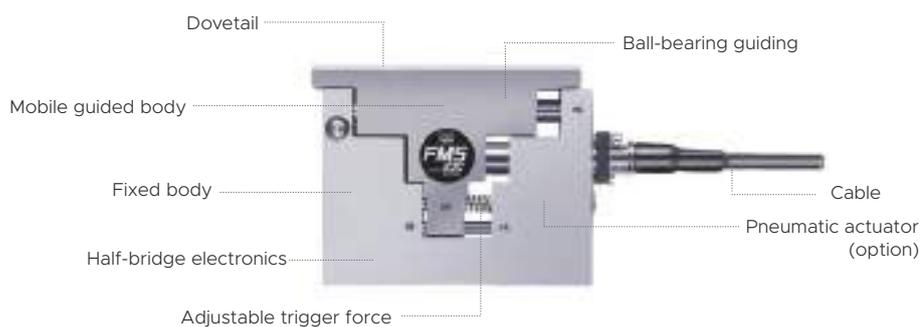
### Axial probe



### Lever probe

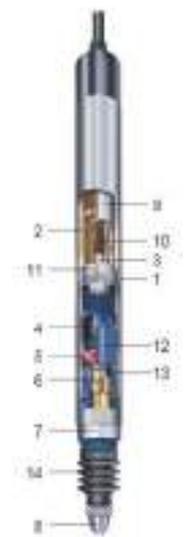


### FMS probe with parallel guiding



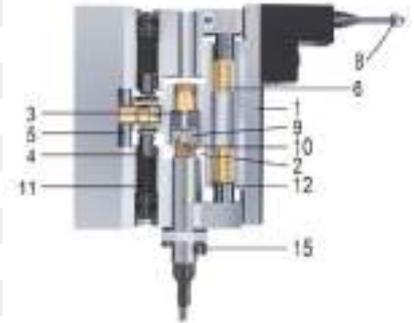
## Standard lever probes

### Components of a TESA inductive probe



**Axial probe**

1	Mounting stem or probe housing
2	Coil system
3	Element mounted between the ferromagnetic core and the measuring bolt for the correction of varying coefficients of thermal expansion
4	Force compression spring
5	Anti-rotation guiding system
6	Ball cage
7	Setting element for limiting the measuring bolt travel
8	Probe insert
9	In-between tube being part of the coil system
10	Ferro-magnetic core
11	Force spring stop
12	Ball-bearing guiding tube
13	Measuring bolt
14	Sealing rubber bellow
15	Mechanical device for zero-setting



**FMS probe**

### Sensitivity of TESA half-bridge probes for TESA electronic interfaces and display units

Sensitivity	All: 73,75 mV/V/mm except GT61, GT62: 29,50 mV/V/mm FMS130, FMS132: 49,17 mV/V/mm
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The aforementioned sensitivities are valid under the following reference conditions:

Drive voltage	3 V <sub>pp</sub>
Drive frequency	13 kHz
Adjustment load	2 kΩ

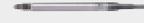
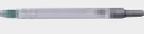
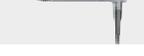
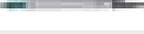
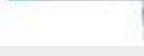
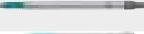
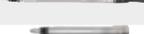
### Activation and retraction modes

Activation (1)	Spring	Spring	Pneumatic pressure
Retraction (2)	-	Vacuum	Spring
Examples of probe models	GT21, GT27	GTL211, GT271	GTL212, GTL222

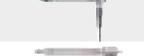
### Output signal type

Data output	TESA standard half-bridge	DC	USB
Probe models	GT21, GT22,...	GTL211, GT271,...	GTL212, GTL222,...
Specifications			USB A Transmission speed: 4800 Data bits: 7 Stop bits: 2 Parity: even

### Axial probes, Ø 8 mm

	Article number	Description	Measuring range, mm	Bolt travel	Bolt retraction	Sealing bellow	Cable
	03210904	GT21	±1	4,3	Mechanical	Nitrile	Axial
	03210924	GT22	±1	4,3	Mechanical Vacuum	Nitrile	Radial
	03230057	GTL21	±2	4,3	Mechanical	Viton	Axial
	03230072	GTL211	±2	4,3	Mechanical Vacuum	Viton	Axial
	03230056	GTL22	±2	4,3	Mechanical Vacuum	Viton	Radial
	03230027	GT27	±2	10,3	Mechanical	Viton	Axial
	03230073	GT271	±2	10,3	Mechanical Vacuum	Viton	Axial
	03230026	GT28	±2	10,3	Mechanical Vacuum	Viton	Radial
	03230041	GT61	±5	10,3	Mechanical	Viton	Axial
	03230042	GT62	±5	10,3	Mechanical Vacuum	Viton	Radial
	03230036	GT21 HP	±0,2	4,3	Mechanical	Nitrile	Axial
	03230021	GT22 HP	±0,2	4,3	Mechanical Vacuum	Nitrile	Radial

### Axial probes, Ø 8 mm, activation of the bolt by pneumatic pressure

	Article number	Description	Measuring range, mm	Bolt travel mm	Sealing bellow	Cable
	03230060	GTL212	±1,5	3,2	Viton	Axial
	03230067	GTL212-A	±1,5	3,2	Without	Axial
	03230054	GTL222	±1,5	3,2	Viton	Radial
	03230063	GTL222-A	±1,5	3,2	Without	Radial
	03230061	GT272	±2	10,3	Viton	Axial
	03230068	GT272-A	±2	10,3	Without	Axial
	03230053	GT282	±2	10,3	Viton	Radial
	03230069	GT282-A	±2	10,3	Without	Radial
	03230062	GT612	±5	10,3	Viton	Axial
	03230070	GT612-A	±5	10,3	Without	Axial
	03230055	GT622	±5	10,3	Viton	Radial
	03230071	GT622-A	±5	10,3	Without	Radial

### Lever probe

	Article number	Description	Measuring range, mm	Bolt travel mm	Bolt retraction	Sealing bellow	Cable
	03210802	GT31	±0,3	0,7	Without	Without	Angled

### DC lever probe

	Article number	Description	Measuring range, mm	Bolt travel mm	Bolt retraction	Sealing bellow	Cable
	03230081	GT31 DC	0,3	0,7	Without	Without	Angled

## Measuring probes

Nominal measuring force, N	Mobile weight, g	Max. permissible error for deviations in linearity, $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
0,63	6	0,2 + 3xLxLxL	0,02	0,01	IP65
0,63	6	0,2 + 3xLxLxL	0,02	0,01	IP65
0,63	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,01	IP65
0,63	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,01	IP65
0,63	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,01	IP65
0,63	8	0,2 + 3xLxLxL	0,05	0,05	IP65
0,63	8	0,2 + 3xLxLxL	0,05	0,05	IP65
0,63	8	0,2 + 3xLxLxL	0,05	0,05	IP65
0,9	8	1 + 4xL 0,6 + 0,8xL (with TESA interface)	0,05	0,05	IP65
0,9	8	1 + 4xL 0,6 + 0,8xL (with TESA interface)	0,05	0,05	IP65
0,63	6	0,07 + 0,4xL	0,01	0,01	IP65
0,63	6	0,07 + 0,4xL	0,01	0,01	IP65

Nominal measuring force, N	Mobile weight, g	Max. permissible error for deviations in linearity, $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
1,2	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,015	IP65
0,2	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,015	IP50
1,2	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,015	IP65
0,2	6	0,2 + 2,4xLxL 0,2 + 0,8xL (with TESA interface)	0,02	0,015	IP50
1	8	0,2 + 3xLxLxL	0,05	0,05	IP65
0,85	8	0,2 + 3xLxLxL	0,05	0,05	IP50
1	8	0,2 + 3xLxLxL	0,05	0,05	IP65
0,85	8	0,2 + 3xLxLxL	0,05	0,05	IP50
2	8	1 + 4xL 0,6 + 0,8xL (with TESA interface)	0,05	0,05	IP65
1	8	1 + 4xL 0,6 + 0,8xL (with TESA interface)	0,05	0,05	IP50
2	8	1 + 4xL 0,6 + 0,8xL (with TESA interface)	0,05	0,05	IP65
1	8	1 + 4xL 0,6 + 0,8xL (with TESA interface)	0,05	0,05	IP50

Nominal measuring force, N	Mobile weight, g	Max. permissible error for deviations in linearity, $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
0,1	12	0,2 + 50xLxL	0,25	0,1	IP40

Nominal measuring force, N	Mobile weight, g	Max. permissible error $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
0,1	12	0,2 + 50xLxL		0,1	IP65

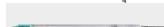
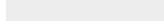
**Miniature axial probes**

	Article number	Description	Measuring range, mm	Bolt travel mm	Bolt retraction	Sealing bellow	Cable
	<b>03230001</b>	GT41	±0,3	0,7	Without	Nitrile	Axial
	<b>03230002</b>	GT42	±0,3	0,7	Vacuum	Nitrile	Radial
	<b>03230035</b>	GT43	±1	2,1	Mechanical	Viton	Axial
	<b>03230017</b>	GT44	±1	2,1	Vacuum	Viton	Radial

**Neutral axial probes**

	Article number	Description	Measuring range, mm	Bolt travel mm	Bolt retraction	Sealing bellow	Cable
	<b>96410012</b>	410	±1	2,5	Mechanical	Nitrile	Axial Radial
	<b>96160013</b>	160	±1	3,3	Mechanical	Viton	Axial
	<b>96430029</b>	430	±0,5	1,25	Mechanical	Nitrile	Axial
	<b>96441041</b>	451	±0,5	2,1	Mechanical	Nitrile	Radial

**USB & DC axial probes**

	Article number	Description	Measuring range, mm	Bolt travel mm	Bolt retraction	Sealing bellow	Cable
	<b>03230059</b>	GTL21 DC	±2	4,3	Mechanical	Viton	Axial
	<b>03230058</b>	GTL22 DC	±2	4,3	Mechanical Vacuum	Viton	Radial
	<b>03230086</b>	GT61 DC	±5	10,3	Mechanical	Viton	Axial
	<b>03230087</b>	GT62 DC	±5	10,3	Mechanical Vacuum	Viton	Radial
	<b>03230085</b>	GT44 DC	±1	2,1	Mechanical Vacuum	Viton	Radial
	<b>03230200</b>	GTL21 USB	±2	4,3	Mechanical	Viton	Axial
	<b>03230201</b>	GTL22 USB	±2	4,3	Mechanical Vacuum	Viton	Radial
	<b>03230204</b>	GT61 USB	±5	10,3	Mechanical	Viton	Axial
	<b>03230205</b>	GT62 USB	±5	10,3	Mechanical Vacuum	Viton	Radial
	<b>03230202</b>	GTL222 USB	±1,5	3,1	Pressure (advance) Spring (retract)	Viton	Radial
	<b>03230211</b>	GTL272 USB	±2	10,3	Pressure (advance) Spring (retract)	Viton	Axial
	<b>03230210</b>	GT612 USB	±5	10,3	Pressure (advance) Spring (retract)	Viton	Axial
	<b>03230206</b>	GT622 USB	±5	10,3	Pressure (advance) Spring (retract)	Viton	Radial

**FMS probes**

	Article number	Description	Measuring range, mm	Bolt travel mm	Bolt retraction	Sealing bellow	Cable
	<b>03230019</b>	FMS100	±2	5,8	Retraction by air pressure (optional accessory)	Without	Axial
	<b>03230037</b>	FMS100-P	±2	5,8	Retraction by air pressure (optional accessory)	Without	Axial
	<b>03230028</b>	FMS102	±2	5,8	Retraction by air pressure (optional accessory)	Without	Radial
	<b>03230038</b>	FMS102-P	±2	5,8	Retraction by air pressure (optional accessory)	Without	Radial
	<b>03230049</b>	FMS130	±2,9	5,8	Retraction by air pressure (optional accessory)	Without	Axial
	<b>03230051</b>	FMS130-P	±2,9	5,8	Retraction by air pressure (optional accessory)	Without	Axial
	<b>03230050</b>	FMS132	±2,9	5,8	Retraction by air pressure (optional accessory)	Without	Radial
	<b>03230052</b>	FMS132-P	±2,9	5,8	Retraction by air pressure (optional accessory)	Without	Radial

## Measuring probes

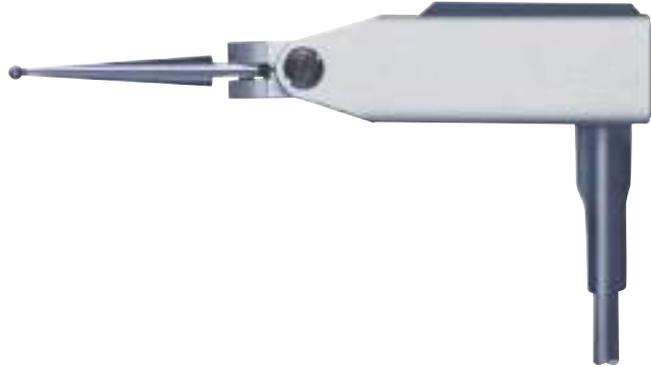
Nominal measuring force, N	Mobile weight, g	Max. permissible error for deviations in linearity, $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
0,63	2	0,2 + 5xLxL	0,01	0,01	IP65
0,63	2	0,2 + 5xLxL	0,01	0,01	IP65
0,4	2	0,2 + 5xLxL	0,15	0,1	IP65
0,4	2	0,2 + 5xLxL	0,15	0,1	IP65

Nominal measuring force, N	Mobile weight, g	Max. permissible error for deviations in linearity, $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
0,6	3,1	0,2% (for a measuring range of $\pm 1$ mm)	0.02	0,1	IP62
0,6	2,5	0,2% (for a measuring range of $\pm 1$ mm)	0.02	0,1	IP62
0,75	1,9	0,2% (for a measuring range of $\pm 0,5$ mm)	0.02	0,2	IP62
0,6	3	0,2% (for a measuring range of $\pm 0,5$ mm)	0.02	0,1	IP62

Nominal measuring force, N	Mobile weight, g	Max. permissible error $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
0,63	6	0,2 + 3,5xLxL	0,5	0,1	IP65
0,63	6	0,2 + 3,5xLxL	0,5	0,1	IP65
0,9	8	1 + 4xL	0,5	0,1	IP65
0,9	8	1 + 4xL	0,5	0,1	IP65
0,4	2	0,2 + 5xLxL	0,5	0,1	IP65
0,63	6	0,4 + 0,8xL	0,5	0,1	IP65
0,63	6	0,4 + 0,8xL	0,5	0,1	IP65
0,9	8	1 + 4xL	0,5	0,24	IP65
0,9	8	1 + 4xL	0,5	0,24	IP65
1,2	6	0,4 + 0,8xL	0,5	0,1	IP65
1	8	0,4 + 0,8xLxLxL	0,5	0.01	IP65
2	8	1 + 4xL	0,5	0.24	IP65
2	8	1 + 4xL	0,5	0.24	IP65

Nominal measuring force, N	Mobile weight, g	Max. permissible error for deviations in linearity, $\mu\text{m}$ , L in mm	Hysteresis $\mu\text{m}$	Repeatability $\mu\text{m}$	Protection
2	110	0,2 + 3xLxLxL	0.5	0.5	IP50
2	110	0,2 + 3xLxLxL	0.5	0.5	IP54
2	110	0,2 + 3xLxLxL	0.5	0.5	IP50
2	110	0,2 + 3xLxLxL	0.5	0.5	IP54
2	110	0,2 + 3xLxLxL	0.5	0.5	IP50
2	110	0,2 + 3xLxLxL	0.5	0.5	IP54
2	110	0,2 + 3xLxLxL	0.5	0.5	IP50
2	110	0,2 + 3xLxLxL	0.5	0.5	IP54

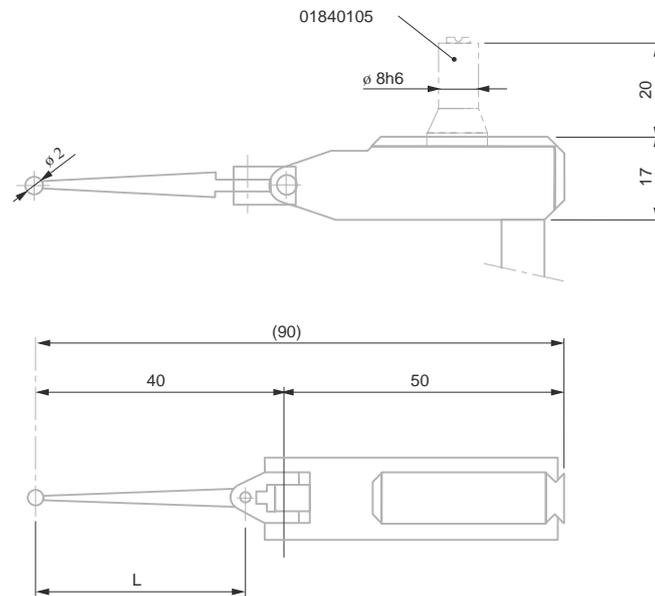
**Lever probes,  $\pm 0,3$  mm, 0,7 mm bolt travel**



03210802

Standard	DIN 32876
Measuring range	$\pm 0,3$ mm
Bolt travel	0,7 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,25 $\mu$ m
Max. perm. errors	L in mm 0,2 + 50 x (L x L) $\mu$ m
Degree of protection	IP40
Weight	Mobile weight: 12 g
Working temperature	20 °C $\pm$ 0,5
Material	Metal housing: matt chrome-plated Ball insert: tungsten carbide
Dimensions	Ball insert: $\varnothing$ 2 mm Cable: 2 m (except 03210807, 3 m) Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Fixing rod $\varnothing$ 8 mm User manual Declaration of conformity

## Standard lever probes



03210802

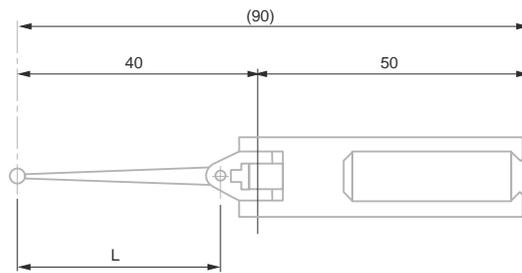
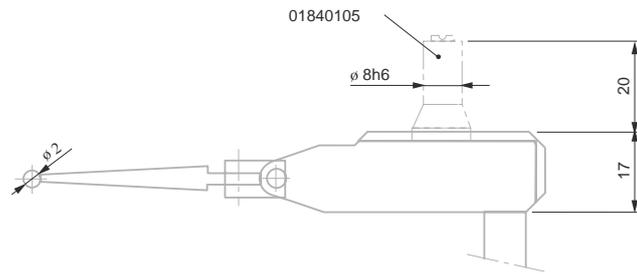
Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03210801</b>	GT31 probe	0,02	Without	IP40	Radial	2
<b>03210802</b>	GT31 probe	0,1	Without	IP40	Radial	2
<b>03210807</b>	GT31 probe	0,1	Without	IP40	Radial	3
<b>03210803</b>	GT31 probe	0,2	Without	IP40	Radial	2

**DC lever probe,  $\pm 0,3$  mm, 0,7 mm bolt travel**

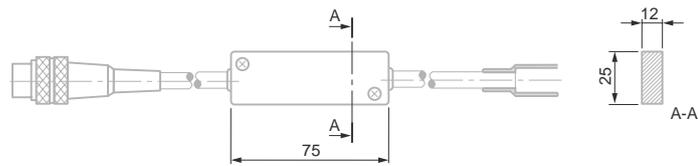

03230081

Standard	DIN 32876
Measuring range	$\pm 0,3$ mm
Bolt travel	0,7 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,5 $\mu$ m
Max. perm. errors	L in mm 0,2 + 50 x (L x L) $\mu$ m
Degree of protection	IP40
Weight	Mobile weight: 12 g
Working temperature	20 °C $\pm$ 0,5
Material	Metal housing: matt chrome-plated Ball insert: tungsten carbide
Dimensions	Ball insert: $\varnothing$ 2 mm Cable: 2 m Connector: 5p DIN45322
Power supply	Stabilised supply voltage: $\pm 15$ V Consumption: 15 mAh Adjustable load: > 1k $\Omega$ Output voltage: $\pm 0,3$ V
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Fixing rod $\varnothing$ 8 mm User manual Declaration of conformity

## DC lever probes



03230081



Article number	Designation	Measuring force, N	Bolt retraction	Output voltage, V	Sensitivity V/mm	Degree of protection	Cable orientation	Cable length, m
<b>03230081</b>	GT31 DC probe	0,1	Without	$\pm 0,3$	1	IP40	Radial	2,2

**Standard GT21 probes, ± 1 mm, 4,3 mm bolt travel, axial cable**



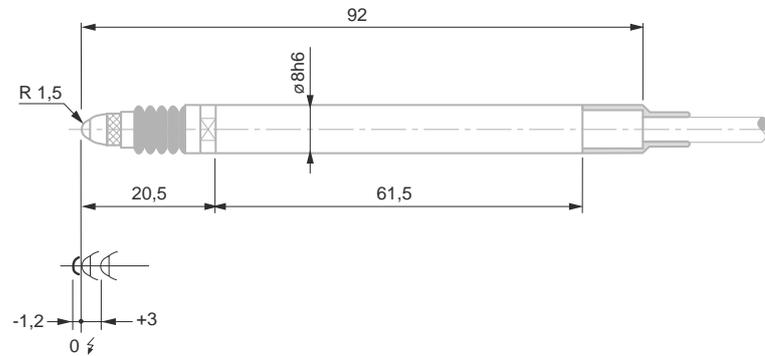
03210904

Standard	DIN 32876
Measuring range	± 1 mm
Bolt travel	4,3 mm
Repeatability	0,01 µm
Hysteresis	0,02 µm
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) µm
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 ÷ 0,1 mm
Coefficient of linear expansion	0,15 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03210904

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03210904</b>	GT21-I probe	0,63	Mechanical	IP65	Axial	2
<b>03290133</b>	10x GT21-I probe	0,63	Mechanical	IP65	Axial	2
<b>03210905</b>	GT21-L probe	1	Mechanical	IP65	Axial	2
<b>03290167</b>	10x GT21-L probe	1	Mechanical	IP65	Axial	2
<b>03210906</b>	GT21-P probe	1,6	Mechanical	IP65	Axial	2
<b>03290179</b>	10x GT21-P probe	1,6	Mechanical	IP65	Axial	2
<b>03210907</b>	GT21-T probe	2,5	Mechanical	IP65	Axial	2
<b>03210908</b>	GT21-U probe	4	Mechanical	IP65	Axial	2

**Standard GT22 probes,  $\pm 1$  mm, 4,3 mm bolt travel, radial cable**



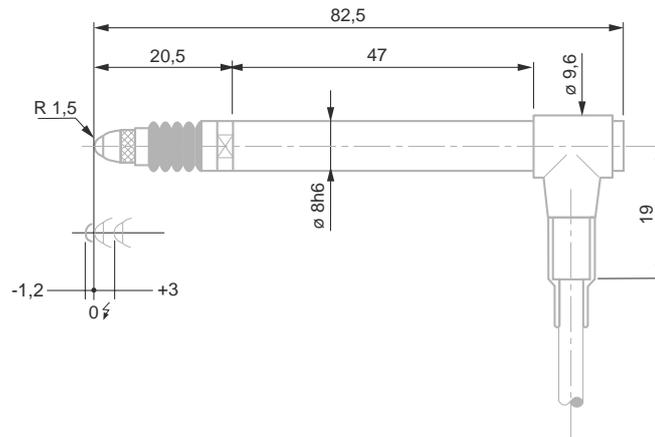
03210924

Standard	DIN 32876
Measuring range	$\pm 1$ mm
Bolt travel	4,3 mm
Repeatability	0,01 $\mu$ m
Hysteresis	0,02 $\mu$ m
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\div$ 0,1 mm
Coefficient of linear expansion	0,15 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03210924

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03210924</b>	GT22-I probe	0,63	Mechanical, vacuum	IP65	Radial	2
<b>03290134</b>	10x GT22-I probe	0,63	Mechanical, vacuum	IP65	Radial	2
<b>03210921</b>	GT22-C probe	0,16	Mechanical, vacuum	IP65	Radial	2
<b>03290156</b>	10x GT22-C probe	0,16	Mechanical, vacuum	IP65	Radial	2
<b>03210922</b>	GT22-D probe	0,25	Mechanical, vacuum	IP65	Radial	2
<b>03210923</b>	GT22 probe	0,4	Mechanical, vacuum	IP65	Radial	2
<b>03210925</b>	GT22-L probe	1	Mechanical, vacuum	IP65	Radial	2
<b>03290168</b>	10x GT22-L probe	1	Mechanical, vacuum	IP65	Radial	2
<b>03210926</b>	GT22-P probe	1,6	Mechanical	IP65	Radial	2
<b>03290180</b>	10x GT22-P probe	1,6	Mechanical	IP65	Radial	2
<b>03210927</b>	GT22-T probe	2,5	Mechanical	IP65	Radial	2
<b>03210928</b>	GT22-U probe	4	Mechanical	IP65	Radial	2

**Standard linearised GTL21 probes, ± 2 mm, 4,3 mm bolt travel, axial cable**


03230057



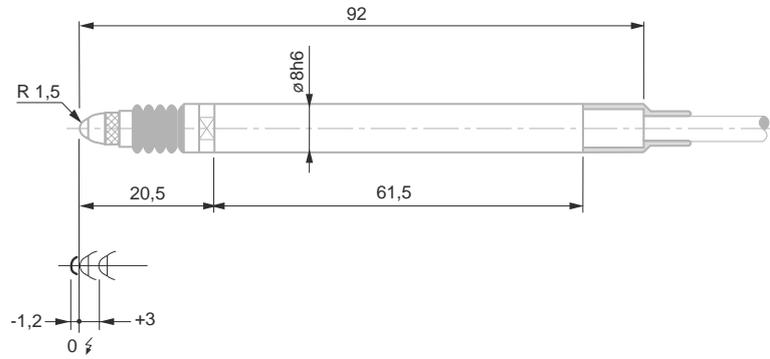
03230072

Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	4,3 mm
Repeatability	0,01 µm
Hysteresis	0,02 µm
Max. perm. errors	L in mm 0,2 + 2,4 x (L x L) µm 0,2 + 0,8 x L µm (with TESA interface)
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 ÷ 0,1 mm
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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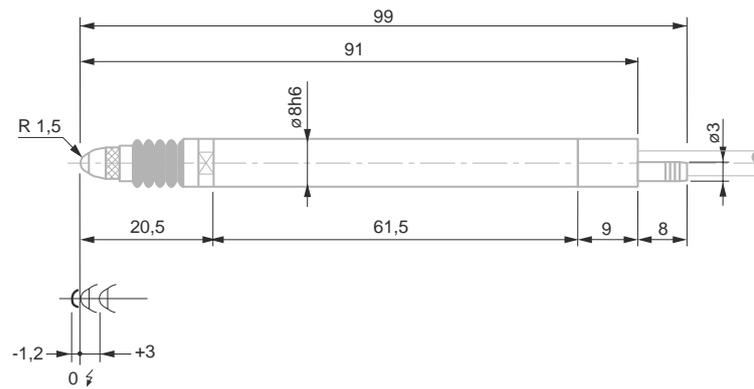
Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230057



03230072

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230057</b>	GTL21 probe	0,63	Mechanical	IP65	Axial	2
<b>03290138</b>	10x GTL21 probe	0,63	Mechanical	IP65	Axial	2
<b>03230072</b>	GTL211 probe	0,63	Mechanical, vacuum	IP65	Axial	2

**Standard linearised GTL22 probes, 2 mm, 4,3 mm bolt travel, radial cable**

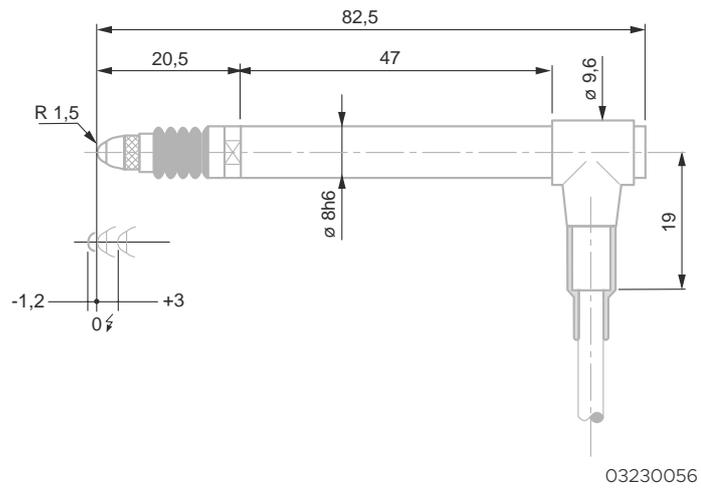

03230056

Standard	DIN 32876
Measuring range	$\pm 2$ mm
Bolt travel	4,3 mm
Repeatability	0,01 $\mu\text{m}$
Hysteresis	0,02 $\mu\text{m}$
Max. perm. errors	L in mm $0,2 + 2,4 \times (L \times L) \mu\text{m}$ $0,2 + 0,8 \times L \mu\text{m}$ (with TESA interface)
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\div$ 0,1 mm
Coefficient of linear expansion	0,2 $\mu\text{m}/^\circ\text{C}$
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm$  25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230056</b>	GTL22 probe	0,63	Mechanical, vacuum	IP65	Radial	2
<b>03290139</b>	10x GTL22 probe	0,63	Mechanical, vacuum	IP65	Radial	2
<b>03230076</b>	GTL22 probe	1	Mechanical, vacuum	IP65	Radial	2
<b>03290176</b>	10x GTL22 probe	1	Mechanical, vacuum	IP65	Radial	2

**Standard GT27 probes,  $\pm 2$  mm, 10,3 mm bolt travel, axial cable**


03230027



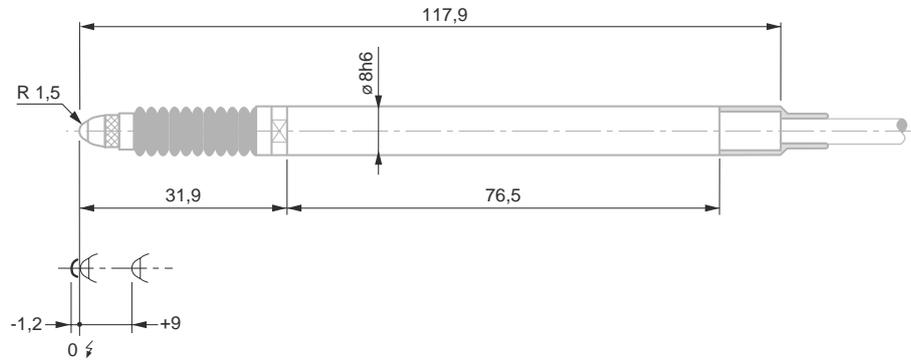
03230073

Standard	DIN 32876
Measuring range	$\pm 2$ mm
Bolt travel	10,3 mm
Repeatability	0,05 $\mu$ m
Hysteresis	0,05 $\mu$ m
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\div$ 0,1 mm
Coefficient of linear expansion	0,15 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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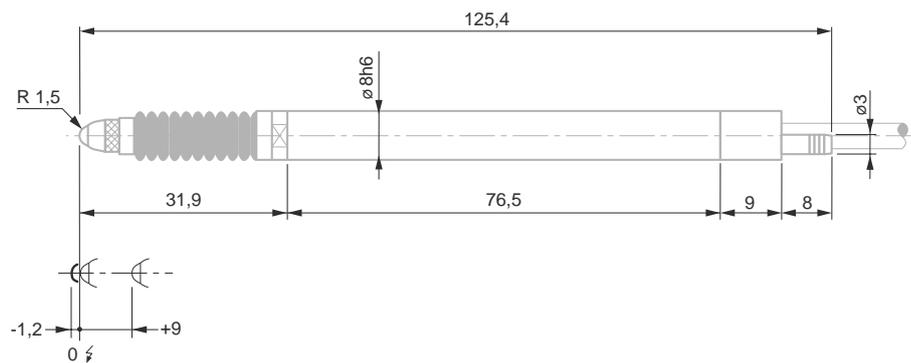
Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm$  25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230027



03230073

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230027</b>	GT27 probe	0,63	Mechanical	IP65	Axial	2
<b>03290152</b>	10x GT27 probe	0,63	Mechanical	IP65	Axial	2
<b>03230073</b>	GT271 probe	0,63	Mechanical, vacuum	IP65	Axial	2

**Standard GT28 probes,  $\pm 2$  mm, 10,3 mm bolt travel, radial cable**

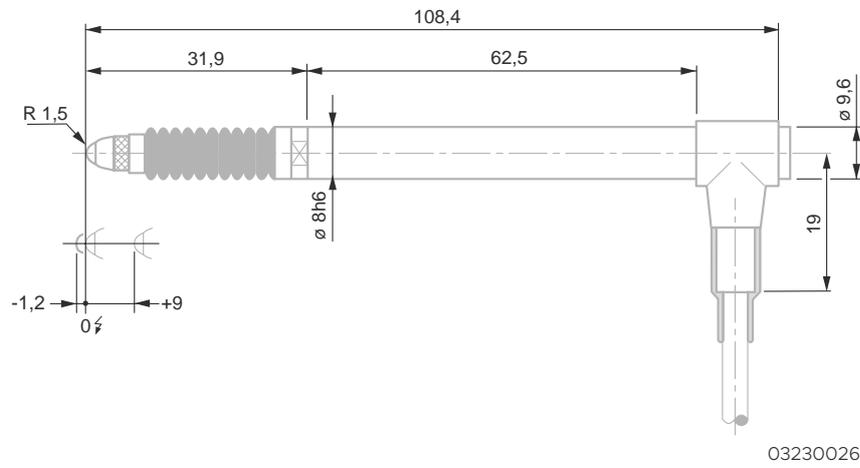

03230026

Standard	DIN 32876
Measuring range	$\pm 2$ mm
Bolt travel	10,3 mm
Repeatability	0,05 $\mu$ m
Hysteresis	0,05 $\mu$ m
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\div$ 0,1 mm
Coefficient of linear expansion	0,15 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230026</b>	GT28 probe	0,63	Mechanical, vacuum	IP65	Radial	2
<b>03290137</b>	10x GT28 probe	0,63	Mechanical, vacuum	IP65	Radial	2

**Standard GT61 probes,  $\pm 5$  mm, 10,3 mm bolt travel, axial cable**

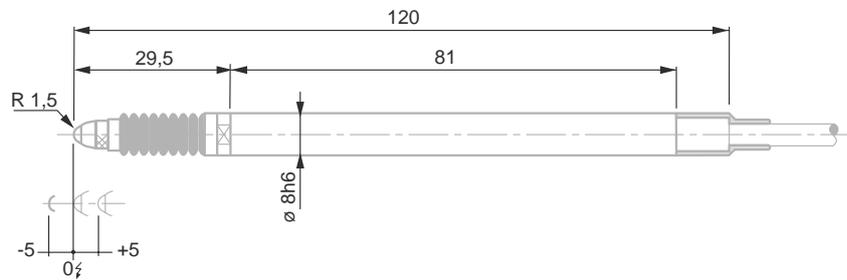

03230041

Standard	DIN 32876
Measuring range	$\pm 5$ mm
Bolt travel	10,3 mm
Repeatability	0,05 $\mu\text{m}$
Hysteresis	0,05 $\mu\text{m}$
Max. perm. errors	L in mm $1 + 4 \times L \mu\text{m}$
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -5 mm Not adjustable: lower: -5,1 mm, upper +5,2 mm
Coefficient of linear expansion	0,09 $\mu\text{m}/^{\circ}\text{C}$
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230041

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230041</b>	GT61 probe	0,9	Mechanical	IP65	Axial	2
<b>03290153</b>	10x GT61 probe	0,9	Mechanical	IP65	Axial	2

**Standard GT62 probes,  $\pm 5$  mm, 10,3 mm bolt travel, radial cable**

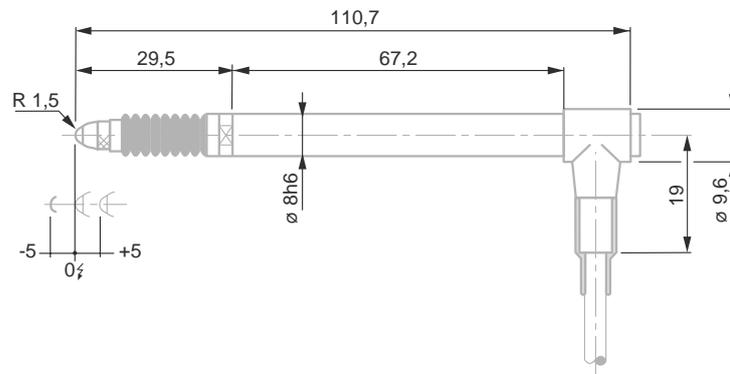

03230042

Standard	DIN 32876
Measuring range	$\pm 5$ mm
Bolt travel	10,3 mm
Repeatability	0,05 $\mu$ m
Hysteresis	0,05 $\mu$ m
Max. perm. errors	L in mm 1 + 4 x L $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -5 mm Not adjustable: lower: -5,1 mm, upper +5,2 mm
Coefficient of linear expansion	0,09 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230042

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230042</b>	GT62 probe	0,9	Mechanical, vacuum	IP65	Radial	2
<b>03290135</b>	10x GT62 probe	0,9	Mechanical, vacuum	IP65	Radial	2

## High precision GT21 HP probe, $\pm 0,2$ mm, 4,3 mm bolt travel, axial cable



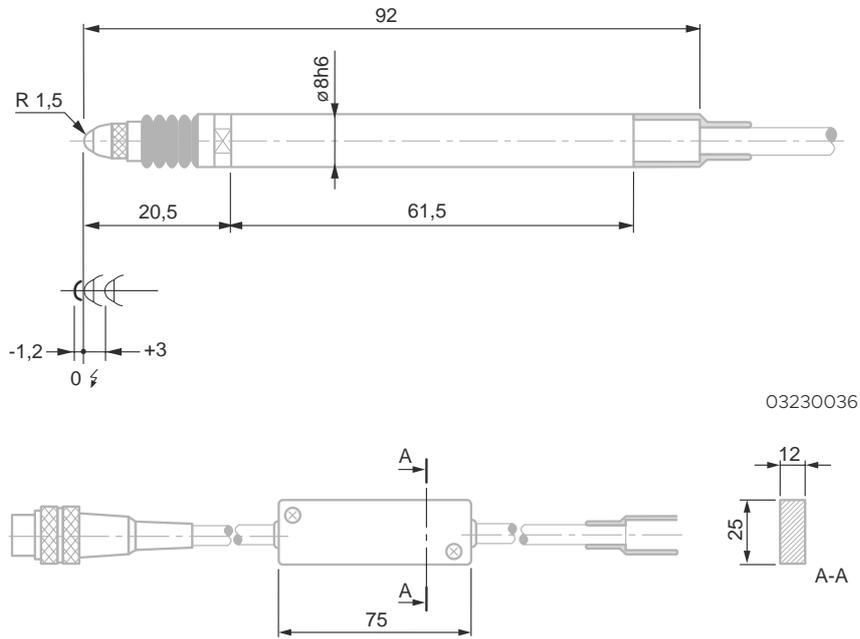
03230036

Standard	DIN 32876
Measuring range	$\pm 0,2$ mm
Bolt travel	4,3 mm
Repeatability	0,01 $\mu$ m
Hysteresis	0,01 $\mu$ m
Max. perm. errors	L in mm 0,07 + 0,4 x L $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\pm$ 0,1 mm
Coefficient of linear expansion	0,15 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

# Standard axial probes



Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230036</b>	GT21 HP probe	0,63	Mechanical	IP65	Axial	2

**High precision GT22 HP probe,  $\pm 0,2$  mm, 4,3 mm bolt travel, radial cable**



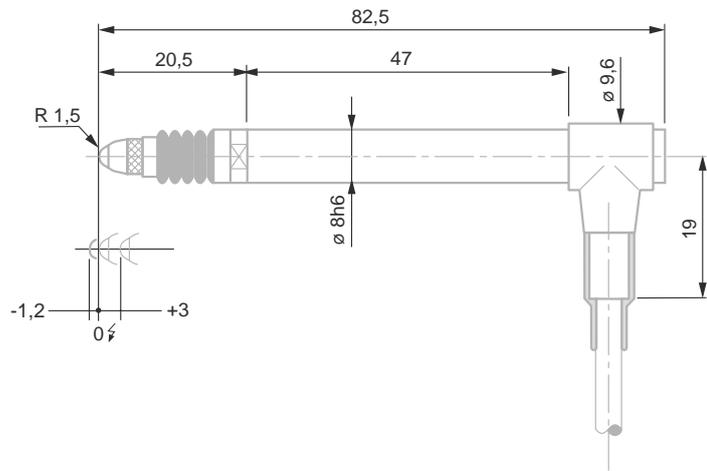
03230021

Standard	DIN 32876
Measuring range	$\pm 0,2$ mm
Bolt travel	4,3 mm
Repeatability	0,01 $\mu$ m
Hysteresis	0,01 $\mu$ m
Max. perm. errors	L in mm 0,07 + 0,4 x L $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\div$ 0,1 mm
Coefficient of linear expansion	0,15 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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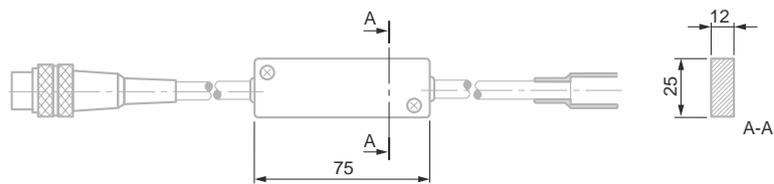
Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

# Standard axial probes



03230021



Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230021</b>	GT22 HP probe	0,63	Mechanical, vacuum	IP65	Radial	2

**Miniature GT41 probe, 0,3 mm, 0,7 mm bolt travel, axial cable**

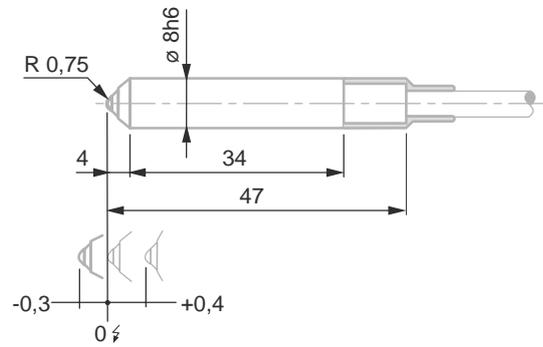

03230001

Standard	DIN 32876
Measuring range	± 0,3 mm
Bolt travel	0,7 mm
Repeatability	0,01 µm
Hysteresis	0,01 µm
Max. perm. errors	L in mm 0,2 + 5 x (L x L) µm
Degree of protection	IP65
Weight	Mobile weight: 2 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -0,3 mm Not adjustable: lower: -0,3 mm, upper +0,4 mm
Coefficient of linear expansion	0,1 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: ceramic Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Non-interchangeable insert Ball insert: Ø 1,5 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230001

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230001</b>	GT41 probe	0,63	Without	IP65	Axial	2

**Miniature GT42 probe,  $\pm 0,3$  mm, 0,7 mm bolt travel, radial cable**

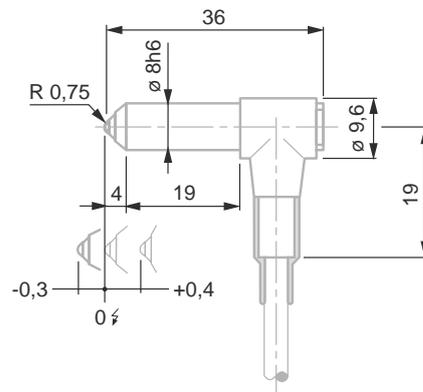

03230002

Standard	DIN 32876
Measuring range	$\pm 0,3$ mm
Bolt travel	0,7 mm
Repeatability	0,01 $\mu\text{m}$
Hysteresis	0,01 $\mu\text{m}$
Max. perm. errors	L in mm 0,2 + 5 x (L x L) $\mu\text{m}$
Degree of protection	IP65
Weight	Mobile weight: 2 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -0,3 mm Not adjustable: lower: -0,3 mm, upper +0,4 mm
Coefficient of linear expansion	0,1 $\mu\text{m}/^\circ\text{C}$
Material	Fixing shank: nickel plated Measuring bolt: ceramic Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Non-interchangeable insert Ball insert: $\varnothing$ 1,5 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230002

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230002</b>	GT42 probe	0,63	Vacuum	IP65	Radial	2

**Miniature GT43 probe,  $\pm 1$  mm, 2,1 mm bolt travel, axial cable**

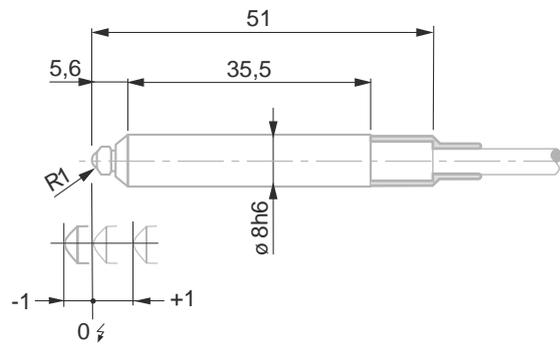

03230035

Standard	DIN 32876
Measuring range	$\pm 1$ mm
Bolt travel	2,1 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,15 $\mu$ m
Max. perm. errors	L in mm 0,2 + 5 x (L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 2 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,0 mm Not adjustable: lower: -1,05 mm, upper +1,05 mm
Coefficient of linear expansion	0,1 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2 Insert with ball tip: $\varnothing$ 2 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230035

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230035</b>	GT43 probe	0,4	Mechanical	IP65	Axial	2
<b>03290151</b>	10x GT43 probe	0,4	Mechanical	IP65	Axial	2

**Miniature GT44 probe,  $\pm 1$  mm, 2,1 mm bolt travel, radial cable**

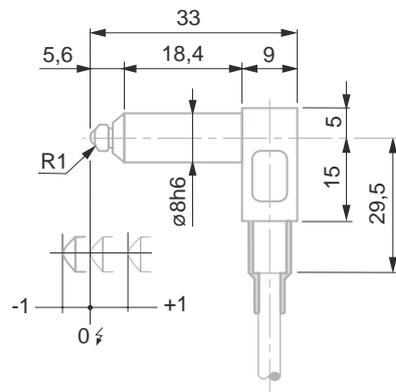

03230017

Standard	DIN 32876
Measuring range	$\pm 1$ mm
Bolt travel	2,1 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,15 $\mu$ m
Max. perm. errors	L in mm 0,2 + 5 x (L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 2 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,0 mm Not adjustable: lower: -1,05 mm, upper +1,05 mm
Coefficient of linear expansion	0,1 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2 Insert with ball tip: $\varnothing$ 2 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm$  25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230017

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230017</b>	GT44 probe	0,4	Vacuum	IP65	Radial	2
<b>03290136</b>	10X GT44 probe	0,4	Vacuum	IP65	Radial	2

***Pneumatic linearised GTL212 probes, ± 1,5 mm, 3,2 mm bolt travel, axial cable***


03230060

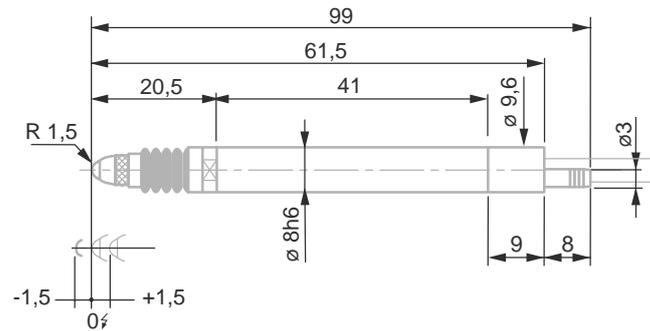


03230067

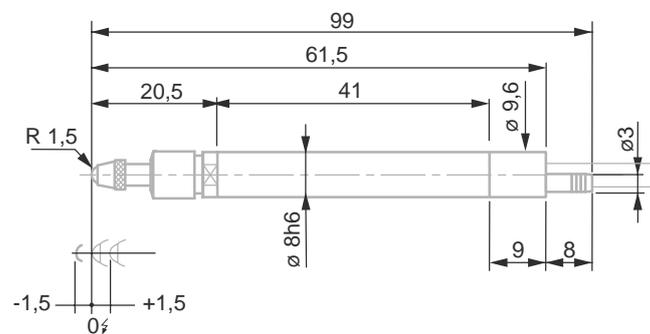
Standard	DIN 32876
Measuring range	± 1,5 mm
Bolt travel	3,2 mm
Repeatability	0,015 µm
Hysteresis	0,02 µm
Max. perm. errors	L in mm 0,2 + 2,4 x (L x L) µm 0,2 + 0,8 x L µm (with TESA interface)
Degree of protection	IP65 or IP50
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230060



03230067

Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230060</b>	GTL212 probe	1,2	Activation: pressure, retraction: spring	0,7	1	IP65	Axial	2
<b>03290157</b>	10x GTL212 probe	1,2	Activation: pressure, retraction: spring	0,7	1	IP65	Axial	2
<b>03230067</b>	GTL212-A probe	0,2	Activation: pressure, retraction: spring	0,25	6	IP50	Axial	2
<b>03290170</b>	10x GTL212-A probe	0,2	Activation: pressure, retraction: spring	0,25	6	IP50	Axial	2

***Pneumatic linearised GTL222 probes, ± 1,5 mm, 3,2 mm bolt travel, radial cable***


03230054

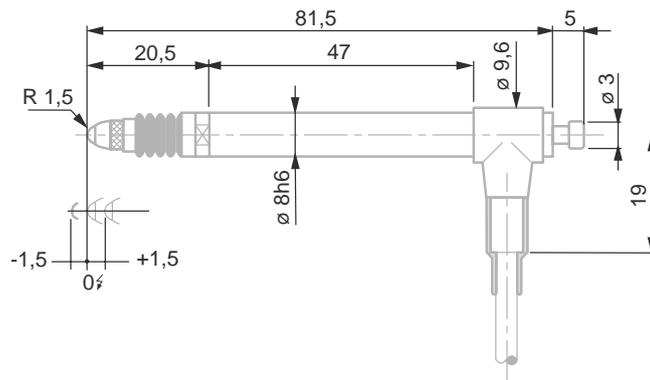


03230063

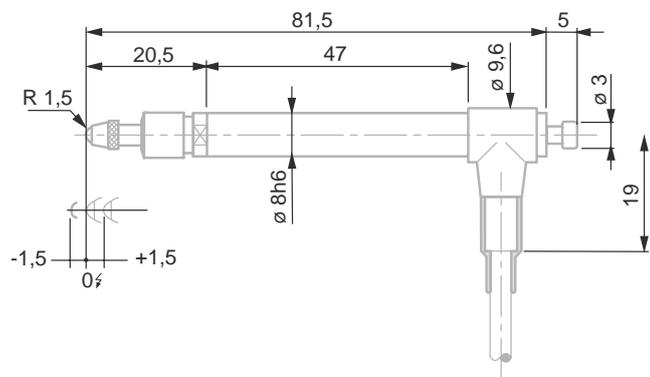
Standard	DIN 32876
Measuring range	± 1,5 mm
Bolt travel	3,2 mm
Repeatability	0,015 µm
Hysteresis	0,02 µm
Max. perm. errors	L in mm 0,2 + 2,4 x (L x L) µm 0,2 + 0,8 x L µm (with TESA interface)
Degree of protection	IP65 or IP50
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Hose clamp Wrench Measurement report User manual Declaration of conformity

Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230054



03230063

Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure, bar	Degree of protection	Cable orientation	Cable length, m
<b>03230054</b>	GTL222 probe	1,2	Activation: pressure, retraction: spring	0,7	1	IP65	Radial	2
<b>03290140</b>	10x GTL222 probe	1,2	Activation: pressure, retraction: spring	0,7	1	IP65	Radial	2
<b>03230063</b>	GTL222-A probe	0,2	Activation: pressure, retraction: spring	0,25	6	IP50	Radial	2
<b>03290171</b>	10x GTL222-A probe	0,2	Activation: pressure, retraction: spring	0,25	6	IP50	Radial	2

**Pneumatic GT272 probes,  $\pm 2$  mm, 10,3 mm bolt travel, axial cable**



03230061

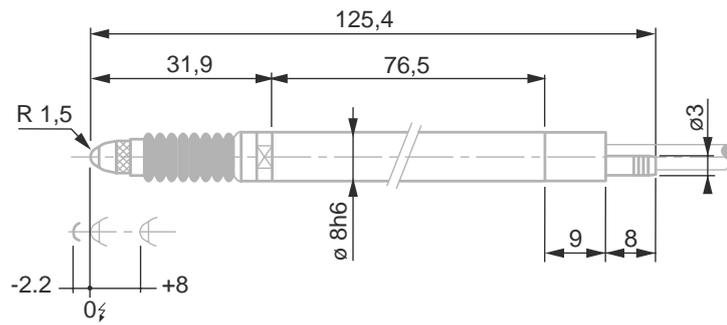


03230068

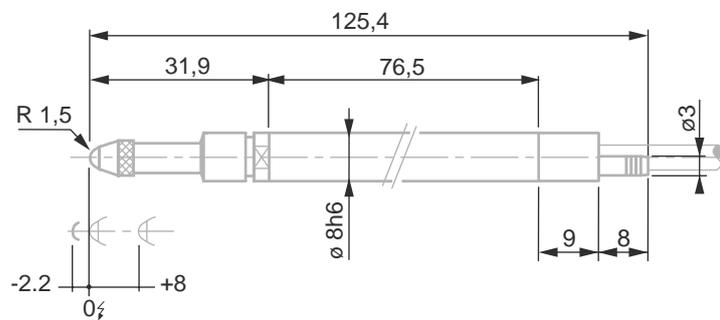
Standard	DIN 32876
Measuring range	$\pm 2$ mm
Bolt travel	10,3 mm
Repeatability	0,05 $\mu$ m
Hysteresis	0,05 $\mu$ m
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) $\mu$ m
Degree of protection	IP65 or IP50
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Coefficient of linear expansion	0,15 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Measuring force: at electrical zero, limit deviation  $\pm 25\%$ , valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230061



03230068

Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure, bar	Degree of protection	Cable orientation	Cable length, m
<b>03230061</b>	GT272 probe	1	Activation: pressure, retraction: spring	1,1	1,5	IP65	Axial	2
<b>03290158</b>	10x GT272 probe	1	Activation: pressure, retraction: spring	1,1	1,5	IP65	Axial	2
<b>03230068</b>	GT272-A probe	0,85	Activation: pressure, retraction: spring	1	6	IP50	Axial	2
<b>03290172</b>	10x GT272-A probe	0,85	Activation: pressure, retraction: spring	1	6	IP50	Axial	2

***Pneumatic GT282 probes, ± 2 mm, 10,3 mm bolt travel, radial cable***


03230053

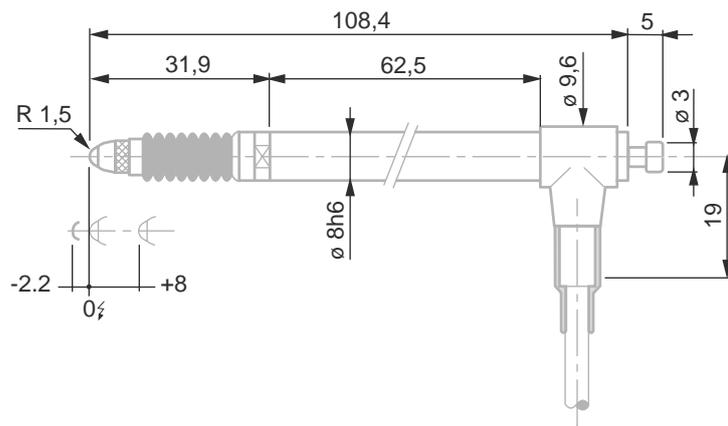


03230069

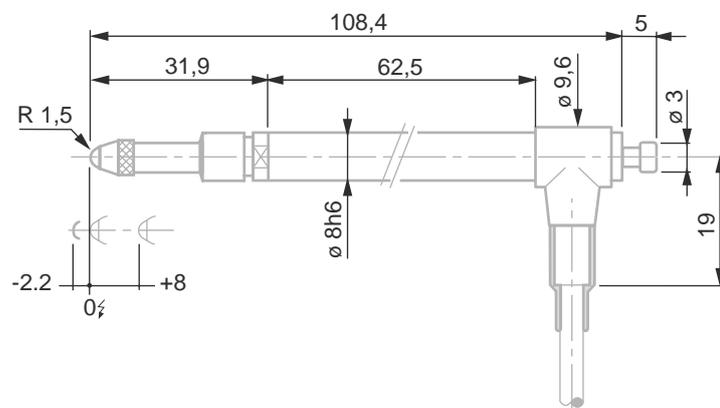
Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	10,3 mm
Repeatability	0,05 µm
Hysteresis	0,05 µm
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) µm
Degree of protection	IP65 or IP50
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,15 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230053



03230069

Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230053</b>	GT282 probe	1	Activation: pressure, retraction: spring	1,1	1,5	IP65	Radial	2
<b>03290141</b>	10x GT282 probe	1	Activation: pressure, retraction: spring	1,1	1,5	IP65	Radial	2
<b>03230069</b>	GT282-A probe	0,85	Activation: pressure, retraction: spring	1	6	IP50	Radial	2
<b>03290173</b>	10x GT282-A probe	0,85	Activation: pressure, retraction: spring	1	6	IP50	Radial	2

**Pneumatic GT612 probes, ± 5 mm, 10,3 mm bolt travel, axial cable**



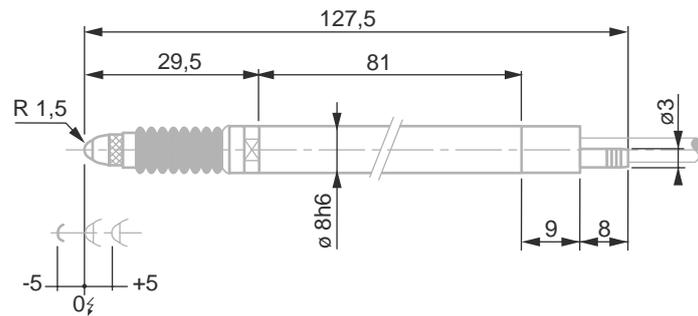
03230062



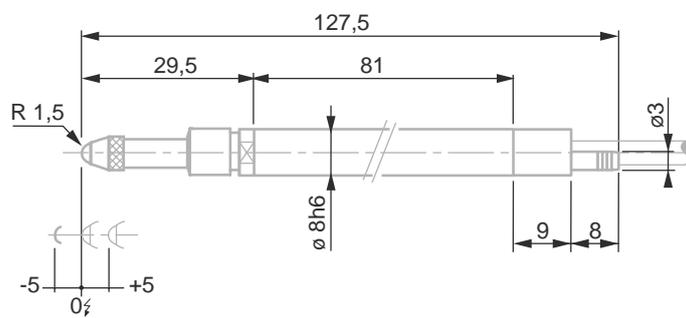
03230070

Standard	DIN 32876
Measuring range	± 5 mm
Bolt travel	10,3 mm
Repeatability	0,05 µm
Hysteresis	0,05 µm
Max. perm. errors	L in mm 1 + 4 x L µm 0,6 + 0,8 x L µm (with TESA interface)
Degree of protection	IP65 or IP50
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,09 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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## Standard axial probes



03230062



03230070

Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230062</b>	GT612 probe	2	Activation: pressure, retraction: spring	1,1	1,5	IP65	Axial	2
<b>03290159</b>	10x GT612 probe	2	Activation: pressure, retraction: spring	1,1	1,5	IP65	Axial	2
<b>03230070</b>	GT612-A probe	1	Activation: pressure, retraction: spring	1	6	IP50	Axial	2
<b>03290174</b>	10x GT612-A probe	1	Activation: pressure, retraction: spring	1	6	IP50	Axial	2

***Pneumatic GT622 probes, ± 5 mm, 10,3 mm bolt travel, radial cable***


03230055

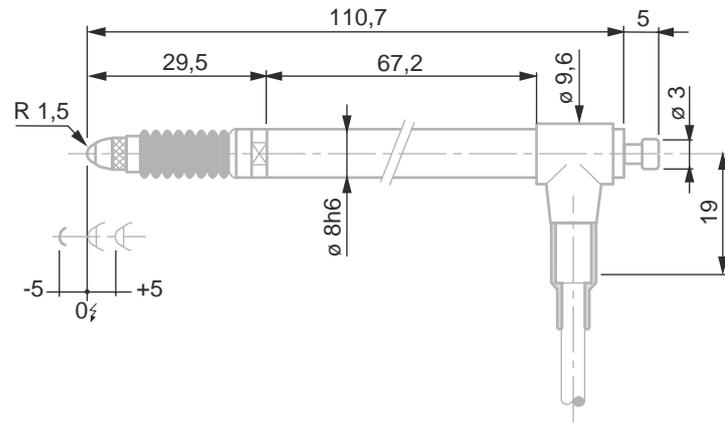


03230071

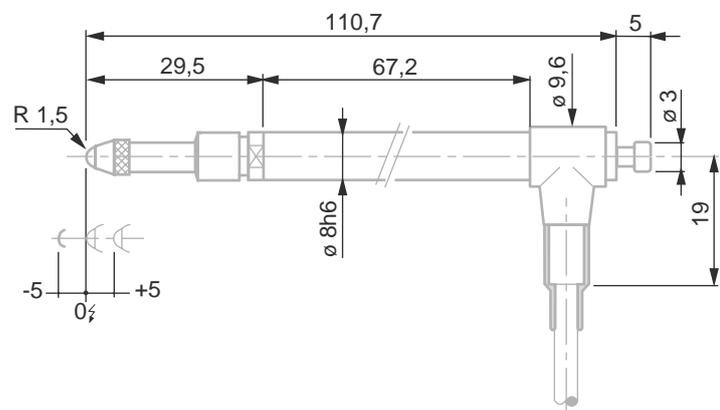
Standard	DIN 32876
Measuring range	± 5 mm
Bolt travel	10,3 mm
Repeatability	0,05 µm
Hysteresis	0,05 µm
Max. perm. errors	L in mm 1 + 4 x L µm 0,6 + 0,8 x L µm (with TESA interface)
Degree of protection	IP65 or IP50
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,09 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
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Measuring force: at electrical zero, limit deviation ± 25%, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



03230055



03230071

Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230055</b>	GT622 probe	2	Activation: pressure, retraction: spring	1,1	1,5	IP65	Radial	2
<b>03290142</b>	10x GT622 probe	2	Activation: pressure, retraction: spring	1,1	1,5	IP65	Radial	2
<b>03230071</b>	GT622-A probe	1	Activation: pressure, retraction: spring	1	6	IP50	Radial	2
<b>03290175</b>	10x GT622-A probe	1	Activation: pressure, retraction: spring	1	6	IP50	Radial	2

**Unbranded probe,  $\pm 1$  mm, 2,5 mm bolt travel, axial and radial cable**



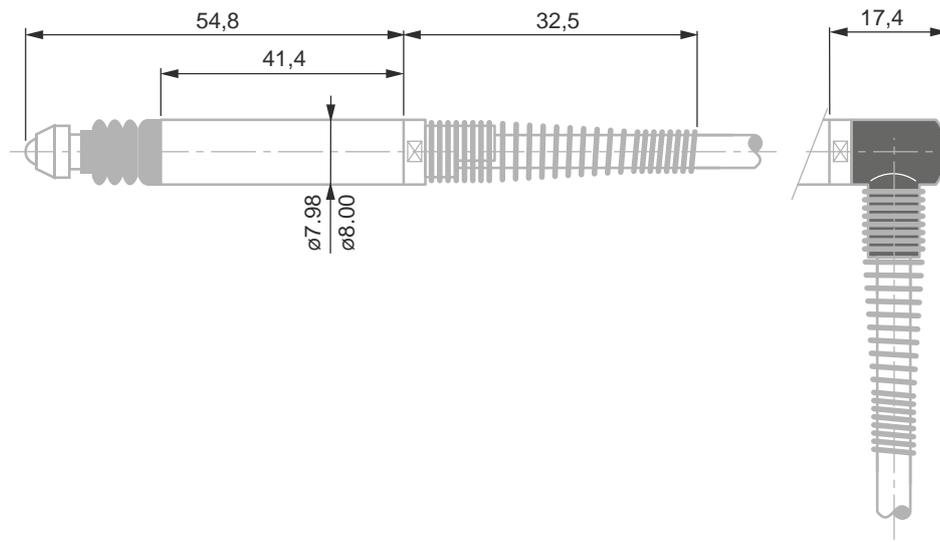
96410012

Standard	DIN 32876
Measuring range	$\pm 1$ mm
Bolt travel	2,5 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,02 $\mu$ m
Max. perm. errors	0,2 % (for a measuring range of $\pm 1$ mm)
Degree of protection	IP65
Weight	Mobile weight: 3,1 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,08 mm Adjustable: -1,2 $\div$ 0,0 mm
Coefficient of linear expansion	0,025 $\mu$ m/°C
Material	Fixing shank: chrome plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation  $\pm 0,15$  N, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



96410012

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>96410012</b>	Unbranded probe	0,6	Mechanical	IP65	Axial and radial	2

**Unbranded probe,  $\pm 1$  mm, 3,3 mm bolt travel, axial cable**

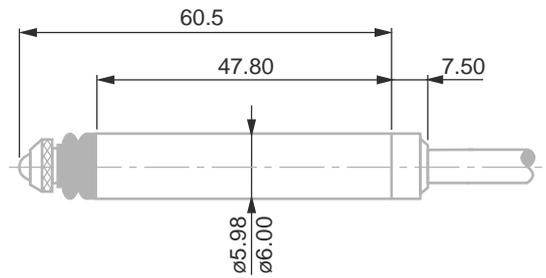

96160013

Standard	DIN 32876
Measuring range	$\pm 1$ mm
Bolt travel	3,3 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,02 $\mu$ m
Max. perm. errors	0,2 % (for a measuring range of $\pm 1$ mm)
Degree of protection	IP65
Weight	Mobile weight: 2,5 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,08 mm Adjustable: -1,2 $\div$ 0,0 mm
Coefficient of linear expansion	0,025 $\mu$ m/°C
Material	Fixing shank: chrome plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 6 mm Insert thread: M2 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 0,15$  N, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



96160013

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>96160013</b>	Unbranded probe	0,6	Mechanical	IP65	Axial	2

## **Unbranded miniature probe, $\pm 0,5$ mm, 1,25 mm bolt travel, axial cable**



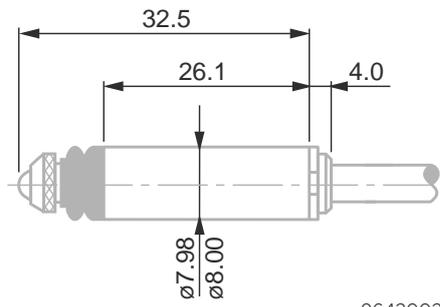
96430029

Standard	DIN 32876
Measuring range	$\pm 0,5$ mm
Bolt travel	1,25 mm
Repeatability	0,2 $\mu$ m
Hysteresis	0,02 $\mu$ m
Max. perm. errors	0,2 % (for a measuring range of $\pm 0,5$ mm)
Degree of protection	IP65
Weight	Mobile weight: 1,9 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -0,58 mm Adjustable: -0,7 $\div$ 0,0 mm
Coefficient of linear expansion	0,025 $\mu$ m/°C
Material	Fixing shank: chrome plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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Free position: corresponds to the distance from the electrical zero

 Measuring force: at electrical zero, limit deviation  $\pm 0,2$  N, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



96430029

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>96430029</b>	Unbranded probe	0,75	Mechanical	IP65	Axial	2

**Unbranded miniature probe,  $\pm 0,5$  mm, 2,1 mm bolt travel, radial cable**



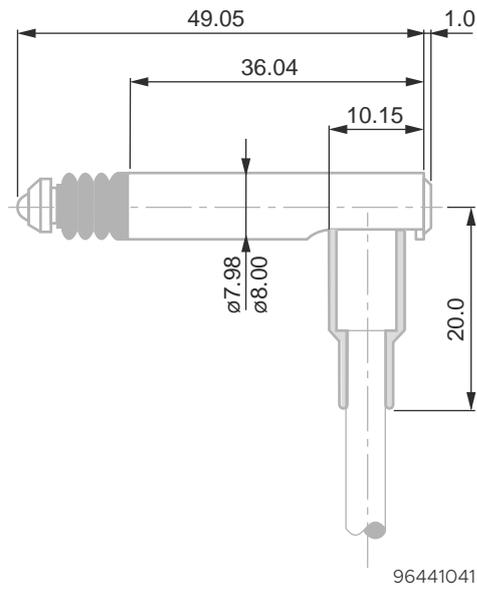
96441041

Standard	DIN 32876
Measuring range	$\pm 0,5$ mm
Bolt travel	2,1 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,02 $\mu$ m
Max. perm. errors	0,2 % (for a measuring range of $\pm 0,5$ mm)
Degree of protection	IP65
Weight	Mobile weight: 3 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -0,58 mm Adjustable: -0,7 $\div$ 0,0 mm
Coefficient of linear expansion	0,025 $\mu$ m/°C
Material	Fixing shank: chrome plated Measuring bolt: stainless steel Protection bellow: Nitrile Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
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Free position: corresponds to the distance from the electrical zero

Measuring force: at electrical zero, limit deviation  $\pm 0,15$  N, valid in vertical position, static measurement, bolt pointing downwards

## Standard axial probes



Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
96441041	Unbranded probe	0,6	Mechanical	IP65	Radial	2

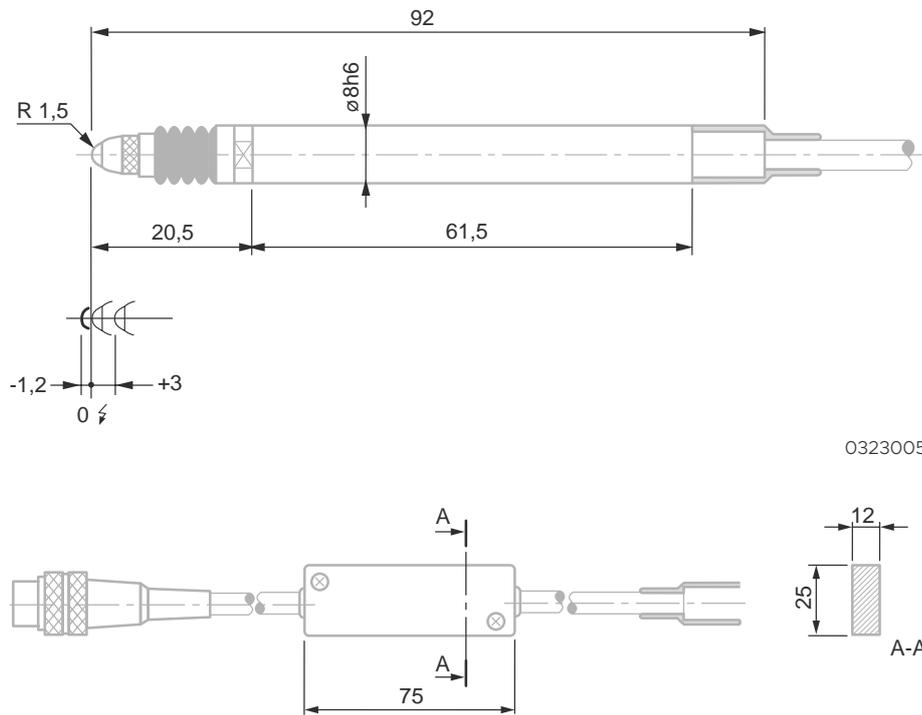
**GTL21 DC probe, ± 2 mm, 4,3 mm bolt travel, axial cable**



03230059

Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	4,3 mm
Repeatability	0,1 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,2 + 3,5 x (L x L) µm
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 ÷ 0,1 mm
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Power supply	Stabilised supply voltage: ± 15 V Consumption: 15 mAh Adjustable load: > 1kΩ Output voltage: ± 2 V
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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# DC axial probes



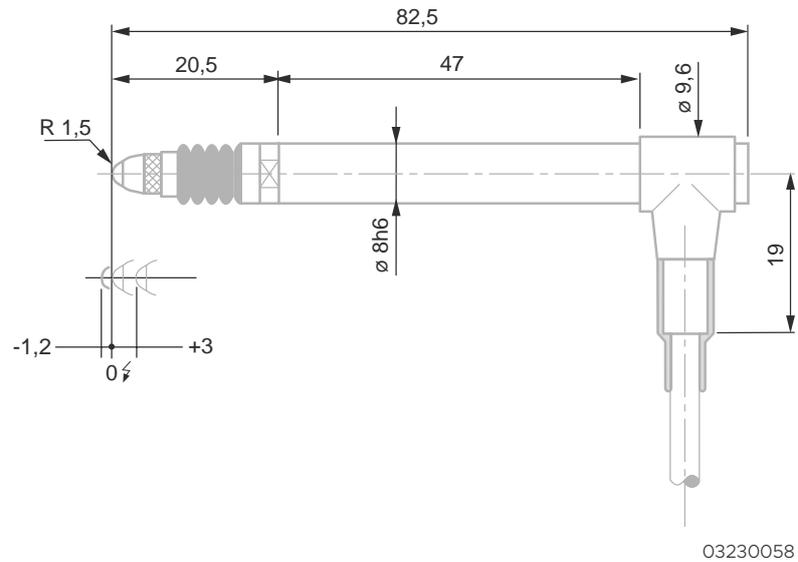
Article number	Designation	Measuring force, N	Bolt retraction	Output voltage, V	Sensitivity V/mm	Degree of protection	Cable orientation	Cable length m
<b>03230059</b>	GTL21 DC probe	0,63	Mechanical	$\pm 2$	1	IP65	Axial	2,2

**DGTL22 DCC probe,  $\pm 2$  mm, 4,3 mm bolt travel, radial cable**

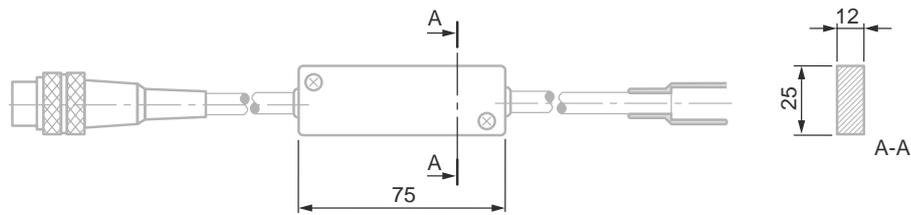

03230058

Standard	DIN 32876
Measuring range	$\pm 2$ mm
Bolt travel	4,3 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,5 $\mu$ m
Max. perm. errors	L in mm 0,2 + 3,5 x (L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\pm$ 0,1 mm
Coefficient of linear expansion	0,2 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Power supply	Stabilised supply voltage: $\pm 15$ V Consumption: 15 mA Adjustable load: > 1k $\Omega$ Output voltage: $\pm 2$ V
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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# DC axial probes



03230058



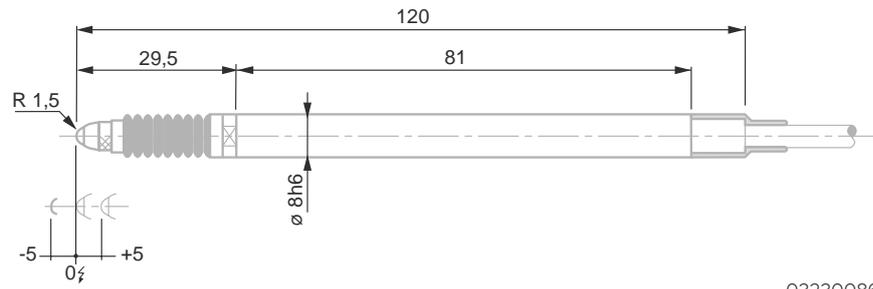
Article number	Designation	Measuring force, N	Bolt retraction	Output voltage, V	Sensitivity V/mm	Degree of protection	Cable orientation	Cable length, m
<b>03230058</b>	GTL21 DC probe	0,63	Mechanical, vacuum	± 2	1	IP65	Radial	2,2

**GT61 DC probe, ± 5 mm, 10,3 mm bolt travel, axial cable**

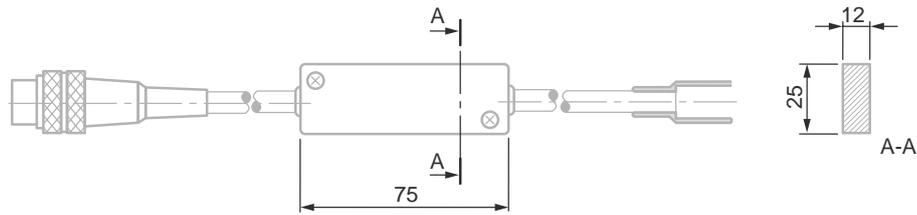

03230086

Standard	DIN 32876
Measuring range	± 5 mm
Bolt travel	10,3 mm
Repeatability	0,1 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 1 + 4 x L µm
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -5 mm Not adjustable: lower: -5,1 mm, upper +5,2 mm
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2 m Connector: 5p DIN45322
Power supply	Stabilised supply voltage: ± 15 V Consumption: 15 mAh Adjustable load: > 1kΩ Output voltage: ± 5 V
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
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## DC axial probes



03230086



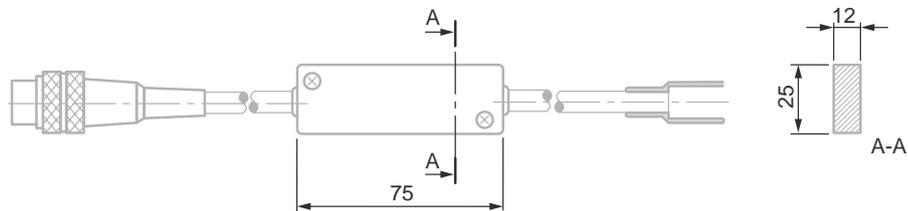
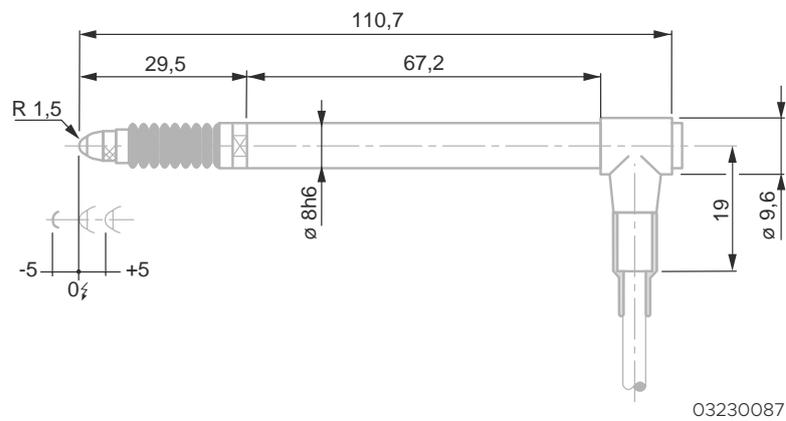
Article number	Designation	Measuring force, N	Bolt retraction	Output voltage, V	Sensitivity V/mm	Degree of protection	Cable orientation	Cable length, m
<b>03230086</b>	GT61 DC probe	0,9	Mechanical	$\pm 5$	1	IP65	Axial	2,2

**GT62 DC probes,  $\pm 5$  mm, 10,3 mm bolt travel, radial cable**


03230087

Standard	DIN 32876
Measuring range	$\pm 5$ mm
Bolt travel	10,3 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,5 $\mu$ m
Max. perm. errors	L in mm 1 + 4 x L $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -5 mm Not adjustable: lower: -5,1 mm, upper +5,2 mm
Coefficient of linear expansion	0,2 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Power supply	Stabilised supply voltage: $\pm 15$ V Consumption: 15 mAh Adjustable load: > 1k $\Omega$ Output voltage: $\pm 5$ V
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

## DC axial probes



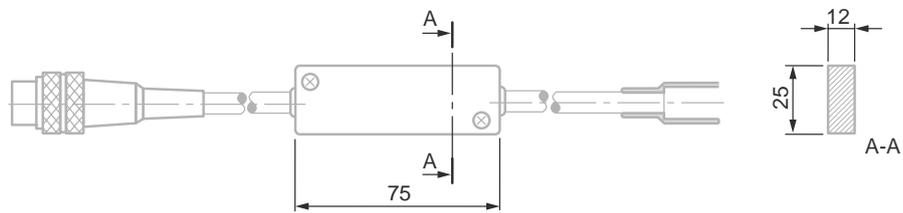
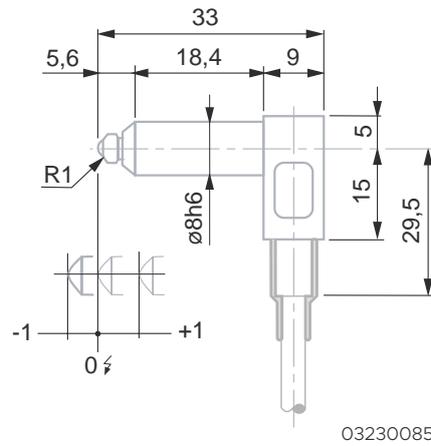
Article number	Designation	Measuring force, N	Bolt retraction	Output voltage, V	Sensitivity V/mm	Degree of protection	Cable orientation	Cable length, m
<b>03230087</b>	GT62 DC probe	0,9	Mechanical, vacuum	± 5	1	IP65	Radial	2,2

**Miniature GT44 DC probe,  $\pm 1$  mm, 2,1 mm bolt travel, radial cable**


03230085

Standard	DIN 32876
Measuring range	$\pm 1$ mm
Bolt travel	0,7 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,5 $\mu$ m
Max. perm. errors	L in mm 0,2 + 5 x (L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 2 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,0 mm Not adjustable: lower: -1,05 mm, upper +1,05 mm
Coefficient of linear expansion	0,1 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2 m Connector: 5p DIN45322
Power supply	Stabilised supply voltage: $\pm 15$ V Consumption: 15 mAh Adjustable load: > 1k $\Omega$ Output voltage: $\pm 1$ V
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

# DC axial probes



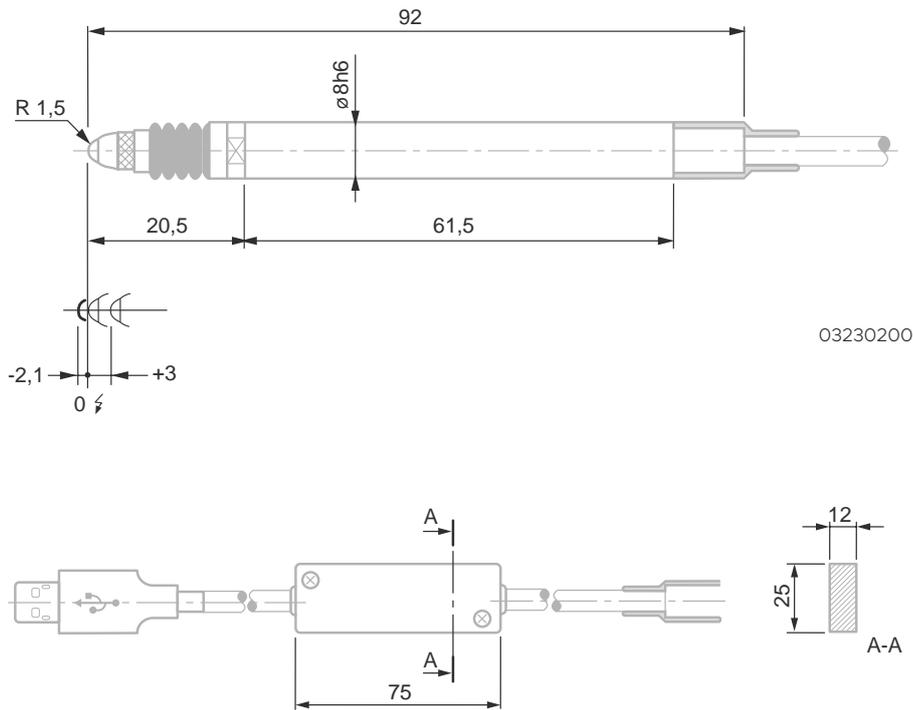
Article number	Designation	Measuring force, N	Bolt retraction	Output voltage, V	Sensitivity V/mm	Degree of protection	Cable orientation	Cable length, m
<b>03230085</b>	GT44 DC probe	0,4	Mechanical, vacuum	± 1	1	IP65	Radial	2,2

**GTL21 USB probe, ± 2 mm, 4,3 mm bolt travel, axial cable**


03230200

Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	4,3 mm
Repeatability	0,1 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,4 + 2,4 x (L x L) µm
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 ÷ 0,1 mm
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

# USB axial probes



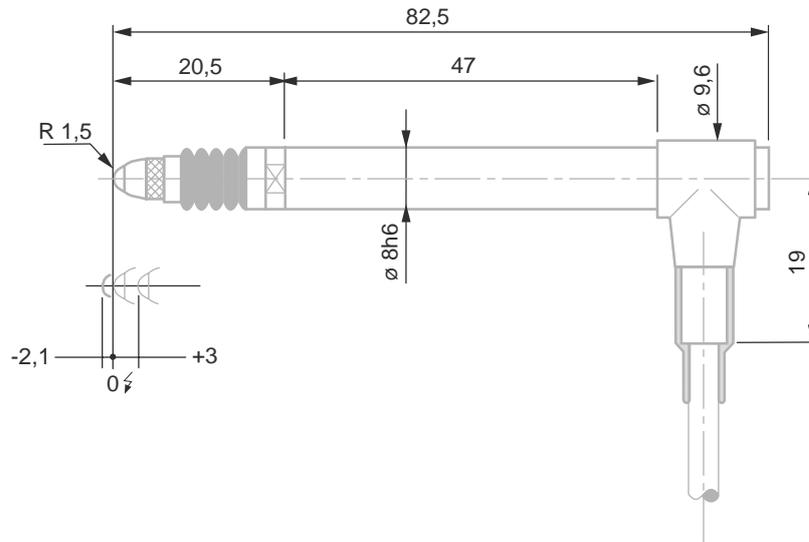
Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
03230200	GTL21 USB probe	0,63	Mechanical	IP65	Axial	2,9

**GTL22 USB probes,  $\pm 2$  mm, 4,3 mm bolt travel, radial cable**

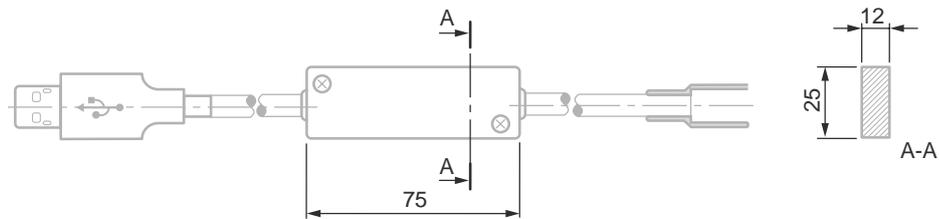

03230201

Standard	DIN 32876
Measuring range	$\pm 2$ mm
Bolt travel	4,3 mm
Repeatability	0,1 $\mu$ m
Hysteresis	0,5 $\mu$ m
Max. perm. errors	L in mm 0,4 + 2,4 x (L x L) $\mu$ m
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C $\pm$ 0,5
Resting position	Factory setting: -1,2 mm Adjustable: -2,2 $\div$ 0,1 mm
Coefficient of linear expansion	0,2 $\mu$ m/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

# USB axial probes



03230201



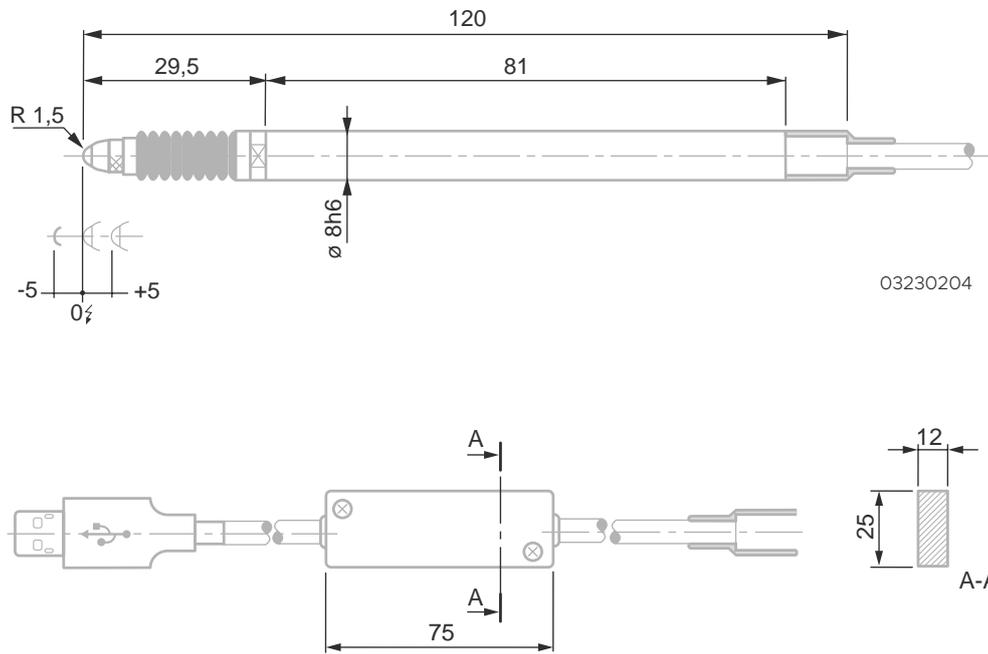
Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230201</b>	GTL22 USB probe	0,63	Mechanical, vacuum	IP65	Radial	2,9

**GT61 USB probe, ± 5 mm, 10,3 mm bolt travel, axial cable**


03230204

Standard	DIN 32876
Measuring range	± 5 mm
Bolt travel	10,3 mm
Repeatability	0,24 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 1 + 4 x L µm
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -5 mm Not adjustable: lower: -5,1 mm, upper +5,2 mm
Coefficient of linear expansion	0,09 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

# USB axial probes



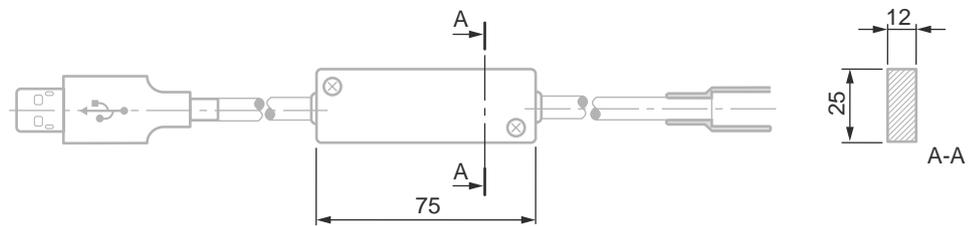
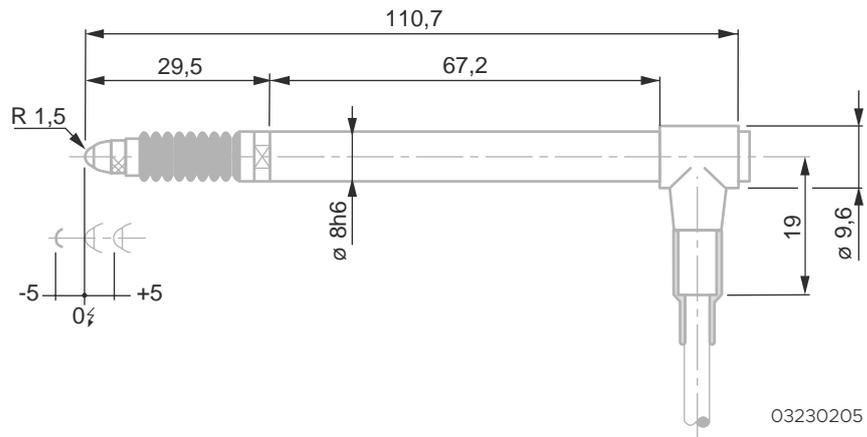
Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230204</b>	GT61 USB probe	0,9	Mechanical	IP65	Axial	2,9

**GT62 USB probe, ± 5 mm, 10,3 mm bolt travel, radial cable**


03230205

Standard	DIN 32876
Measuring range	± 5 mm
Bolt travel	10,3 mm
Repeatability	0,24 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 1 + 4 x L µm
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Resting position	Factory setting: -5 mm Not adjustable: lower: -5,1 mm, upper +5,2 mm
Coefficient of linear expansion	0,09 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

# USB axial probes



Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230205</b>	GT62 USB probe	0,9	Mechanical, vacuum	IP65	Radial	2,9

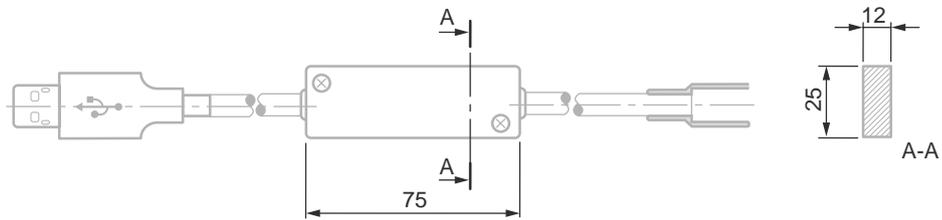
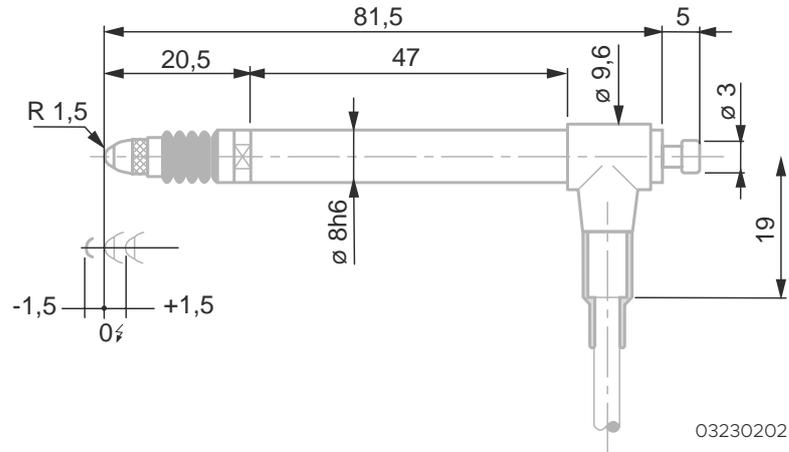
## ***Pneumatic GTL222 USB probe, ± 1,5 mm, 3,1 mm bolt travel, radial cable***



03230202

Standard	DIN 32876
Measuring range	± 1,5 mm
Bolt travel	3,1 mm
Repeatability	0,1 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,4 + 2,4 x (L x L) µm
Degree of protection	IP65
Weight	Mobile weight: 6 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,2 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Hose clamp Wrench Measurement report User manual Declaration of conformity

# USB axial probes



Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230202</b>	GTL222 USB probe	1,2	Activation: pressure, retraction: spring	0,7	1	IP65	Radial	2,9

***Pneumatic GTL272 USB probes, ± 2 mm, 10,3 mm bolt travel, axial cable***

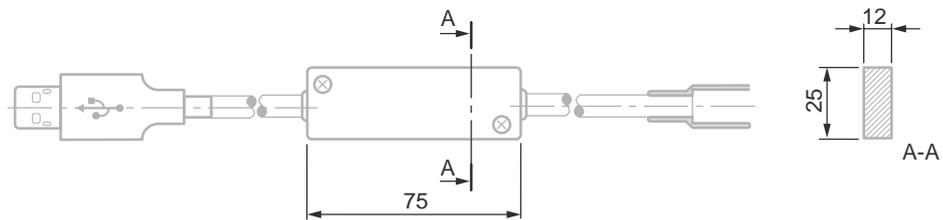
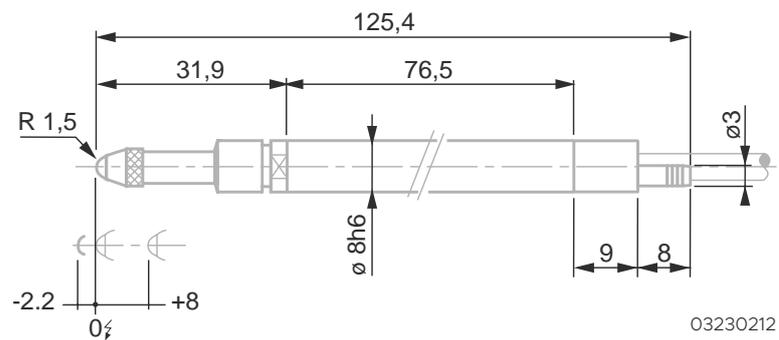
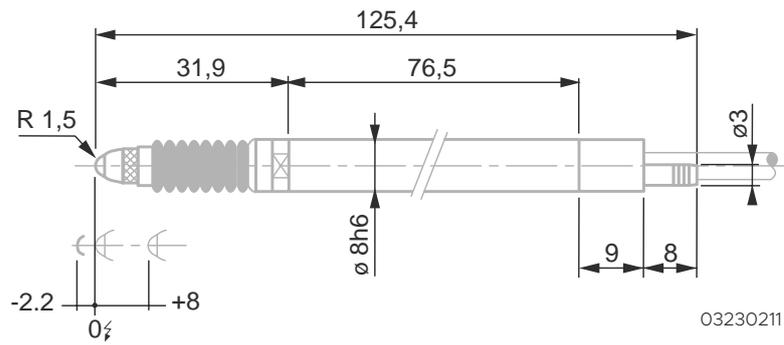

03230211



03230212

Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	10,3 mm
Repeatability	0,01 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,4 + 0,8 x (L x L x L) µm
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,15 µm/°C
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: Ø 8 mm Insert thread: M2,5 Ball insert: Ø 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

## USB axial probes



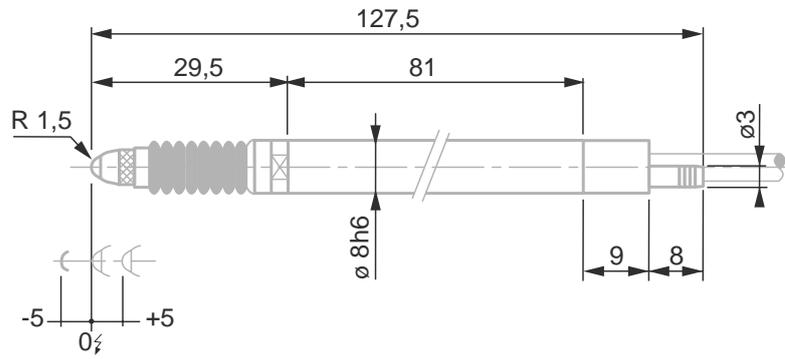
Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure, bar	Degree of protection	Cable orientation	Cable length, m
<b>03230211</b>	GTL272 USB probe	1	Activation: pressure, retraction: spring	1,1	1,5	IP65	Axial	2,9
<b>03230212</b>	GTL272-A USB probe	0,85	Activation: pressure, retraction: spring	1	6	IP65	Axial	2,9

**GT612 USB pneumatic probes,  $\pm 5$  mm, 10,3 mm bolt travel, axial cable**

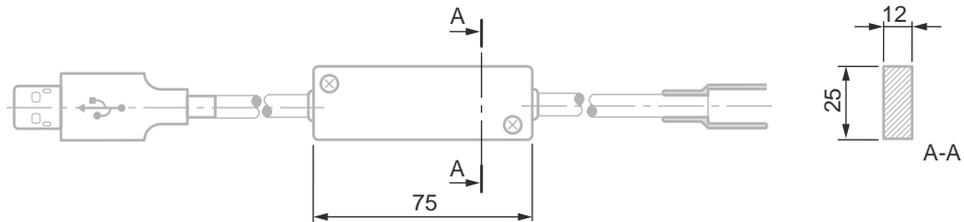

03230210

Standard	DIN 32876
Measuring range	$\pm 5$ mm
Bolt travel	10,3 mm
Repeatability	0,24 $\mu\text{m}$
Hysteresis	0,5 $\mu\text{m}$
Max. perm. errors	L in mm 1 + 4 x L $\mu\text{m}$
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Coefficient of linear expansion	0,09 $\mu\text{m}/^{\circ}\text{C}$
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Wrench Measurement report User manual Declaration of conformity

# USB axial probes



03230210



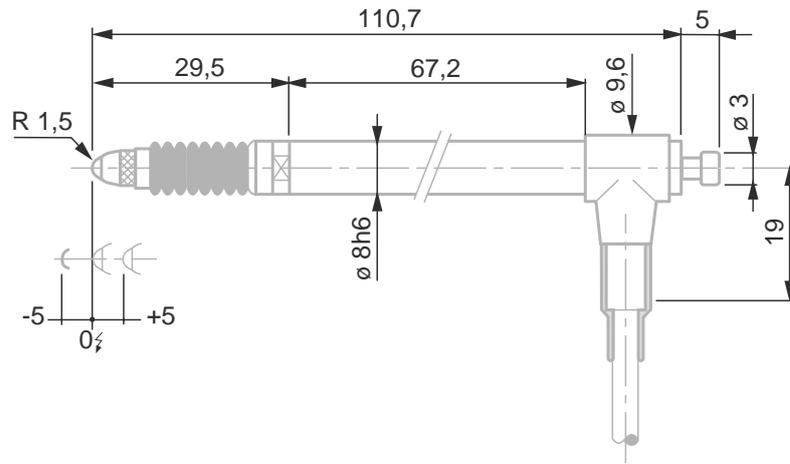
Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230210</b>	GT612 USB probe	2	Activation: pressure, retraction: spring	1,1	1,5	IP65	Axial	2,9

**Pneumatic GT622 USB probe,  $\pm 5$  mm, 10,3 mm bolt travel, radial cable**

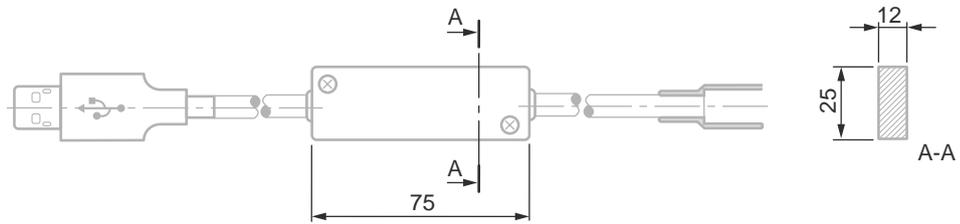

03230206

Standard	DIN 32876
Measuring range	$\pm 5$ mm
Bolt travel	10,3 mm
Repeatability	0,24 $\mu\text{m}$
Hysteresis	0,5 $\mu\text{m}$
Max. perm. errors	L in mm 1 + 4 x L $\mu\text{m}$
Degree of protection	IP65
Weight	Mobile weight: 8 g
Working temperature	20 °C $\pm$ 0,5
Coefficient of linear expansion	0,09 $\mu\text{m}/^\circ\text{C}$
Material	Fixing shank: nickel plated Measuring bolt: stainless steel Protection bellow: Viton® Ball insert: tungsten carbide
Dimensions	Fixing shank: $\varnothing$ 8 mm Insert thread: M2,5 Ball insert: $\varnothing$ 3 mm Cable: 2,9 m Connector: USB A type
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Hose clamp Wrench Measurement report User manual Declaration of conformity

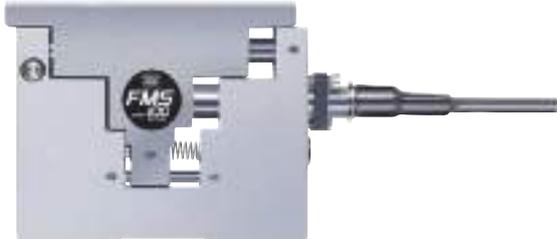
# USB axial probes



03230206



Article number	Designation	Measuring force, N	Bolt retraction	Nominal pressure, bar	Max. pressure bar	Degree of protection	Cable orientation	Cable length, m
<b>03230206</b>	GT622 USB probe	2	Activation: pressure, retraction: spring	1,1	1,5	IP65	Radial	2,9

***FMS100 probes, ± 2 mm, 5,8 mm measuring travel, axial cable***


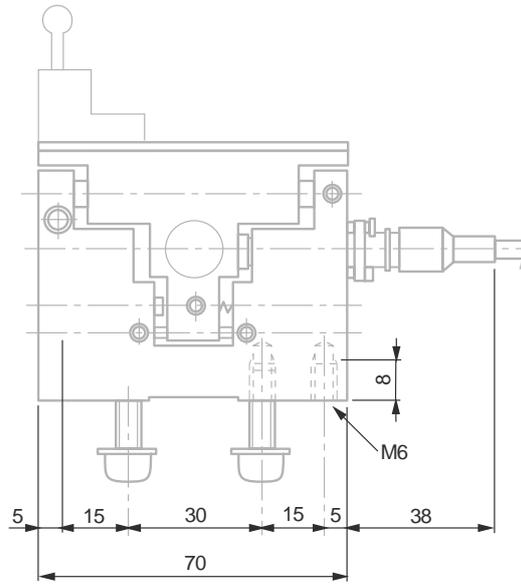
03230019



03230037

Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	5,8 mm
Repeatability	0,5 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) µm
Degree of protection	IP50 or IP54
Weight	Mobile weight: 110 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,14 µm/°C
Material	Probe body: nickel plated steel
Dimensions	Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Allen key 2x M2 x 10 screws 2x M6 x 20 screws 2x M6 washers Measurement report User manual Declaration of conformity

# FMS probes with parallel guiding



03230019

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length, m
<b>03230019</b>	FMS100 probe	2	Retraction by air pressure (optional accessory)	IP50	Axial	2
<b>03230037</b>	FMS100-P probe	2	Retraction by air pressure (optional accessory)	IP54	Axial	2

**FMS102 probes, ± 2 mm, 5,8 mm measuring travel, radial cable**



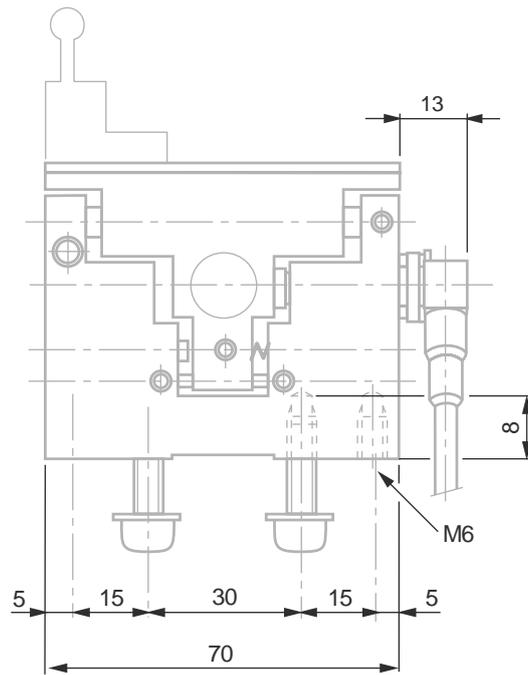
03230028



03230038

Standard	DIN 32876
Measuring range	± 2 mm
Bolt travel	5,8 mm
Repeatability	0,5 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) µm
Degree of protection	IP50 or IP54
Weight	Mobile weight: 110 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,14 µm/°C
Material	Probe body: nickel plated steel
Dimensions	Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Allen key 2x M2 x 10 screws 2x M6 x 20 screws 2x M6 washers Measurement report User manual Declaration of conformity

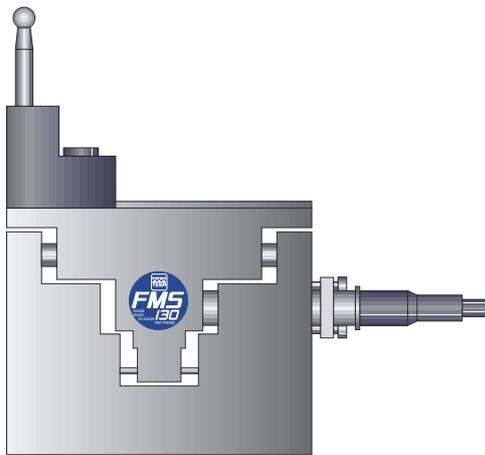
## FMS probes with parallel guiding



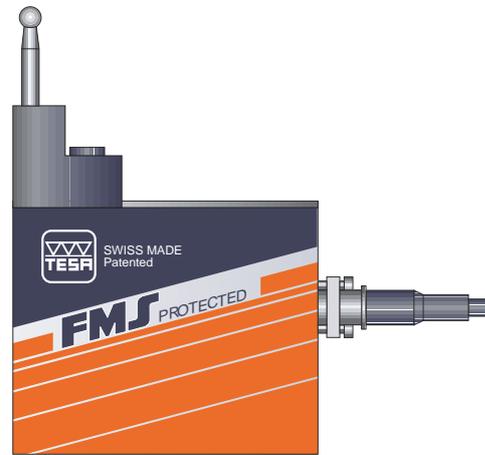
03230028

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length, m
<b>03230028</b>	FMS102 probe	2	Retraction by air pressure (optional accessory)	IP50	Radial	2
<b>03230038</b>	FMS102-P probe	2	Retraction by air pressure (optional accessory)	IP54	Radial	2

**FMS130 probes, ± 2,9 mm, 5,8 mm measuring travel, axial cable**



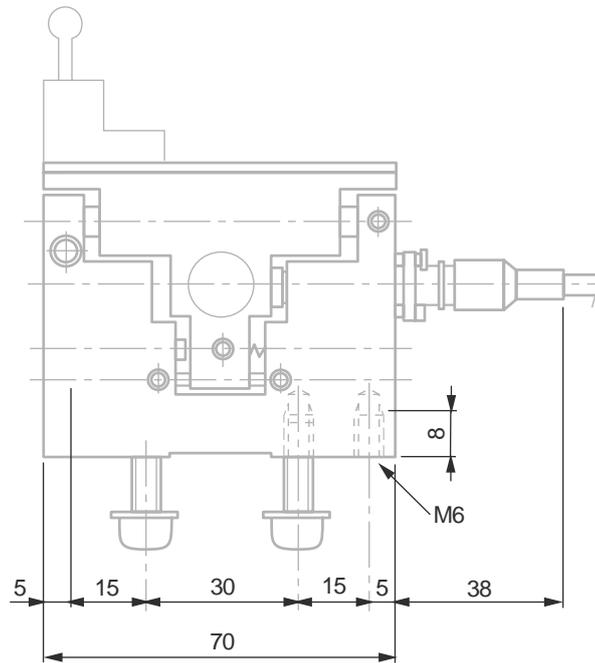
03230049



03230051

Standard	DIN 32876
Measuring range	± 2,9 mm
Bolt travel	5,8 mm
Repeatability	0,5 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) µm
Degree of protection	IP50 or IP54
Weight	Mobile weight: 110 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,14 µm/°C
Material	Probe body: nickel plated steel
Dimensions	Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Allen key 2x M2 x 10 screws 2x M6 x 20 screws 2x M6 washers Measurement report User manual Declaration of conformity

## FMS probes with parallel guiding



03230049

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length, m
<b>03230049</b>	FMS130 probe	2	Retraction by air pressure (optional accessory)	IP50	Axial	2
<b>03230051</b>	FMS130-P probe	2	Retraction by air pressure (optional accessory)	IP54	Axial	2

**FMS132 probes, ± 2,9 mm, 5,8 mm measuring travel, radial cable**



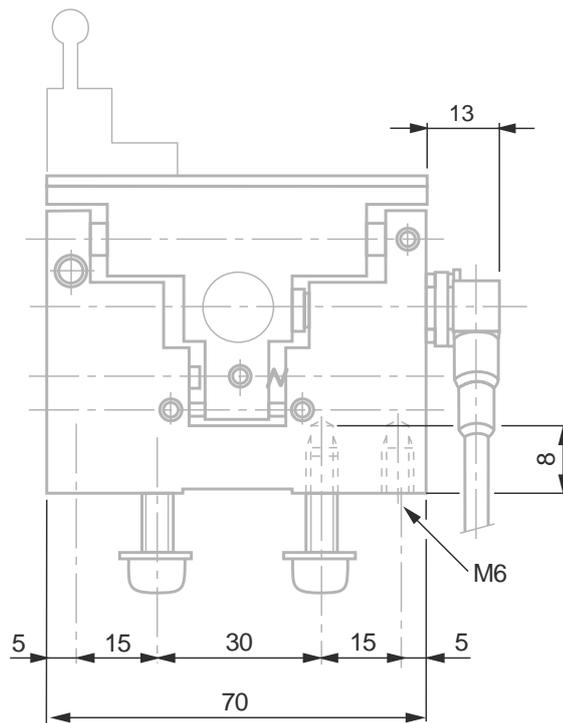
03230050



03230052

Standard	DIN 32876
Measuring range	± 2,9 mm
Bolt travel	5,8 mm
Repeatability	0,5 µm
Hysteresis	0,5 µm
Max. perm. errors	L in mm 0,2 + 3 x (L x L x L) µm
Degree of protection	IP50 or IP54
Weight	Mobile weight: 110 g
Working temperature	20 °C ± 0,5
Coefficient of linear expansion	0,14 µm/°C
Material	Probe body: nickel plated steel
Dimensions	Cable: 2 m Connector: 5p DIN45322
Remark(s)	CAD files available on request Downloadable data sheets on <a href="http://www.TESAtechnology.com">www.TESAtechnology.com</a>
Included in delivery	Probe Allen key 2x M2 x 10 screws 2x M6 x 20 screws 2x M6 washers Measurement report User manual Declaration of conformity

## FMS probes with parallel guiding

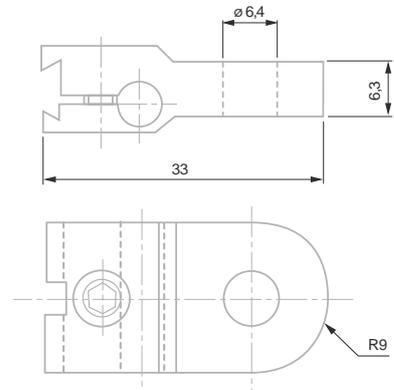


03230050 and 03230052

Article number	Designation	Measuring force, N	Bolt retraction	Degree of protection	Cable orientation	Cable length m
<b>03230050</b>	FMS132 probe	2	Retraction by air pressure (optional accessory)	IP50	Radial	2
<b>03230052</b>	FMS132-P probe	2	Retraction by air pressure (optional accessory)	IP54	Radial	2

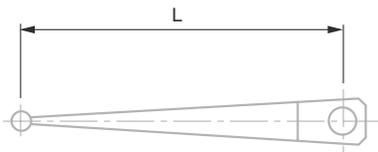
### Fixing clamp

Article number	Designation	Particular characteristic(s)
03240100	Fixing bracket	With dovetail and cylindrical bore

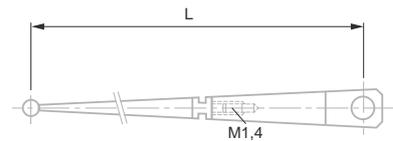


### Ball tip inserts

Article number	Designation	Probe length mm	Diameter mm	Particular characteristic(s)
03260402	Ball insert	32	1	One-piece shaft
03260410	Ball insert	32	2	One-piece shaft
03260403	Ball insert	32	3	One-piece shaft
03590002	Ball insert	32	1	Two-piece shaft
03590003	Ball insert	32	2	Two-piece shaft
03590004	Ball insert	32	3	Two-piece shaft
03590005	Ball insert	32	4	Two-piece shaft
03590007	Ball insert	72	2	Two-piece shaft



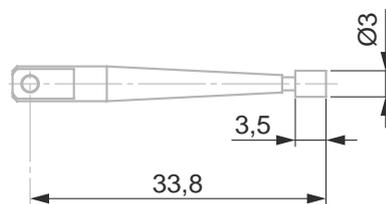
1-piece insert



2-pieces insert

### Cylindrical insert

Article number	Designation	Probe length mm	Diameter mm
03260510	Cylindrical-shaped insert	32	$\varnothing 3 \times 3,5$



## Other accessories for axial probes

### Protection bellows for measuring probes

Article number	Designation	Particular characteristic(s)
<b>03260468</b>	Nitrile bellow, 4,3 mm travel	For GT21, GT22
<b>03260470</b>	Viton® bellow, 4,3 mm travel	For GTL21, GTL211, GTL22
<b>03260489</b>	Viton® bellow for pressure probe, 4,3 mm travel	For GTL212, GTL222
<b>03260491</b>	Viton® bellow, 10,3 mm travel	For GT27, GT271, GT28, GT61, GT611, GT62
<b>03260490</b>	Viton® bellow for pressure probe, 10,3 mm travel	For GT272, GT282, GT612, GT622



03260468



03260470



03260489

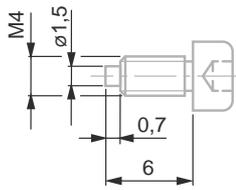
### Spring sets for measuring probes

Article number	Designation	Measuring force N	Particular characteristic(s)
<b>03260419</b>	Spring sets	0,16	For GT22
<b>03260420</b>	Spring sets	0,25	For GT22
<b>03260421</b>	Spring sets	0,4	For GT22
<b>03260457</b>	Spring sets	0,63	For GT21, GT22
<b>03260422</b>	Spring sets	1	For GT21, GT22
<b>03260423</b>	Spring sets	1,6	For GT21, GT22
<b>03260424</b>	Spring sets	2,5	For GT21, GT22
<b>03260425</b>	Spring sets	4	For GT21, GT22
<b>03260458</b>	Spring sets	0,63	For GT27, GT28
<b>03260464</b>	Spring sets	1,6	For GT61, GT62

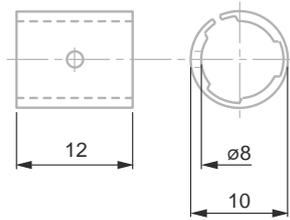


### Clamping elements for measuring probes

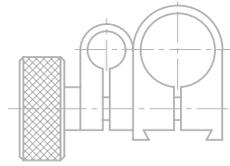
Article number	Designation	Diameter mm
<b>02611013</b>	VKD clamping screw	M4
<b>02611014</b>	VKE clamping sleeve, Ø 8 mm	8
<b>01860401</b>	Dovetail clamp with dovetail clamp, clamping Ø 5,6 and Ø 9,5 mm	5,6 / 9,5
<b>02660048</b>	VDE probe holder, Ø 8 mm, L = 28 mm	8



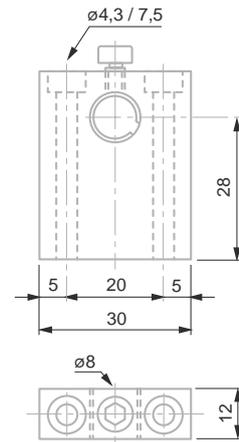
02611013



02611014



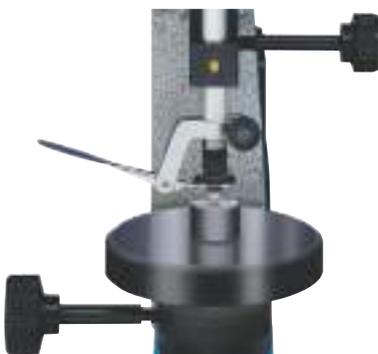
01860401



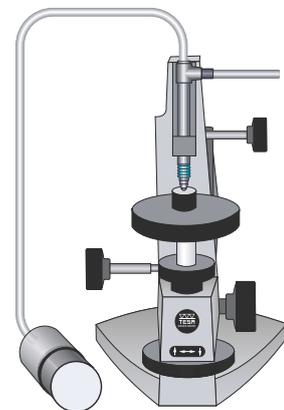
02660048

### Manual measuring bolt retraction

Numéro d'article	Designation	Composed of
<b>03540104</b>	Device for mechanical plunger retraction	1x washer TB102 1x lifting lever TB101
<b>03260401</b>	Pneumatic retraction of the measuring bolt, manually operated	1x manual vacuum pump 1x 1m tube, Ø 4,7 mm



03540104

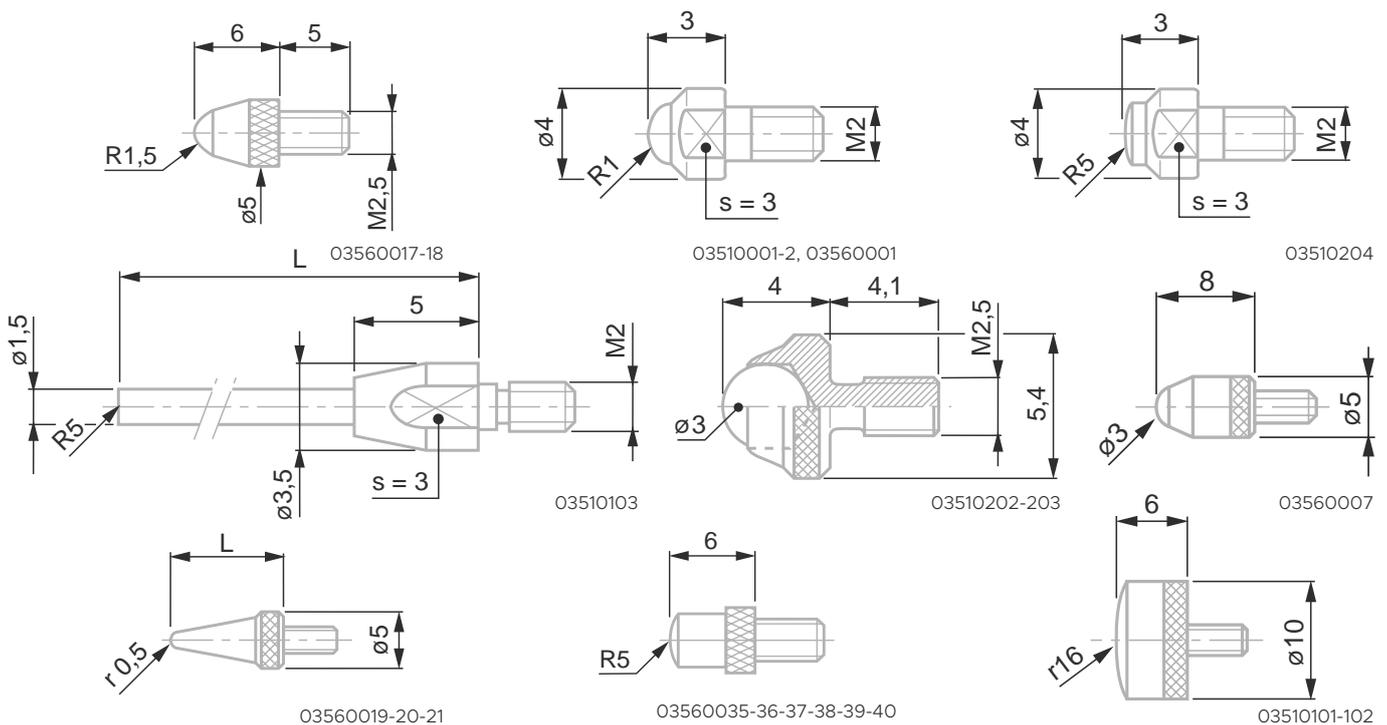


03260401

## Inserts for axial probes

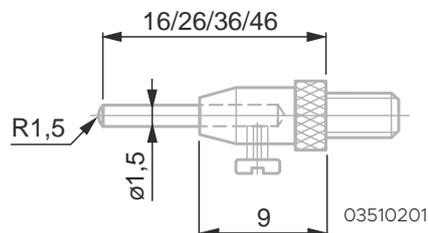
### Hemispherical inserts

Article number	Designation	Fixing mm	Radius mm	Probe length mm	Diameter mm	Material
03510103	Hemispherical insert	M2	1	3	4	Tungsten carbide
03510204	Hemispherical insert	M2	1	3	4	Tungsten carbide
03510202	Hemispherical insert	M2	5	16	1,5	Tungsten carbide
03510203	Hemispherical insert	M2	5	26	1,5	Tungsten carbide
03560035	Hemispherical insert	M2,5	0,5	5	5	Steel
03560036	Hemispherical insert	M2,5	0,5	5	5	Steel
03560037	Hemispherical insert	M2,5	0,5	15	5	Steel
03560038	Hemispherical insert	M2,5	0,5	20	5	Steel
03560039	Hemispherical insert	M2,5	0,5	30	5	Steel
03560040	Hemispherical insert	M2,5	0,5	40	5	Steel
03560007	Hemispherical insert	M2,5	1,5	4	5,4	Tungsten carbide
03510001	Hemispherical insert	M2,5	1,5	6	5	Steel
03510002	Hemispherical insert	M2,5	1,5	6	5	Tungsten carbide
03560001	Hemispherical insert	M2,5	1,5	6	5	Sapphire
03560019	Hemispherical insert	M2,5	1,5	8	8	Steel
03560020	Hemispherical insert	M2,5	1,5	8	8	Tungsten carbide
03560021	Hemispherical insert	M2,5	1,5	8	8	Ruby
03510101	Hemispherical insert	M2,5	5	6	5	Steel
03510102	Hemispherical insert	M2,5	5	6	5	Tungsten carbide
03560017	Hemispherical insert	M2,5	16	6	10	Steel
03560018	Hemispherical insert	M2,5	16	6	10	Tungsten carbide



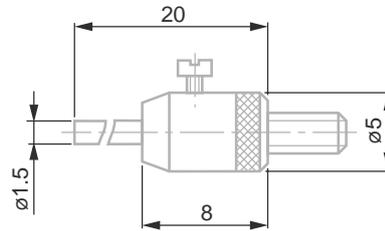
### Hemispherical measuring insert with 4 interchangeable pins

Article number	Designation	Fixing mm	Measuring face(s)	Probe length mm	Diameter mm	Material
03510201	Hemispherical insert with interchangeable pins	M2,5	R1,5	16, 26, 36, 46	1,5	Steel



### Inserts with flat measuring face and interchangeable pins

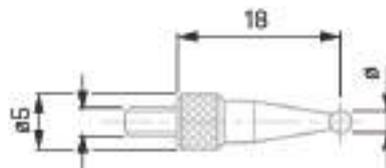
Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
<b>03560008</b>	Insert with exchangeable contact pin	M2,5	20	1,5	Steel	Flat measuring face
<b>03560009</b>	Insert with exchangeable contact pin	M2,5	20	1,5	Tungsten carbide	Flat measuring face



03560008

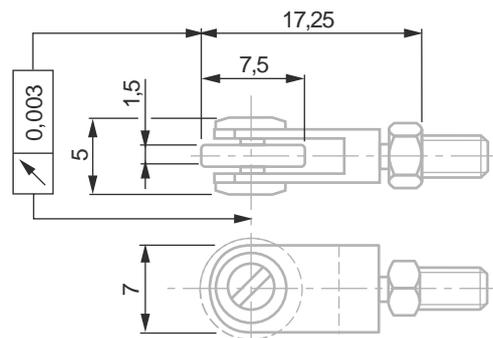
### Ball tip inserts

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
<b>03560051</b>	Ball insert	M2,5	18	1	Tungsten carbide
<b>03560052</b>	Ball insert	M2,5	18	2	Tungsten carbide
<b>03560053</b>	Ball insert	M2,5	18	3	Tungsten carbide
<b>03560054</b>	Ball insert	M2,5	18	4	Tungsten carbide
<b>03560055</b>	Ball insert	M2,5	18	5	Tungsten carbide
<b>03560056</b>	Ball insert	M2,5	18	6	Tungsten carbide
<b>03560057</b>	Ball insert	M2,5	18	7	Tungsten carbide
<b>03560058</b>	Ball insert	M2,5	18	8	Tungsten carbide



### Inserts with rollers

Article number	Designation	Fixing mm	Probe length, mm	Material	Particular characteristic(s)
<b>03560010</b>	Insert with ball-bearing roller	M2,5	17,25	Steel	Cylindrical shape Locknut for radial alignment
<b>03560011</b>	Insert with ball-bearing roller	M2,5	17,25	Steel	Domed shape Locknut for radial alignment

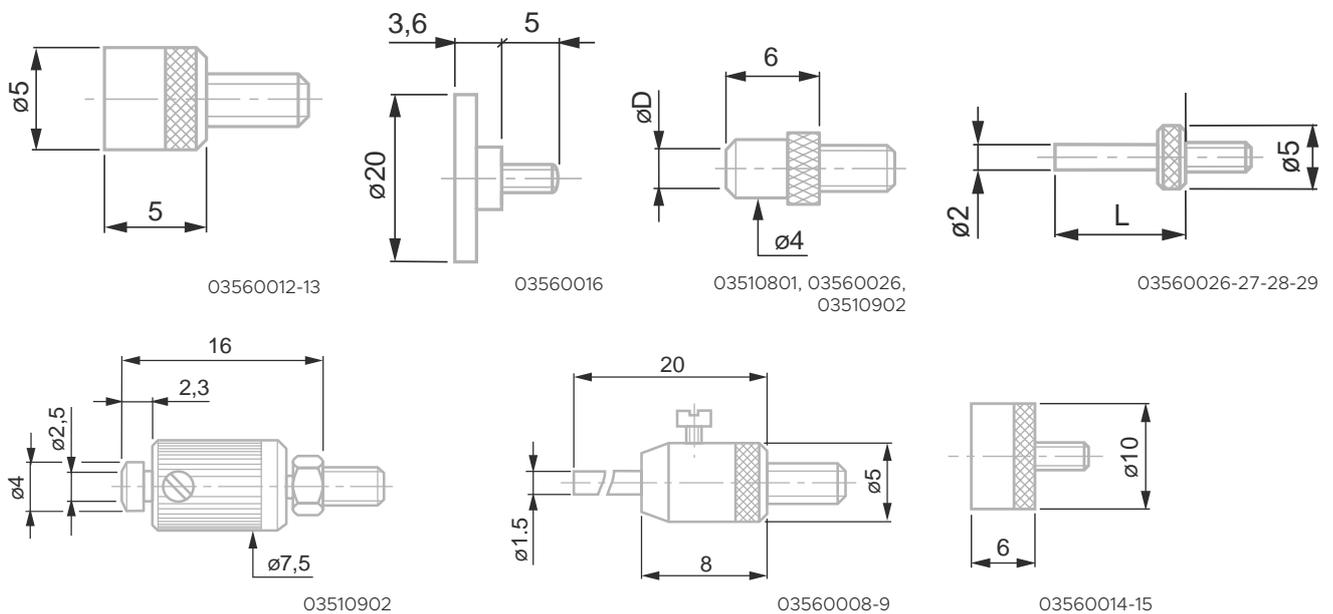


03560010

## Inserts for axial probes

### Inserts with flat measuring face

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
03560026	Insert with a flat measuring face	M2,5	2,8	2	Steel
03560027	Insert with a flat measuring face	M2,5	7,8	2	Steel
03560028	Insert with a flat measuring face	M2,5	12,8	2	Steel
03560029	Insert with a flat measuring face	M2,5	17,8	2	Steel
03510801	Insert with a flat measuring face	M2,5	6	2,5	Steel
03510802	Insert with a flat measuring face	M2,5	6	2,5	Tungsten carbide
03560022	Insert with a flat measuring face	M2,5	6	3,4	Steel
03560023	Insert with a flat measuring face	M2,5	6	3,4	Tungsten carbide
03560012	Insert with a flat measuring face	M2,5	5	5	Steel
03560013	Insert with a flat measuring face	M2,5	5	5	Tungsten carbide
03560014	Insert with a flat measuring face	M2,5	6	10	Steel
03560015	Insert with a flat measuring face	M2,5	6	10	Tungsten carbide
03560016	Insert with a flat measuring face	M2,5	3,6	20	Steel



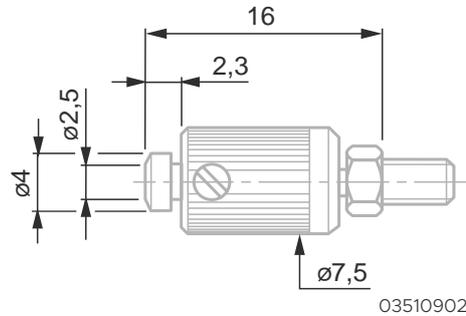
### Cylindrical inserts

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
03510502	Insert with cylindrical face	M2,5	6	Ø 2 x 3,3	Tungsten carbide	Lock nut for radial alignment
03510503	Insert with cylindrical face	M2	6	Ø 2 x 2,5	Tungsten carbide	Lock nut for radial alignment



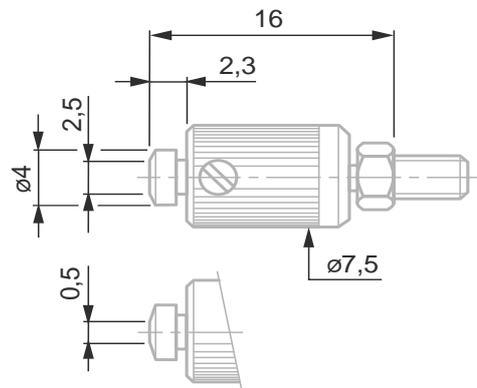
### Insert with a flat measuring face, parallelism adjustable

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
<b>03510902</b>	Insert with a flat measuring face	M2,5	16	4	Tungsten carbide	Flat face Locknut for radial alignment



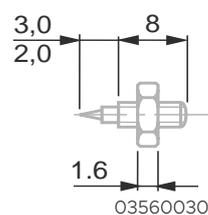
### Narrow insert with adjustable parallelism

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
<b>03510702</b>	Insert with adjustable parallelism	M2,5	16	4	Tungsten carbide	Narrow face Locknut for radial alignment



### Needle insert

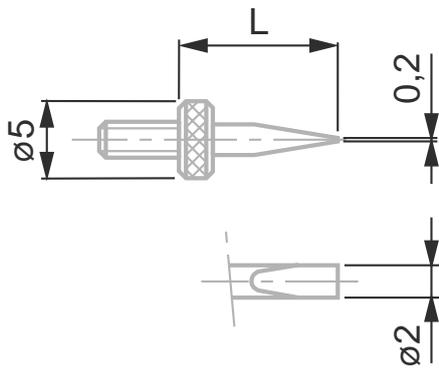
Article number	Designation	Fixing mm	Probe length mm	Material
<b>03560030</b>	Needle insert, steel, $\varnothing$ 0,6 x 2,5 mm	M2,5	7	Steel



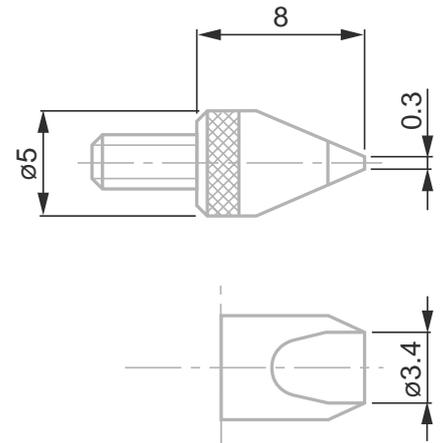
## Inserts for axial probes

### Inserts with knife blade shape

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Particular characteristic(s)
03560031	Insert with knife blade face	M2,5	5	Ø 2 x 0,2	Steel	Locknut for radial alignment
03560032	Insert with knife blade face	M2,5	10	Ø 2 x 0,2	Steel	Locknut for radial alignment
03560033	Insert with knife blade face	M2,5	15	Ø 2 x 0,2	Steel	Locknut for radial alignment
03560034	Insert with knife blade face	M2,5	20	Ø 2 x 0,2	Steel	Locknut for radial alignment
03560024	Insert with knife blade face	M2,5	8	Ø 3,4 x 0,3	Steel	Locknut for radial alignment
03560025	Insert with knife blade face	M2,5	8	Ø 3,4 x 0,3	Tungsten carbide	Locknut for radial alignment



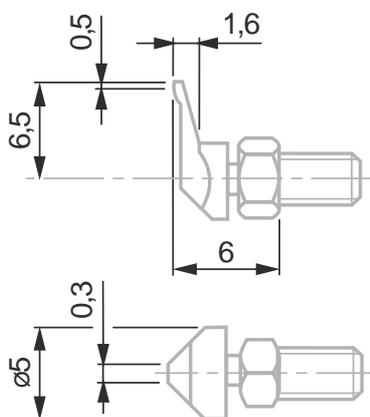
03560031



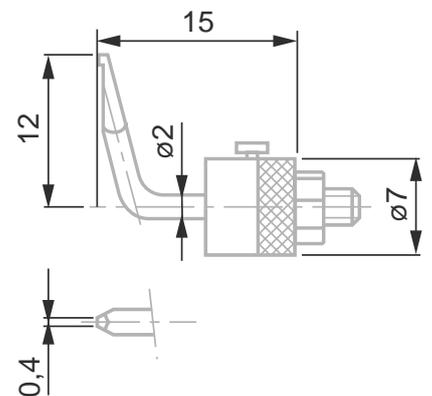
03560024

### Pointed offset inserts

Article number	Designation	Fixing mm	Material	Particular characteristic(s)
03510401	Insert with offset	M2,5	Steel	Pointed face Locknut for radial alignment
03560063	Insert with offset	M2,5	Steel	Pointed face Locknut for radial alignment



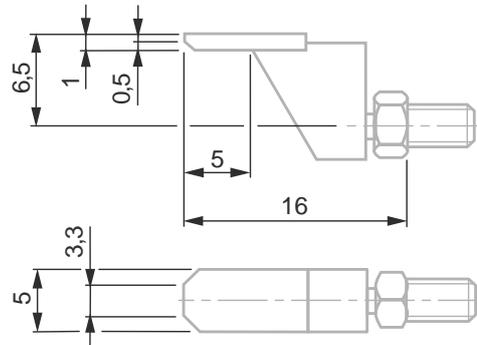
03510401



03560063

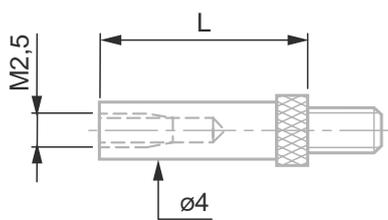
## Narrow insert with offset

Article number	Designation	Fixing mm	Probe length mm	Material	Particular characteristic(s)
<b>03510602</b>	Insert with narrow and off-centre face	M2,5	16	Tungsten carbide	Lock nut for radial alignment

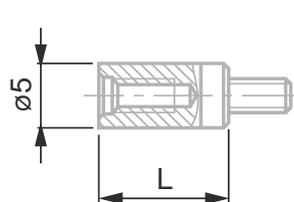


## Extensions

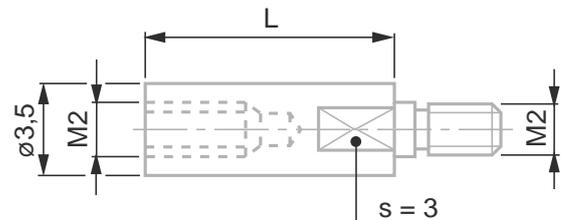
Article number	Designation	Fixing mm	Probe length mm	Diameter mm
<b>03540505</b>	Extension	M2	10	3,5
<b>03540506</b>	Extension	M2	15	3,5
<b>03540501</b>	Extension	M2,5	10	4
<b>03540502</b>	Extension	M2,5	15	4
<b>03540503</b>	Extension	M2,5	20	4
<b>03540504</b>	Extension	M2,5	40	4
<b>03560042</b>	Extension	M2,5	10	5
<b>03560043</b>	Extension	M2,5	15	5
<b>03560044</b>	Extension	M2,5	20	5
<b>03560045</b>	Extension	M2,5	25	5
<b>03560046</b>	Extension	M2,5	30	5
<b>03560047</b>	Extension	M2,5	35	5
<b>03560048</b>	Extension	M2,5	40	5
<b>03560049</b>	Extension	M2,5	45	5
<b>03560050</b>	Extension	M2,5	50	5



03540501 to 03540504



03560042 to 03560050

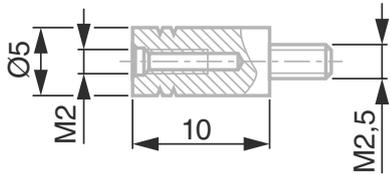


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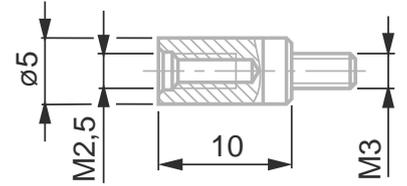
## Inserts for dial gauges

### Adapters

Article number	Designation	Fixing mm	Probe length mm	Particular characteristic(s)
<b>03560092</b>	Adapter	M2,5	10	For M2 inserts
<b>03560065</b>	Adapter	M3	10	For M2,5 inserts



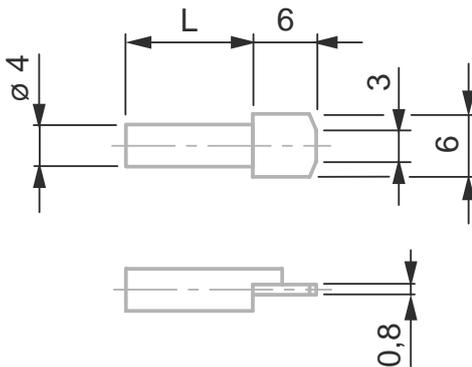
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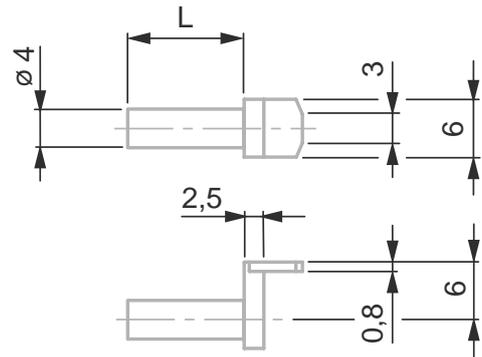
03560065

### Probe inserts with flat rectangular face

Article number	Designation	Fixing mm	Probe length, mm	Material	Particular characteristic(s)
<b>02660066</b>	Insert with flat and right-angle measuring face	Ø 4	12	Tungsten carbide	Centered
<b>02660067</b>	Insert with flat and right-angle measuring face	Ø 4	12	Tungsten carbide	Offset
<b>02660068</b>	Insert with flat and right-angle measuring face	Ø 4	25	Tungsten carbide	Centered
<b>02660069</b>	Insert with flat and right-angle measuring face	Ø 4	25	Tungsten carbide	Offset



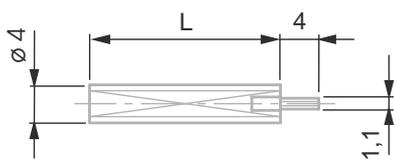
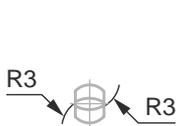
02660067, 02660069



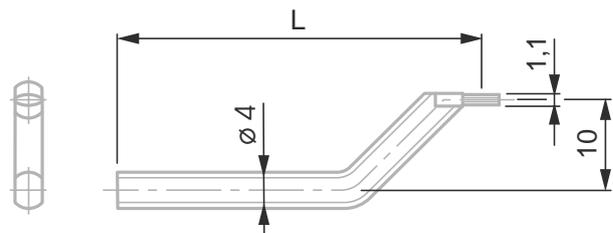
02660066, 02660068

### Inserts with 2 cylindrical measuring faces

Article number	Designation	Fixing mm	Probe length mm	Material	Particular characteristic(s)
<b>02660070</b>	Insert with 2 cylindrical faces	Ø 4	20	Tungsten carbide	Centered
<b>02660071</b>	Insert with 2 cylindrical faces	Ø 4	40	Tungsten carbide	Centered
<b>02660072</b>	Insert with 2 cylindrical faces	Ø 4	60	Tungsten carbide	Centered
<b>02660082</b>	Insert with 2 cylindrical faces	Ø 4	40	Tungsten carbide	Offset
<b>02660083</b>	Insert with 2 cylindrical faces	Ø 4	60	Tungsten carbide	Offset



02660070-71-72

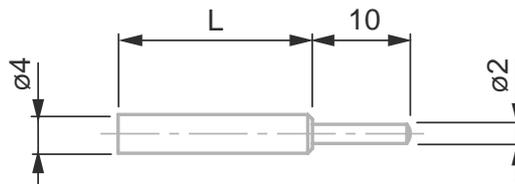


02660082-83

## Inserts and holders for FMS probes

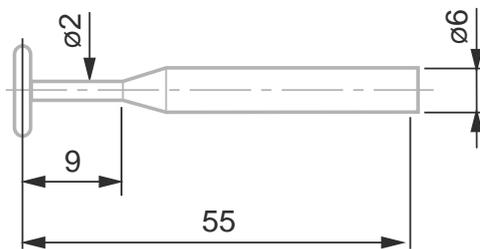
### Pin insert

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
<b>02660073</b>	Insert with contact pin	Ø 4	20	2	Tungsten carbide
<b>02660074</b>	Insert with contact pin	Ø 4	40	2	Tungsten carbide

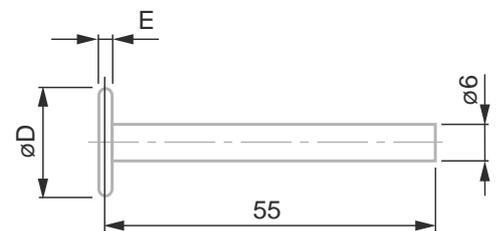


### Disc inserts

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material	Disc thickness mm
<b>00760074</b>	Disc insert	Ø 6	55	4,5	Tungsten carbide	1
<b>00760075</b>	Disc insert	Ø 6	55	14	Tungsten carbide	2
<b>00760076</b>	Disc insert	Ø 6	55	19	Tungsten carbide	3



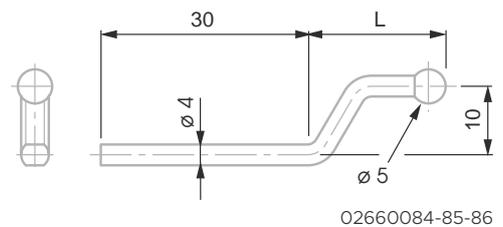
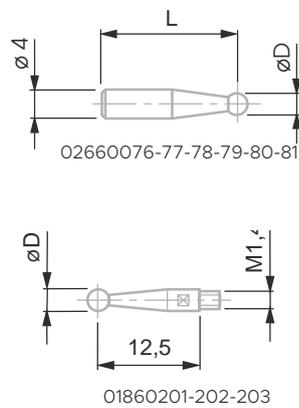
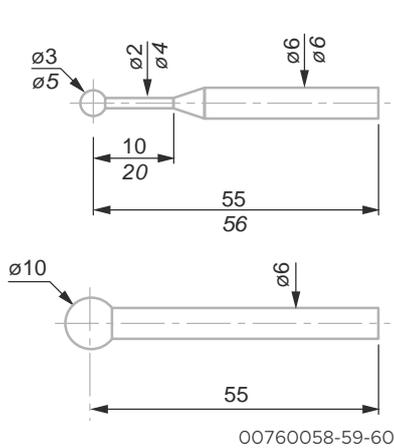
00760074



00760075-76

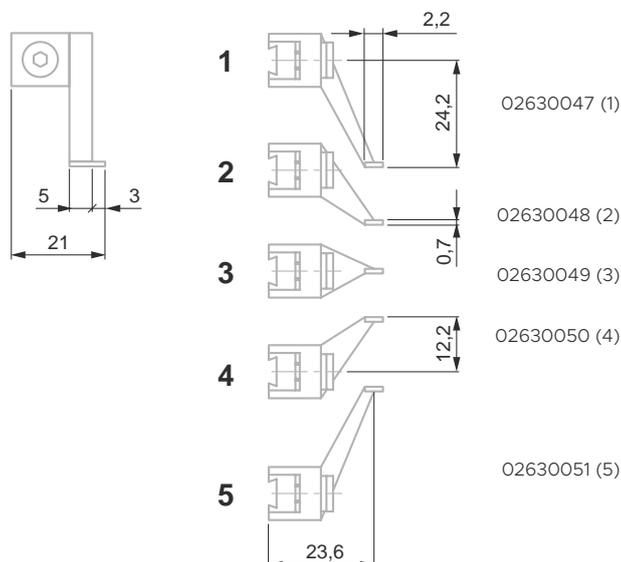
### Ball tip inserts

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
02660076	Ball insert	∅ 4	20	3	Tungsten carbide
02660077	Ball insert	∅ 4	40	3	Tungsten carbide
02660078	Ball insert	∅ 4	60	3	Tungsten carbide
02660079	Ball insert	∅ 4	20	5	Tungsten carbide
02660080	Ball insert	∅ 4	40	5	Tungsten carbide
02660081	Ball insert	∅ 4	60	5	Tungsten carbide
02660084	Ball insert	∅ 4	20	5	Tungsten carbide
02660085	Ball insert	∅ 4	33	5	Tungsten carbide
02660086	Ball insert	∅ 4	48	5	Tungsten carbide
00760058	Ball insert	∅ 6	55	3	Tungsten carbide
00760059	Ball insert	∅ 6	56	5	Tungsten carbide
00760060	Ball insert	∅ 6	55	10	Tungsten carbide
01860201	Ball insert	M1,4	12,53	1	Tungsten carbide
01860202	Ball insert	M1,4	12,53	2	Tungsten carbide
01860203	Ball insert	M1,4	12,53	3	Tungsten carbide



### Offset inserts

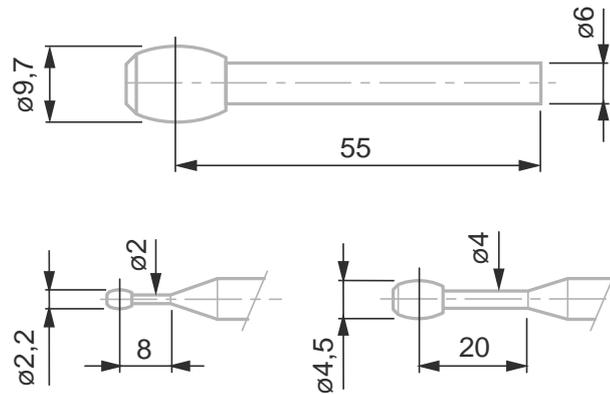
Article number	Designation	Material	Particular characteristic(s)
02630047	VBM insert with flat and right-angle measuring face	Tungsten carbide	Offset
02630048	VBN insert with flat and right-angle measuring face	Tungsten carbide	Offset
02630049	VBO insert with flat and right-angle measuring face	Tungsten carbide	Centered
02630050	VBP insert with flat and right-angle measuring face	Tungsten carbide	Offset
02630051	VBQ insert with flat and right-angle measuring face	Tungsten carbide	Offset



## Inserts and holders for FMS probes

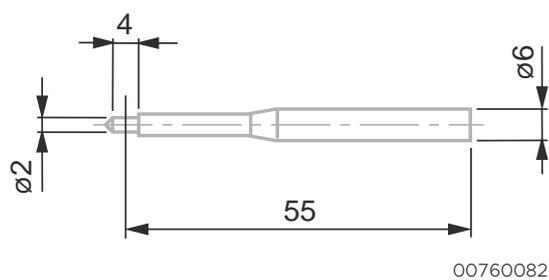
### Barrel inserts

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
<b>00760066</b>	Barrel-shaped insert	∅ 6	57,5	2,2	Tungsten carbide
<b>00760067</b>	Barrel-shaped insert	∅ 6	60	4,5	Tungsten carbide
<b>00760068</b>	Barrel-shaped insert	∅ 6	62,5	9,7	Tungsten carbide



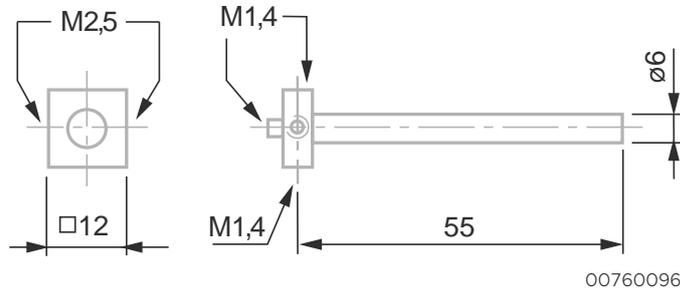
### Cylindrical insert

Article number	Designation	Fixing mm	Probe length mm	Diameter mm	Material
<b>00760082</b>	Cylindrical-shaped insert	∅ 6	55,8	2	Tungsten carbide



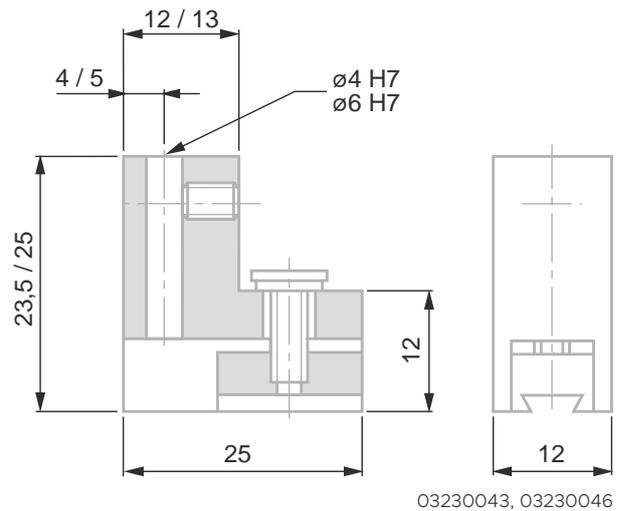
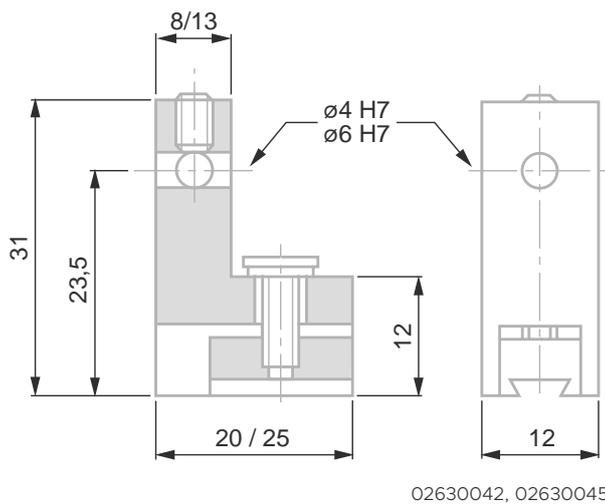
### Cross-shaped inserts holder

Article number	Designation	Fixing mm	Length mm	Compatibility
00760096	Cross-shaped probe support	Ø 6	55	M1,4 and M2,5



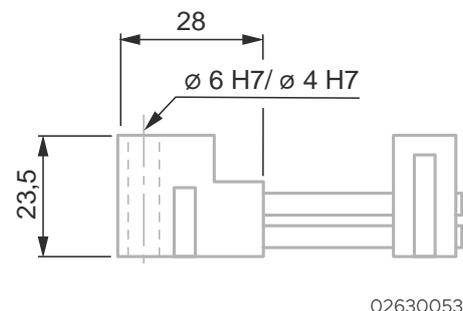
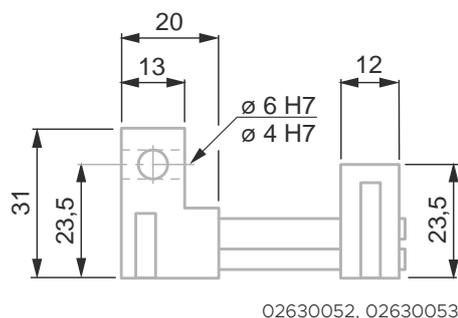
### Fixed inserts holder

Article number	Designation	Fixing mm
02630042	VBH horizontal fixed holder	Ø 4
02630043	VBJ vertical fixed holder	Ø 4
02630045	VBK horizontal fixed holder	Ø 6
02630046	VBL vertical fixed holder	Ø 6



### Inserts holder with fine adjustment

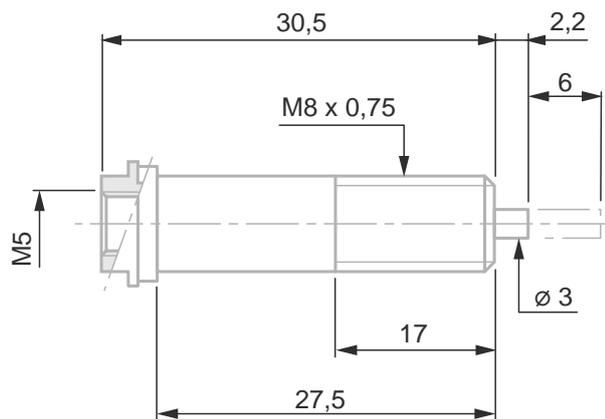
Article number	Designation	Fixing mm	Displacement range mm
02630053	VBS horizontal holder, with fine adjustment	Ø 4	25
02630055	VBU vertical holder, with fine adjustment	Ø 4	25
02630052	VBR horizontal holder, with fine adjustment	Ø 6	25
02630054	VBT vertical holder, with fine adjustment	Ø 6	25



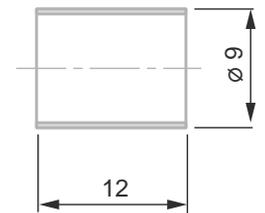
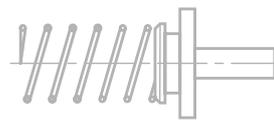
## Other accessories for FMS probes

### Auxiliary spring-loaded element

Article number	Designation	Measuring force N
03260441	Auxiliary spring-element, red	0,4
03260442	Auxiliary spring-element, yellow	0,63
03260443	Auxiliary spring-element, green	1
03260444	Auxiliary spring-element, blue	1,6
03260445	Auxiliary spring-element, grey	2
03260446	Auxiliary spring-element, brown	2,5
03260447	Auxiliary spring-element, black	4
03260440	Pneumatic jack	11 (for 4 bars)



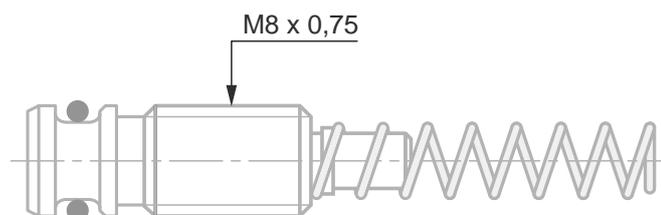
03260440



03260441 to 03260447

### Measuring force spring sets

Article number	Designation	Measuring force N
03260448	Spring set, red	0,4
03260449	Spring set, yellow	0,63
03260450	Spring set, green	1
03260451	Spring set, blue	1,6
03260452	Spring set, brown	2,5
03260453	Spring set, black	4



### Extension, Din 5p

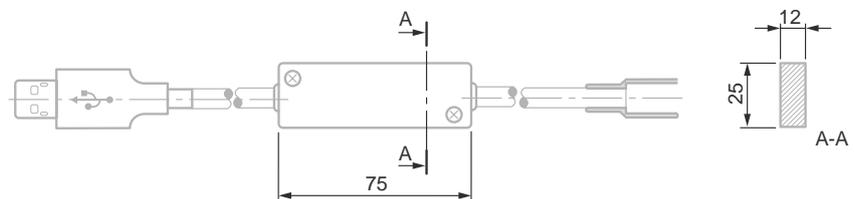


03240203

Remark(s) It is recommended to calibrate the complete equipment (probe + extension), in order to guarantee the highest accuracy

Article number	Designation
03240201	Extension cable for TESA inductive probe, L = 1 m
03240202	Extension cable for TESA inductive probe, L = 2 m
03240203	Extension cable for TESA inductive probe, L = 3 m
03240205	Extension cable for TESA inductive probe, L = 5 m
03240207	Extension cable for TESA inductive probe, L = 7 m
03240210	Extension cable for TESA inductive probe, L = 10 m
03240215	Extension cable for TESA inductive probe, L = 15 m
03240220	Extension cable for TESA inductive probe, L = 20 m

### Adapter Din 5p to USB



03260501

Standard	DIN 32876
Resolution	0,1 $\mu$ m
Dimensions	1,2 m
Degree of protection	IP51
Power supply	2 V effective, 13 kHz $\pm$ 0,5 %
Working temperature	20 $^{\circ}$ C $\pm$ 0,5
Particular characteristic(s)	Standard refresh rate = 80 ms Maximum refresh rate = 42 ms
Particular characteristic(s)	The total error must take into account that of the standard probe and that of the adapter

Article number	Designation	Deviation span $\mu$ m	Compatibility	Zero drift
03260500	DIN 5p to USB adapter	0,3% $\pm$ 0,1	For probes with sensitivity 73,75 mV/V/mm	$\pm$ 0,01% / $^{\circ}$ C
03260501	DIN 5p to USB adapter	0,3% $\pm$ 0,1	For probes with sensitivity 29,5 mV/V/mm	$\pm$ 0,01% / $^{\circ}$ C

## Other accessories for probes

### Electropneumatic pumps



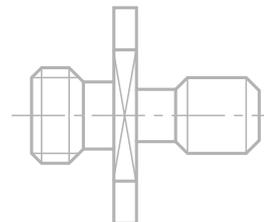
03260432

Article number	Designation	Particular characteristic(s)
<b>03260432</b>	Electro-pneumatic vacuum pump, 230 V, 50 Hz, operated via foot switch	Operated via foot switch
<b>03260433</b>	Electro-pneumatic vacuum pump, activation via external TESA control	Operated via TESA external control

### Pneumatic accessories



03560000



Article number	Designation	Particular characteristic(s)
<b>03560000</b>	Straight connector, M4, for $\varnothing$ 4,7 mm / $\varnothing$ 2 mm tube	For pipe $\varnothing$ 4,7 / $\varnothing$ 2 mm
<b>03560002</b>	Angle connector, M4, for $\varnothing$ 4,7 mm / $\varnothing$ 2 mm tube	For pipe $\varnothing$ 4,7 / $\varnothing$ 2 mm
<b>03540403</b>	T-connector, M4, for $\varnothing$ 4,7 mm / $\varnothing$ 2 mm tube	For pipe $\varnothing$ 4,7 / $\varnothing$ 2 mm
<b>03540405</b>	TB311 flexible tube, L = 1 m, $\varnothing$ 4,7 mm	
<b>01660011</b>	Pneumatic suction loader	





# Display units and electronic interfaces



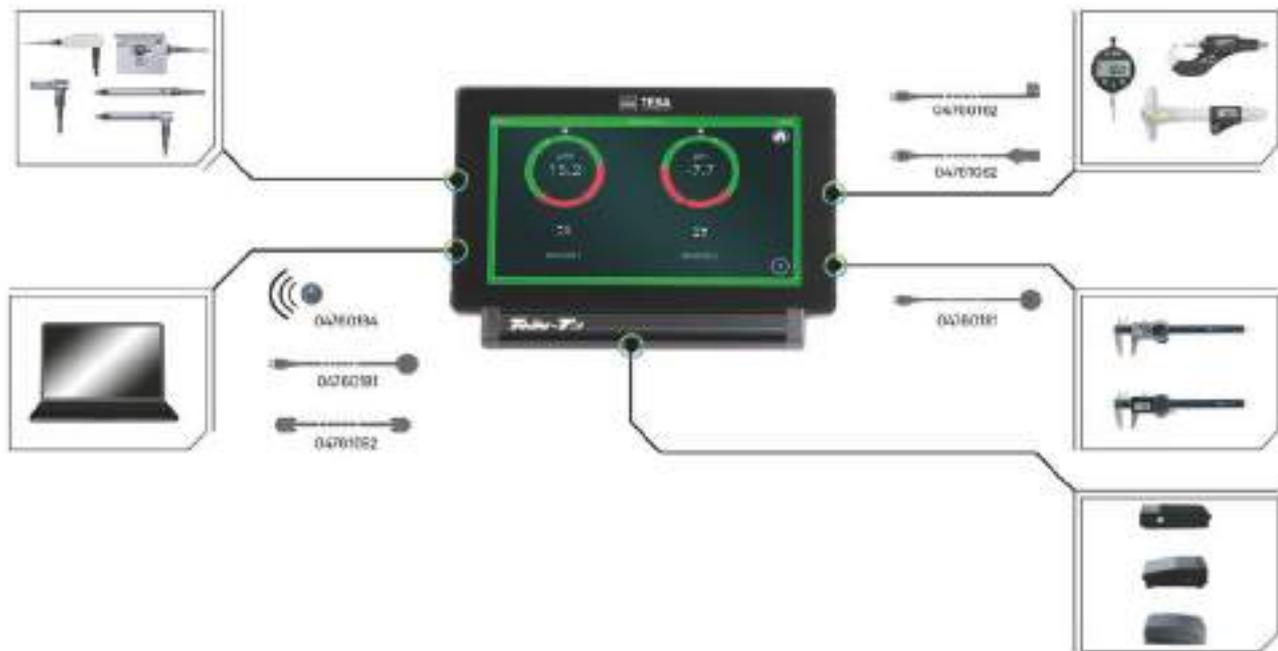
**TESA**  
TECHNOLOGY

### ***TESA displays units: precision for all your applications***

The display units are designed to show a reliable measurement value, usually from inductive TESA probes, for quick control of parts both in production workshops and quality assurance laboratories.

Our range meets the needs of portable measurement for the verification of alignments or run-outs close to the installation and also stationary measurement benches.

Of course, our display units also incorporate connectivity features to store, collect and analyse data for optimal traceability.



### ***The TESATRONIC range, a solution for every need:***



## Display units and electronic interfaces

### Display unit with battery (TWIN-T10)



### Display unit with power supply (TWIN-T20)



## TWIN-T10 digital display unit

- DISPLAY
  - Large, high-contrast screen for clear and immediate reading
  - Retractable feet
  - Back mounting
- USE
  - Light and portable
  - Robust for use in any kind of conditions, even the most extreme ones
- AUTONOMY
  - Powered by standard AA batteries only
  - Low consumption allows a long autonomy
- FUNCTIONS
  - Metric or imperial unit
  - Identification of values out of tolerance
  - Storage of MAX, MIN or MAX-MIN values during dynamic measurement
  - Combines analogue display and analogue indication
  - Zeroing of the display facilitating measurements by comparison
  - Special ZOOM display allowing a more detailed visualization of the analogue scale to facilitate precise adjustment
  - Up to 7 measuring ranges or automatic switching according to the measured value



04430013

Standard	DIN 32876
Input(s)	1 probe input
Max. perm. errors	At 20°C and relative humidity of ≤ 50 %: analogue display: 1% ± 0,1 μm Digital display: 1% ± 0,1 μm
Material	Resistant synthetic material
Dimensions	Housing: 100 x 170 x 38 mm Screen: 70 x 62 mm Digit: 10 x 5 mm
Degree of protection	IP63
Weight	500 g
Power supply	4 AA batteries
Data output(s)	TLC
Units	mm / in
Particular characteristic(s)	At 20°C and relative humidity of ≤ 50 %: Zero drift and signal amplification: ≤ 0,005 %/° C Display frequency limit with respect to input signal: 10 Hz
Response time	At 20°C and relative humidity of ≤ 50 %: Response time ≤ 100 ms Digital display hold ≥ 100 ms
Included in delivery	TWIN-T10 display unit 4 AA batteries Instruction manual including declaration of conformity

## Display units



Part number	Designation
<b>04430013</b>	TWIN-T10 display

### Accessories

Part number	Designation
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>01460008</b>	Back with central lug, Ø 40 mm
<b>04768000</b>	Handswitch, Jack, 1,8 m
<b>04768001</b>	Footswitch, Jack, 1,8 m
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable

### Measuring ranges, analogue and numerical interval

Measuring range $\mu\text{m}$	Analogue interval $\mu\text{m}$	Numerical interval $\mu\text{m}$	Measuring range in	Analogue interval in	Numerical interval in
$\pm 5000$	1	0,1	$\pm 250/1000$	.010/1000	.005/1000
$\pm 2000$	1	0,1	$\pm 100/1000$	.010/1000	.005/1000
$\pm 500$	1	0,1	$\pm 25/1000$	.010/1000	.005/1000
$\pm 200$	1	0,1	$\pm 10/1000$	.010/1000	.005/1000
$\pm 50$	0,1	0,1	$\pm 2.5/1000$	.005/1000	.005/1000
$\pm 20$	0,1	0,1	$\pm 1.0/1000$	.005/1000	.005/1000
$\pm 5$	0,1	0,1	$\pm 0.25/1000$	.005/1000	.005/1000

## TWIN-T20 digital display unit

- USE
  - Robust, for laboratory and workshop use
  - Compatible with a wide range of probes and measuring devices
  - Large colour screen for comfortable reading in dark environments
  - Black background display for excellent contrast
  - Refined interface for easy handling without confusion
  - 4 different display styles
  - Touch screen
- FUNCTIONS
  - One or two measurement values displayed
  - Static or dynamic measurements
  - Intuitive measurement setting
  - 8 tolerance classes available



Standard	DIN 32876
Input(s)	2 inductive probe inputs 2 digital probe inputs 2 USB measuring device inputs
Max. perm. errors	At 20°C, relative humidity of ≤ 50 %, with fictive probes: Digital display: ±(0,2 % measured value + 0,3 µm)
Material	Housing: aluminium
Dimensions	Housing: 112 x 190 x 119 mm Screen: 155 x 87 mm
Degree of protection	Front side: IP65
Weight	1,74 kg
Power supply	100 ÷ 240 V, 50 ÷ 60 Hz, 0,6 A
Data output(s)	TLC, RS232
Units	mm / in
Particular characteristic(s)	At 20°C and relative humidity of ≤ 50 %: Zero drift ≤ 0,15 µm / °C
Sampling frequency	6500 Hz
Included in delivery	TWIN-T20 display unit Power supply + EU, UK, US and CH cables Self-test report Calibration certificate Quick start manual including a declaration of conformity

## Display units



Part number	Designation
<b>04430014</b>	TWIN-T20 display

### Accessories

Part number	Designation
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04460016</b>	TWIN-T20 power supply + UE, UK, US and CH cables
<b>04460013</b>	Stylus + holder
<b>04460017</b>	Screen
<b>04460019</b>	Socket
<b>04768000</b>	Handswitch, Jack, 1,8 m
<b>04768001</b>	Footswitch, Jack, 1,8 m
<b>04761071</b>	Footswitch, USB, 2 m
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04761062</b>	Opto-RS232 to USB cable, duplex, 2 m
<b>04760151</b>	USB A to USB B cable, 1,8 m
<b>04761063</b>	Sub-D 9p/m to USB cable, 2 m

### Measuring ranges, analogue and numerical interval

Measuring range $\mu\text{m}$	Analogue interval $\mu\text{m}$	Numerical interval $\mu\text{m}$	Measuring range in	Analogue interval in	Numerical interval in
$\pm 5000$	200	0,1	$\pm 2$	.01	.0001
$\pm 2000$	100	0,1	$\pm 1$	.005	.0001
$\pm 500$	20	0,1	$\pm 0,2$	.001	.0001
$\pm 200$	10	0,1	$\pm 0,1$	.0005	.0001
$\pm 50$	2	0,1	$\pm 0,02$	.0001	.0001
$\pm 20$	1	0,1	$\pm 0,01$	.00005	.0001
$\pm 5$	0,2	0,1	$\pm 0,002$	.00001	.0001

## TWIN-T20 nano digital display unit

- USE
  - Robust, for laboratory and workshop use
  - Compatible with all Heidenhain probes type 1 Vpp and 11  $\mu$ App
  - Large colour screen for comfortable reading in dark environments
  - Black background display for excellent contrast
  - Refined interface for easy handling without confusion
  - 4 different display styles
  - Touch screen
- FUNCTIONS
  - One or two measurement values displayed
  - Static or dynamic measurements
  - Intuitive measurement setting
  - Classification of the values



Standard	DIN 32876
Input(s)	2 incremental Heidenhain probe inputs 2 USB measuring device inputs
Max. perm. errors	Depending on the connected probe
Material	Housing: aluminium
Dimensions	Housing: 112 x 190 x 119 mm Screen: 155 x 87 mm
Degree of protection	Front side: IP65
Weight	1,2 kg
Power supply	100 ÷ 240 V, 50 ÷ 60 Hz, 0,6 A
Data output(s)	TLC, RS232, USB HID
Units	mm / in
Particular characteristic(s)	At 20°C and relative humidity of $\leq 50\%$ : Zero drift $\leq 0,15 \mu\text{m} / ^\circ\text{C}$
Sampling frequency	260 kHz
Included in delivery	TWIN-T20 nano display unit Power supply + EU, UK, US and CH cables Self-test report Quick start manual including a declaration of conformity

## Display units



Part number	Designation
<b>04430020</b>	TWIN-T20 nano display

### Accessories

Part number	Designation
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04460016</b>	TWIN-T20 power supply + UE, UK, US and CH cables
<b>04460013</b>	Stylus + holder
<b>04460017</b>	Screen
<b>04768000</b>	Handswitch, Jack, 1,8 m
<b>04768001</b>	Footswitch, Jack, 1,8 m
<b>04761071</b>	Footswitch, USB, 2 m
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04761062</b>	Opto-RS232 to USB cable, duplex, 2 m
<b>04761063</b>	Sub-D 9p/m to USB cable, 2 m
<b>04760151</b>	USB A to USB B cable, 1,8 m

## TWIN-T40 digital display unit

- USE
  - Robust, for laboratory and workshop use
  - Compatible with a wide range of probes and measuring devices
  - Large colour screen for comfortable reading in dark environments
  - Black background display for excellent contrast
  - Refined interface for easy handling without confusion
  - 4 different display styles
  - Touch screen
- FUNCTIONS
  - One or two measurement values displayed
  - Static or dynamic measurements
  - Intuitive measurement setting
  - 16 tolerance classes available
  - Mathematical functions for simultaneous calculation of multiple probes (flatness)



04430015

Standard	DIN 32876
Input(s)	4 inductive probe inputs 4 USB measuring device inputs
Max. perm. errors	At 20°C, relative humidity of ≤ 50 %, with fictive probes: Digital display: ± (0,2 % measured value + 0,3 µm)
Material	Housing: aluminium
Dimensions	Housing: 112 x 190 x 119 mm Screen: 155 x 87 mm
Degree of protection	Front side: IP65
Weight	1,74 kg
Power supply	100 ÷ 240 V, 50 ÷ 60 Hz, 0,6 A
Data output(s)	TLC, RS232
Units	mm / in
Particular characteristic(s)	At 20°C and relative humidity of ≤ 50 %: Zero drift ≤ 0,15 µm / °C
Sampling frequency	6500 Hz
Included in delivery	TWIN-T40 display unit Power supply + EU, UK, US and CH cables Self-test report Calibration certificate

## Display units



Part number	Designation
<b>04430015</b>	TWIN-T40 display

### Accessories

Part number	Designation
<b>04768000</b>	Handswitch, Jack, 1,8 m
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04460016</b>	TWIN-T20 power supply + UE, UK, US and CH cables
<b>04460013</b>	Stylus + holder
<b>04460020</b>	Socket
<b>04460017</b>	Screen
<b>04768001</b>	Footswitch, Jack, 1,8 m
<b>04761071</b>	Footswitch, USB, 2 m
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>04761062</b>	Opto-RS232 to USB cable, duplex, 2 m
<b>04760151</b>	USB A to USB B cable, 1,8 m
<b>04761063</b>	Sub-D 9p/m to USB cable, 2 m

**Set probe + TWIN-T10 display unit**



04430013P1 and 04430013P2

Input(s)	1 probe input
Max. perm. errors	TWIN-T10 at 20°C and relative humidity of ≤ 50 %: Analogue display: 1% Digital display: 1 %
Material	Resistant synthetic material (TWIN-T10)
Dimensions	TWIN-T10: Housing: 100 x 170 x 38 mm Screen: 70 x 62 mm Digit: 10 x 5 mm
Degree of protection	TWIN-T10: IP63
Power supply	4 AA batteries
Data output(s)	TWIN-T10: TLC
Units	mm / in
Particular characteristic(s)	TWIN-T10 at 20°C and relative humidity of ≤ 50 %: Zero drift and signal amplification: ≤ 0,005 %/° C Display frequency limit with respect to input signal: 10 Hz
Response time	TWIN-T10 at 20°C and relative humidity of ≤ 50 %: Response time ≤ 100 ms Digital display hold ≥ 100 ms
Included in delivery	TWIN-T10 + batteries Probe GT31 or GT22 Magnetic holder UJ15 Instruction manual including declaration of conformity

## Sets of probe and display unit

Part number	Designation
<b>04430013P1</b>	TESA $\mu$ -FINDER set with GT31 lever probe
<b>04430013P2</b>	TESA $\mu$ -FINDER set with GT22 axial probe

### Accessories

Part number	Designation
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>01460008</b>	Back with central lug, $\varnothing$ 40 mm
<b>03210802</b>	GT31 probe
<b>04768000</b>	Handswitch, Jack, 1,8 m
<b>04768001</b>	Footswitch, Jack, 1,8 m
<b>04760181</b>	TLC-USB cable, 2 m
<b>04760182</b>	TLC-DIGIMATIC cable, 2 m
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable

### Dummy probes

The reference probes, also called 'dummy probes', are resistance dividers. Each probe simulates a given length very accurately. Reference probes are connected to the instrument instead of standard probes for checking or calibrating electronic devices that can be connected to TESA inductive probes.



Dimensions	Ø 18 x 118 mm
Degree of protection	IP40
Weight	≈ 45 g
Particular characteristic(s)	<p>Input impedance: <math>970 \pm 50 \Omega</math> (13 kHz) or <math>2150 \pm 50 \Omega</math> (0 <math>\mu\text{m}</math> normal)</p> <p>Phase (13 kHz): <math>71 \pm 2^\circ</math></p> <p>Input resistance: <math>100 \pm 5 \Omega</math></p> <p>Output impedance (13 kHz): <math>1000 \pm 2 \Omega</math></p> <p>Phase (13 kHz): <math>0,2^\circ</math></p> <p>Dummy probe (half-bridge), sensitivity 73.75 mV/V/mm</p> <p>Suitable for instruments characterized as follows:</p> <p>Frequency: <math>13 \pm 0,65</math> kHz</p> <p>Voltage: <math>3 \pm 0,015</math> Vrms (2 symmetrical voltages of 1,5 Vrms)</p> <p>Output and input impedance: <math>\leq 0,2 \Omega</math> and <math>2000 \Omega</math>, resp.</p>
Included in delivery	Measurement report

Part number	Designation
<b>S41078077</b>	Dummy probe, $\pm 0 \mu\text{m}$
<b>S41078079</b>	Dummy probe, $\pm 3 \mu\text{m}$
<b>S41078231</b>	Dummy probe, $\pm 5 \mu\text{m}$
<b>S41078081</b>	Dummy probe, $\pm 10 \mu\text{m}$
<b>S41078228</b>	Dummy probe, $\pm 100 \mu\text{m}$
<b>S41078230</b>	Dummy probe, $\pm 190 \mu\text{m}$
<b>S41078087</b>	Dummy probe, $\pm 300 \mu\text{m}$
<b>S41078332</b>	Dummy probe, $\pm 500 \mu\text{m}$
<b>S41078751</b>	Dummy probe, $\pm 1000 \mu\text{m}$
<b>S41078752</b>	Dummy probe, $\pm 1900 \mu\text{m}$
<b>S41077249</b>	Set of 3 dummy probes, $\pm 0 \mu\text{m}$ , $\pm 100 \mu\text{m}$ , $\pm 1000 \mu\text{m}$
<b>S41078654</b>	Set of 2 dummy probes, $\pm 190 \mu\text{m}$ , $\pm 1900 \mu\text{m}$

## Electronic interfaces

### BPX interface

- FUNCTIONS
  - Direct connection to the computer's USB port
  - 'Stand Alone' operational mode
  - Modularity: possibility to connect multiple BPX units together to increase the number of probes used
  - High immunity to environmental disturbances, whether of electrical origin or caused by solid or liquid contaminants
- SOFTWARE
  - TIS interface software included with BPX delivery
  - Tolerance indication capabilities
  - Simple functions +A, -A, +A+B, +A-B
  - Export of values to a .csv file



BPX interface, front and back faces

Max. perm. errors	At 20°C and relative humidity of ≤ 50 % Digital output: ± (0,05 + 0,15 % of the measuring range)
Material	Housing: aluminium
Dimensions	55 x 172 x 155 mm
Degree of protection	IP40
Weight	1 kg
Data output(s)	3x USB 2.0
Particular characteristic(s)	At 20°C and relative humidity of ≤ 50 %: Zero drift: ≤0,05 %/°C Sensitivity drift: ≤0,05 %/°C Acquisition time: 10 ms (between two consecutive measurements), 1 ms (timing window) Time data transfer of digital serial output (USB): depends on the operating system of the computer
Power supply	115 ÷ 230 V, 50 ÷ 60 Hz

Part number	Designation
05030010	BPX44 interface

## M4P-3 interface

- USE
  - Connection to PC possible via A/D converter
  - Connectable to a programmable controller
  - Easy and quick integration on DIN rail
  - Interfaces can be connected to each other (up to 10 interfaces) with a common power supply
- FUNCTIONS
  - analogue signal output (in V/mm)
  - The interface converts the signal from the probe into a DC voltage via an electronic circuit optimised for fast measurements.
  - Gain of 1V/mm (standard) or 2,5, 5 or 10 V/mm (via adjustment)



04130323

Max. perm. errors	Gain = 1: $\pm$ (1% measured value + 1 $\mu$ m) Gain > 1: $\pm$ (1,5% measured value + 1 $\mu$ m)
Dimensions	75 x 155 x 40 mm
Degree of protection	IP40
Weight	400 g
Data output(s)	Sub-D 9p/f
Particular characteristic(s)	Gain: 1 V/mm (standard), 2,5 V/mm, 5 V/mm, 10 V/mm
Operating temperature	0 ÷ 40 °C
Input(s)	4 probe inputs
Fixing	On 35 x 7,5 mm DIN rail

Part number	Designation
<b>04130323</b>	M4P-3 interface

### Accessories

Part number	Designation
<b>04760153</b>	M4P-3 power supply + UE, UK, US and CH adaptors



# Measuring supports and clamping equipment



**TESA**  
TECHNOLOGY

TESA measuring stands are designed to provide the best stability for holding instruments such as dial gauges, lever-type indicators, or probes.

Stability is a key criteria as it minimizes uncertainties related to the measuring method.

The wide range of measuring stands offers a selection based on the useful measuring arm's range, the fixing base, or the instrument's mounting type.

These various configurations enable the optimization of your measurement solution.

### *TESA measuring stands*



Suction support with articulated arm



Magnetic supports with articulated arm



Tiltable magnetic support



Small magnetic support



Support with ground table



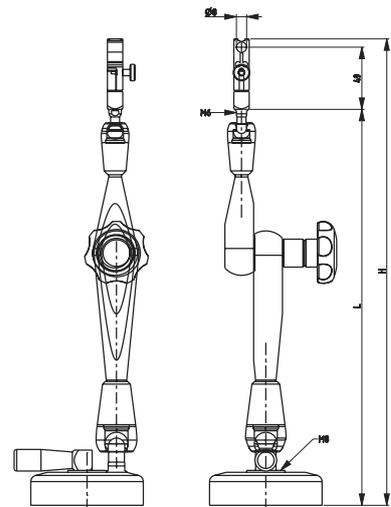
Support with granite table

## Measuring supports and clamping equipment

### Suction support with articulated arm



01639064

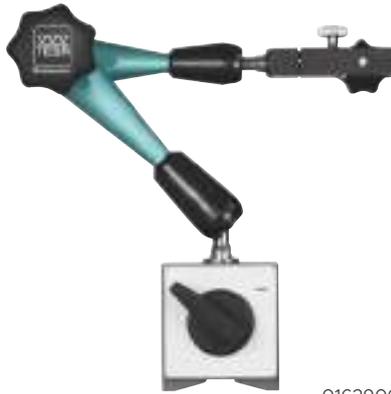


Material	Arm: Light alloy Base: Metallic
Dimensions	Base: Ø 88 x 28 mm
Function(s)	Suction controlled by lever switch Fine adjustment
Measuring instrument mount	Dovetail fixing bracket with circular clamping Ø 8 mm
Base	Suction cup force: 300 N
Included in delivery	Articulated arm Clamp with fine adjustment Suction base Declaration of conformity User manual

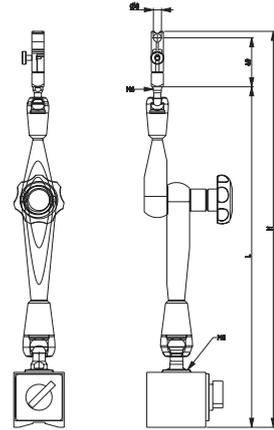
Article number	Designation	Height mm	Length mm	Base dimensions mm	Suction cup force N
<b>01639064</b>	Suction support with articulated arm	365	280	Ø 88 x 28	300



### Magnetic supports with articulated arm



01639061



Material	Arm: Light alloy Base: Metallic
Function(s)	With switch to disengage the magnet Fine adjustment
Measuring instrument mount	Dovetail fixing bracket with circular clamping $\varnothing 8$ mm
Base	V-shaped
Included in delivery	Articulated arm Clamp with fine adjustment Magnetic base Declaration of conformity User manual

Article number	Designation	Height mm	Length mm	Base dimensions, mm	Dimensions of V, mm	Magnetic force N
01639060	Magnetic support with articulated arm	220	130	34 x 30 x 35	$\varnothing 27 \div 76$	300
01639061	Magnetic support with articulated arm	310	200	60 x 50 x 55	$\varnothing 30 \div 150$	800
01639062	Magnetic support with articulated arm	390	280	60 x 50 x 55	$\varnothing 30 \div 150$	800
01639063	Magnetic support with articulated arm	445	73 x 50 x 55	$\varnothing 30 \div 150$	1000	



01639060



01639062



01639063



01639061

## Supports with magnetic base

### *Magnetic support with flexible arm*



01639020

Material	Arm: Metallic Base: Metallic
Dimensions	Base: 50 x 60 x 55 mm
Function(s)	With switch to disengage the magnet
Measuring instrument mount	Dovetail fixing bracket with circular clamping $\varnothing$ 8 mm
Base	V-shaped, for $\varnothing$ 30 ÷ 150 mm Magnetic force: 400 N
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Base dimensions mm	Dimensions of V mm	Magnetic force N
<b>01639020</b>	Magnetic support with flexible arm	350	60 x 50 x 55	$\varnothing$ 30 ÷ 150	400

### Magnetic support EASY



01639070

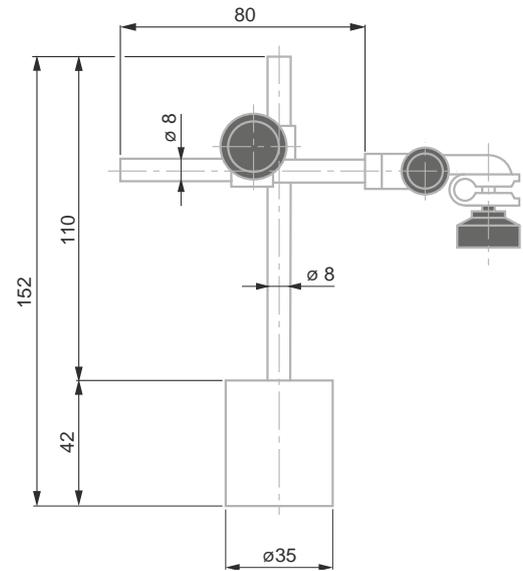
Material	Arm: Metallic Base: Metallic
Dimensions	Base: 60 x 50 x 55 mm
Function(s)	With switch to disengage the magnet Fine adjustment
Measuring instrument mount	Dovetail fixing bracket with circular clamping Ø 8 mm
Base	V-shaped, for Ø 30 ÷ 150 mm Magnetic force: 750 N
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Base dimensions mm	Dimensions of V mm	Magnetic force N
01639070	Magnetic support EASY	450	60 x 50 x 55	Ø 30 ÷ 150	750



## Supports with magnetic base

### Magnetic support UJ15



Material	Arm: Metallic Base: Metallic
Dimensions	Base: Ø 35 x 42 mm
Measuring instrument mount	Dovetail fixing bracket with circular clamping Ø 4 and Ø 8 mm
Base	Permanent magnet Magnetic force: 220 N
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Base dimensions mm	Magnetic force N
<b>01639007</b>	UJ15 magnetic support	152	Ø 35 x 42	220



**Magnetic support**



01639010

Material	Arm: Metallic Base: Metallic
Dimensions	Base: Ø 30 x 25 mm Main axis: Ø 6 mm
Function(s)	Articulated arm, 360°
Measuring instrument mount	Dovetail fixing bracket with circular clamping Ø 6 or Ø 8 mm
Base	Permanent magnet Magnetic force: 140 N
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Base dimensions mm	Magnetic force N
<b>01639010</b>	Support with magnetic base, articulated arm	90	Ø 30 x 25	140

## Supports with table

### Measuring support with articulated arm



01639065

Material	Support: Light alloy
Dimensions	Granite: 300 x 200 mm
Function(s)	Fine adjustment
Measuring instrument mount	Dovetail fixing bracket with circular clamping $\varnothing$ 8 mm
Grade	0
Included in delivery	Articulated arm Clamp with fine adjustment Granite table User manual

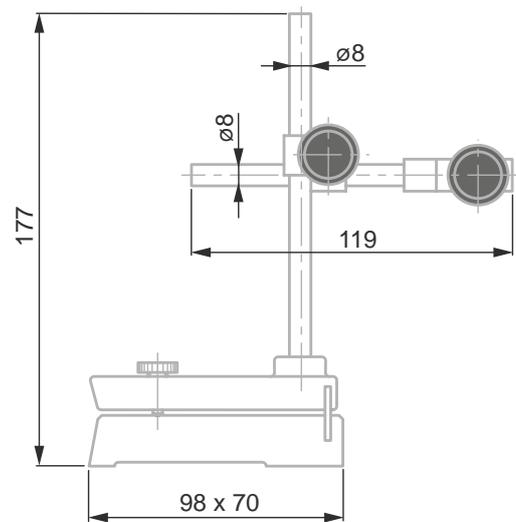
Article number	Designation
<b>01639065</b>	Measurement support with articulated arm



**Inclinable measuring support**



01639003



Material	Arm: Metallic Base: Cast iron
Function(s)	Base with front support face
Measuring instrument mount	Dovetail fixing bracket with circular clamping $\varnothing$ 8 mm
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Base dimensions mm
01639003	Inclinable measuring support	177	98 x 70



## Supports with table

### UD12 measuring support



01639000

Material	Arm: Metallic Base: Cast iron
Function(s)	Support with lateral guiding faces T-slot for vertical column
Measuring instrument mount	Dovetail fixing bracket with circular clamping $\varnothing$ 8 mm
Included in delivery	Support Declaration of conformity

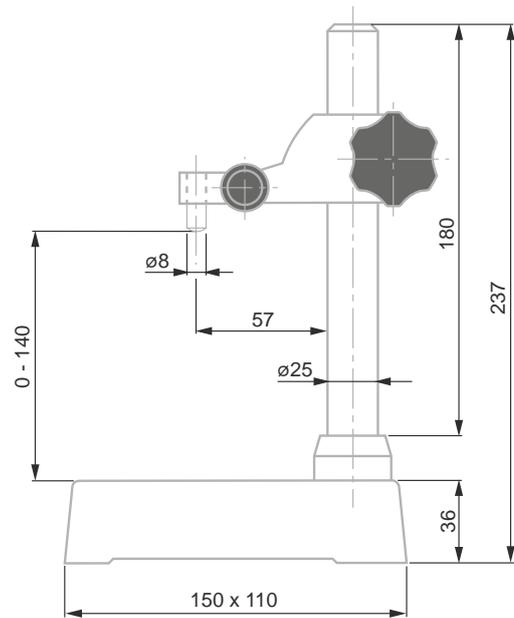
Article number	Designation	Height mm	Base dimensions mm
01639000	UD12 measuring support	243	200 x 55 x 35



### Measuring support with UA1 ground surface table



01639008



Application range	0 ÷ 140 mm
Material	Table: Cast iron Column: Chrome steel Arm: Spheroidal graphite cast iron
Dimensions	Ground side: 100 x 100 mm
Function(s)	Column can be dismantled
Measuring instrument mount	Measuring arm with clamp $\varnothing 8$ mm
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Measuring face(s)	Material
01639008	UA1 measuring support with ground table	237	100 x 100	Base: Cast iron

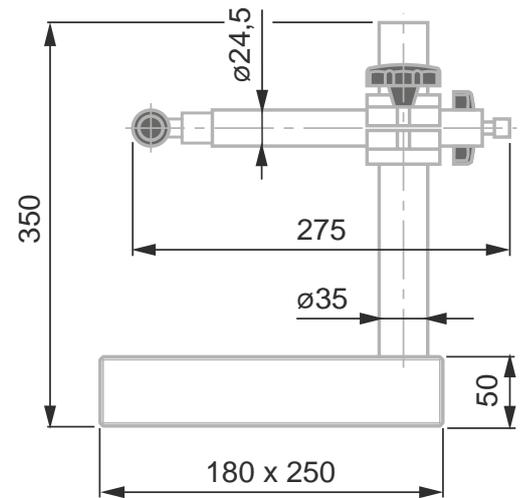


## Supports with table

### Measuring support with granite table



01639033



Application range	0 ÷ 260 mm
Material	Column: Chrome plated
Dimensions	Table: 180 x 250 x 50 mm Axis: Ø 35 mm Working surface: 180 x 200 mm
Function(s)	Horizontal sliding arm Fine adjustment
Measuring instrument mount	Circular clamping Ø 4 mm or Ø 8 mm for dovetail or lug
Grade	00
Flatness	3 µm
Included in delivery	Support Declaration of conformity

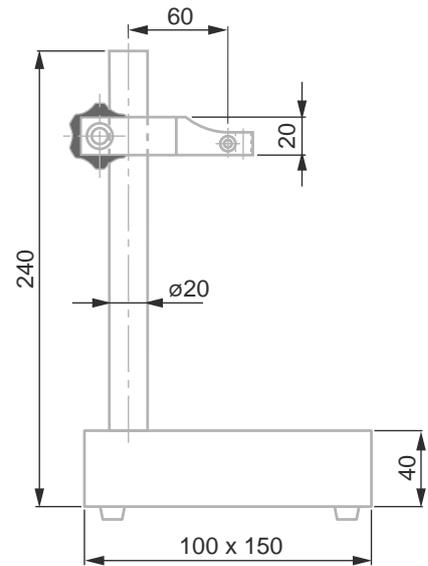
Article number	Designation	Height mm	Base dimensions mm
01639033	Measuring support with granite table	350	180 x 250 x 50



### Measuring support with granite table



01639035



Application range	0 ÷ 170 mm
Material	Table: Granite Pole: Steel Holder: Aluminium
Dimensions	Base: 100 x 150 x 40 mm
Measuring instrument mount	Circular clamping Ø 8 mm
Grade	00
Flatness	3 µm
Included in delivery	Support Declaration of conformity

Article number	Designation	Height mm	Base dimensions mm	Application range mm
01639035	Measuring support with granite table	240	100 x 150 x 40	0 ÷ 170

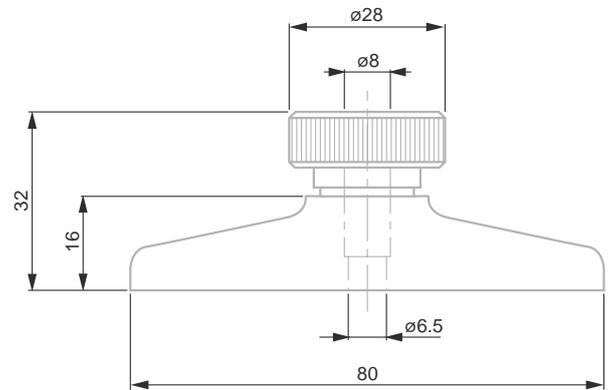


## Depth foot

### Depth foot with flat face



01639046

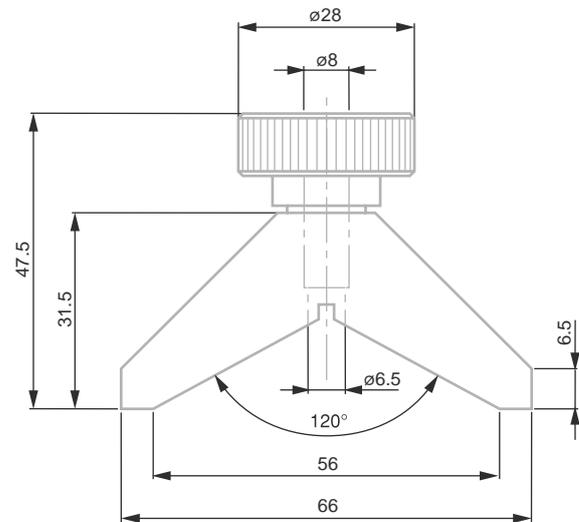


Material	Hardened steel
Dimensions	Measuring face: 80 x 16 mm
Measuring instrument mount	Mounting with clamping bracket Ø 8 mm
Measuring face(s)	Fine ground measuring face
Flatness	4 µm
Included in delivery	Support Declaration of conformity

Article number	Designation	Base dimensions mm
01639046	Depth foot with flat face	80 x 16



### Depth foot with V-shaped face



Material	Hardened steel
Dimensions	Measuring faces: 5 x 16 mm
Measuring instrument mount	Mounting with clamping bracket $\varnothing$ 8 mm
Base	V-groove, for $\varnothing$ 10 $\div$ 100 mm
Measuring face(s)	Fine ground measuring faces
Flatness	6 $\mu$ m
Included in delivery	Support Declaration of conformity

Article number	Designation	Base dimensions mm	Dimensions of V mm
01639047	Depth foot with V-shaped base	Each face: 5 x 16	$\varnothing$ 10 $\div$ 100



## Fixing blocks

### Measurement base for squares



05360030

Material	Base: Light alloy
Dimensions	Base: 200 x 100 mm Drilling: 20 x 20 mm with M5 thread
Parallelism	0,5 µm
Flatness	0,5 µm
Included in delivery	Base Stop-bar Mounting bracket SCS calibration certificate

Article number	Designation	Base dimensions mm
05360030	Base square check	200 x 100

### Swivel clamps



01860401

Article number	Designation
<b>01860401</b>	Clamp with dovetail mount, clamping = $\varnothing$ 5,6 and $\varnothing$ 9,5 mm
<b>01860402</b>	Clamp with dovetail mount, clamping = $\varnothing$ 7 and 9,5 mm
<b>074108603</b>	Clamp with dovetail mount, clamping = $\varnothing$ 7/32 and 5/32 in

### Rotating holder



SPT

Article number	Designation
<b>SPT</b>	Rotating support, shaft = $\varnothing$ 8 x 25 mm, clamping = $\varnothing$ 4,1 mm

## Fixing accessories

### Squares holders



01840406



01850406

Article number	Designation
<b>01840406</b>	Bracket support, shaft = Ø 8 x 25 mm, clamping = Ø 8 mm
<b>01850406</b>	Bracket support, shaft = Ø 3/8 x 3.5 in, clamping = Ø 3/8 in

### Swivel holders



01840404



01840407



01850404



01840405

Article number	Designation
<b>01840404</b>	Swivel holder with dovetail mount, shaft = Ø 8 x 25 mm
<b>01850404</b>	Swivel holder with dovetail grip, shaft = Ø 3/8 x 1 in
<b>01840405</b>	Swivel holder with dovetail clamp, shaft = Ø 8 x 90 mm
<b>01850405</b>	Swivel holder with dovetail grip, shaft = Ø 3/8 x 3-5/8 in
<b>01840407</b>	Swivel holder with dovetail grip, fine adjustment device, shaft = Ø 8 x 125 mm
<b>074106026</b>	Swivel holder with dovetail grip, shaft = Ø 8 x 133 mm, clamping = Ø 4 and Ø 7 mm
<b>074106931</b>	Swivel holder with dovetail grip, shaft = Ø 3/8 x 5-1/4 in, clamping = Ø 4 and Ø 7 mm
<b>074106331</b>	Swivel holder with dovetail grip, shaft = 6 x 12,6 x 76 mm, clamping = Ø 4 and Ø 5,5 mm

### Fixing rod with pin



01840202



01850203



074111481

Article number	Designation
<b>01840202</b>	Fixing rod, pin = $\varnothing$ 5,6 mm, shaft = 8 x 80 mm
<b>01850202</b>	Fixing rod, pin = $\varnothing$ 7/32 in, axis = $\varnothing$ 3/8 x 3.5 in
<b>01850203</b>	Fixing rod, pin = $\varnothing$ .22 in, shaft = 1/4 x 1/2 x 3 in
<b>074111481</b>	Fixing rod, pin = $\varnothing$ 5/32 in, pole = 3/16 x 5/16 in

### Rigid fixing rods with dovetail attachment



01840105



01840104

Article number	Designation
<b>01840104</b>	Dovetail fixing rod, shaft = $\varnothing$ 4 x 13 mm
<b>01840105</b>	Dovetail fixing rod, shaft = $\varnothing$ 8 x 13 mm
<b>01850104</b>	Dovetail fixing rod, shaft = $\varnothing$ 5,55 x 13 mm
<b>01850105</b>	Dovetail fixing rod, shaft = $\varnothing$ 6,35 x 13 mm
<b>01860008</b>	Dovetail fixing rod, axis = $\varnothing$ 6 x 13 mm

## Fixing accessories

### Swivelling fixing rods with dovetail attachment



01840408

Article number	Designation
<b>01840408</b>	Dovetail fixing rod, swivelling, shaft = Ø 4 x 64,35 mm
<b>01840409</b>	Dovetail fixing rod, swivelling, shaft = Ø 8 x 64,35 mm

### Centering holder



01840501

Article number	Designation
<b>01840501</b>	Centering holder, shaft = Ø 4 x 25 mm, clamping = Ø 4 mm

### Mounting backs for DIALTRONIC dial gauges



01960100

Article number	Designation	Composed of
<b>01960100</b>	Back with central lug, for DIALTRONIC dial gauge	Mounting back 4x M2 x 4 mm screw

### Mounting backs for analogue dial gauges



01462004



01460020

Article number	Designation	Composed of
<b>01462004</b>	Back with central lug, for IP40 dial gauges with Ø 40 or Ø 44,5 mm dial	Mounting back 3x M1,5 x 4 mm screw
<b>01462005</b>	Back with central lug, for IP40 dial gauges with Ø 58 or Ø 61,5 mm dial	Mounting back 3x M2 x 4 mm screw
<b>01460020</b>	Back with central lug, for IP67 dial gauges with Ø 40 or Ø 44,5 mm dial	Mounting back 3x M2 x 6 mm screw
<b>01460021</b>	Back with central lug, for IP67 dial gauges with Ø 58 or Ø 61,5 mm dial	Mounting back 3x M3 x 5,5 mm screw

## Fixing accessories

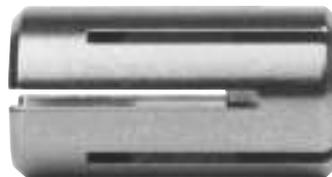
### Mounting backs for lever-type test indicators



03238013

Article number	Designation
03238013	Dovetail mounting lug, Ø 6,4 mm

### Reducing sleeves



074108942

Article number	Designation
074108942	Reducing sleeve, Ø 8 mm - Ø 4 mm
074108943	Reducing sleeve, Ø 3/8 in - Ø 5/32 in
03560101	Reducing sleeve, Ø 9,5 mm - Ø 8 mm



# 2-point measurement



**TESA**  
TECHNOLOGY

### UNIMASTER model, metric

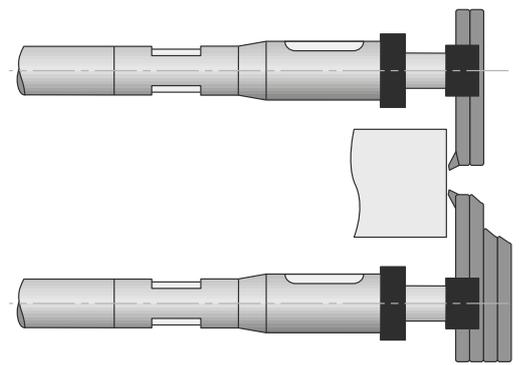
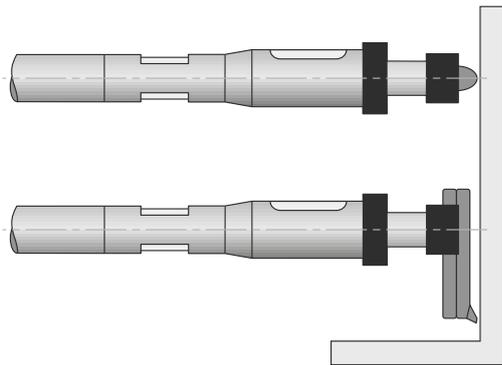
- MEASUREMENT
  - Internal or external
  - Direct or comparative
  - No need for expensive setting standard thanks to the included standard
  - Constant measuring force for optimal repeatability
- INSTRUMENT
  - Incorporates a dial test indicator for easy detection of the culmination point
  - Interchangeable measuring inserts
  - Ensures stable measuring owing to a negligible deflection of the instrument
  - Thermal protection against hand warmth of the operator
  - Integrated shockproof system
- USE
  - Portable for use on large work pieces that cannot be transported to the laboratory
  - Easy to handle because it can be positioned both horizontally and vertically



01110001

Standard	DIN 863 T4
Measuring range	Vernier: 25 mm Dial gauge: $\pm 0,4$ mm
Max. perm. errors	Measurement element: $5 \mu\text{m}$ + error of each extension + error depending on the number of extensions used  Error depending on the number of extensions used 1 extension: $1,1 \mu\text{m}$ 2 extensions: $1,9 \mu\text{m}$ 3 extensions: $4,4 \mu\text{m}$
Resolution	0,01 mm
Material	Inserts: Tungsten Carbide Extensions: Steel
Thread pitch	1 mm
Measuring force	$15 \div 20$ N
Remark(s)	Use of up to 3 extension cables with the measuring element
Included in delivery	Measuring element Extensions Masterpiece Measuring inserts Calibration certificate for the setting standard Measurement report for the measuring element Measurement report for each extension Declaration of conformity User manual

## Large dimensions measurement



Article number	Designation	Application range mm
<b>01110000</b>	UNIMASTER, set without 1000 mm extension	Internal: 250 ÷ 1625, external: 225 ÷ 1600
<b>01110001</b>	UNIMASTER, set with 1000 mm extension	Internal: 250 ÷ 2325, external: 225 ÷ 2300

### Accessories

Article number	Designation
<b>01112401</b>	UNIMASTER wheeled case
<b>01130001</b>	Screwdriver UNIMASTER

### UNIMASTER sets

Article number	Description	Measurement	01110000	01110001
<b>01110300</b>	Measurement element	Internal: 250 ÷ 275 mm External: 225 ÷ 250 mm	•	•
<b>01110101</b>	Extension, L = 25 mm		•	•
<b>01110102</b>	Extension, L = 50 mm		•	•
<b>01110103</b>	Extension, L = 75 mm		•	•
<b>01110104</b>	Extension, L = 100 mm		•	•
<b>01110105</b>	Extension, L = 125 mm		•	•
<b>01110106</b>	Extension, L = 150 mm		•	•
<b>01110112</b>	Extension, L = 300 mm		•	•
<b>01110118</b>	Extension, L = 450 mm		•	•
<b>01110124</b>	Extension, L = 600 mm		•	•
<b>01110140</b>	Extension, L = 1000 mm			•
<b>01110203</b>	Pair of inserts	Internal	•	•
<b>01110205</b>	Pair of inserts, L = 75 mm	Internal External	•	•
<b>01110208</b>	Pair of inserts, L = 100 mm	Internal External	•	•
<b>01110501</b>	Setting standard	Internal: 250 mm External: 225 mm	•	•
<b>01130001</b>	Screwdriver		•	•
<b>01110401</b>	Set of suspension accessories (4 brackets and 4 clamps)		•	•
<b>01112401</b>	Wheeled case		•	•

## Extensions for UNIMASTER



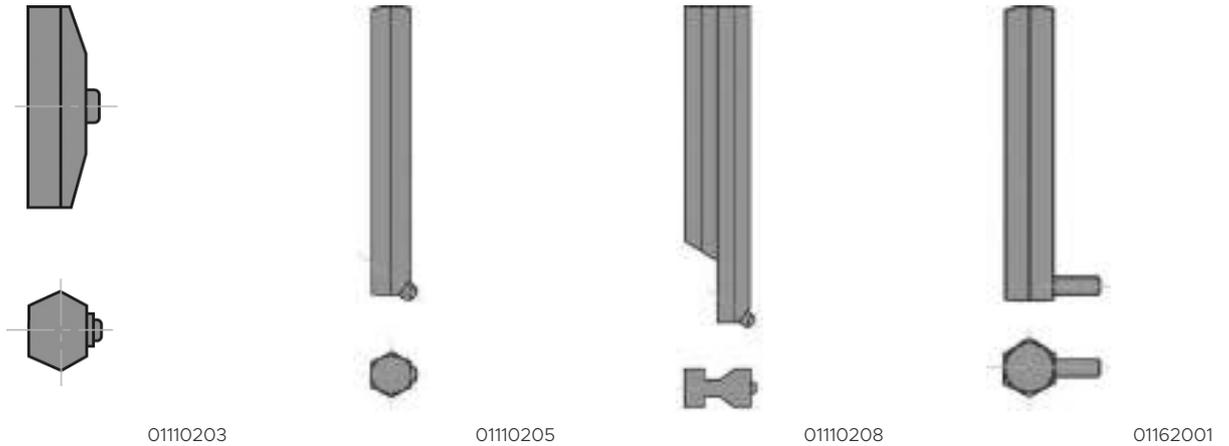
01110104

Max. perm. errors	<p>Measurement element: 5 <math>\mu\text{m}</math>          + error of each extension          + error depending on the number of extensions used</p> <p>Error depending on the number of extensions used          1 extension: 1,1 <math>\mu\text{m}</math>          2 extensions: 1,9 <math>\mu\text{m}</math>          3 extensions: 4,4 <math>\mu\text{m}</math></p>
Material	Steel
Diameter	$\varnothing$ 38 mm
Remark(s)	Use of up to 3 extension cables with the measuring element
Included in delivery	Extension Calibration certificate

Article number	Designation	Max. perm. errors $\mu\text{m}$
<b>01110101</b>	UNIMASTER extension, L = 25 mm	0,7
<b>01110102</b>	UNIMASTER extension, L = 50 mm	1
<b>01110103</b>	UNIMASTER extension, L = 75 mm	1,2
<b>01110104</b>	UNIMASTER extension, L = 100 mm	1,5
<b>01110105</b>	UNIMASTER extension, L = 125 mm	1,5
<b>01110106</b>	UNIMASTER extension, L = 150 mm	2
<b>01110112</b>	UNIMASTER extension, L = 300 mm	3,5
<b>01110118</b>	UNIMASTER extension, L = 450 mm	4,5
<b>01110124</b>	UNIMASTER extension, L = 600 mm	6,5
<b>01110140</b>	UNIMASTER extension, L = 1000 mm	10

## Large dimensions measurement

### Measuring bolts for UNIMASTER



Article number	Designation
<b>01110203</b>	Pair of inserts for internal measurement
<b>01110205</b>	Pair of inserts for internal and external measurement, L = 75 mm
<b>01110208</b>	Pair of inserts for internal and external measurement, L = 100 mm
<b>01162001</b>	Pair of inserts for internal, external and grooves measurement, depth ≤ 20 mm, Ø 4 x 7 mm

### Other accessories for UNIMASTER



Article number	Designation
<b>01110401</b>	Set of suspension accessories (4 brackets and 4 clamps)
<b>01160001</b>	Roller (2 items are needed)

### VERIBOR light models

- MEASUREMENT
  - 2-point measurement
  - For comparative measurement
- INSTRUMENT
  - Gauge body made of Invar steel to neutralise the influence of the operator's hand warmth
  - Centring shoe for correct alignment of the instrument in the bore
  - Tungsten Carbide ball tips for high resistance to wear
  - Can be used with a dial gauge, a precision indicator, or a probe with  $\varnothing$  8 mm



05710090

Max. perm. errors	4 $\mu$ m
Repeatability	2 $\mu$ m
Compatibility	Fixation for accessory: $\varnothing$ 8 mm
Material	Measuring bolts: hardened steel Anvils: hardened steel
Included in delivery	VERIBOR (without dial gauge) Set of interchangeable fixed inserts Declaration of conformity

The metrological values are given for the VERIBOR light only, without including the dial gauge mounted on it.

Article number	Designation	Measuring range mm	Application range mm
05710090	VERIBOR light bore gauge	1,3	18 ÷ 35
05710091	VERIBOR light bore gauge	1,4	35 ÷ 60
05710092	VERIBOR light bore gauge	1,4	50 ÷ 150
05710093	VERIBOR light bore gauge	1,3 / 1,4	18 ÷ 150

## Bore measurement

### VERIBOR models

- MEASUREMENT
  - 2-point measurement
  - For comparative measurement
- INSTRUMENT
  - Gauge body made of Invar steel to neutralise the influence of the operator's hand warmth
  - Centring shoe for correct alignment of the instrument in the bore
  - Tungsten Carbide ball tips for high resistance to wear
  - Can be used with a dial gauge, a precision indicator or a probe with  $\varnothing 8$  mm

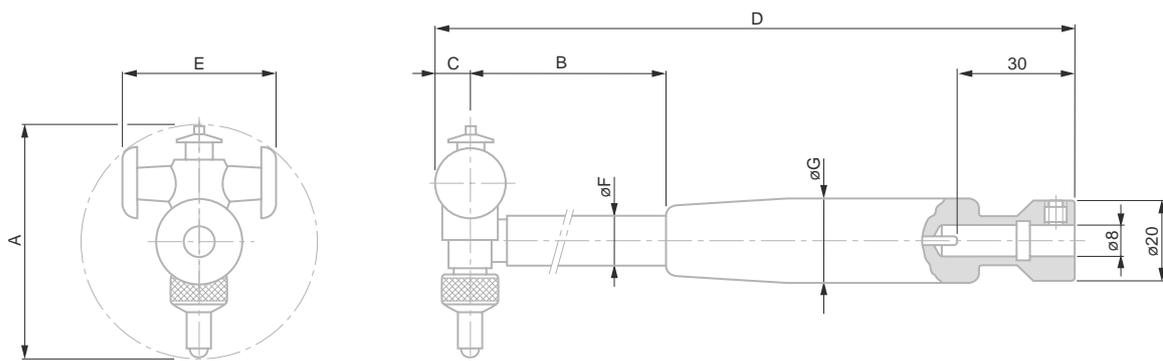


05710012

Max. perm. errors	2 $\mu\text{m}$
Repeatability	0,5 $\mu\text{m}$
Compatibility	Fixation for accessory: $\varnothing 8$ mm
Material	Measuring bolts: Tungsten Carbide Anvils: Tungsten Carbide
Included in delivery	VERIBOR (without dial gauge) Set of interchangeable fixed inserts Declaration of conformity

The metrological values are given for the VERIBOR only, without including the dial gauge mounted on it.

Article number	Designation	Max. perm. errors, $\mu\text{m}$	Measuring range, mm	A mm	B mm	C mm	D mm	E mm	F mm
05710012	VERIBOR bore gauge	2	0,35	4,5 ÷ 6	74	2	138	3,3	3,8
05710013	VERIBOR bore gauge	2	0,5	6 ÷ 12,5	93	2,6	156	4,3	4,9
05710014	VERIBOR bore gauge	2	0,9	12 ÷ 25	106	4,5	194	7,8	7,9
05710015	VERIBOR bore gauge	2	1,3	25 ÷ 50	140	6	228	16	8
05710016	VERIBOR bore gauge	2	1,4	50 ÷ 150	173	10	279	36	12
05710018	VERIBOR bore gauge	2	1,4	50 ÷ 300	173	10	279	36 / 66	12
05710017	VERIBOR bore gauge	2	1,6	240 ÷ 550	227	14	347	112	18



## Depth extensions for VERIBOR



05760027

Compatibility

For VERIBOR  $25 \leq \varnothing \leq 550$  mm

Article number	Designation
<b>05760026</b>	VERIBOR extension, L = 250 mm
<b>05760027</b>	VERIBOR extension, L = 500 mm
<b>05760028</b>	VERIBOR extension, L = 750 mm
<b>05760029</b>	VERIBOR extension, L = 1000 mm

## Extensions set for VERIBOR



05740001

Compatibility

Compatible only with VERIBOR n° 05710016

Article number	Designation
<b>05740001</b>	Set of VERIBOR extensions

# Height gauges



**TESA**  
TECHNOLOGY

## Monitoring operations in the manufacturing process

Why carry the workpieces from a distant measuring room when they can be inspected almost on the spot?

The vertical measurement systems are 1D instruments, usually placed on a granite table, defining a reference plane, devoted to the determination of various characteristics such as height, thickness, depth, internal/external diameter. This is dependant upon the configuration of the associated measuring probe.

The range of TESA height gauges is primarily distinguished by the variety of models available, but also by the many possibilities for applications where these instruments offer genuine performance solutions. Designed for process control of manufacturing operations or directly on a machine tool, they also provide a safe measurement when parts of the dimensions are critical.



## A complete family that meets the needs of demanding users

**TESA-HITE & TESA-HITE MAGNA range**

The height gauges of this range are specially designed for workshop measurement, where ensuring quality metrology is in generally complicated. These instruments are often subject to harsh environmental factors such as temperature, projections, etc.

**MICRO- HITE range**

These high-end 2D height gauges are intuitive due to the clear and refined user philosophy of their embedded software. They are reliable and robust universal machines, developed for workshops that can be integrated as close as possible to the user. Multifunctional, they are a metrological “multi-user” asset, that replaces the most conventional measuring tools.

**μ-HITE range**

Compact measuring station, the perfect compromise for measuring small parts or applications requiring a low measuring force. Based on the comparator principle (coaxial measuring according to the ABBE principle) it achieves extremely fine precision, a characteristic that is often essential for laboratory use.



## Height gauges

### *The safety of a quality product, guaranteed benefits*

Since their development phase, TESA height gauges are subject to strict internal standards aligned with the most restrictive national standards. Thanks to this close monitoring, all TESA height gauges meet the QUALITY requirements that we strive to keep as sharp as possible.

For this reason, our measurement laboratory meets the requirements for SCS accreditation (Swiss Calibration Service). Each instrument in this product line is therefore delivered with a free SCS certificate, making our products meet the requirements of many central laboratories through ILAC cooperation (International Laboratory Accreditation & Cooperation). Any hidden additional extra cost due to a re-certification of the instrument after purchase is avoided.



Calibration laboratory for TESA height gauges

### *A philosophy of use for everyone*

With their refined user interface, ergonomic panel and contextual help button, the TESA height gauges are designed to be quickly accessible to any user profile.

The required learning time is short and autonomy of use is often achieved in less than a day.



Two panels, one philosophy  
For TESA-HITE (left) and for MICRO-HITE or μ-HITE (right)

**MICRO-HITE+M**

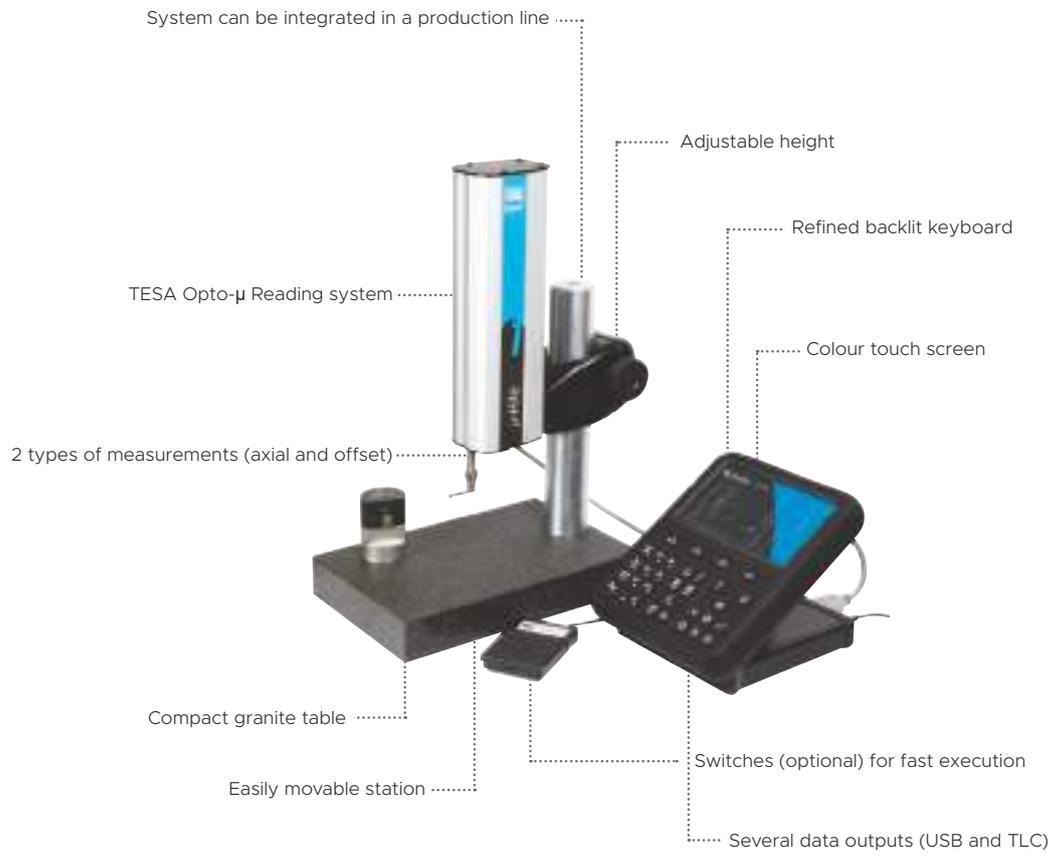


**TESA-HITE**



## Height gauges

### TESA $\mu$ -HITE





		μ-HITE	TESA-HITE MAGNA		TESA-HITE	
Part number		00730502* 00730503*	00730082	00730083	00730084	00730085
Type	Manuel displacement		•	•	•	•
	Motorised displacement	•				
Precision	Max. permissible errors μm, L in mm	Axial: ≤1 Offset: ≤2	≤8	≤8	2,5+4L/1000	2.5+4L/1000
	Repeatability (2σ), μm	Surface: ≤0,5 Arc: ≤1	Surface: ≤ 3 Arc: ≤5	Surface: ≤ 3 Arc: ≤5	Surface: ≤ 2 Arc: ≤3	Surface: ≤ 2 Arc: ≤3
	SCS Certificate	•	•	•	•	•
Instrument	Size, mm	100	400	700	400	700
	Air cushion				•	•
	Fine adjustment		•	•	•	•
	Adjustable panel arm					
Accessories	Probe support Ø 6 mm		•	•	•	•
	Axial probe holder for insert M2,5	•				
	Ball tip insert, Ø 5 mm, tungsten carbide		•	•	•	•
	Axial ball tip insert, Ø 3 mm, tungsten carbide ball tip	•				
	Masterpiece 6,35 mm / .25 in	•	•	•		
Masterpiece 12,7 mm / .5 in	•			•	•	
Power supply	Integrated rechargeable battery		•	•	•	•
	Rechargeable interchangeable battery					
	Charger	•	•	•	•	•
	Power cables EU, US, UK	•	•	•	•	•
Functionalities	Single probing, culmination point	•	•	•	•	•
	Double probing, bore, axis, groove, rib	•	•	•	•	•
	Perpendicularity, straightness				With external display	With external display
	Min, max, delta	•	•	•	•	•
	Angle	•				
	2D	•				
	Integrated calculator, configurable functions	•				
	Reference(s)	2	1	1	1	1
	Distance, midpoint	•	•	•	•	•
	Tolerancing, Go-NoGo report	•				
	Context-based help	•	•	•	•	•
	Preset	•	•	•	•	•
	Programs' management	•				
	Manual or automatic data transmission	•	•	•	•	•
	Data backup on USB stick (txt)	•				
	Sending data through TLC port	•	•	•	•	•
	Screenshot	•				
Customizable interface		•	•	•	•	

\*The metrological specifications for these instruments are valid only for the measuring head and not for the complete system.



### MICRO-HITE

- **PANEL**
    - Hybrid with colour touch screen and keyboard
    - Refined keyboard for easy handling without confusion
    - Adjustable support for optimal reading of the screen at any time
  - **AUTONOMY**
    - Rechargeable interchangeable battery
    - Infinite operative with a backup battery
  - **MEASUREMENT**
    - Patented QUICKCENTER technology integrated to efficiently determine the culmination points
    - Advanced functions for a multi-task instrument, accessible to all users
    - Context-based help to avoid incorrect use and bad results
    - Clear results to decrease possible errors due to bad interpretation of the displayed results
  - **INSTRUMENT**
    - Robust construction to ensure longevity and stability of results over time
  - **DATA MANAGEMENT**
    - Sending values to computer via TLC port
- Automatic creation of pdf reports or txt file on USB stick
- Data printing via USB printer
- **SCS CALIBRATION CERTIFICATE**
    - Free SCS Certificate supplied with purchase to avoid any additional extra costs for calibration of the instrument directly after purchase



00730074

Standard	Factory standard
Resolution	0,0001 / 0,001 / 0,01 mm .00001 / .0001 / .001 in
Zero	Fixed
Coefficient of linear expansion	11,5 x 10 <sup>-6</sup> K <sup>-1</sup>
Material	Base and frame: cast iron
Panel	Colour & touch screen, 84 x 152 mm Keyboard: backlit
Weight	Model 350: 33 kg Model 600: 37 kg Model 900: 45 kg
Power supply	Power connection Rechargeable interchangeable battery
Data output(s)	TLC, USB
Function(s)	Measuring probe can be manually displaced with a displacement wheel Air cushion system
Execution	Manual
Autonomy	8 hours (with a battery block) Infinite (with 2 battery blocks)
Included in delivery	SCS calibration certificate Declaration of conformity
Measuring force	1,6 ± 0,25 N
Units	mm / in

## 2D height gauges

Part number	Designation	Measuring range, mm	Max. perm. errors, $\mu\text{m}$	Repeatability limit, $\mu\text{m}$	Max. perm. perp. error, $\mu\text{m}$	Measuring force, N	Weight kg	Fine adjustment
<b>00730073</b>	MH 350	365	2 + 2L	On surface: $\leq 1$ On arc: $\leq 1$	Frontal: 5 Lateral: 5	$1,6 \pm 0,25$	33	Without
<b>00730074</b>	MH 600	615	2 + 2L	On surface: $\leq 1$ On arc: $\leq 1$	Frontal: 5 Lateral: 5	$1,6 \pm 0,25$	37	Without
<b>00730075</b>	MH 900	920	2 + 2L	On surface: $\leq 1$ On arc: $\leq 1$	Frontal: 9 Lateral: 9	$1,6 \pm 0,25$	45	Without
<b>00730076</b>	MH 350F	365	2 + 2L	On surface: $\leq 1$ On arc: $\leq 1$	Frontal: 5 Lateral: 5	$1,6 \pm 0,25$	33	With
<b>00730077</b>	MH 600F	615	2 + 2L	On surface: $\leq 1$ On arc: $\leq 1$	Frontal: 7 Lateral: 7	$1,6 \pm 0,25$	37	With
<b>00730078</b>	MH 900F	920	2 + 2L	On surface: $\leq 1$ On arc: $\leq 1$	Frontal: 9 Lateral: 9	$1,6 \pm 0,25$	45	With

### Accessories

Part number	Designation
<b>00760222</b>	Holder for accessories
<b>00760140</b>	IG13 probe + holder
<b>00760235</b>	USB printer
<b>00760250</b>	Thermal paper (4 rolls)
<b>00760124</b>	Practice piece
<b>00760151</b>	Dust cover, 350 mm
<b>00760152</b>	Dust cover, 600 mm
<b>00760153</b>	Dust cover, 900 mm
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>00760249</b>	Cleaning liquid for granite table, 1 L
<b>00760256</b>	Rechargeable battery block
<b>00760258</b>	14 V charger + adapter
<b>062473</b>	MICRO-HITE 350 and MICRO-HITE+M 350 packaging
<b>062474</b>	MICRO-HITE 600 and MICRO-HITE+M 600 packaging
<b>062475</b>	MICRO-HITE 900 and MICRO-HITE+M 900 packaging



### MICRO-HITE+M

- **PANEL**
  - Hybrid with colour touch screen and keyboard
  - Refined keyboard for easy handling without confusion
  - Adjustable support for optimal reading of the screen at any time
- **AUTONOMY**
  - Rechargeable interchangeable battery
  - Infinite operative with a backup battery
- **MEASUREMENT**
  - Patented QUICKCENTER technology integrated to efficiently determine the culmination points
  - Advanced functions for a multi-task instrument, accessible to all users
  - Context-based help to avoid incorrect use and bad results
  - Clear results to decrease possible errors due to bad interpretation of the displayed results
- **INSTRUMENT**
  - Robust construction to ensure longevity and stability of results over time
  - Intelligent hand-wheel that integrates the FEEL&MOVE technology for fast and precise probe positioning.
- **DATA MANAGEMENT**
  - Sending values to computer via TLC port
  - Automatic creation of pdf reports or txt file on USB stick
  - Data printing via USB printer
- **SCS CALIBRATION CERTIFICATE**
  - Free SCS Certificate supplied with purchase to avoid any additional extra costs for calibration of the instrument directly after purchase



00730080

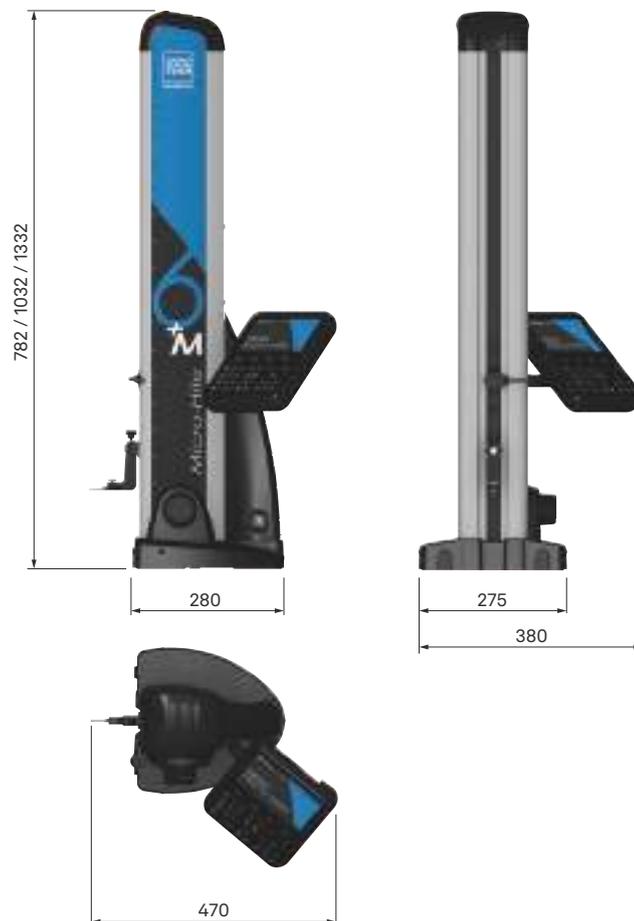
Standard	Factory standard
Resolution	0,0001 / 0,001 / 0,01 mm .00001 / .0001 / .001 in
Zero	Fixed
Coefficient of linear expansion	11,5 x 10 <sup>-6</sup> K <sup>-1</sup>
Material	Base and frame: cast iron
Panel	Colour & touch screen, 84 x 152 mm Keyboard: backlit
Weight	Model 350: 33 kg Model 600: 37 kg Model 900: 45 kg
Power supply	Power connection Rechargeable interchangeable battery
Data output(s)	TLC, USB
Function(s)	Measuring probe can be displaced (motorised) with a displacement wheel Air cushion system
Execution	Motorised
Autonomy	8 hours (with a battery block) Infinite (with two battery blocks)
Included in delivery	SCS calibration certificate Declaration of conformity
Measuring force	1,6 ± 0,25 N
Units	mm / in

## 2D height gauges

Part number	Designation	Measuring range, mm	Max. perm. errors, $\mu\text{m}$	Repeatability limit $\mu\text{m}$	Max. perm. perp. error, $\mu\text{m}$	Measuring force, N	Weight kg
<b>00730079</b>	MH+M 350	365	1,8 + 2L	On surface: $\leq 0,5$ On arc: $\leq 1$	Frontal: 5 Lateral: 5	$1,6 \pm 0,25$	33
<b>00730080</b>	MH+M 600	615	1,8 + 2L	On surface: $\leq 0,5$ On arc: $\leq 1$	Frontal: 7 Lateral: 7	$1,6 \pm 0,25$	37
<b>00730081</b>	MH+M 900	920	1,8 + 2L	On surface: $\leq 0,5$ On arc: $\leq 1$	Frontal: 9 Lateral: 9	$1,6 \pm 0,25$	45

### Accessories

Part number	Designation
<b>00760222</b>	Holder for accessories
<b>00760140</b>	IG13 probe + holder
<b>00760235</b>	USB printer
<b>00760250</b>	Thermal paper (4 rolls)
<b>00760124</b>	Practice piece
<b>00760151</b>	Dust cover, 350 mm
<b>00760152</b>	Dust cover, 600 mm
<b>00760153</b>	Dust cover, 900 mm
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>00760249</b>	Cleaning liquid for granite table, 1 L
<b>00760256</b>	Rechargeable battery block
<b>00760258</b>	14 V charger + adapter
<b>062473</b>	MICRO-HITE 350 and MICRO-HITE+M 350 packaging
<b>062474</b>	MICRO-HITE 600 and MICRO-HITE+M 600 packaging
<b>062475</b>	MICRO-HITE 900 and MICRO-HITE+M 900 packaging



## TESA-HITE

- **PANEL**
  - Protected against the penetration of liquids or dust (IP65)
  - Big colour screen for better reading in dimly lit surroundings
  - Black display background for excellent contrast
  - Large numbers displayed on the screen (21 mm) for optimal readability
  - Keyboard with few buttons for easy learning without confusion
- **AUTONOMY**
  - Long battery life (60h) to avoid too frequent recharging
- **MEASURE**
  - Philosophy of use similar to tablets or smartphones
  - Quick access to the first measurement from start up (<4s) for a significant time saving
  - QUICKCENTER DYNAMIC technology integrated to efficiently determine the culmination points
  - Context-based help to avoid incorrect use and bad results
  - The interface can be customized according to the user's wishes
- **SCS CALIBRATION CERTIFICATE**
  - Free SCS certificate provided to avoid additional costs for re-calibration at the initial purchase



00730084

Standard	Factory standard
Resolution	0,0001 / 0,001 / 0,01 mm .00001 / .0001 / .001 in
Zero	Fixed
Coefficient of linear expansion	(12 ± 1,5) x 10 <sup>-6</sup> K <sup>-1</sup>
Material	Base: cast iron
Degree of protection	Panel: IP65
Particular characteristic(s)	Integrated fine adjustment Air cushion system
Panel	Panel: 155 x 210 x 43 mm Screen: colour, 121 x 92 mm Value on screen: 20 x 10 mm
Weight	Model 400: 24 kg Model 700: 30 kg
Power supply	Power connection Rechargeable interchangeable battery
Data output(s)	TLC
Function(s)	Manual displacement of the measuring probe
Execution	Manual
Autonomy	≈ 60 hours
Included in delivery	SCS calibration certificate Declaration of conformity
Measuring force	1,5 ± 0,5 N
Units	mm / in

## 1D height gauges

Part number	Designation	Measuring range, mm	Max. perm. errors, $\mu\text{m}$	Repeatability limit, $\mu\text{m}$	Max. perm. perp. error, $\mu\text{m}$	Measuring force, N	Weight kg
<b>00730084</b>	TH 400	415	2,5 + 4L	On surface: $\leq 2$ On arc: $\leq 3$	9	$1,5 \pm 0,5$	24
<b>00730085</b>	TH 700	715	2,5 + 4L	On surface: $\leq 2$ On arc: $\leq 3$	13	$1,5 \pm 0,5$	30

### Accessories

Part number	Designation
<b>00760124</b>	Practice piece
<b>00760152</b>	Dust cover, 600 mm
<b>00760153</b>	Dust cover, 900 mm
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>00760249</b>	Cleaning liquid for granite table, 1 L
<b>00760258</b>	14 V charger + adapter
<b>S07610172</b>	Travel case for TESA-HITE
<b>063404</b>	TESA-HITE 400 and TESA-HITE MAGNA 400 packaging
<b>063405</b>	TESA-HITE 700 and TESA-HITE MAGNA 700 packaging



## TESA-HITE MAGNA

- **PANEL**
  - Protected against the penetration of liquids or dust (IP65)
  - Big colour screen for better reading in dimly lit surroundings
  - Black display background for excellent contrast
  - Large numbers displayed on the screen (21 mm) for optimal readability
  - Keyboard with few buttons for easy learning without confusion
- **AUTONOMY**
  - Long battery life (60h) to avoid too frequent recharging
- **MEASURE**
  - Philosophy of use similar to tablets or smartphones
  - Quick access to the first measurement from start up (<4s) for a significant time saving
  - Magnetic measuring system (patented) ensuring functioning in the extreme conditions of the workshop
  - QUICKCENTER DYNAMIC technology integrated to efficiently determine the culmination points
  - Context-based online help to avoid incorrect use and bad results
  - The interface can be customized according to the user's wishes
- **SCS CALIBRATION CERTIFICATE**
  - Free SCS certificate provided to avoid additional costs for re-calibration at the initial purchase



00730082

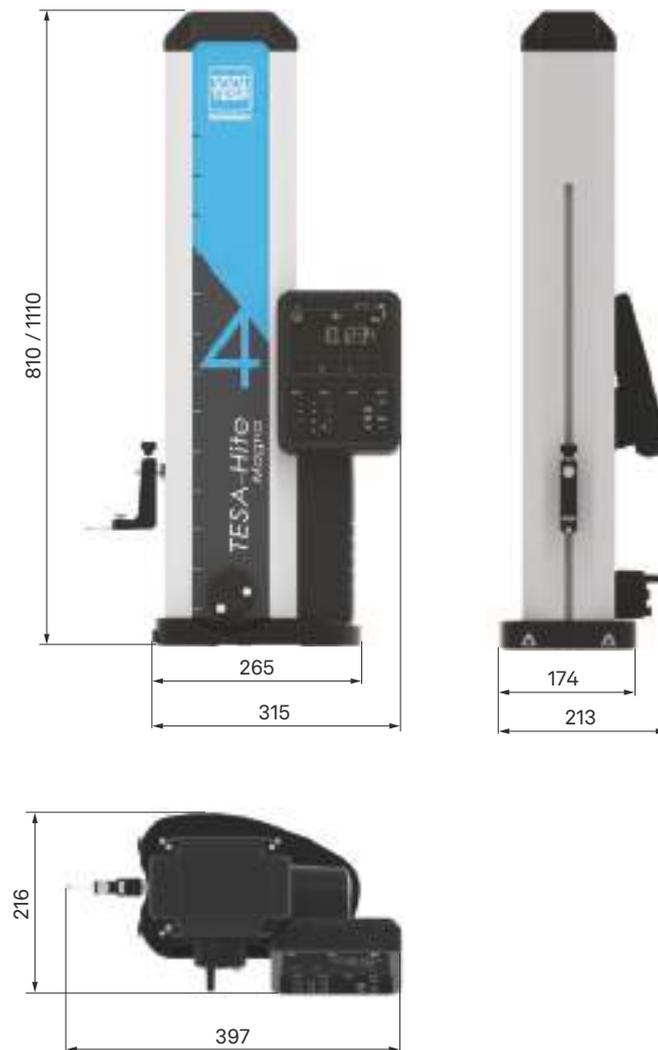
Standard	Factory standard
Resolution	0,001 / 0,005 / 0,01 mm .0001 / .0002 / .001 in
Zero	Fixed
Coefficient of linear expansion	(12 ± 1,5) x 10 <sup>-6</sup> K <sup>-1</sup>
Material	Base: cast iron
Degree of protection	Measuring system: IP55 Panel: IP65
Particular characteristic(s)	Integrated fine adjustment
Panel	Panel: 155 x 210 x 43 mm Screen: colour, 121 x 92 mm Value on screen: 20 x 10 mm
Weight	Model 400: 15 kg Model 700: 18 kg
Power supply	Power connection Rechargeable interchangeable battery
Data output(s)	TLC
Function(s)	Manual displacement of the measuring probe
Execution	Manual
Autonomy	≈ 60 hours
Included in delivery	SCS calibration certificate Declaration of conformity
Measuring force	1,5 ± 0,5 N
Units	mm / in

## 1D height gauges

Part number	Designation	Measuring range, mm	Max. perm. errors, $\mu\text{m}$	Repeatability limit, $\mu\text{m}$	Measuring force, N	Weight kg
<b>00730082</b>	TH MG 400	415	$\leq 8$	On surface: $\leq 3$ On arc: $\leq 5$	$1,5 \pm 0,5$	15
<b>00730083</b>	TH MG 700	715	$\leq 8$	On surface: $\leq 3$ On arc: $\leq 5$	$1,5 \pm 0,5$	18

### Accessories

Part number	Designation
<b>00760124</b>	Practice piece
<b>00760152</b>	Dust cover, 600 mm
<b>00760153</b>	Dust cover, 900 mm
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE ® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>00760249</b>	Cleaning liquid for granite table, 1 L
<b>00760258</b>	14 V charger + adapter
<b>S07610172</b>	Travel case for TESA-HITE
<b>063404</b>	TESA-HITE 400 and TESA-HITE MAGNA 400 packaging
<b>063405</b>	TESA-HITE 700 and TESA-HITE MAGNA 700 packaging



## TESA $\mu$ -HITE

- **PANEL**
  - Hybrid with colour touch screen and keyboard
  - Refined keyboard for easy handling without confusion
- **MEASUREMENT**
  - Advanced functions (angle, parallelism, 2D, ...) for a multi-task instrument, accessible to all users
  - Context-based online help to avoid incorrect use and bad results
  - Clear interface to decrease possible errors due to bad interpretation of the displayed results
  - Flexible since the instrument can be used as 1D probe as well as height gauge
- **INSTRUMENT**
  - Turnkey solution easy to set up and quickly operational
  - Its small footprint makes it an instrument that can be integrated and moved in any kind of workshop close to production machines
- **DATA MANAGEMENT**
  - Sending values to computer via TLC port (cable or Bluetooth®)
  - Automatic creation of pdf reports or txt files on USB stick
  - Data printing via USB printer
- **SCS CALIBRATION CERTIFICATE**
  - Free SCS Certificate supplied with purchase to avoid any additional extra costs for calibration of the instrument directly after purchase



00730503

Standard	Factory standard
Resolution	0,001 mm / 0,0001 mm .0001 / .00005 in
Zero	Fixed
Coefficient of linear expansion	11,5 x 10 <sup>-6</sup> K <sup>-1</sup>
Material	Table: granit Pole: hardened steel Measuring head support: cast iron
Dimensions	Granite: 200 x 300 x 50 mm Pole: Ø 50 x 300 mm
Degree of protection	Measuring head: IP50
Panel	Colour & touch screen, 84 x 152 mm Keyboard: backlit
Weight	Table + pole + support: 16,2 kg Panel + box: 1,5 kg Measuring head: 2,5 kg
Data output(s)	TLC, USB
Max. displacement speed	Fast displacement: 10, 20, 30, 40 mm/s Probing: 5, 10 mm/s
Execution	Motorised
Included in delivery	SCS calibration certificate Declaration of conformity
Measuring force	1,0 ± 0,2 N 0,6 ± 0,2 N
Units	mm / in

## Measuring station

Part number	Designation	Max. perm. errors, $\mu\text{m}$	Repeatability limit, $\mu\text{m}$	Measuring force, N	Execution
<b>00730503</b>	$\mu$ -HITE	Axial: 1 Offset: 2	Axial: 0,5 Offset: 1	0,6 or 1	Motorised
<b>00730502</b>	$\mu$ -HITE without granite, pole and support	Axial: 1 Offset: 2	Axial: 0,5 Offset: 1	0,6 or 1	Motorised
<b>00730504</b>	Retrofit kit for former $\mu$ -HITE			0,6 or 1	

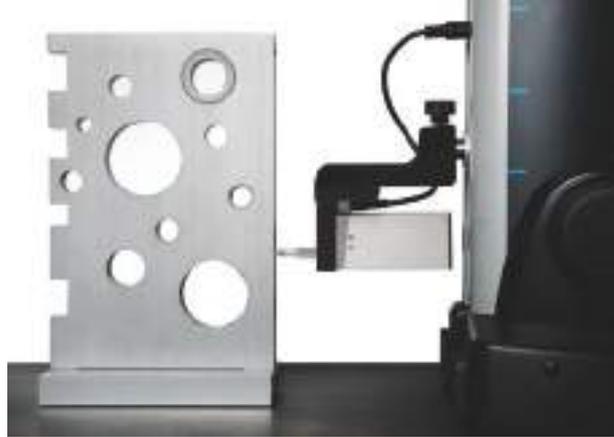
### Accessories

Part number	Designation (catalog)
<b>00760235</b>	USB printer
<b>00760250</b>	Thermal paper (4 rolls)
<b>04981001</b>	DATA-DIRECT software
<b>04981002</b>	STAT-EXPRESS software
<b>DATA-VIEWER</b>	Free data acquisition software
<b>04760183</b>	TLC-BLE Bluetooth® emitter + USB dongle receiver + 1,5 m extension cable set
<b>04760184</b>	TLC-BLE Bluetooth® emitter
<b>04760185</b>	USB receiver + 1,5 m extension cable
<b>00760258</b>	14 V charger + adapter
<b>00760249</b>	Cleaning liquid for granite table, 1 L
<b>063416</b>	$\mu$ -HITE packaging



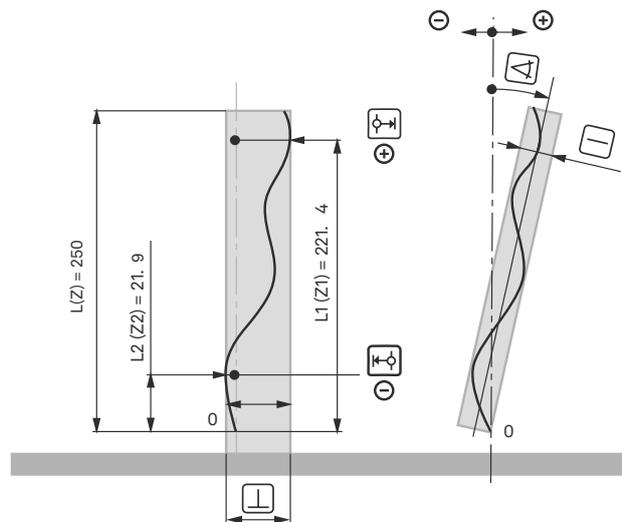
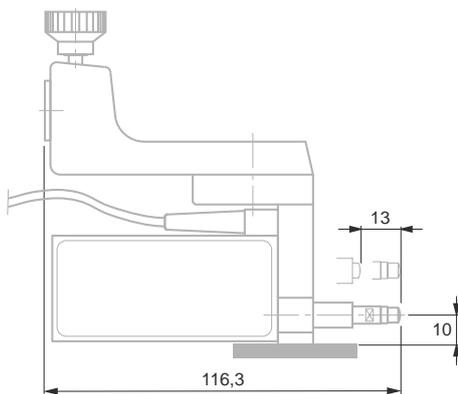
### IG13 probe and accessories

The IG13 probe has been specially developed for the range of the MICRO-HITE (manual or motorised) height gauges for reliability and accuracy reasons. Robust, it is used in laboratories as well as workshops where the working environment is more restrictive.



Measuring range	13 mm
Max. perm. errors	1 $\mu\text{m}$
Measuring force	0,45 N at zero 0,75 N at stop
Included in delivery	Measurement report Declaration of conformity

Part number	Designation	Remark(s)
<b>00760138</b>	IG13 holder	
<b>00760139</b>	IG13 probe	
<b>00760140</b>	IG13 probe + holder	
<b>00760247</b>	Connection cable to the MH or MH+M	Useable with height gauges 00730073 to 00730081



## Accessories for perpendicularity measurement

### Supports for accessories

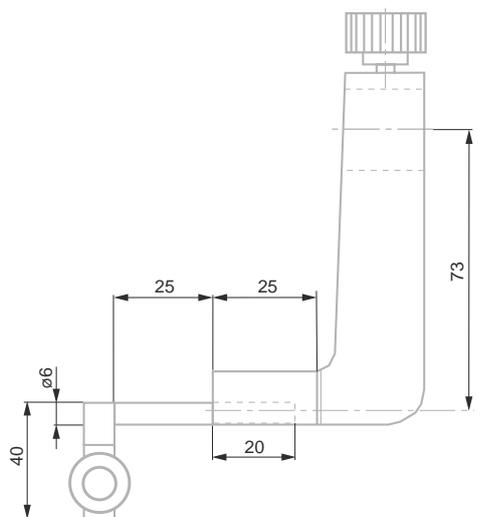
Certain height gauges of the range are adjusted in their perpendicularity (frontal plane) so that they can be used as a squareness measuring instrument by using a lever-type dial test indicator or other similar accessory. In this configuration we speak of a mechanical perpendicularity deviation only.

- Manual MICRO-HITE models
- Motorised MICRO-HITE+M models
- Manual TESA-HITE models (with external display)

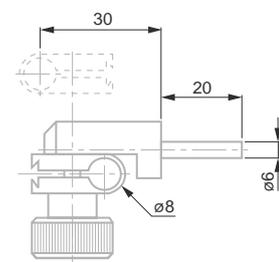
For example, a TWIN-T10 display coupled to an inductive probe and its support is an optimal configuration for detecting perpendicularity deviations. Other configurations are also possible.



Part number	Designation
<b>00760222</b>	Holder for accessories
<b>00760166</b>	Holder for accessories



00760222



00760166

### Printer for MICRO-HITE range

Together with instruments in the MICRO-HITE range as well as the TESA  $\mu$ -HITE measuring station, data can be automatically and directly sent to a printer connected to the control panel.

As the printer is optional, it can be connected to an instrument in this range at any time of its use.



Part number	Designation	Remark(s)
00760235	USB printer for MICRO-HITE	For panel 00760233 and 00760234

### MICRO-HITE fine adjustment system



Part number	Designation	Remark(s)
00760246	MICRO-HITE fine adjustment kit	For MICRO-HITE 2016 range

## Printers and accessories

### Battery and accessories

The power supply of a MICRO-HITE or a MICRO-HITE + M can be achieved via two means:

- via a network connected to power
- via an integrated battery in the instrument, this battery is rechargeable and easy to remove.

With an accumulator, work on the control granite is therefore much easier to the extent that no power cable impedes the operator's movements with the height gauge.

When used mainly on battery power, it is highly advisable to purchase a second battery pack that will, through an interchangeable system, always have an operational battery when the other is charging. This allows an infinite autonomy unlike the instruments with an integrated battery without possibility of exchange.



Part number	Designation	Remark(s)
<b>00760256</b>	Rechargeable battery block	For MICRO-HITE 2016 range
<b>00760258</b>	14 V charger + adapter	For MICRO-HITE 2016 range

### Cleaning liquid for granite table

- SCOPE
  - Thorough cleaning of all types of stone surfaces
  - Daily or weekly use
  - Apply with a lint free cloth and then wipe with a dry cloth.
- AUTONOMY
 

Cleaning is an important part of preventive maintenance. It ensures correct measurements and extends the life of your granite.



Part number	Designation
<b>00760249</b>	Cleaning liquid for granite table, 1 L

### Dust cover

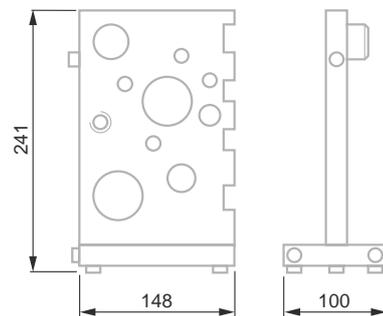
In certain situations the columns are used in harsh production environments characterized by a high rate of dust and frequent spills of liquid (water, oil, etc.). Thus, a cover can be the essential accessory to effectively protect the instrument when not in use.



Part number	Designation
00760151	Dust cover, 350 mm
00760152	Dust cover, 600 mm
00760153	Dust cover, 900 mm

### Practice piece

Just as learning an instrument is a key moment to confirm optimum productivity later, TESA has developed an exercise piece that allows to review all metrological options that offer its vertical measuring ranges.



00760124

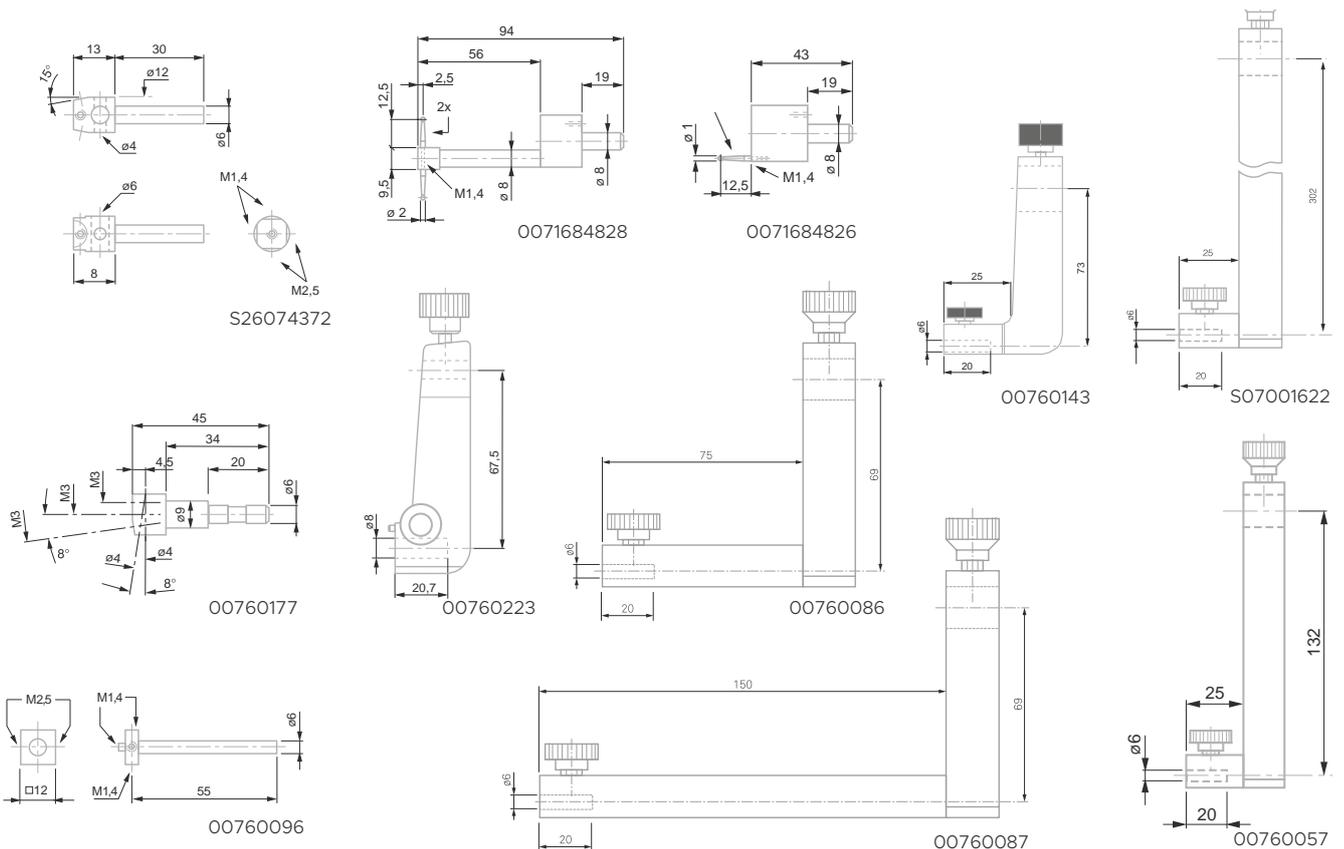
Part number	Designation
00760124	Practice piece

## Other accessories for height gauges

### Inserts holders for TESA-HITE and MICRO-HITE ranges



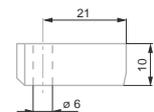
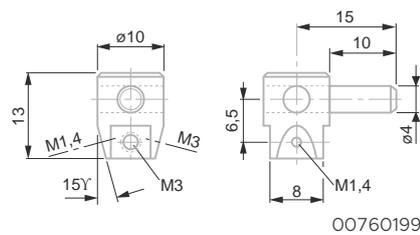
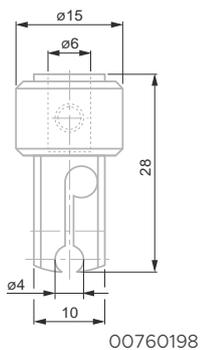
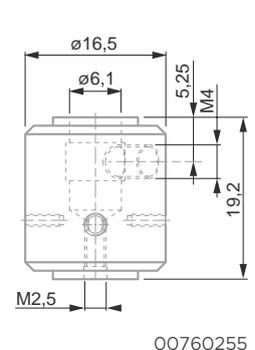
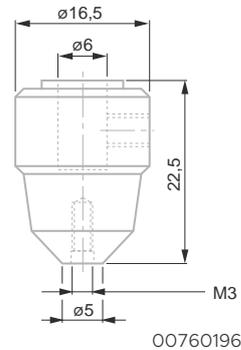
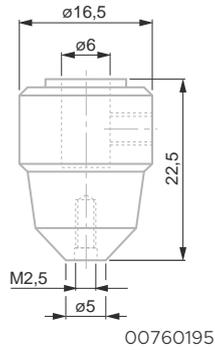
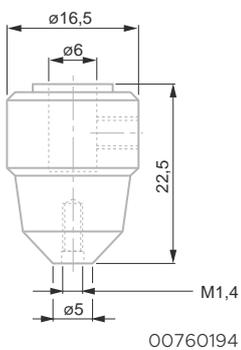
Part number	Fixing mm	Particular characteristic(s)
<b>S26074372</b>	Ø 6	For insert Ø 4 mm (1), Ø 6 mm (1), M1,4 (2), M2,5 (2)
<b>00760096</b>	Ø 6	For inserts M1,4 (3) and M2,5 (2)
<b>00760177</b>	Ø 6	For M3 inserts
<b>00760243</b>	Ø 6	For inserts with Ø 6 mm
<b>0071684828</b>	Ø 8	For M1,4 inserts (including Ø 2 mm and Ø 2,5 mm)
<b>0071684826</b>	Ø 8	For M1,4 inserts (including Ø 1 mm)
<b>00760057</b>	Ø 14,5	For inserts with Ø 6 mm
<b>00760086</b>	Ø 14,5	For inserts with Ø 6 mm
<b>00760087</b>	Ø 14,5	For inserts with Ø 6 mm
<b>S07001622</b>	Ø 14,5	For inserts with Ø 6 mm
<b>00760223</b>	Ø 14,5	For inserts with Ø 8 mm



Inserts holders for TESA  $\mu$ -HITE range



Part number	Execution	Fixing mm	Particular characteristic(s)
<b>00760187</b>	Radial		
<b>00760199</b>	Radial	$\varnothing$ 4	For inserts M1,4 (2) and M3 (2)
<b>00760194</b>	Axial	$\varnothing$ 6	For M1,4 inserts
<b>00760195</b>	Axial	$\varnothing$ 6	For M2,5 inserts
<b>00760196</b>	Axial	$\varnothing$ 6	For M3 inserts
<b>00760198</b>	Radial	$\varnothing$ 6	For M4 inserts
<b>00760255</b>	Radial	$\varnothing$ 6	For inserts M1,4 (2) and M2,5 (3)





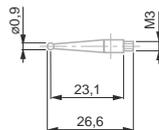
**Ball tip inserts, mounting M2,5 and M3**



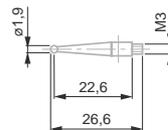
Part number	Diameter mm	Probe length mm	Fixing mm	Material	Particular characteristic(s)
<b>00760180</b>	0,9	26,6	M3	Steel	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>00760181</b>	1,9	26,6	M3	Steel	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>00760182</b>	2,9	26,6	M3	Steel	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560051</b>	1	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560052</b>	2	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560053</b>	3	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560054</b>	4	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560055</b>	5	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560056</b>	6	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560057</b>	7	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>03560058</b>	8	18	M2,5	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE



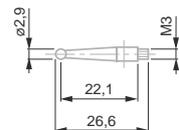
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00760180



00760181



00760182

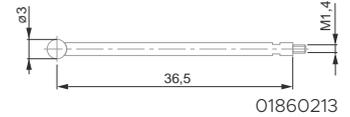
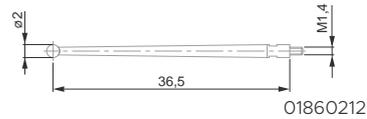
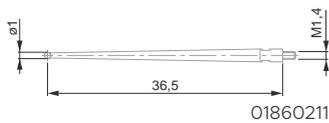
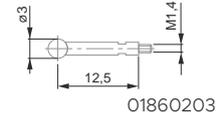
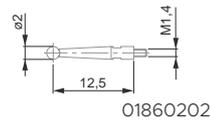
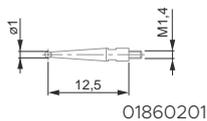
## Inserts and holders

### Ball tip inserts, mounting M1,4



01860201 + 00760096

Part number	Diameter mm	Probe length mm	Fixing mm	Material	Particular characteristic(s)
<b>01860201</b>	1	12,53	M1,4	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>01860202</b>	2	12,53	M1,4	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>01860203</b>	3	12,53	M1,4	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>01860211</b>	1	36,5	M1,4	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>01860212</b>	2	36,5	M1,4	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE
<b>01860213</b>	3	36,5	M1,4	Tungsten carbide	For TESA-HITE, MICRO-HITE and $\mu$ -HITE



## Cone probes

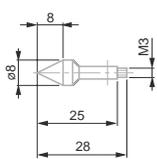
Conical probes are in principle not used for conventional measure such as 'probing', since it is not possible by their geometry to trigger in an accurate way a measuring point.

They are mainly used for determining the location of bores as their shape allows quick mechanical positioning at the center of these elements.

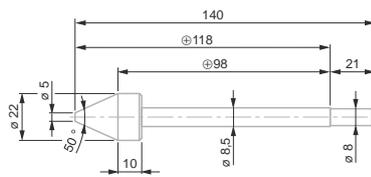


0071684822

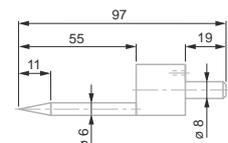
Part number	Diameter mm	Probe length mm	Fixing mm	Material
<b>0071684819</b>	22	140	Ø 8	Steel
<b>0071684822</b>	6	97	Ø 8	Steel
<b>00760183</b>	8	28	M3	Steel



00760183



0071684819



0071684822

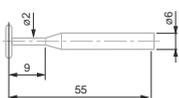
## Disc inserts

As their name suggests, these styli are disc shaped with variable thicknesses and diameters to allow for probing of centring shoulders and grooves.

These accessories are often used in interior bore measurements where they are a good substitute to the star shaped stylus if this one cannot be used.



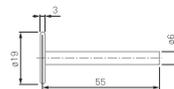
Part number	Diameter mm	Probe length mm	Fixing mm	Material
<b>0071684827</b>	12	91	Ø 8	Tungsten carbide
<b>00760074</b>	4,5	55,5	Ø 6	Tungsten carbide
<b>00760075</b>	14	56	Ø 6	Tungsten carbide
<b>00760076</b>	19	56,5	Ø 6	Tungsten carbide



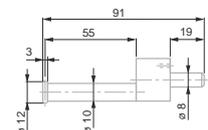
00760074



00760075



00760076



0071684827

## Inserts and holders

### Cylindrical or barrel inserts

The cylinder-shaped stylus are often used for the measurement of elements that cannot or only with difficulty be measured with a simple ball stylus. Indeed, it happens that for some measures the contact between the accessory and the part to be measured cannot be guaranteed when the end of the accessory is a sphere.

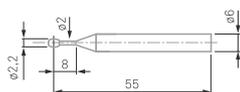
It can also be used for measuring threaded elements and often for the determination of center tapped holes



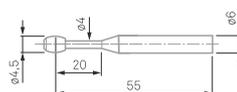
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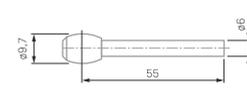
Part number	Diameter mm	Probe length, mm	Fixing mm	Material	Particular characteristic(s)
<b>03510502</b>	3,3	6	M2,5	Tungsten carbide	Counter-nut for radial alignment
<b>03510503</b>	4	6	M2	Tungsten carbide	Counter-nut for radial alignment
<b>0071684820</b>	10	96	Ø 8	Steel	
<b>00760066</b>	2,2	57,5	Ø 6	Tungsten carbide	
<b>00760067</b>	4,5	60	Ø 6	Tungsten carbide	
<b>00760068</b>	9,7	62,5	Ø 6	Tungsten carbide	
<b>00760082</b>	2	58,5	Ø 6	Tungsten carbide	
<b>00760093</b>	10	91		Steel basis, measuring face tungsten carbide	



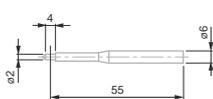
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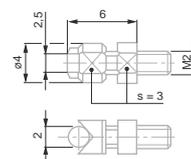
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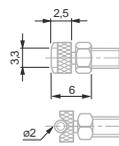
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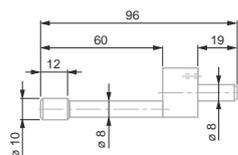
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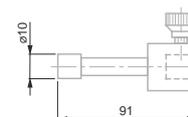
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03510502



0071684820

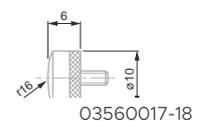
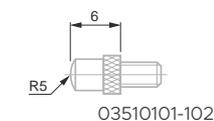
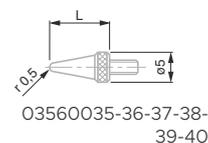
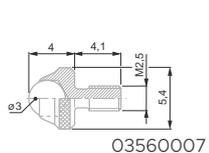
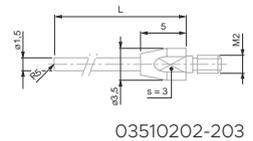
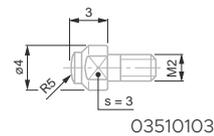
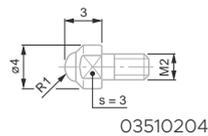
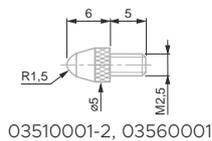
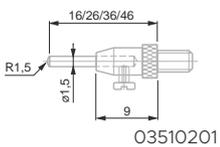


00760093

## Hemispherical inserts



Part number	Radius mm	Probe length mm	Fixing mm	Material	Particular characteristic(s)
<b>03510201</b>	1,5	16, 26, 36, 46	M2,5	Steel	Interchangeable pins
<b>03510202</b>	5	16	M2	Tungsten carbide	
<b>03510203</b>	5	26	M2	Tungsten carbide	
<b>03510204</b>	1	3	M2	Tungsten carbide	
<b>03510001</b>	1,5	6	M2,5	Steel	
<b>03510002</b>	1,5	6	M2,5	Tungsten carbide	
<b>03510101</b>	5	6	M2,5	Steel	
<b>03510102</b>	5	6	M2,5	Tungsten carbide	
<b>03510103</b>	1	3	M2	Tungsten carbide	
<b>03560001</b>	1,5	6	M2,5	Sapphire	
<b>03560007</b>	1,5	4	M2,5	Tungsten carbide	
<b>03560017</b>	16	6	M2,5	Steel	
<b>03560018</b>	16	6	M2,5	Tungsten carbide	
<b>03560019</b>	1,5	8	M2,5	Steel	
<b>03560020</b>	1,5	8	M2,5	Tungsten carbide	
<b>03560021</b>	1,5	8	M2,5	Ruby	
<b>03560035</b>	0,5	5	M2,5	Steel	
<b>03560036</b>	0,5	10	M2,5	Steel	
<b>03560037</b>	0,5	15	M2,5	Steel	
<b>03560038</b>	0,5	20	M2,5	Steel	
<b>03560039</b>	0,5	30	M2,5	Steel	
<b>03560040</b>	0,5	40	M2,5	Steel	

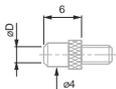


## Inserts and holders

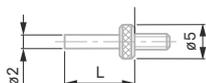
### Inserts with flat measuring face



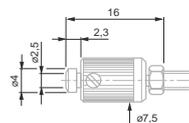
Part number	Diameter mm	Probe length mm	Fixing mm	Material	Particular characteristic(s)
<b>03510902</b>	4	16	M2,5	Tungsten carbide	Adjustable parallelism
<b>03560008</b>	1,5	20	M2,5	Steel	Interchangeable pins
<b>03560009</b>	1,5	20	M2,5	Tungsten carbide	Interchangeable pins
<b>03510801</b>	2,5	6	M2,5	Steel	
<b>03510802</b>	2,5	6	M2,5	Tungsten carbide	
<b>03560022</b>	3,4	6	M2,5	Steel	
<b>03560023</b>	3,4	6	M2,5	Tungsten carbide	
<b>03560026</b>	2	2,8	M2,5	Steel	
<b>03560027</b>	2	7,8	M2,5	Steel	
<b>03560028</b>	2	12,8	M2,5	Steel	
<b>03560029</b>	2	17,8	M2,5	Steel	
<b>03560012</b>	5	5	M2,5	Steel	
<b>03560013</b>	5	5	M2,5	Tungsten carbide	
<b>03560014</b>	10	6	M2,5	Steel	
<b>03560015</b>	10	6	M2,5	Tungsten carbide	
<b>03560016</b>	20	3,6	M2,5	Steel	



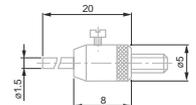
03510801, 03560026, 03510902



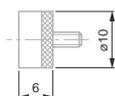
03560026-27-28-29



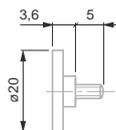
03510902



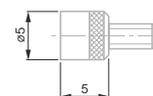
03560008-9



03560014-15



03560016



03560012-13

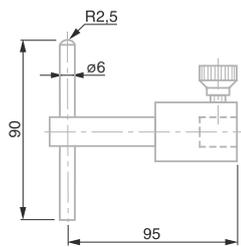
## Shaft probes

The shaft probes are mainly used to measure grooves, centring shoulders, blind bores, etc.

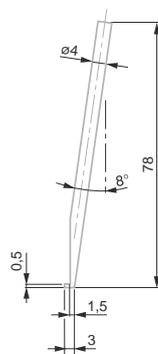


00760178

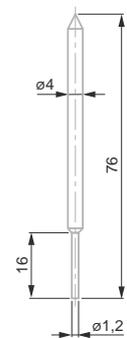
Part number	Probe length mm	Material	Particular characteristic(s)
<b>00760094</b>	95	Steel	1 x flat face and 1 x hemispherical face
<b>00760178</b>	78	Steel	Angle 8°
<b>00760179</b>	76	Steel	1 x contact point face and 1 x flat face



00760094



00760178



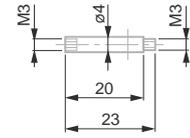
00760179

## Inserts and holders

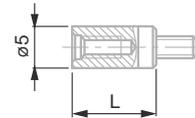
### Extensions



00760184

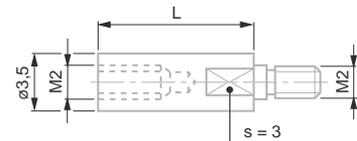


00760184



03560042-43-44-45-46-47-48-49-50

Part number	Probe length mm	Fixing mm
<b>00760184</b>	20	M3
<b>03540505</b>	10	M2
<b>03540506</b>	15	M2
<b>03560042</b>	10	M2,5
<b>03560043</b>	15	M2,5
<b>03560044</b>	20	M2,5
<b>03560045</b>	25	M2,5
<b>03560046</b>	30	M2,5
<b>03560047</b>	35	M2,5
<b>03560048</b>	40	M2,5
<b>03560049</b>	45	M2,5
<b>03560050</b>	50	M2,5

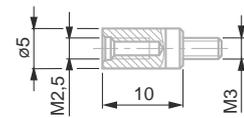


03540505-506

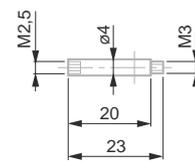
### Adapters



03560065



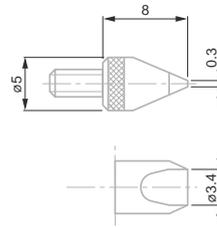
03560065



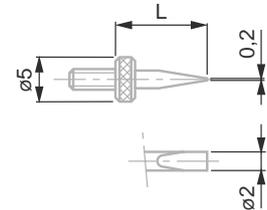
00760185

Part number	Probe length mm	Fixing mm	Particular characteristic(s)
<b>03560092</b>		M2,5	For M2 inserts
<b>03560065</b>		M3	For M2,5 inserts
<b>00760185</b>	20	M3	For M2,5 inserts

**Inserts with knife blade shape**



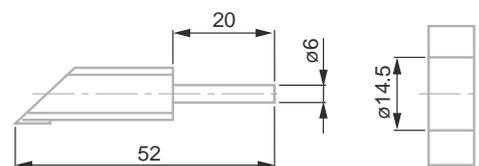
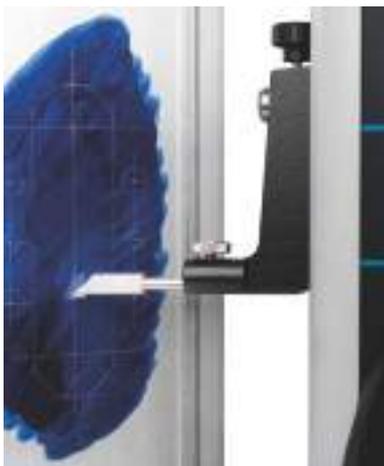
03560031



03560024

Part number	Probe length mm	Fixing mm	Material	Particular characteristic(s)
03560024	8	M2,5	Steel	Lock nut for radial alignment
03560025	8	M2,5	Tungsten carbide	Lock nut for radial alignment
03560031	5	M2,5	Steel	Lock nut for radial alignment
03560032	10	M2,5	Steel	Lock nut for radial alignment
03560033	15	M2,5	Steel	Lock nut for radial alignment
03560034	20	M2,5	Steel	Lock nut for radial alignment

**Scribers**



00760165

Part number	Probe length mm	Fixing mm	Material
00760172	30	Ø 6	Tungsten carbide
00760165	32	Ø 6	Tungsten carbide

## Set of probe inserts + accessories

### Instrument sets



00760175

			For TESA-HITE and MICRO-HITE				For $\mu$ -HITE	
Family	Part number	Description	00760232	00760173	00760148	00760175	00760186	
Probe holders	00760057	Probe support $\varnothing$ 6 mm			•			
	00760086	Probe holder $\varnothing$ 6 mm For depth up to 110 mm			•			
	00760087	Probe holder $\varnothing$ 6 mm For depth up to 185 mm			•			
	00760177	Adapter for M3 inserts				•		
	00760187	Probe holder for offset measurement					•	
Probes	00760061	Ball tip insert $\varnothing$ 3 mm Mounting $\varnothing$ 6 mm	•	•	•			
	00760060	Ball tip insert $\varnothing$ 10 mm Mounting $\varnothing$ 6 mm		•	•			
	00760180	Ball tip insert $\varnothing$ 0,9 mm Mounting M3				•	•	
	00760181	Ball tip insert $\varnothing$ 1,9 mm Mounting M3				•	•	
	00760182	Ball tip insert $\varnothing$ 2,9 mm Mounting M3				•	•	
	00760228	Ball tip insert $\varnothing$ 1 mm Mounting $\varnothing$ 6 mm		•	•			
	00760229	Ball tip insert $\varnothing$ 2 mm Mounting $\varnothing$ 6 mm		•	•			
	00760230	Ball tip insert $\varnothing$ 3 mm Mounting $\varnothing$ 6 mm		•	•			
	00760066	Barrel shaped insert $\varnothing$ 2,2 mm Mounting $\varnothing$ 6 mm			•			
	00760067	Barrel shaped insert $\varnothing$ 4,5 mm Mounting $\varnothing$ 6 mm			•			
	00760068	Barrel shaped insert $\varnothing$ 9,7 mm Mounting $\varnothing$ 6 mm			•			
	00760074	Disc-shaped insert $\varnothing$ 4,5 mm Mounting $\varnothing$ 6 mm			•			
	00760075	Disc-shaped insert $\varnothing$ 14 mm Mounting $\varnothing$ 6 mm	•	•	•			
	00760076	Disc-shaped insert $\varnothing$ 19 mm Mounting $\varnothing$ 6 mm			•			
	00760082	Cylindrical insert $\varnothing$ 2 mm Mounting $\varnothing$ 6 mm	•		•			
	00760093	Cylindrical insert $\varnothing$ 10 mm		•	•			
	00760183	Cone-shaped insert $\varnothing$ 8 mm Mounting M3				•	•	
	Shaft probes	00760094	Probe holder + rod	•	•	•		
		00760178	Shaft probe $\varnothing$ 4 mm Angle 8°				•	•
00760179		Cylindrical shaft probe $\varnothing$ 4 mm 1 x pointed tip				•	•	
Extensions	00760184	Extension L20 mm Mounting M3 For M3 insert				•	•	
	00760185	Extension L20 mm Mounting M3 For M2,5 insert				•	•	





# Surface roughness testing



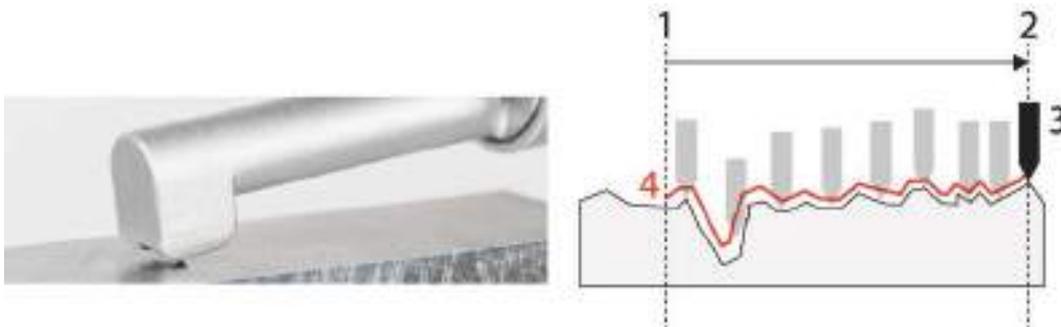
**TESA**  
TECHNOLOGY

## Roughness Measurement

Roughness gauges are instruments used to determine surface irregularities, such as the level of wear on metal surfaces or the condition of surfaces after machining.

TESA roughness gauges are classic compact models using a highly resistant diamond tip. This tip will scan these irregularities so that the instrument can determine a profile. The determination of the tip to be measured is important since it will allow, according to the surface to be measured, to reach a more or less high precision.

Once the micro-geometric asperities of the surface are measured, parameter values are defined, thus qualifying the defects of the controlled zone.



(1) Start of measurement, (2) End of measurement, (3) Diamond tip, (4) Measured profile

## TESA Roughness Gauges

### RUGOSURF 20

A portable and compact roughness tester, its large screen allows the user to directly display the measured profiles and available graphics.

### TWIN-SURF

A portable and ultra-compact roughness tester, this instrument allows measurements in hard-to-reach places thanks to its feature that allows the probe to be positioned at 90°. It can also be mounted on other instruments such as height gauges. A model with integrated Bluetooth® is available, allowing data to be send directly to a wireless printer.

### RUGOSURF 90G

Roughness tester that can also be transformed into a profile meter by using the PROFILE SET 2 mm option. It can also measure in three directions: +90°, 0 and -90°.



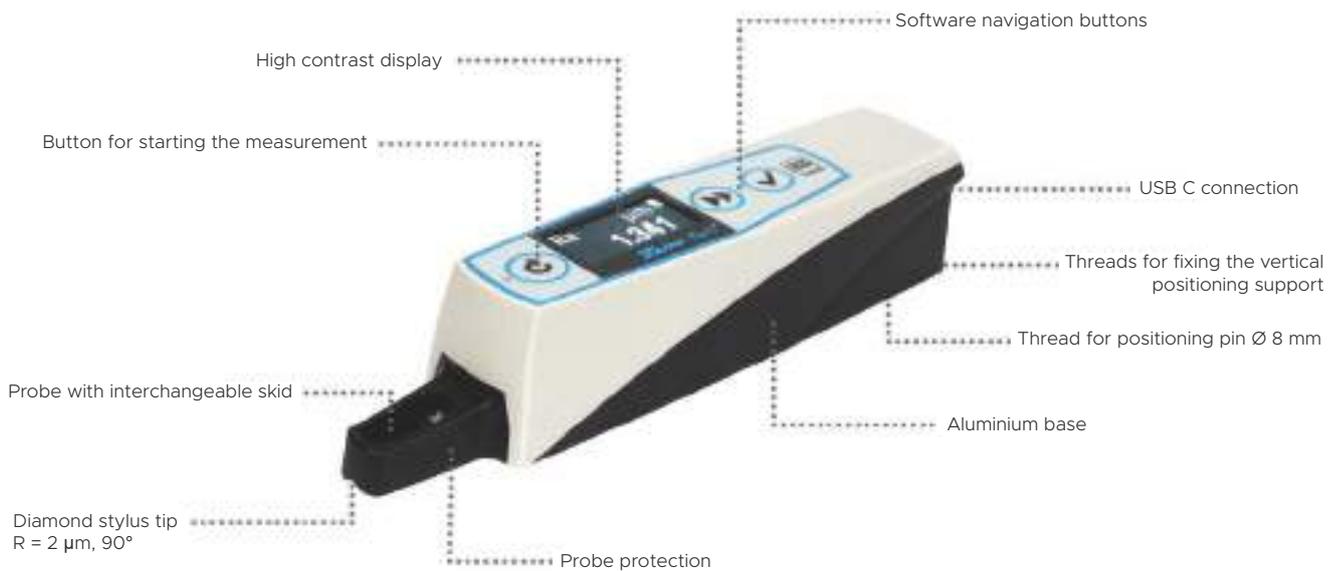
TWIN-SURF, RUGOSURF 20, RUGOSURF 90G

## Surface roughness testing

### RUGOSURF 20



### TWIN-SURF



## RUGOSURF 20

- INSTRUMENT
  - Portable and robust
  - 3 buttons on top of the product for easy instrument configuration
  - Interchangeable probes
- AUTONOMY
  - Can be operated with power supply or battery
- MEASUREMENT
  - Suitable for use in production environments or for incoming inspection
  - Access to narrow and deep areas thanks to the 100 mm probe extension (optional)
- FUNCTIONS (with DATA-STUDIO, basic version)
  - R-profile display
  - 13 roughness parameters available
  - 10 measurements usable for statistical processing
  - Storage of 10 measurement programs
  - Each parameter can be individually activated
  - Tolerancing possible for each parameter
- DATA MANAGEMENT
  - Transfer of measurements, creation of database, report with DATA-STUDIO software



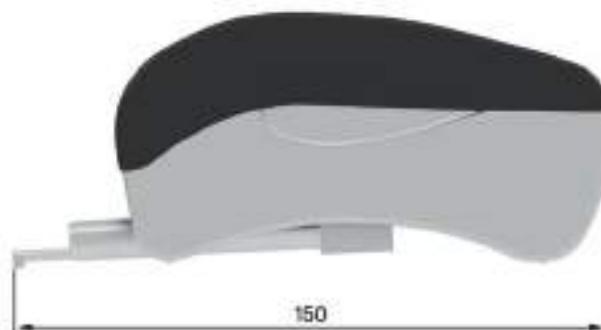
Article number	Designation
<b>06930013</b>	RUGOSURF 20 roughness gauge

### Accessories

Article number	Designation
<b>04760099</b>	USB to micro-USB cable
<b>06960035</b>	Support with granite table, 400 x 250 mm
<b>06960081</b>	SB10-2 probe, for RUGOSURF 20, R = 2 $\mu\text{m}$ , 90°
<b>06960036</b>	SB10 probe, for RUGOSURF 20, R = 5 $\mu\text{m}$ , 90°
<b>06960037</b>	SB20 probe, for RUGOSURF 20, for groove of depth < 5 mm
<b>06960038</b>	SB30 probe, for RUGOSURF 20, for bores $\varnothing > 4$ mm
<b>06960039</b>	SB40 probe, for RUGOSURF 20, V-shape for cylinders $\varnothing > 1$ mm
<b>06960040</b>	SB50 probe, for RUGOSURF 20, for concave surfaces or 90°
<b>06960056</b>	100 mm extension for probe with skid, for RUGOSURF 20
<b>06960057</b>	SB110 probe, for RUGOSURF 20, for concave or convex surfaces R > 5 mm
<b>06960063</b>	Battery NiMH 8,4V, 170 mAh, format PP3
<b>06960046</b>	Power supply 100 $\div$ 240 V, 50 $\div$ 60 Hz, 12 V, 400 $\div$ 600 mAh
<b>06960041</b>	Roughness standard, Ra = 2,97 $\mu\text{m}$
<b>06960064</b>	Roughness standard, Ra = 0,1 $\mu\text{m}$
<b>06960065</b>	Roughness standard, Ra = 0,5 $\mu\text{m}$
<b>06960066</b>	Roughness standard, Ra = 1 $\mu\text{m}$
<b>06960091</b>	DATA-STUDIO software

## Roughness gauges

Standard	ISO 3274, ISO 4287, ISO 12085, ISO 21920
Measuring range	Z: $\pm 200 \mu\text{m}$ X: 16 mm
Range of indication	Ra = $0 \div 100 \mu\text{m}$ Rt = $0,05 \div 400 \mu\text{m}$
Max. perm. errors	R = roughness in $\mu\text{m}$ $0,05 \mu\text{m} + (5\% R)$
Resolution	$0,001 \mu\text{m} / .01 \mu\text{in}$
Material	Stylus tip: diamond
Dimensions	Housing: 122 x 60 x 62 mm Screen: 160 x 100 pixels Tip: R2 $\mu\text{m}$ , 90°
Degree of protection	Keyboard: IP67
Display	LCD, black/white
Weight	650 g
Data output(s)	Micro-USB
Measuring force	0,75 mN
Units	mm / in
Roughness parameters	<p>Available with the RUGOSURF 20 used in conjunction with the following TESA DATA-STUDIO versions:</p> <p>Basic version: According to ISO 4287: Ra, Rq, Rt, Rz, Rc, Rmax, RSm, RPC According to ISO 12085: Pt, R, AR, Rx, PPc</p> <p>Premium version: According to ISO 12085: Rke, Rpke, Rvke, A1e, A2e, Mr1e, Mr2e According to ISO 4287: Rp, Rv, Rsk, Rku, RΔq, RΔa, Rmr rel, Rδc, Rmr(c) Pa, Pq, Pp, Pv, Pt, Pc, RPC, R3z Psk, Pku, PSm, PΔq, Pmr rel, Pδc, Pmr(c) Rk, Rpk, Rvk, A1, A2, Mr1, Mr2 as well as all parameters of the basic version</p>
Graphic(s)	<p>With DATA-STUDIO version:</p> <p>Basic: R-profile Premium: P-profile, Rk-profile Number: 1 - 5</p>
Cut-off	<p>Lengths:</p> <p>0,25 - 0,8 - 2,5 mm (ISO 4287) 1,5 - 2,5 - 4 - 8 - 12 - 16 mm (ISO 12085)</p>
Memory	<p>Measurements with parameters: &lt; 1'000 Measurements with profile and graph: &lt; 20</p>
Probe displacement speed	1 mm/s
Delay before measurement	4 to 10 s
Included in delivery	<p>1x RUGOSURF 20 1x SB10-2 probe, R = 2 <math>\mu\text{m}</math> 1x standard, Ra = 2,97 <math>\mu\text{m}</math> 1x positioning pin <math>\varnothing</math> 8 mm 1x vertical positioning support 1x removable probe protection 1x rechargeable battery 1x charger and UE/US adapter</p>



## RUGOSURF 90G

- INSTRUMENT
  - Vertical adjustment screw for probe positioning (up to 90 mm) without accessories
  - Can be transformed into a profile measurer by using the PROFILE SET 2 mm option
- MEASURE
  - Suitable for use in production environments or for incoming inspection
  - 3 horizontal measuring positions of the probe: 0°, -90° and +90°.
  - Roughness or waviness measurement with one probe (probe with removable skid)
- FUNCTIONS
  - R-profile measurement
  - P-profile measurement
  - W-profile measurement
  - 51 roughness parameters available
  - Tolerancing possible for each parameter
- DATA MANAGEMENT
  - USB output for transferring measured values to a computer
  - TESA MEASUREMENT STUDIO software (optional)



06930012

Article number	Designation
<b>06930012</b>	RUGOSURF 90G roughness gauge

### Accessories

Article number	Designation
<b>06960062</b>	USB cable, RUGOSOFT 90G to computer
<b>06960048</b>	MEASUREMENT STUDIO software
<b>06960067</b>	SB60/10-2 probe, for RUGOSURF 90G, detachable skid, R = 2 µm, 90°
<b>06960050</b>	SB20P probe, for RUGOSURF 90G, for groove of depth < 5 mm
<b>06960051</b>	SB30P probe, for RUGOSURF 90G, for bores Ø > 4 mm
<b>06960052</b>	SB40P probe, for RUGOSURF 90G, V-shape for cylinders Ø > 1 mm
<b>06960053</b>	SB50P probe, for RUGOSURF 90G, for concave surfaces or 90° measurement
<b>06960054</b>	SB120P probe, for RUGOSURF 90G, for groove of depth < 20 mm
<b>06960058</b>	SB120S probe, for RUGOSURF 90G, for groove of depth < 15 mm
<b>06960061</b>	SB60-D2 probe, for RUGOSURF 90G, for bores Ø > 2 mm
<b>06960049</b>	SB60/10 probe, for RUGOSURF 90G, detachable skid, R = 5 µm, 90°
<b>06960041</b>	Roughness standard, Ra = 2,97 µm
<b>06960064</b>	Roughness standard, Ra = 0,1 µm
<b>06960065</b>	Roughness standard, Ra = 0,5 µm
<b>06960066</b>	Roughness standard, Ra = 1 µm
<b>06960100</b>	PROFILE SET, 2 mm
<b>06960055</b>	Support with granite table, 630 x 400 mm

## Roughness gauges

Standard	ISO 3274, ISO 4287, ISO 12085, ISO 21920
Measuring range	Z: $\pm 500 \mu\text{m}$ X: 50 mm
Range of indication	Ra = 0 ÷ 400 $\mu\text{m}$ Rt = 0 ÷ 1000 $\mu\text{m}$
Max. perm. errors	R = roughness in $\mu\text{m}$ 0,05 $\mu\text{m}$ + (5% R)
Resolution	0,001 $\mu\text{m}$ / .01 $\mu\text{in}$
Material	Stylus tip: diamond
Dimensions	Housing: 270 x 140 x 90 mm Screen: 320 x 240 pixels Tip: R2 $\mu\text{m}$ , 90°
Degree of protection	Keyboard: IP67
Display	TFT, color
Weight	3 kg
Data output(s)	Micro-USB
Measuring force	0,75 mN
Units	mm / in
Roughness parameters	According to ISO 4287: Ra, Rq, Rt, Rp, Rc, Rv, RSm, R $\delta$ c, RPc Pa, Pq, Pp, Pc, Pv, PSm, P $\delta$ c Wa, Wq, Wt, Wp, Wc, Wv, WSm, W $\delta$ c, WPc Rmr, Rz, Rmax, Rsk, Rku, Wz Rk, Rpk, Rvk, Mr1, Mr2 As per DB N 31007: R3z, R3zm According to ISO 12085: Pt, R, Rx, AR, Wte, W, AW, Wx, Rke, Rpke, Rvke, Pdc, Ppc, Mr1e, Mr2e
Graphic(s)	Bearing area curve P-profile R-profile W-profile
Cut-off	Length: 0,08 - 0,25 - 0,80 - 2,50 - 8,00 mm Number: 1 - 19 for cut-off up to 2,5 mm 1 - 5 for cut-off 8,0 m
Memory	Measurements with parameters: < 60'000
Probe displacement speed	0,5 or 1 mm/s
Included in delivery	1x RUGOSURF 90G 1x SB60/10-2 probe with skid 1x standard, Ra = 2,97 $\mu\text{m}$ 1x probe holder 1x guide column, vertical stroke of 90 mm 1x rechargeable battery 1x charger and UE/US adapter



## TWIN-SURF

- INSTRUMENT
  - Ultra-compact, portable and robust
  - High contrast display for comfortable reading in dark environments
  - 3 buttons on top of the product for easy instrument configuration
  - Interchangeable probes
- AUTONOMY
  - Can be operated with power supply or battery
- MEASUREMENT
  - Suitable for use in production environments or for incoming inspection
  - Access to narrow and deep areas thanks to the 100 mm probe extension (optional)
  - 90° probe orientation for cross-sectional measurements
- FUNCTIONS (with DATA-STUDIO, basic version)
  - R-profile display
  - 13 roughness parameters available
  - 10 measurements usable for statistical processing
  - Storage of 10 measurement programs
  - Each parameter can be individually activated
  - Tolerancing possible for each parameter
- DATA MANAGEMENT
  - Standard version connectable to a computer via cable
  - Bluetooth® version wirelessly connectable to a computer, tablet or smartphone
  - Free TESA DATA-STUDIO software (basic version) included for creating measurement reports, statistical management, measurement parameters.



06930014

Article number	Designation
<b>06930014</b>	TWIN-SURF roughness gauge
<b>06930015</b>	TWIN-SURF roughness gauge, Bluetooth® version

### Accessories

Article number	Designation
<b>06960092</b>	SB21 probe, for TWIN-SURF, for groove of depth < 5 mm
<b>06960093</b>	SB31 probe, for TWIN-SURF, for bores $\varnothing > 4$ mm, depth < 20 mm
<b>06960094</b>	SB51 probe, for TWIN-SURF, for concave surfaces or 90° measurement, for groove of depth < 5 mm
<b>06960095</b>	SB121 probe, for TWIN-SURF, for groove of depth < 20 mm
<b>06960096</b>	Extension for TWIN-SURF, 100 mm
<b>04760152</b>	USB A to USB C cable, 1 m
<b>06960090</b>	Bluetooth® printer
<b>06960091</b>	DATA-STUDIO software

## Roughness gauges

Standard	ISO 3274, ISO 4287, ISO 12085, ISO 21920
Measuring range	Z: $\pm 200 \mu\text{m}$ X: 17,5 mm
Range of indication	Ra = $0 \div 50 \mu\text{m}$ Rt = $0,05 \div 200 \mu\text{m}$
Max. perm. errors	R = roughness in $\mu\text{m}$ $0,05 \mu\text{m} + (5\% R)$
Resolution	$0,001 \mu\text{m} / .01 \mu\text{in}$
Material	Stylus tip: diamond
Dimensions	Housing: 160 x 34 x 34 mm Screen: 128 x 64 pixels Tip: R2 $\mu\text{m}$ , 90°
Degree of protection	Keyboard: IP67
Display	OLED, monochrome
Weight	200 g
Data output(s)	USB C
Measuring force	0,75 mN
Units	mm / in
Roughness parameters	Available with the TWIN-SURF used in conjunction with the following TESA DATA-STUDIO versions: Basic version: According to ISO 4287: Ra, Rq, Rt, Rz, Rc, Rmax, RSm, RPC According to ISO 12085: Pt, R, AR, Rx, PPc Premium version: According to ISO 12085: Rke, Rpke, Rvke, A1e, A2e, Mr1e, Mr2e According to ISO 4287: Rp, Rv, Rsk, Rku, RΔq, RΔa, Rmr rel, Rδc, Rmr(c) Pa, Pq, Pp, Pv, Pt, Pc, RPC, R3z Psk, Pku, PSm, PΔq, Pmr rel, Pδc, Pmr(c) Rk, Rpk, Rvk, A1, A2, Mr1, Mr2 and all the parameters of the basic version
Graphic(s)	With DATA-STUDIO version: Basic: R-profile Premium: P-profile, Rk-profile Number: 1 - 5
Cut-off	Lengths: 0,25 - 0,8 - 2,5 mm (ISO 4287) 1,5 - 2,5 - 4 - 8 - 12 - 16 mm (ISO 12085)
Memory	Measurements with parameters: < 18'000 (evaluation length: 0,8 x 5 mm) Measurements with profile and graph: < 30
Probe displacement speed	0,5 or 1 mm/s
Delay before measurement	0 to 10 s
Included in delivery	1x TWIN-SURF 1x probe SB51 1x standard, Ra = 2,97 $\mu\text{m}$ 1x positioning pin $\varnothing$ 8 mm 1x key for protection management 1x charger and EU/US adapter 1x USB A-C cable DATA-STUDIO software (basic version) Measuring report Declaration of conformity



## PROFILE SET 2 mm

- USE
  - Transforms the RUGOSURF 90G into a profile measuring device
  - For the measurement of lengths, radii and angles
- FUNCTIONS (with PROFILE STUDIO software)
  - Dimensions can be inserted on the measured profile after defining the geometrical elements (point, line, arc or intersection between 2 lines 'for example')
  - A previous measurement can be used as a measurement template for repeating a measurement of a part with identical geometry
  - A detailed measurement report with customizable header
  - Measurement command and help for calibration from computer
  - Import and export of measurement parameters from and to the instrument
  - Archiving of measurement results and measured parameters as a database



06960102

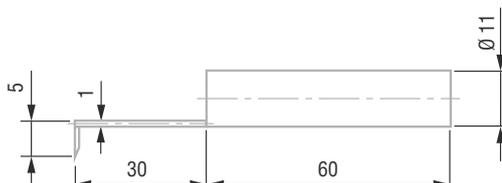


Measuring range	Z: 2 mm X: 50 mm
Max. perm. errors	Z: $3.5 + 0.75 \times H$ $\mu\text{m}$ (H in Z axis, in mm) X: $3.5 + L/10$ $\mu\text{m}$ (L in X axis, in mm)
Resolution	Z: 0,1 $\mu\text{m}$ X: 0,4 to 4 $\mu\text{m}$ (depending on measured length)
Measuring force	0,003 mN with SB2000 probe
Roughness parameters	According to ISO 4287, ISO 13565-1, ISO 13565-2, ISO 12085, VDA 2007
Probe displacement speed	1 mm/s
Profile angles	Upward measurement: 70° Downward measurement: 85°

Article number	Designation
<b>06960100</b>	PROFILE SET, 2 mm

### Accessories

Article number	Designation
<b>06960101</b>	PROFILE STUDIO software
<b>06960102</b>	SB2000 probe for PROFILE SET 2 mm, R = 15 $\mu\text{m}$ , 20°
<b>06960103</b>	Setting master for PROFILE SET 2 mm
<b>06960062</b>	USB cable, RUGOSOFT 90G to computer

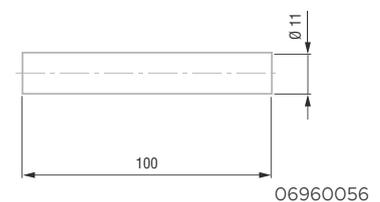
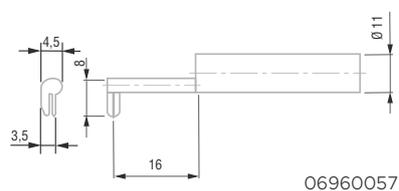
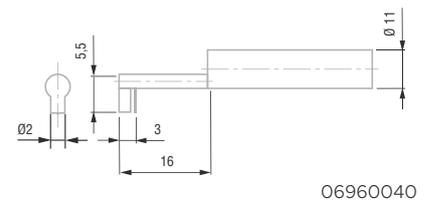
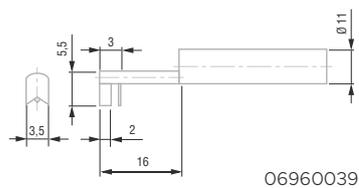
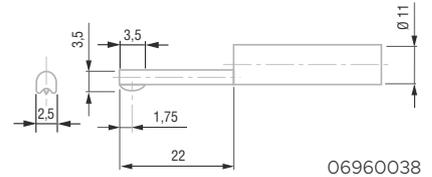
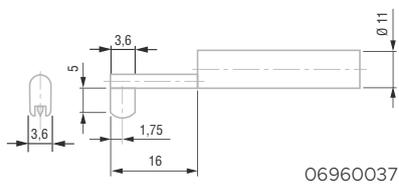
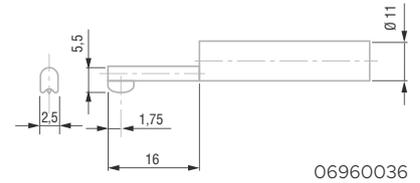
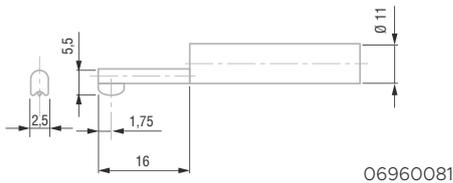


## Accessories for roughness gauges

### Probes and extension for RUGOSURF 20



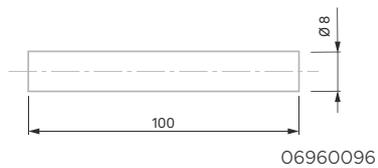
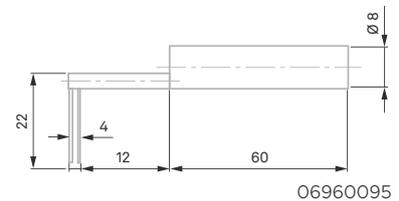
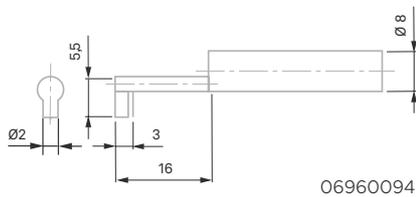
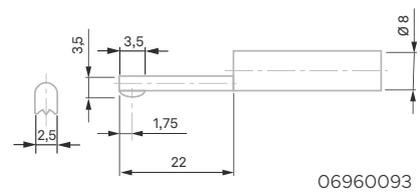
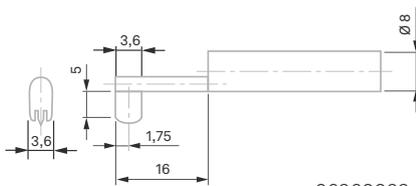
Article number	Designation
<b>06960036</b>	SB10 probe, for RUGOSURF 20, R = 5 $\mu$ m, 90°
<b>06960037</b>	SB20 probe, for RUGOSURF 20, for groove of depth < 5 mm
<b>06960038</b>	SB30 probe, for RUGOSURF 20, for bores $\varnothing$ > 4 mm
<b>06960039</b>	SB40 probe, for RUGOSURF 20, V-shape for cylinders $\varnothing$ > 1 mm
<b>06960040</b>	SB50 probe, for RUGOSURF 20, for concave surfaces or 90°
<b>06960057</b>	SB110 probe, for RUGOSURF 20, for concave or convex surfaces R > 5 mm
<b>06960081</b>	SB10-2 probe, for RUGOSURF 20, R = 2 $\mu$ m, 90°
<b>06960056</b>	100 mm extension for probe with skid, for RUGOSURF 20



## Probes and extension for TWIN-SURF



Article number	Designation
<b>06960092</b>	SB21 probe, for TWIN-SURF, for groove of depth < 5 mm
<b>06960093</b>	SB31 probe, for TWIN-SURF, for bores $\varnothing > 4$ mm, depth < 20 mm
<b>06960094</b>	SB51 probe, for TWIN-SURF, for concave surfaces or 90° measurement, for groove of depth < 5 mm
<b>06960095</b>	SB121 probe, for TWIN-SURF, for groove of depth < 20 mm
<b>06960096</b>	Extension for TWIN-SURF, 100 mm

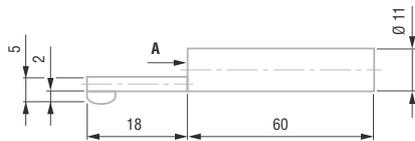


## Accessories for roughness gauges

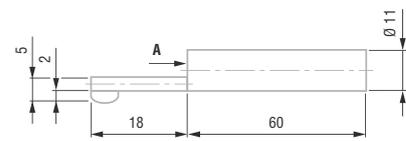
### Probes and extension for RUGOSURF 90G



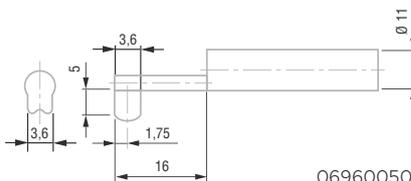
Article number	Designation
06960049	SB60/10 probe, for RUGOSURF 90G, detachable skid, R = 5 $\mu$ m, 90°
06960050	SB20P probe, for RUGOSURF 90G, for groove of depth < 5 mm
06960051	SB30P probe, for RUGOSURF 90G, for bores $\varnothing$ > 4 mm
06960052	SB40P probe, for RUGOSURF 90G, V-shape for cylinders $\varnothing$ > 1 mm
06960053	SB50P probe, for RUGOSURF 90G, for concave surfaces or 90° measurement
06960054	SB120P probe, for RUGOSURF 90G, for groove of depth < 20 mm
06960058	SB120S probe, for RUGOSURF 90G, for groove of depth < 15 mm
06960061	SB60-D2 probe, for RUGOSURF 90G, for bores $\varnothing$ > 2 mm
06960067	SB60/10-2 probe, for RUGOSURF 90G, detachable skid, R = 2 $\mu$ m, 90°
06960056	100 mm extension for probe with skid, for RUGOSURF 90G



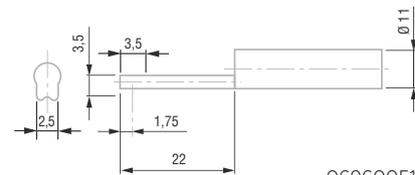
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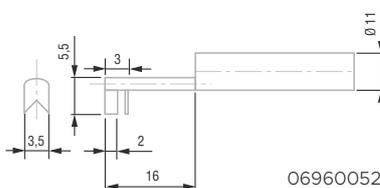
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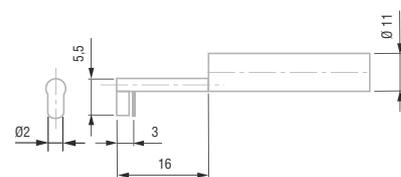
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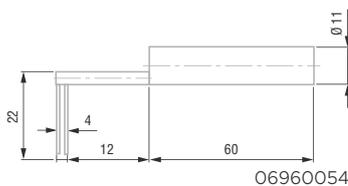
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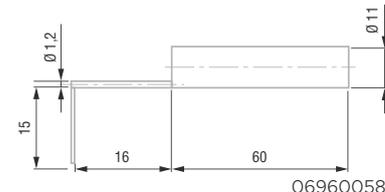
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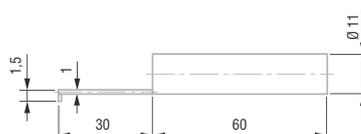
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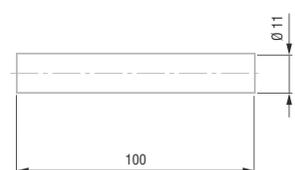
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06960058



06960061



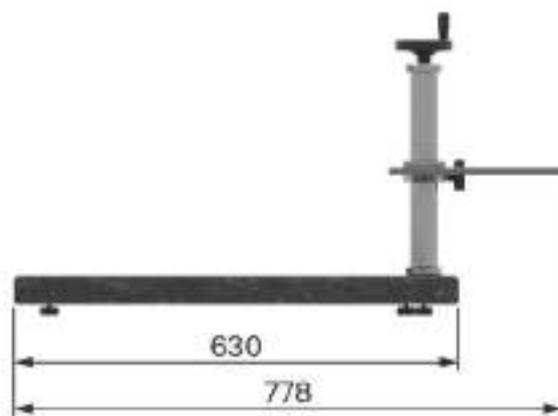
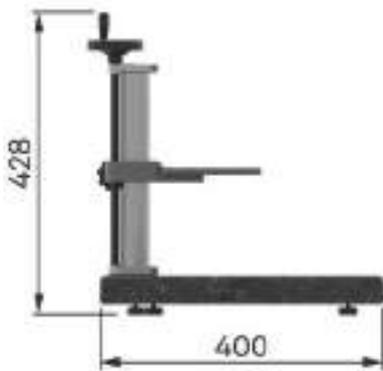
06960056

### Support group



06960055

Article number	Designation
<b>06960055</b>	Support with granite table, 630 x 400 mm



### Calibration standards



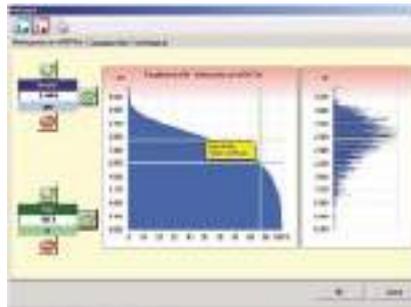
06960041

Article number	Designation
<b>06960041</b>	Roughness standard, Ra = 2,97 $\mu\text{m}$
<b>06960066</b>	Roughness standard, Ra = 1 $\mu\text{m}$
<b>06960065</b>	Roughness standard, Ra = 0,5 $\mu\text{m}$
<b>06960064</b>	Roughness standard, Ra = 0,1 $\mu\text{m}$

## Software for roughness gauges

### MEASUREMENT STUDIO

- COMPATIBILITY
  - For RUGOSURF 90G
- FUNCTIONS
  - Remote management of measurement start-up and calibration
  - Visualization of the measured parameters
  - Visualization of roughness profiles R, primary P and waviness W
  - Calculation of roughness parameters, including VDA parameters
  - Calculation of statistics from a set of measurements
  - Adjustable upper and lower tolerance for each parameter
  - Creation and storage of measurement programs (instrument settings and parameters to be measured)
  - Transferable measurement programs on the instrument
  - Measurement report with customizable header
  - 51 parameters available
- DATA MANAGEMENT
  - Connection to the instrument via USB
  - Import of saved measurements from the instrument to the computer, for the management of a database
  - Measurement report in .xls, .pdf, .doc, .rpt or .rtf format



Par VDA 2007			
Parameter	Value	Tol-	Tol+
WDSm	0.273 µm		
WDc	0.971 µm		
WDt	2.243 µm		

Included in delivery

License key (dongle)  
 USB-PC connection cable, 1,80 m  
 User manual  
 Software installation file

Article  
number

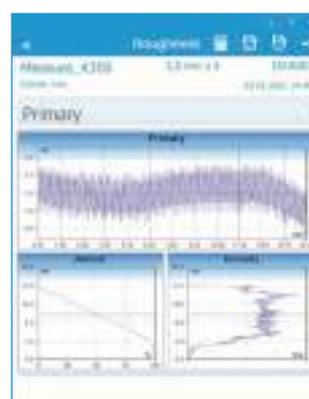
Designation

**06960048**

MEASUREMENT STUDIO software

## DATA-STUDIO

- COMPATIBILITY
  - For RUGOSURF 20
  - For TWIN-SURF
- FUNCTIONS
  - Remote management of measurement start and calibration
  - Visualization of the measured parameters
  - Visualization of the measured roughness profiles R, primary P and RK
  - Calculation of roughness parameters, including VDA parameters
  - Statistical calculations from several measurements
  - Adjustable upper and lower tolerance for each parameter
  - Creation and archiving of measurement programs (instrument settings and parameters to be measured)
  - Measurement programs transferable to the instrument
  - Measurement report for each parameter head
  - 51 parameters available with the Premium version
- DATA MANAGEMENT
  - Connection to the instrument via USB or Bluetooth® (depending on the instrument)
  - Import of measurements saved from the instrument to the computer for data base management
  - Printing of results with printer accessory
  - Measurement report in .xls and .pdf format



Included in delivery 1x USB key including:  
User manual  
Software installation file

Article number	Designation
06960091	DATA-STUDIO software



# Straightness, angles and inclination measurement



**TESA**  
TECHNOLOGY

## Straightness, angles and inclination measurement

Irrespective of whether they are spirit or electronic inclinometers, all precision levels are based on the same perfectly reliable reference but also cost-free: The centre of the earth's gravity.

Under the force of gravity, the gas bubble in the liquid or the pendulum inclines itself according to this natural physical principle. The position of the pendulum with respect to the measuring faces of the instrument body can then be measured.

Based on this perfect principle, these instruments offer a great number of measuring applications of high precision. The horizontal and vertical positioning of the measuring faces enable the detection of form errors in the geometrical elements on the workpiece to be measured.

These errors often result from deviations in straightness, flatness, position, parallelism and squareness.

Indication of values may vary depending on the type of level, the values typically displayed are:

- Inclination (mm/m or in/10 in)
- Radian (mrad)
- Decimal angle (12,37°, for example);
- Sexagesimal angle in degrees (°), minutes (') and seconds (") (15° 30' 45" for example)

### ***TESA precision clinometers and levels***



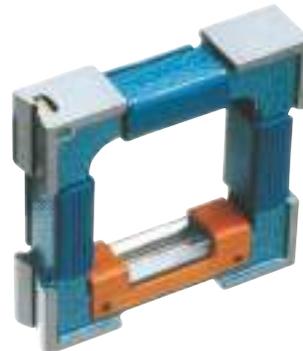
CLINOBEVEL 1 USB digital clinometer



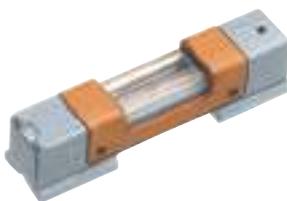
CLINOBEVEL 3 SQUARE digital clinometer



Square spirit level with magnetic inserts



Frame spirit level



Precision spirit level



MICRO-SQUARE Perpendicularity Gauge

## Straightness, angles and inclination measurement



## CLINOBEVEL 1 clinometer

- INSTRUMENT
  - Compact, lightweight, and robust
  - Reinforced anodized aluminum casing
  - Large digital display to eliminate interpretation errors
- MEASUREMENT
  - For direct (absolute) or comparative (relative) measurement
  - Measuring range of  $\pm 45^\circ$  with angle or inclination indication
- DATA MANAGEMENT
  - USB connection to the computer
  - Measurement data transfer using CLINOSOFT software
  - Automatic generation of measurement reports in Microsoft Excel



05330203

Standard	DIN 2276
Measuring range	$\pm 45^\circ$
Max. perm. errors	2' + 1 digit
Resolution	0,020 mm/m (5'')
Material	Aluminium anodised
Dimensions	100 x 75 x 35 mm
Measuring face(s)	4 flat measuring faces
Degree of protection	IP65
Display	LCD display
Power supply	1 x 1,5 V, AA, type LRC 6 battery
Data output(s)	USB, RS-485
Function(s)	Automatic shutdown after 8 minutes Absolute zero mode Relative zero mode Display lock Memory for 21 correction values
Autonomy	$\approx 150$ hours
Units	DEG, mm/m, „/10“, „/12“, mRad, DEG/min, min/sec, mm/REL, „/REL, A‰, GON
Response time	$\approx 1$ s
Included in delivery	CLINOBEVEL 1 CLINOSOFT software (as per model) LRC 6 battery USB cable, L = 1,8 m (as per model) User manual Declaration of conformity SCS certificate (as per model)

## Clinometers

Article number	Designation
<b>05330203</b>	CLINOBEVEL 1 USB + CLINOSOFT software
<b>05330204</b>	CLINOBEVEL 1 USB
<b>S53220194</b>	CLINOBEVEL 1 USB, 4 magnetic faces + CLINOSOFT software
<b>05330205</b>	CLINOBEVEL 1 USB + certificate SCS

### Accessories

Article number	Designation
<b>05360006</b>	External control with cable, L = 2 m
<b>053300165</b>	USB cable, L = 1,8 m



## CLINOBEVEL 3 SQUARE clinometers

- INSTRUMENT
  - Cast iron treated against rust
  - 4 rectified measurement faces
  - Large-format digital display eliminating any interpretation errors
- MEASUREMENT
  - For direct (absolute) or comparative (relative) measurement
  - Measuring range of  $\pm 60^\circ$  or  $\pm 1^\circ$  with angle or inclination indication
  - Remote measurement via smartphone with its remote display
- DATA MANAGEMENT
  - A free application called «CLINOBEVEL 3» allows measurement visualization on a smartphone
  - The application enables recording of measurement values in .csv format



05330220

Standard	DIN 2276
Measuring range	$\pm 60^\circ$ or $\pm 1^\circ$
Max. perm. errors	$\alpha$ = measured value $T = 20^\circ\text{C}$ Model $\pm 60^\circ$ : $15'' + (0,027\% \alpha)$ Model $\pm 1^\circ$ : $1\% \alpha$
Material	Housing: Cast iron
Dimensions	160 x 160 x 40 mm
Measuring face(s)	V-shaped measuring faces for $\varnothing 30 \div 100$ mm: top left and lower side Flat measuring faces: top right and upper side
Display	Color LCD screen with high contrast 4 different background colors Various measurement display configurations, such as a bubble level or bar graph
Power supply	2 x 1,5 V, Size C, type LR14 batteries
Data output(s)	USB, RS-485
Function(s)	Display configurations Absolute zero mode Relative zero mode Display lock Configurable alarms when limits are exceeded
Autonomy	25 hours
Units	mm/m, „/10“, „/12“, mRad, mm/REL, „/REL, A%, ‰, DEG, GON
Included in delivery	CLINOBEVEL 3 SQUARE 2x calibration pins for quick calibration (05330220 and 05330222) 2x LR14 1,5 V batteries User manual Declaration of conformity SCS certificate (as per model)

## Clinometers



Article number	Designation
<b>05330220</b>	CLINOBEVEL 3 SQUARE, 60°
<b>05330221</b>	CLINOBEVEL 3 SQUARE, 1°
<b>05330222</b>	CLINOBEVEL 3 SQUARE + SCS certificate
<b>05330223</b>	CLINOBEVEL 3 SQUARE + SCS certificate

### Accessories

Article number	Designation
<b>S53300166</b>	USB cable, L = 2,5 m

## NIVELTRONIC clinometers

- INSTRUMENT
  - Analog display with precision needle galvanometer
  - High zero point stability thanks to the measurement system with pendulum-type inductive sensor
- MEASUREMENT
  - For checking and aligning surfaces vertically or horizontally
  - For measuring slight inclinations



03130060



03130063

Standard	DIN 2276
Measuring range	$\pm 0,15$ mm/m or $\pm 0,75$ mm/m
Max. perm. errors	$< 0,5$ x measuring range: min. 0,001 mm/m, max. 1 % of the measured value $\geq 0,5$ x measuring range: max. 1 % of (2 x measured value - 0,5 x total range)
Resolution	0,05 / 0,01 mm/m
Repeatability	1 $\mu$ m/m
Material	Body: Cast iron Base: Granite (horizontal model)
Dimensions	Base: 150 x 45 mm (03130063), 200 x 45 mm (03130060)
Measuring face(s)	1 flat measuring face (horizontal model) 2 V-shaped measuring faces for $\varnothing 20 \div 120$ mm (square model)
Display	Analog display and integrated galvanometer
Power supply	4 x 1,5 V, AAA batteries
Units	mm/m NIVELTRONIC
Included in delivery	4x AAA, 1,5 V batteries Declaration of conformity User manual

## Clinometers



Article number	Designation
<b>03130063</b>	NIVELTRONIC electronic clinometer, horizontal version
<b>03130060</b>	NIVELTRONIC electronic clinometer, square version

### Accessories

Article number	Designation
<b>03160007</b>	Granit base 200 x 50 mm
<b>03160008</b>	Granit base 250 x 50 mm
<b>03160009</b>	Granit base 500 x 50 mm
<b>03160048</b>	Holder with voltage regulator (4,65 V) and 4 x AAA batteries

**Spirit clinometer with angle protractor and micrometer element**



05331750

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Resolution	Vial: 0,3 mm/m Micrometric screw: 1 arcmin Main scale: 1°
Material	Base: Hardened, ground steel
Dimensions	150 x 35 x 116 mm
Measuring face(s)	Flat measuring face with V-groove for $\varnothing 17 \div 80$ mm
Particular characteristic(s)	Longitudinal and cross vials
Included in delivery	Clinometer Declaration of conformity

Article number	Designation
<b>05331750</b>	Spirit clinometer with angle protractor and micrometer element

## Levels

### *Precision spirit level*

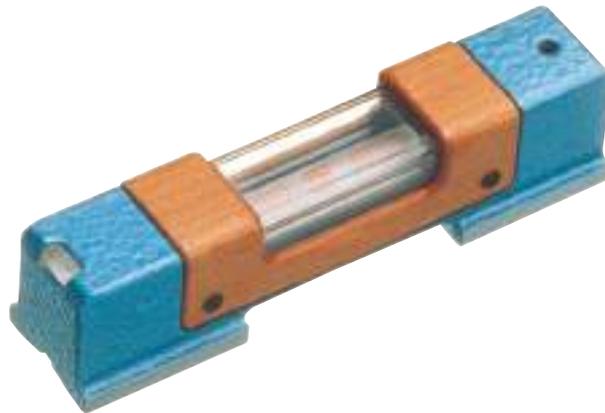


05331450

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Resolution	0,02 mm/m
Material	Hardened and ground steel
Dimensions	150 x 45 x 45 mm
Measuring face(s)	V-shaped measuring face for $\varnothing 19 \div 108$ mm
Function(s)	1 longitudinal vial 1 transverse vial 1 micrometer rotation = +2 mm/m Side thermal insulator
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	For shafts mm	Dimensions mm
<b>05331450</b>	Precision spirit level with micrometric element	0,02	$\varnothing 19 \div 120$	150 x 45 x 45

## Precision spirit level



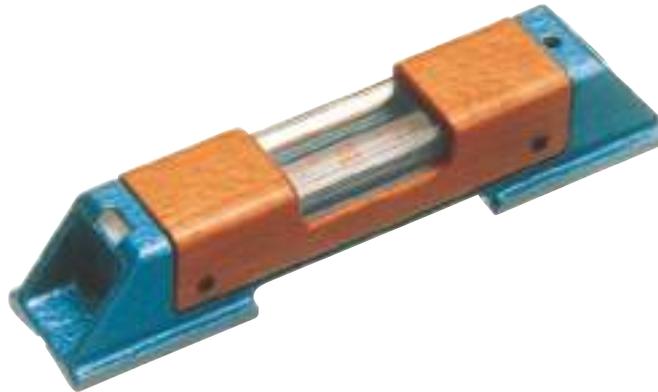
05331050

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Measuring face(s)	Flat and V-shaped measuring faces
Function(s)	1 longitudinal vial 1 transverse vial Side viewing slots Thermal insulation and protection of the vial
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	For shafts mm	Dimensions mm
<b>05331050</b>	Precision spirit level	0,02	Ø 17 ÷ 84	100 x 32 x 35

## Levels

### Precision spirit levels

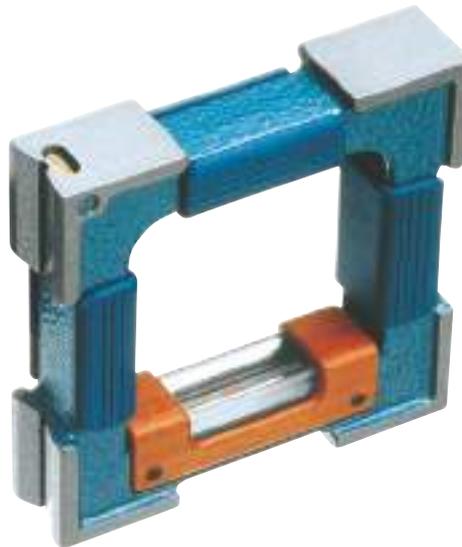


05331054

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Measuring face(s)	Flat and V-shaped measuring faces
Function(s)	1 longitudinal vial 1 transverse vial Side viewing slots Thermal insulation and protection of the vial
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	For shafts mm	Dimensions mm
<b>05331054</b>	Precision spirit level	0,02	Ø 17 ÷ 94	150 x 35 x 38
<b>05331056</b>	Precision spirit level	0,05	Ø 17 ÷ 94	150 x 35 x 38
<b>05331058</b>	Precision spirit level	0,02	Ø 19 ÷ 108	200 x 40 x 42
<b>05331060</b>	Precision spirit level	0,05	Ø 19 ÷ 108	200 x 40 x 42
<b>05331061</b>	Precision spirit level	0,1	Ø 19 ÷ 108	200 x 40 x 42
<b>05331063</b>	Precision spirit level	0,02	Ø 19 ÷ 120	250 x 45 x 42

## Precision spirit levels



05331201

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Measuring face(s)	4 flat measuring surfaces: 2 faces with V-groove 2 smooth faces
Function(s)	1 longitudinal vial 1 transverse vial Side viewing slots Thermal insulation and protection of the vial
Perpendicularity	90° measuring surfaces, machined together
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	For shafts mm	Dimensions mm
<b>05331201</b>	Precision spirit level with frame	0,05	Ø 17 ÷ 84	100 x 100 x 32
<b>05331202</b>	Precision spirit level with frame	0,1	Ø 17 ÷ 84	100 x 100 x 32
<b>05331204</b>	Precision spirit level with frame	0,05	Ø 17 ÷ 94	150 x 150 x 35
<b>05331206</b>	Precision spirit level with frame	0,02	Ø 19 ÷ 108	200 x 200 x 40

## Levels

### Precision spirit levels



05331000

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Measuring face(s)	2 V-shaped measuring faces for $\varnothing 19 \div 108$ mm
Function(s)	1 longitudinal vial 1 transverse vial Side viewing slots Thermal insulation and protection of the vial Vertical face with magnetic inserts
Perpendicularity	90° measuring surfaces, machined together
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	Dimensions mm
<b>05331000</b>	Precision spirit level, magnetic square	0,02	150 x 150 x 40
<b>05331002</b>	Precision spirit level, magnetic square	0,05	150 x 150 x 40

## Spirit levels to be fixed



05331416

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Function(s)	1 longitudinal vial
Fixing	With 2 screws
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	Dimensions mm
<b>05331402</b>	Spirit level to be fixed	1	50 x 10 x 12
<b>05331406</b>	Spirit level to be fixed	0,3	60 x 12 x 14
<b>05331408</b>	Spirit level to be fixed	0,1	80 x 15 x 18
<b>05331411</b>	Spirit level to be fixed	0,1	100 x 18 x 22

## Levels

### *Spirit levels to be fixed*



05331500

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Material	Protection in anodized aluminum alloy
Function(s)	1 longitudinal vial 1 transverse vial
Fixing	With 3 screws
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	Dimensions mm
<b>05331500</b>	Spirit level to be fixed	2 ÷ 5	Ø 40 x 11
<b>05331502</b>	Spirit level to be fixed	0,3	Ø 60 x 13

**Spirit levels to be fixed**



05331550

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Function(s)	1 longitudinal vial 1 transverse vial
Fixing	With 2 screws
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	Dimensions mm
<b>05331550</b>	Spirit level to be fixed	0,1	80 x 65 x 17
<b>05331551</b>	Spirit level to be fixed	0,3	80 x 65 x 17

## Levels

### Spirit levels



05331254

Standard	DIN 877
Max. perm. errors	DIN 2276/1
Measuring face(s)	Flat measuring face
Function(s)	1 longitudinal vial
Included in delivery	Level Declaration of conformity

Article number	Designation	Resolution mm/m	Dimensions mm
<b>05331250</b>	Spirit level	0,1	Ø 16 x 80 x 9
<b>05331254</b>	Spirit level	0,05	Ø 22 x 150 x 11
<b>05331255</b>	Spirit level	0,1	Ø 22 x 150 x 11

### TESA MICRO-SQUARE

- MEASUREMENT
  - High precision perpendicularity
  - Quick visualization of the results with the TWIN-T10
- INSTRUMENT
  - Carriage mounted on an ultra-precise guide
  - Easy handling
- USE
  - Perpendicularity measurement for professionals looking for high precision
- ACCESSORIES
  - Probe holder for easy measurement of hard-to-reach interior surfaces
  - Insert for GT31 lever indicator with cylindrical probing surface for line contact
  - Flanged measuring base and mounting bracket included to secure the position of the workpiece. The inside and outside of a square, for example, can be measured quickly and easily.



Resolution	0,1 $\mu\text{m}$ (TWIN-T10)
Included in delivery	Instrument only: MICRO-SQUARE SCS Calibration Certificate
	Set: MICRO-SQUARE TWIN-T10 display GT31 probe Key SCS calibration certificate

05310400

## Perpendicularity measurement



Article number	Designation	Application range mm	Repeatability limit, $\mu\text{m}$	Max. perm. perp. error, $\mu\text{m}$
<b>05330400</b>	MICRO-SQUARE 350 set	360	0,5	1,5
<b>05330401</b>	MICRO-SQUARE 600 set	610	0,5	2,4
<b>05310400</b>	MICRO-SQUARE 350	360	0,5	1,5
<b>05310401</b>	MICRO-SQUARE 600	610	0,5	2,4

### Accessories

Article number	Designation
<b>05360008</b>	Probe holder, L = 200 mm
<b>05360030</b>	Base square check
<b>03260510</b>	Cylindrical-shaped insert



01840105



05360008

## Sine bar

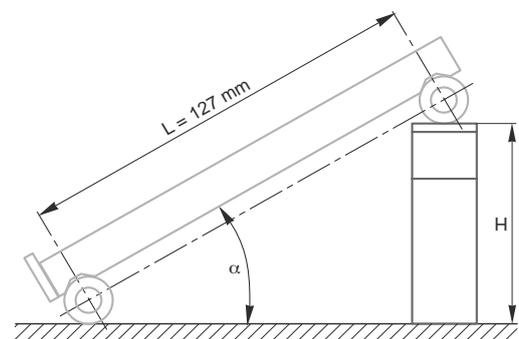
- USE
  - Suitable for angles from 0° to 60°
  - Sine function for determining the angle based on length dimensions obtained from gauge blocks



06769005

Material	Hardened stainless steel
Straightness	5 μm
Dimensions	Center distance: 127 mm ± 0,004 Body: 123 x 25 mm
Function(s)	Removable front stop

Article number	Designation
<b>06769005</b>	Sine bar



Example for the calculation of an angle  
 H = height of combination gauge blocks in mm  
 L = length of sine bar in mm

$$H = L \times \sin(\alpha)$$

$$\sin(\alpha) = H/L$$

$$\alpha = \arcsin(H/L)$$

## Flatness measurement

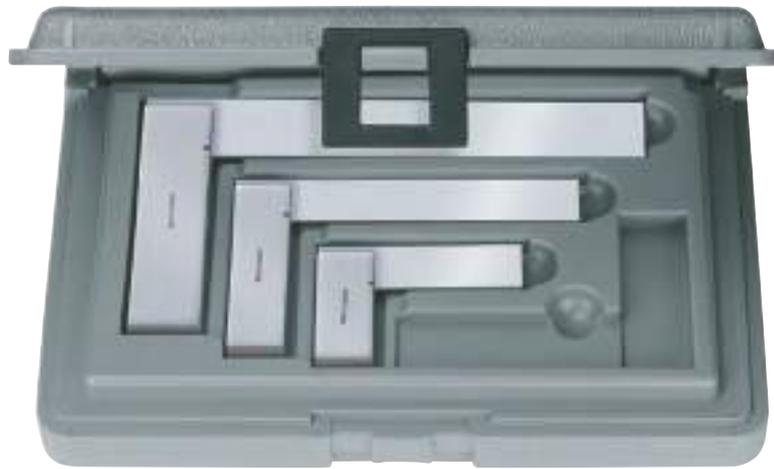
### Bevelled straight edges



Standard	DIN 874 T2 / NF E 11-104
Material	Hardened steel Hardness $\geq 650$ HV 10
Function(s)	1 edge Insulating grip
Included in delivery	Rule Declaration of conformity

Article number	Designation	Dimensions mm	Max. perm. straightness error, $\mu\text{m}$
<b>0951750002</b>	Bevelled straight edge	75	2
<b>0951750003</b>	Bevelled straight edge	100	2
<b>0951750005</b>	Bevelled straight edge	150	3
<b>0951750006</b>	Bevelled straight edge	200	3
<b>0951750007</b>	Bevelled straight edge	300	3
<b>0951750008</b>	Bevelled straight edge	400	4
<b>0951750009</b>	Bevelled straight edge	500	4

**Try squares set**



06739001

Standard	Factory standard
Material	Hardened steel
Perpendicularity	16 µm
Included in delivery	1x square: 68 x 45 mm 1x square: 120 x 70 mm 1x square: 175 x 95 mm

Article number	Designation
<b>06739001</b>	Set of 3 try-squares

# Standards



**TESA**  
TECHNOLOGY

## ***Choice of material***

### Steel

Steel standards have proven their reliability for over a century. Steel is an ideal reference material for the comparison measurement method used in Metrology, ensuring their reliability.

Steel standards are highly resistant to wear and have excellent adhesive properties. However, this material needs to be protected against corrosion, making it essential to properly maintain these standards, which can then be used for many years.

### Tungsten Carbide

Tungsten carbide standards are nearly 10 times more wear-resistant than steel standards. They are particularly sought after for frequent use and their excellent adhesive properties.

### Ceramic

Ceramic standards offer extreme resistance to wear and scratches. The adhesion of their measuring surfaces is never compromised due to the physical properties of this material. They are corrosion-resistant and are particularly insensitive to hand perspiration.

## ***Selection of the precision grade***

### Grade 2

The gauges of this grade are typically used as standard reference gauges at production site inspection stations for the adjustment and calibration of instruments and other measuring equipment, as well as for the verification and adjustment of tooling, devices, or machines.

### Grade 1

These gauges are also considered transfer standards used for the adjustment and calibration of gauges and measuring instruments at production control stations.

### Grade 0

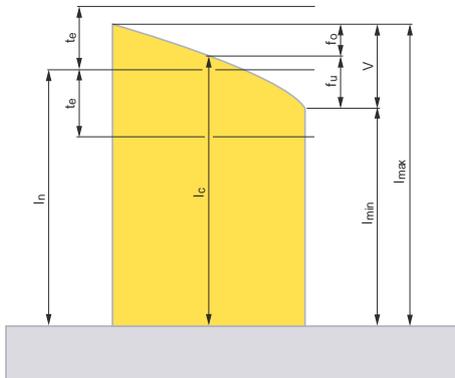
These gauges are reference standards for the company intended for calibration laboratories and other climate-controlled measuring stations, where they are used for the adjustment and calibration of gauges and measuring instruments.

### Grade K

Grade K gauges are reference standards intended for metrology laboratories of national institutes, laboratories accredited or not by a national calibration service, and measurement laboratories. They are used for calibrating gauges or other standards of the same precision and measuring instruments.

## Standards

### Limit Deviations and Tolerances (Definition)



$t_e$	Limit deviations of lengths at any point relative to the nominal length
$t_v$	Tolerances for length variation
$t_f$	Flatness tolerances
$l_n$	Nominal length
$l_c$	Length at the center

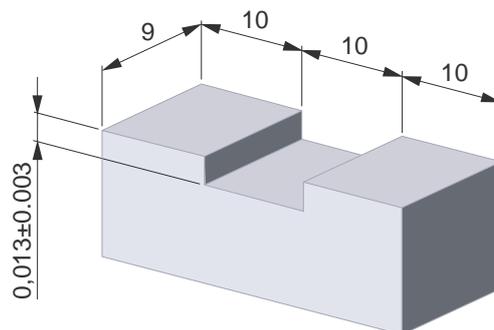
### Limit Deviations and Tolerances according to ISO 3650

Nominal length mm	Grade											
	$\pm t_e$ $\mu\text{m}$	K $\pm t_v$ $\mu\text{m}$	$\pm t_f$ $\mu\text{m}$	$\pm t_e$ $\mu\text{m}$	O $\pm t_v$ $\mu\text{m}$	$\pm t_f$ $\mu\text{m}$	$\pm t_e$ $\mu\text{m}$	1 $\pm t_v$ $\mu\text{m}$	$\pm t_f$ $\mu\text{m}$	$\pm t_e$ $\mu\text{m}$	2 $\pm t_v$ $\mu\text{m}$	$\pm t_f$ $\mu\text{m}$
$0,5 < l_n \leq 10$	0,20	0,05	0,05	0,12	0,10	0,10	0,20	0,16	0,15	0,45	0,30	0,25
$10 < l_n \leq 25$	0,30	0,05	0,05	0,14	0,10	0,10	0,30	0,16	0,15	0,60	0,30	0,25
$25 < l_n \leq 50$	0,40	0,06	0,05	0,20	0,10	0,10	0,40	0,18	0,15	0,80	0,30	0,25
$50 < l_n \leq 75$	0,50	0,06	0,05	0,25	0,12	0,10	0,50	0,18	0,15	1,00	0,35	0,25
$75 < l_n \leq 100$	0,60	0,07	0,05	0,30	0,12	0,10	0,60	0,20	0,15	1,20	0,35	0,25
$100 < l_n \leq 150$	0,80	0,08	0,05	0,40	0,14	0,10	0,80	0,20	0,15	1,60	0,40	0,25
$150 < l_n \leq 200$	1,00	0,09	0,10	0,50	0,16	0,15	1,00	0,25	0,18	2,00	0,40	0,25
$200 < l_n \leq 250$	1,20	0,10	0,10	0,60	0,16	0,15	1,20	0,25	0,18	2,40	0,45	0,25
$250 < l_n \leq 300$	1,40	0,10	0,10	0,70	0,18	0,15	1,40	0,25	0,18	2,80	0,50	0,25
$300 < l_n \leq 400$	1,80	0,12	0,10	0,90	0,20	0,15	1,80	0,30	0,18	3,60	0,50	0,25
$400 < l_n \leq 500$	2,20	0,14	0,10	1,10	0,25	0,15	2,20	0,35	0,18	4,40	0,60	0,25
$500 < l_n \leq 600$	2,60	0,16	0,15	1,30	0,25	0,18	2,60	0,40	0,20	5,00	0,70	0,25
$600 < l_n \leq 700$	3,00	0,18	0,15	1,50	0,30	0,18	3,00	0,45	0,20	6,00	0,70	0,25
$700 < l_n \leq 850$	3,40	0,20	0,15	1,70	0,30	0,18	3,40	0,50	0,20	6,50	0,80	0,25
$800 < l_n \leq 900$	3,80	0,20	0,15	1,90	0,35	0,18	3,80	0,50	0,20	7,50	0,90	0,25
$900 < l_n \leq 1000$	4,20	0,25	0,15	2,00	0,40	0,18	4,20	0,60	0,20	8,00	1,00	0,25

## Sets of 11 gauge blocks for the calibration of UPC/UPD gauge blocks comparators

Standard	ISO 3650
Calibration method	Interferometry or mechanical comparison
Material	6 mm bridge gauge block: Hard metal Other blocks: Special alloy steel
Grade	K
Included in delivery	1x special 6 mm bridge-shaped gauge block for capturing measurement errors of the lower probe 5x pairs of gauge blocks: 0,5 - 0,5 mm 1,0 - 1,005 mm 1,0 - 1,01 mm 4,0 - 4,0 mm 100,0 - 100,0 mm Calibration certificate

Article number	Designation	Max. perm. errors $\mu\text{m}$	Calibration method
<b>S59110152</b>	Set of 11 gauge blocks + PTB certificate	Deviation in center: $U = \pm 0,015$	Interferometry
<b>S59110489</b>	Set of 11 gauge blocks + DAkkS certificate	Deviation in center: $U = \pm 0,030$	Mechanical comparison



Special 6 mm bridge-shaped gauge block

## Gauge blocks

### ***Set of 9 additional metric gauge blocks for calibrating the UPD measuring device***

Standard	ISO 3650
Calibration method	Interferometry or mechanical comparison
Material	Special alloy steel
Grade	K
Included in delivery	Blocks: 1, 5, 10, 15, 20, 25, 50, 75, 100 mm Calibration certificate

Article number	Designation	Max. perm. errors $\mu\text{m}$	Calibration method
<b>S59300107</b>	Set of 9 gauge blocks + PTB certificate	Deviation in center: $\pm (0,02 + 0,2 \times 10^{-6} \times L)$ (L in m)	Interferometry
<b>S59300104</b>	Set of 9 gauge blocks + SCS certificate	Deviation in center: $\pm (0,05 + 0,5 \times 10^{-6} \times L)$ (L in m)	Mechanical comparison

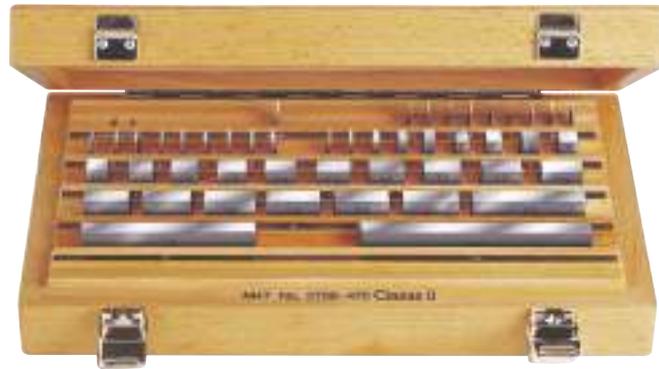
## Sets of 32 gauge blocks, metric

Standard	ISO 3650
Included in delivery	<p>1x gauge block: 1.005 mm            9x gauge blocks: 1.01 ÷ 1.09 mm, increment = 0.01 mm            9x gauge blocks: 1.1 ÷ 1.9 mm, increment = 0.1 mm            9x gauge blocks: 1 ÷ 9 mm, increment = 1 mm            4x gauge blocks: 10, 20, 30, 60 mm</p> <p>+ calibration certificate according to:            Steel sets, all grades: DAkkS certificate            Tungsten carbide sets, all grades: UKAS certificate            Ceramic sets, all grades: UKAS certificate</p>

		Grade			
		K	0	1	2
Material	Steel	<b>0651516027</b>	<b>0651515027</b>	<b>0651511027</b>	<b>0651512028</b>
	Tungsten carbide	<b>0651526027</b>	<b>0651525027</b>	<b>0651521027</b>	-
	Ceramic	<b>0651536027</b>	<b>0651535027</b>	<b>0651531027</b>	-

## Gauge blocks

### Sets of 47 gauge blocks, metric



0651515021

Standard	ISO 3650
Included in delivery	<p>1x gauge block: 1,005 mm            9x gauge blocks: 1,01 ÷ 1,09 mm, increment = 0,01 mm            9x gauge blocks: 1,1 ÷ 1,9 mm, increment = 0,1 mm            24x gauge blocks: 1 ÷ 24 mm, increment = 1 mm            4x gauge blocks: 25 ÷ 100 mm, increment = 25 mm</p> <p>+ calibration certificate according to:            Steel sets, all grades: DAkkS certificate            Tungsten carbide sets, all grades: UKAS certificate            Ceramic sets, all grades: UKAS certificate</p>

		Grade			
		K	0	1	2
Material	Steel	<b>0651516021</b>	<b>0651515021</b>	<b>0651511021</b>	<b>0651512021</b>
	Tungsten carbide	-	<b>0651525021</b>	<b>0651521021</b>	-
	Ceramic	<b>0651536021</b>	<b>0651535021</b>	<b>0651531021</b>	-

Sets of 88 gauge blocks, metric



0651515014

Standard	ISO 3650
Included in delivery	<p>1x gauge block: 1,005 mm            9x gauge blocks: 1,001 ÷ 1,009 mm, increment = 0,001 mm            49x gauge blocks: 1,01 ÷ 1,49 mm, increment = 0,01 mm            19x gauge blocks: 0,5 ÷ 9,5 mm, increment = 0,5 mm            10x gauge blocks: 10 ÷ 100 mm, increment = 10 mm</p> <p>+ calibration certificate according to:            Steel sets, all grades: DAkkS certificate            Tungsten carbide sets, all grades: UKAS certificate            Ceramic sets, all grades: UKAS certificate</p>

		Grade			
		K	O	1	2
Material	Steel	<b>0651516014</b>	<b>0651515014</b>	<b>0651511014</b>	<b>0651512014</b>
	Tungsten carbide	-	<b>0651525014</b>	<b>0651521014</b>	-
	Ceramic	<b>0651536014</b>	<b>0651535014</b>	<b>0651531014</b>	-

## Gauge blocks

### Sets of 112 gauge blocks, metric

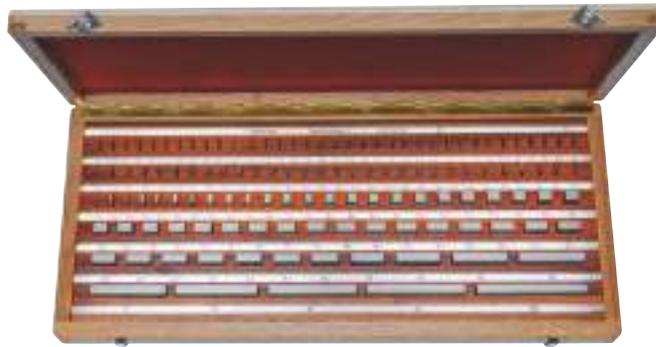


0652511012

Standard	ISO 3650
Included in delivery	<p>1x gauge block: 1,0005 mm            9x gauge blocks: 1,001 ÷ 1,009 mm, increment = 0,001 mm            49x gauge blocks: 1,01 ÷ 1,49 mm, increment = 0,01 mm            49x gauge blocks: 0,5 ÷ 24,5 mm, increment = 0,5 mm            4x gauge blocks: 25 ÷ 100 mm, increment = 25 mm</p> <p>+ calibration certificate according to:            Steel sets, all grades: DAkkS certificate            Tungsten carbide sets, all grades: UKAS certificate            Ceramic sets, all grades: UKAS certificate</p>

		Grade			
		K	0	1	2
Material	Steel	<b>0651516012</b>	<b>0651515012</b>	<b>0651511012</b>	<b>0651512012</b>
	Tungsten carbide	-	<b>0651525012</b>	<b>0651521012</b>	-
	Ceramic	<b>0651536012</b>	<b>0651535012</b>	<b>0651531012</b>	-

## Sets of 122 gauge blocks, metric



0651511011

Standard	ISO 3650
Included in delivery	<p>1x gauge block: 1,0005 mm            9x gauge blocks: 1,001 ÷ 1,009 mm, increment = 0,001 mm            49x gauge blocks: 1,01 ÷ 1,49 mm, increment = 0,01 mm            4x gauge blocks: 1,6 ÷ 1,9 mm, increment = 0,1 mm            49x gauge blocks: 0,5 ÷ 24,5 mm, increment = 0,5 mm            8x gauge blocks: 30 ÷ 100 mm, increment = 10 mm            2x gauge blocks: 25, 75 mm</p> <p>+ calibration certificate according to:            Steel sets, all grades: DAkkS certificate            Tungsten carbide sets, all grades: UKAS certificate            Ceramic sets, all grades: UKAS certificate</p>

		Grade			
		K	0	1	2
Material	Steel	<b>0651516011</b>	<b>0651515011</b>	<b>0651511011</b>	<b>0651512011</b>
	Tungsten carbide	-	<b>0651525011</b>	-	-
	Ceramic	<b>0651536011</b>	<b>0651535011</b>	-	-

## Gauge blocks

### Set with 12 precision squares



06769002

Dimensions	Measuring faces: 6.35 x 76.2 mm (1/4 x 3 in)
Material	Hardened steel
Max. perm. errors	30 in
Included in delivery	12x blocks: 1/4°, 1/2°, 1°, 2°, 3°, 4°, 5°, 10°, 15°, 20°, 25°, 30°

Article number	Designation
<b>06769002</b>	Set of 12 angle gauge blocks

**Setting rings, metric**


Max. perm. errors

The cylindricity errors make no allowance for a rim of 1 mm.

Particular characteristic(s)

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.

Article number	Designation	Max. perm. cylindricity error, $\mu\text{m}$	Uncertainty of measurement, $\mu\text{m}$	Diameter mm
00843200	Ring gauge	1,5	1,5	4
00843201	Ring gauge	1,5	1,5	5,5
00840114	Ring gauge	1,5	1,5	6
00840101	Ring gauge	1,5	1,5	8
00840115	Ring gauge	1,5	1,5	8,5
00840102	Ring gauge	1,5	1,5	10
00840103	Ring gauge	1,5	1,5	11
00840116	Ring gauge	1,5	1,5	12,5
00840104	Ring gauge	1,5	1,5	15
00840105	Ring gauge	1,5	1,5	17
00840117	Ring gauge	1,5	1,5	17,5
00840106	Ring gauge	1,5	1,5	25
00840107	Ring gauge	2	2	35
00843230	Ring gauge	2	2	45
00840108	Ring gauge	2	2	50
00843239	Ring gauge	2	2	60
00840109	Ring gauge	2	2	70
00840118	Ring gauge	2	2	85
00840110	Ring gauge	2	2	90
00840111	Ring gauge	2,5	2,5	110
00840112	Ring gauge	2,5	2,5	125
00840113	Ring gauge	2,5	4	175

## Setting rings

### Setting rings, imperial



00850106

Max. perm. errors

The cylindricity errors make no allowance for a rim of 1 mm.

Particular characteristic(s)

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.

Article number	Designation	Max. perm. cylindricity error, $\mu\text{m}$	Uncertainty of measurement, $\mu\text{m}$	Diameter in
00850101	Ring gauge	1,5	1,5	.35
00850102	Ring gauge	1,5	1,5	.425
00850103	Ring gauge	1,5	1,5	.5
00850104	Ring gauge	1,5	1,5	.6
00850105	Ring gauge	1,5	1,5	.7
00850106	Ring gauge	1,5	1,5	1
00850107	Ring gauge	2	2	1.4
00850108	Ring gauge	2	2	2
00850109	Ring gauge	2	2	2.8
00850110	Ring gauge	2	2	3.6
00850111	Ring gauge	2,5	2,5	4.4
00850112	Ring gauge	2,5	2,5	5
00850113	Ring gauge	2,5	4	7

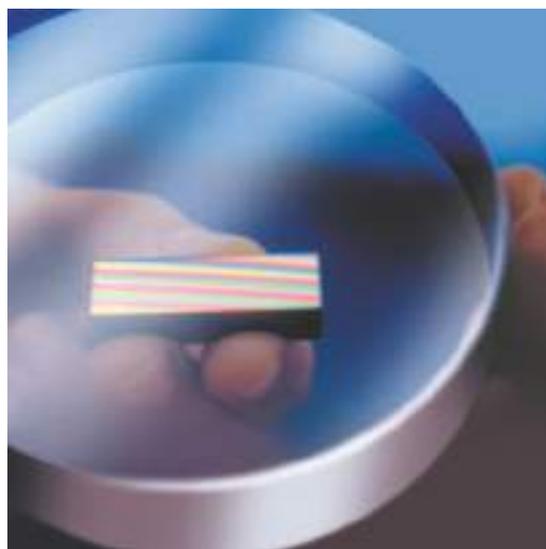
## Optical flats

• USE

- For checking the flatness and adherence of reference gauges or any other parts with flat faces of the same precision.



02530075



Parallelism	Parallelism between the measuring faces is not guaranteed.
Flatness	0,125 $\mu\text{m}$
Included in delivery	Optical flat Declaration of Conformity

Article number	Designation	Diameter mm	Epaisseur mm
02530050	Optical flat	50	15
02530075	Optical flat	75	20

## Optical flats

### Optical flats with two parallel faces

- USE
  - For checking the flatness and parallelism of the measuring faces of external micrometers and similar instruments
- TESTING PROCESS
  - The difference in length of the interference lenses corresponds to one quarter or one third of the micrometer screw pitch (0,5 mm) respectively



Max. perm. errors	Length compared to the nominal dimension: $\pm 100 \mu\text{m}$ Flatness: $\leq 27.335 \text{ mm}$ : $0,15 \mu\text{m}$ $\geq 52.000 \text{ mm}$ : $0,20 \mu\text{m}$ Parallelism: $\leq 27.335 \text{ mm}$ : $0,4 \mu\text{m}$ $\geq 52.000 \text{ mm}$ : $0,5 \mu\text{m}$
Included in delivery	Optical flat(s) Déclaration de conformité

Article number	Designation	Diameter mm	Epaisseur mm
<b>02510000</b>	Set of optical flats	31	12 ÷ 12,375
<b>02510100</b>	Set of optical flats	31	27 ÷ 27,335
<b>02510200</b>	Set of optical flats	31	52 ÷ 52,335
<b>02510300</b>	Set of optical flats	31	77 ÷ 77,335
<b>02510001</b>	Optical flat	31	12
<b>02510002</b>	Optical flat	31	12,125
<b>02510003</b>	Optical flat	31	12,25
<b>02510004</b>	Optical flat	31	12,375
<b>02510101</b>	Optical flat	31	27
<b>02510102</b>	Optical flat	31	27,165
<b>02510103</b>	Optical flat	31	27,335
<b>02510201</b>	Optical flat	31	52
<b>02510202</b>	Optical flat	31	52,165
<b>02510203</b>	Optical flat	31	52,335
<b>02510301</b>	Optical flat	31	77
<b>02510302</b>	Optical flat	31	77,165
<b>02510303</b>	Optical flat	31	77,335

## Sets of adjustable parallels



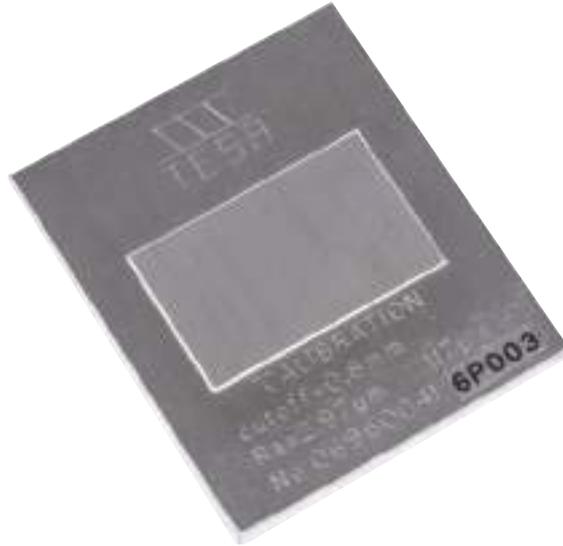
06769010

Material	Hardened steel
Function(s)	Each parallel consists of two conical parts assembled using a dovetail joint. Two fixing screws lock the parallel at the desired dimension.
Included in delivery	<p>1x parallel: height = 10 ÷ 13 mm, length = 44 mm, width = 7 mm</p> <p>1x parallel: height = 13 ÷ 17 mm, length = 54 mm, width = 7 mm</p> <p>1x parallel: height = 17 ÷ 24 mm, length = 68 mm, width = 7 mm</p> <p>1x parallel: height = 24 ÷ 33 mm, length = 90 mm, width = 7 mm</p> <p>1x parallel: height = 33 ÷ 44 mm, length = 106 mm, width = 7 mm</p> <p>1x parallel: height = 44 ÷ 57 mm, length = 129 mm, width = 7 mm</p> <p>Screwdriver</p>

Article number	Designation
<b>06769010</b>	Set of 6 adjustable parallels

## Standards for roughness gauges

### Surface roughness standards



06960041

Standard ISO 5436-1

Article number	Designation
<b>06960041</b>	Roughness standard, Ra = 2,97 µm
<b>06960066</b>	Roughness standard, Ra = 1 µm
<b>06960065</b>	Roughness standard, Ra = 0,5 µm
<b>06960064</b>	Roughness standard, Ra = 0,1 µm

### Dummy probes

The reference probes, also called "dummy probes", are resistance dividers. Each probe simulates a given length very accurately. Reference probes are connected to the instrument instead of standard probes for checking or calibrating electronic devices that can be connected to TESA inductive probes.



Dimensions	Ø 18 x 118 mm
Degree of protection	IP40
Particular characteristic(s)	<p>Input impedance: <math>970 \pm 50 \Omega</math> (13 kHz) or <math>2150 \pm 50 \Omega</math> (0 <math>\mu\text{m}</math> normal)            Phase (13 kHz): <math>71 \pm 2^\circ</math>            Input resistance: <math>100 \pm 5 \Omega</math>            Output impedance (13 kHz): <math>1000 \pm 2 \Omega</math>            Phase (13 kHz): <math>0,2^\circ</math>            Dummy probe (half-bridge), sensitivity 73.75 mV/V/mm</p> <p>Suitable for instruments characterized as follows:            Frequency: <math>13 \pm 0,65 \text{ kHz}</math>            Voltage: <math>3 \pm 0,015 \text{ Vrms}</math> (2 symmetrical voltages of 1,5 Vrms)            Output and input impedance: <math>\leq 0,2 \Omega</math> and <math>2000 \Omega</math>, resp.</p>
Included in delivery	Measurement report

Article number	Designation
<b>S41078077</b>	Dummy probe, $\pm 0 \mu\text{m}$
<b>S41078079</b>	Dummy probe, $\pm 3 \mu\text{m}$
<b>S41078231</b>	Dummy probe, $\pm 5 \mu\text{m}$
<b>S41078081</b>	Dummy probe, $\pm 10 \mu\text{m}$
<b>S41078228</b>	Dummy probe, $\pm 100 \mu\text{m}$
<b>S41078230</b>	Dummy probe, $\pm 190 \mu\text{m}$
<b>S41078087</b>	Dummy probe, $\pm 300 \mu\text{m}$
<b>S41078332</b>	Dummy probe, $\pm 500 \mu\text{m}$
<b>S41078751</b>	Dummy probe, $\pm 1000 \mu\text{m}$
<b>S41078752</b>	Dummy probe, $\pm 1900 \mu\text{m}$
<b>S41077249</b>	Set of 3 dummy probes, $\pm 0 \mu\text{m}$ , $\pm 100 \mu\text{m}$ , $\pm 1000 \mu\text{m}$
<b>S41078654</b>	Set of 2 dummy probes, $\pm 190 \mu\text{m}$ , $\pm 1900 \mu\text{m}$

## Standard for UNIMASTER

### *Setting standard for UNIMASTER*



01110501

Article number	Designation
<b>01110501</b>	Setting standard for UNIMASTER





# Non destructive dimensional control



**TESA**  
TECHNOLOGY

### ***Non-destructive control***

Non-destructive control (NDC) is a discipline that brings together processes and techniques that allow a user to measure and ensure the conformity and integrity of a material or a part without having to destroy or alter it. Non-destructive control can even avoid the need to dismantle or move a part.

The use of non-destructive measurement techniques is essential for industry. Indeed, NDC techniques are very important for a company because they allow to save a lot of money by not destroying parts that can sometimes be very expensive.

There are several very popular non-destructive evaluation techniques today. The metrology and quality control industries are improving these technologies year after year and are allowing them to replace more and more destructive testing, which is still too present in the industry.

One of these techniques is inspection by impression. This control procedure aims at injecting a liquid or pasty product on the surface or in the part whose conformity is to be checked. The products being bi-components, their contact in the part or on the surface causes a polymerization reaction which transforms the liquid into solid.

Once the liquid is hard, we have a perfect negative impression of the part or the surface. All that is left to do is to extract it thanks to the elastic properties of the product.

The advantages of impression taking are that it can be used on almost all materials. It allows a user to highlight a lot of defects: dimensions, angles and geometry of the part, surface condition, surface roughness, presence of micro defects, etc.



### ***Dimensional control of internal shapes***

Dimensional inspection is a very important step to ensure the conformity of your parts after their production.

When you undertake to make the impression of a specific area inside a part, the first imperative is to evaluate its constraints.

The most important constraint is the extraction constraint, which is a simple mathematical calculation that allows you to evaluate the possibility of demolding the impressions. The higher the extraction stress, the more difficult it will be to extract the impression, and therefore, the choice of the product to be used will have to be adapted.

The extraction stress (or undercut) is a ratio that is calculated as follows:  
 $(\text{Minimum dimension of the extraction hole}) / (\text{Maximum internal dimension}) = \text{extraction stress in \%}$ .



## Non destructive dimensional control

### ***Dimensional control of external shapes***

Measuring an external shape requires to consider additional elements compared to measuring an internal shape. The choice of the product is made according to the zone to be controlled, how difficult to control the zone is and its external environment (orientation, etc).

TESA non-destructive dimensional control range includes products of different consistencies (rigid, semi-flexible, pasty, malleable, etc). Each of them can be suitable for an external impression, even if pasty or malleable solutions are recommended because of their non-flowing properties.

When the surface to be controlled does not have a complex shape that could prevent demolding (zero extraction stress), it is recommended to choose a product with a semi-flexible final consistency. The result can be sliced by the double blade cutter, which makes it much easier to control.

If the constraint is too high, it will be necessary to opt for the softest products.



### ***Ra roughness measurement***

Some products have the technical capacity to carry out indirect Ra roughness controls.

In fact, the P80Ra, as its name indicates, is a product capable of copying the roughness of a part and retranscribing it identically on its impression which, sometimes, is not accessible for measuring instruments.

When the Ra of the surface to be controlled is greater than or equal to 0,4  $\mu\text{m}$ , the roughness can be measured directly on the impression using a roughness gauge, and the result is faithful to the original. For a lower roughness, the inspection of the impression can be done with a laser metrology instrument, or an interferometer.



## Molding product M70, malleable

- USE
  - Malleable
  - Can be applied by hand
  - With a consistency similar to modeling clay, it is convenient for controlling shapes that are difficult for the injector gun to reach



Final consistency	Semi-flexible
Final hardness	70
Max. extraction coefficient	5%
Working time at 20°C	± 0,75 min
Setting time at 20°C	± 4 min
Included in delivery	1x jar A, 450 ml 1x jar B, 450 ml Measuring spoon

Article number	Designation
<b>06869121</b>	M70, 2 x 450 ml

### Accessories

Article number	Designation
<b>06869111</b>	Cutter with two blades



## Molding product

### Molding product P80Ra, pasty

- USE
  - Non-flowing (pasty)
  - Can be applied on hard to reach surfaces (vertical, overhanging, etc)
  - Specially developed for roughness control
  - Recommended for surfaces Ra > 0,4 µm



Final consistency	Rigid
Final hardness	80
Max. extraction coefficient	0%
Working time at 20°C	± 0,5 min
Setting time at 20°C	± 6 min

Article number	Designation
<b>06869118</b>	P80Ra, 8 x 50 ml + 48 nozzles + 6 fine nozzles

#### Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs
<b>06869112</b>	Injector gun



## Molding product F20, liquid

• USE

- Flowing, it infiltrates the interior of any type of part, whether small (diameter up to 0,1 mm) or medium size
- Very flexible final impression, which allows it to be strongly stretched and deformed during demolding
- Recommended for impressions in complex internal shapes (threads, internal grooves and grooves)
- High precision final impression, all surface details (shape, size, aspect, surface condition, etc) are reproduced to the  $\mu\text{m}$
- Unaltered replica during the extraction stage, leaves no trace in the controlled area
- Can also be used for protection (can substitute a gasket for example)



Final consistency	Flexible
Final hardness	20
Max. extraction coefficient	30%
Working time at 20°C	$\pm 1,5$ min
Setting time at 20°C	$\pm 8$ min

Article number	Designation
<b>06869102</b>	F20, 8 x 50 ml + 48 nozzles + 6 fine nozzles
<b>06869120</b>	F20, 8 x 50 ml + 48 nozzles + 6 fine nozzles

Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs



## Molding product

### Molding product F50, liquid

- USE

- Semi-flowing
- Semi-flexible final impression, can be used in shapes that are not very complex to demould
- Efficient to create custom-made protections, caps, and savings against surface treatments
- Very high precision final impression, all the surface details (shape, dimension, aspect, surface condition, etc) are reproduced in  $\mu\text{m}$



Final consistency	Semi-flexible
Final hardness	50
Max. extraction coefficient	10%
Working time at 20°C	$\pm 1$ min
Setting time at 20°C	$\pm 8$ min

Article number	Designation
<b>06869101</b>	F50, 8 x 50 ml + 48 nozzles + 6 fine nozzles
<b>06869119</b>	F50, 8 x 50 ml + 48 nozzles + 6 fine nozzles

#### Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs



Case



Included in delivery

- 1x injector gun
- 1x double blade cutter
- 1x cutter extractor
- 1x cutting guide for cutter
- 1x Plastin (0,25 kg)
- 3x rings, Ø 4 mm, H = 15 mm
- 3x rings, Ø 6 mm, H = 15 mm
- 3x rings, Ø 8 mm, H = 16 mm
- 3x rings, Ø 12 mm, H = 18 mm
- 3x rings, Ø 15 mm, H = 20 mm
- 3x rings, Ø 20 mm, H = 20 mm
- 3x rings, Ø 25 mm, H = 25 mm
- 3x cartridges F50, 50 ml
- 3x cartridges F20, 50 ml
- 2x cartridges P80Ra, 50 ml
- 50x nozzles
- 12x nozzle's tips

Article number	Designation
<b>06869122</b>	Case

Accessories

Article number	Designation
<b>06869106</b>	Nozzle, 48 pcs + 6 nozzle's tips
<b>06869107</b>	Nozzle, 96 pcs + 12 nozzle's tips
<b>06869108</b>	Nozzle, 192 pcs + 24 nozzle's tips
<b>06869109</b>	Nozzle's tip, 20 pcs

## Molding product

### Tips for standard nozzle

- USE
  - To control the output of the injector-mixers and avoid air bubbles
  - Bird's beak shape to reach hard to reach spaces
  - Can be used to stir the product inside the part



Article number	Designation
06869109	Nozzle's tip, 20 pcs

### Nozzles

- USE
  - For mixing cartridges' components
  - Mixes the two components of a cartridge with a 1 to 1 ratio, making them homogeneous at its exit
  - Fits all cartridges



Article number	Designation
06869106	Nozzle, 48 pcs + 6 nozzle's tips
06869107	Nozzle, 96 pcs + 12 nozzle's tips
06869108	Nozzle, 192 pcs + 24 nozzle's tips

### Accessories

Article number	Designation
06869109	Nozzle's tip, 20 pcs



### Manual gun

- USE
  - Manual, allows to control the injection flow
  - Guarantees a precise and constant 1:1 mixing ratio



Article number	Designation
06869112	Injector gun

### Technical modelling paste



Article number	Designation
06869110	Plastin

### Double blade cutter



Article number	Designation
06869111	Cutter with two blades

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