

# Mitutoyo

GB-20004



MEASURING INSTRUMENTS CATALOGUE 2019 - 2021





### Competence and customer proximity on one spot

Throughout Europe, the name Mitutoyo represents innovational power as well as outstanding quality in the field of sophisticated dimensional measuring solutions. In order to strengthen and synchronise the concerted pan-European activities, Mitutoyo established the European headquarters named Mitutoyo Europe GmbH in Neuss near Düsseldorf/Germany in January 2010.

The headquarters oversees all the activities of Mitutoyo's sales, service and production facilities throughout Europe and adjacent markets, e.g. of Turkey. It also plans and implements the medium and long term business strategies of such European operations. A Mitutoyo Europe GmbH key objective is to promote coordination amongst its European group companies in order to optimise its sales and technical support services in the best interests of customer satisfaction.

More than 260 highly skilled members of staff work for the benefit of our customers in development, service, sales and administration. They are supported by the specialists of Mitutoyo CTL Germany GmbH in Oberndorf on the River Neckar, which focuses solely on developing ground-breakingly powerful and easy to use software for three-coordinate measurement technology. The peripheral fields of coordinate measuring machines, jiggling and loading systems and thermal cabins are covered by KOMEK company based in Saarland.

The range of products offered by Mitutoyo in Europe is divided into eight groups:

- Coordinate Measuring Machines
- Vision Measuring Systems
- Form Measurement
- Optical Measuring
- Sensor Systems
- Test Equipment and Seismometers
- Digital Scale and DRO Systems
- Small Tool Instruments and Data Management

In addition to top-level measuring and testing equipment, the range of products also includes a wide selection of accessories and – as a further area of focus – sophisticated, high-performance software for coordinate measuring machines and vision measuring systems as well as surface roughness, hardness and form measurement.

The Mitutoyo Information Center of Metrology (MIM) has been demonstrating the manufacturer's commitment to advanced training in all fields of dimensional measurement technology since 1999. The MIM is open to anyone working in the fields of manufacturing, service, science and research. Mitutoyo Europe GmbH is, moreover, a corporate member of "Ausbildung Koordinatenmesstechnik e. V. (AUKOM)". This association is dedicated to providing training schemes for coordinate measuring technology with the aim of ensuring a neutral, comprehensive and state of the art training concept.

Germany has also been home to the Mitutoyo M<sup>3</sup> Solutions Europe division since 2004. The abbreviation M<sup>3</sup> stands for Mitutoyo Measurement Metrology and, as such, for the concept of special measuring solutions developed by Mitutoyo to meet the particular requirements of its customers across the whole breadth of length, form and surface measurement technology. The Mitutoyo Europe GmbH in Neuss offers sample configurations in the 400 m<sup>2</sup> M<sup>3</sup> Solution Center Europe to demonstrate the numerous possibilities. The center also presents the smooth and seamless integration of peripheral systems, such as jigs or feed and climate control systems from KOMEK alongside the measuring equipment.



# Highlights

Dial Test Indicator



ABS AOS Caliper IP67



New Indicator Series



QM Height



MF Microscope



SJ-410



SV-3200



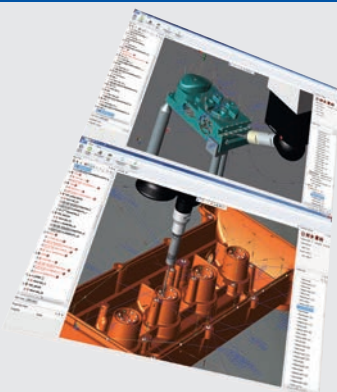
RA-6000CNC



HM-210



Automatic CMM Part Program Generation



MACH Ko-ga-me



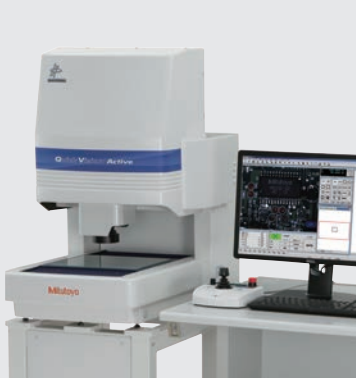
CRYSTA-Apex S



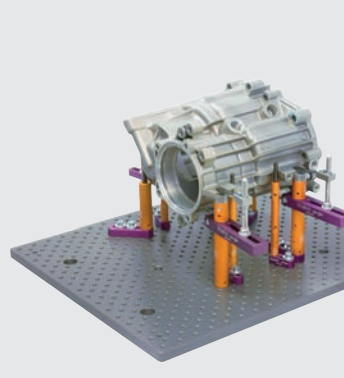
MANUAL Vision



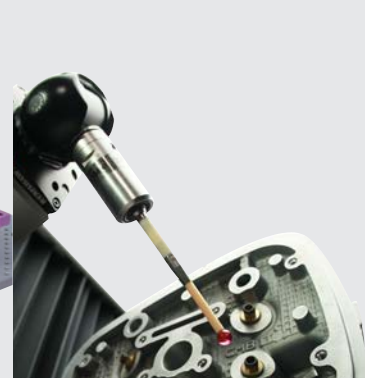
CNC Vision



Fixtures



Styli

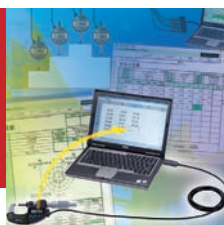


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Micrometer Head Accessories

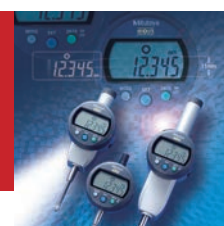
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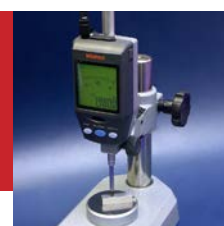
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Depth Measuring Instruments

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etc.



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## For better communication with our customers

Mitutoyo's Domestic Network  
Mitutoyo's Overseas Network  
M<sup>3</sup> Solution Centers



616 - 619

## Hardness Testing

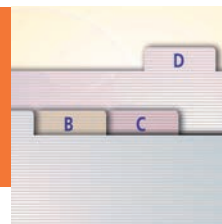
Hardness Testing Machines



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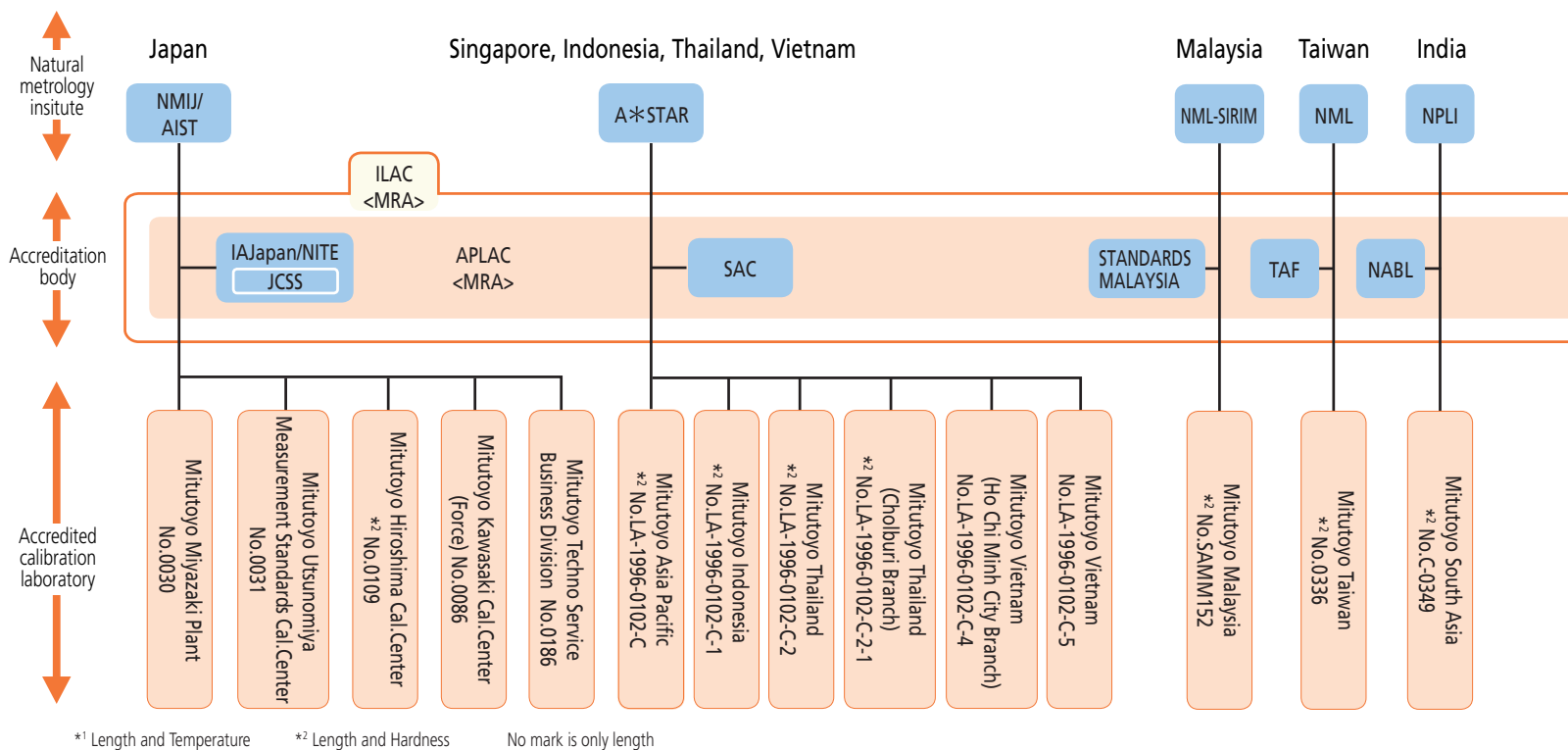
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# Offering Reliable Traceability Worldwide

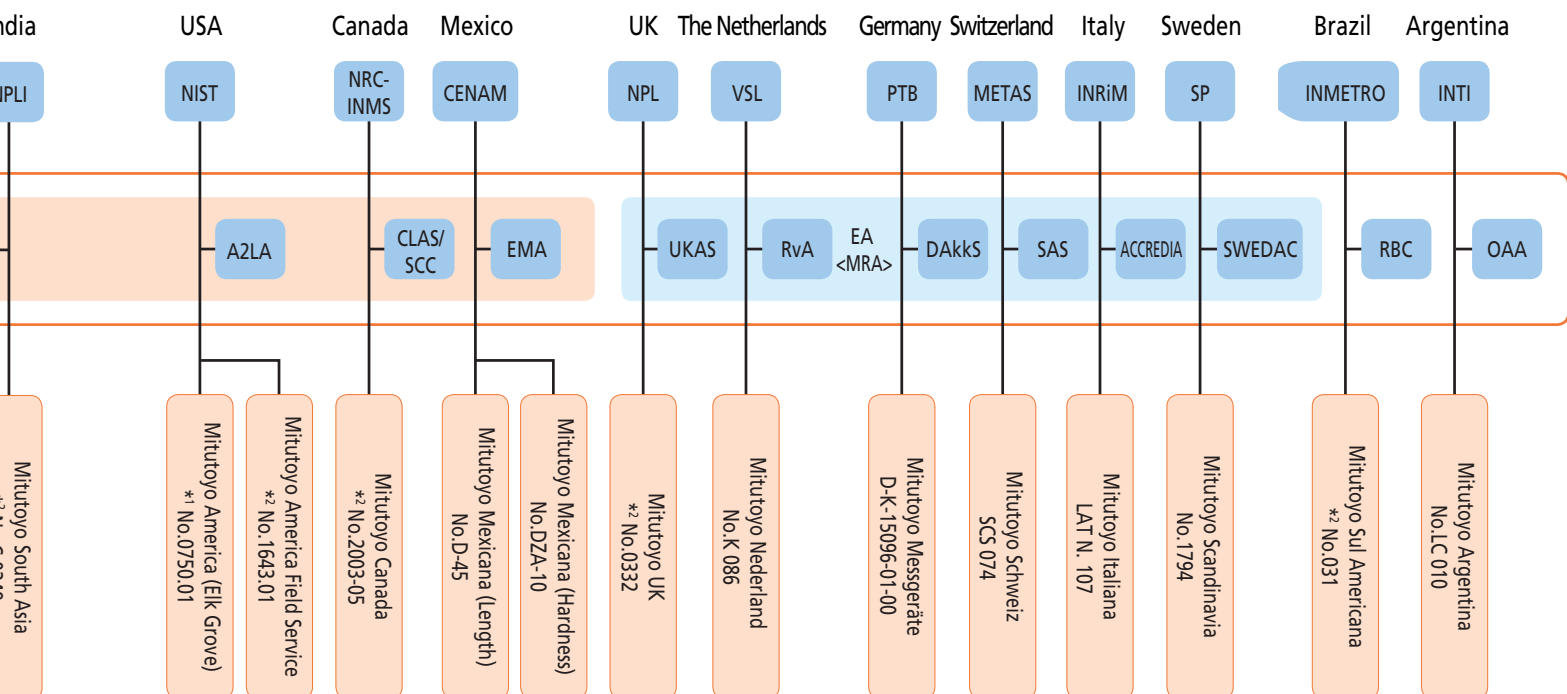
## Calibration laboratories worldwide

Mitutoyo has a system allowing comprehensive support for the calibration of precision measuring products in the global market. In order to provide calibration services on a global basis, Mitutoyo has calibration laboratories that have received ISO/IEC 17025 certification, which is an international standard, from the accredited organisations in each of the countries in which Mitutoyo operates and subsidiaries are located, both in Japan and overseas.



AIST: National Institute of Advanced Industrial Science and Technology  
 NMIJ: National Metrology Institute of Japan  
 JCSS: Japan Calibration Service System  
 NITE: National Institute of Technology and Evaluation  
 IAJapan: International Accreditation Japan  
 A\*STAR: Agency for Science, Technology and Research  
 SAC: Singapore Accreditation Council  
 NML: National Measurement Laboratory  
 TAF: Taiwan Accreditation Foundation  
 NML-SIRIM: National Metrology Laboratory, Standards and Industrial Research Institute of Malaysia  
 STANDARDS MALAYSIA: Department of Standards Malaysia  
 NIST: National Institute of Standards and Technology  
 A2LA: American Association for Laboratory Accreditation  
 NRC-INMS: National Research Council of Canada-Institute for National Measurement Standards  
 CLAS: Calibration Laboratory Assessment Service  
 SCC: Standards Council of Canada  
 CENAM: Centro Nacional de Metrología  
 EMA: Entidad Mexicana de Acreditación, a.c.  
 UKAS: United Kingdom Accreditation Service  
 NMI: Nederlands Meetinstituut

RvA: Raad voor Accreditatie  
 PTB: Physikalisch-Technische Bundesanstalt  
 DAKKS: Deutsche Akkreditierungsstelle GmbH  
 METAS: The Swiss Federal Office of Metrology and Accreditation  
 SAS: Swiss Accreditation Service  
 IMGC: Istituto di Metrologia "GUSTAVO COLONNETTI"  
 ACCREDIA: L'NTE ITALIANO DI ACCREDITAMENTO  
 SP: Swedish National Testing and Research Institute  
 SWEDAC: Swedish Board for Accreditation and Conformity Assessment  
 INMETRO: Instituto Nacional de Metrologia Normalizacao e Qualidade Industrial  
 RBC: Rede Brasileira de Calibração  
 INTI: Instituto Nacional de Tecnología Industrial  
 OAA: Organismo Argentino de Acreditación  
 NPL: National Physical Laboratory  
 NPLI: National Physical Laboratory of India  
 NABL: National Accreditation Board for Testing and Calibration Laboratories  
 (ILAC): International Laboratory Accreditation Cooperation  
 (APLAC): Asia-Pacific Laboratory Accreditation Cooperation  
 (EA): European Accreditation Cooperation  
 (MRA): Mutual Recognition Arrangement  
 #: Accreditation No.



# Offering High-level Calibration Services Worldwide

Based on highest measurement capabilities of the same level as national standards

## Traceability system

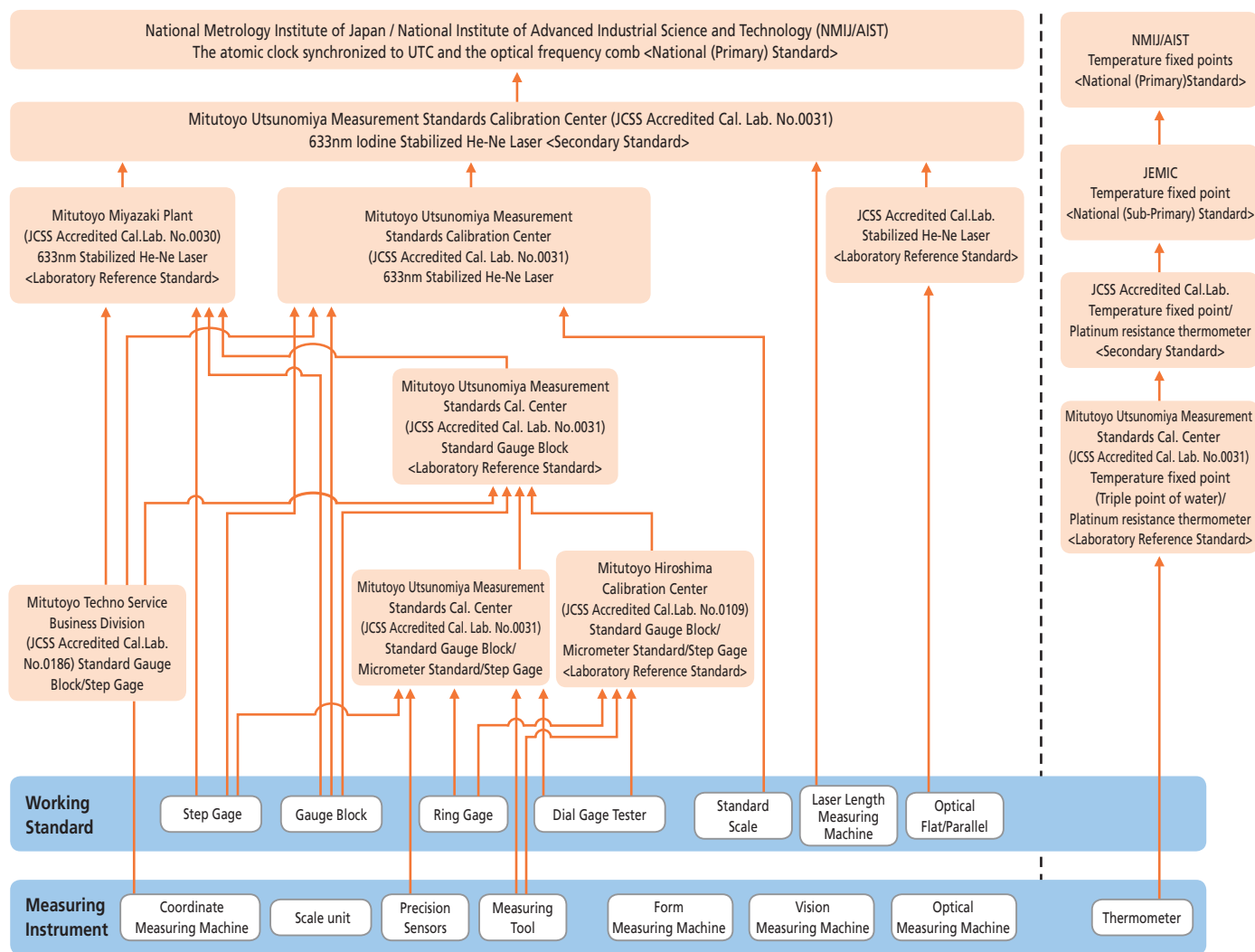
Mitutoyo has a traceability system made possible through an in-house calibration organisation certified by the ISO/IEC 17025 international standard, with length standards directly related to national standards (atomic clock synchronised to UTC and the optical frequency comb) at the highest level.

National standards are mutually recognised by CIPM, and the certified calibration organisation is mutually recognised by ILAC, so that the establishment and maintenance of traceability for Mitutoyo products is achieved both in Japan and overseas.



Certificate of JCSS accredited laboratory (Mitutoyo Utsunomiya Measurement Standards Calibration Center)

### Traceability of length

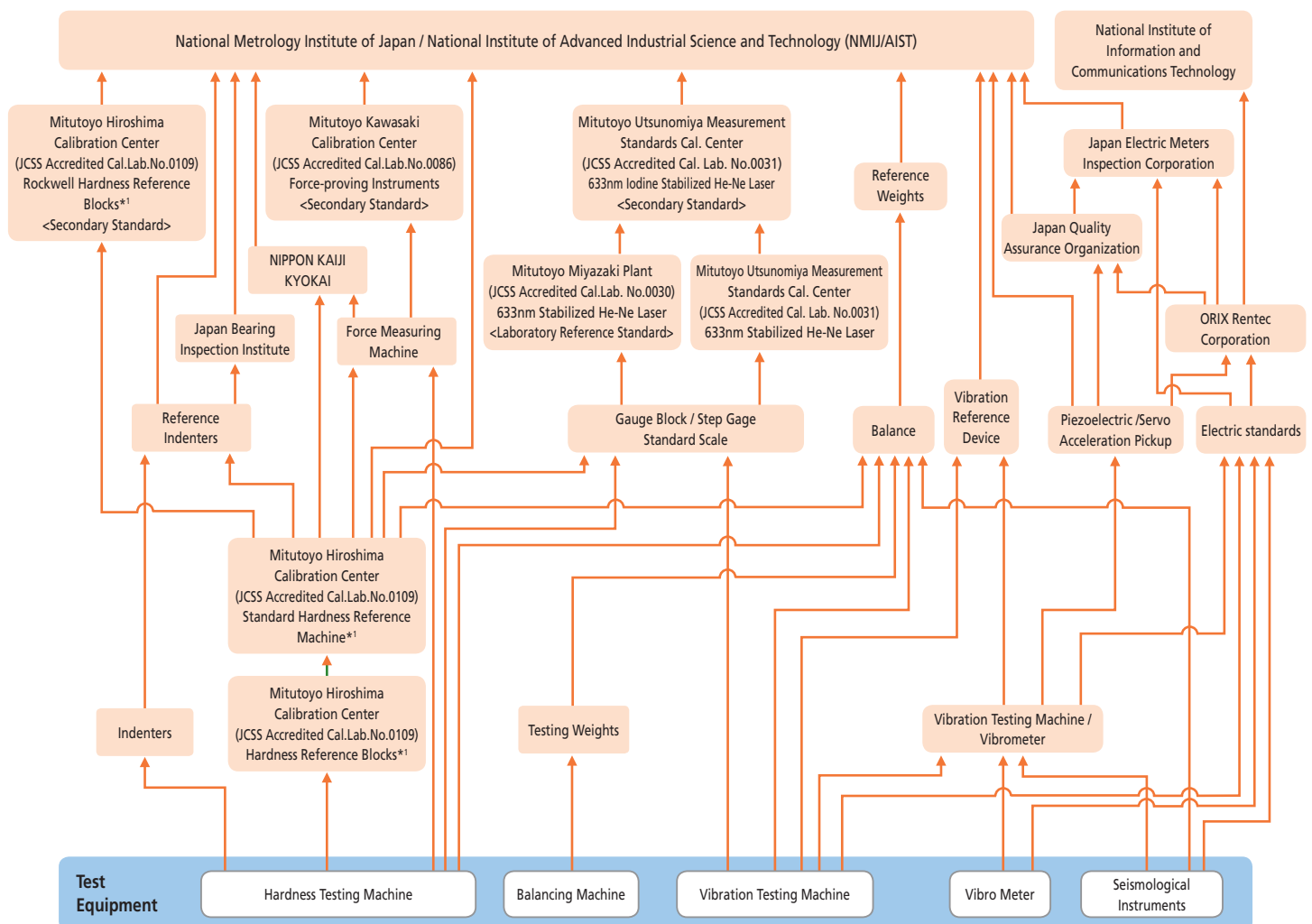


Note: This chart is a simplified representation of Mitutoyo's overall traceability system. Detailed traceability charts are published for each product.



# CE Marking Directives

Traceability of Test Equipment

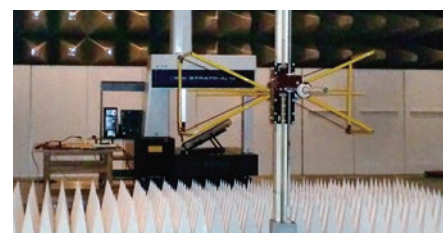


\*1 The scope of JCSS accreditation is from 20HRC up to 65HRC in Rockwell Hardness Testing Machines and Hardness Reference Blocks.

**Note:** This chart is a simplified representation of Mitutoyo's overall traceability system. Detailed traceability charts are published for each product.

## CE Marking Directives

CE stands for "Conformité Européenne", a challenging and important task for Mitutoyo in Europe. For Mitutoyo as a manufacturer of measuring electronics and measuring machines this means no sale without CE marking, no CE marking without completed conformity assessment procedure.



# Meaning of Symbols

**ABSOLUTE®**

## ABSOLUTE Linear Encoder

Mitutoyo's technology has realised the absolute position method (absolute method). With this method, you do not have to reset the system to zero after turning it off and then turning it on. The position information recorded on the scale is read every time. The following three types of absolute encoders are available: electrostatic capacitance model, electromagnetic induction model and model combining the electrostatic capacitance and optical methods. These encoders are widely used in a variety of measuring instruments as the length measuring system that can generate highly reliable measurement data.

### Advantages:

1. No count error occurs even if you move the slider or spindle extremely rapidly.
2. You do not have to reset the system to zero when turning on the system after turning it off\*<sup>1</sup>.
3. As this type of encoder can drive with less power than the incremental encoder, the battery life is prolonged to about 3.5 years (continuous operation of 18,000 hours)\*<sup>2</sup> under normal use.

\*1: Unless the battery is removed

\*2: In the case of the ABSOLUTE AOS Digimatic caliper (electromagnetic encoder model)



## Measuring Instruments Shipped with Inspection Certificate

Mitutoyo guarantees product quality as a leading precision measuring instrument manufacturer and ships measuring instruments with an inspection certificate that includes inspection data so that customers can use them with confidence. Mitutoyo also calibrates the purchased measuring instrument and issues, for a fee, a calibration certificate that proves traceability to the relevant standard.

\* For the meaning of the inspection marks shown at left, refer to the detailed description of each product

## Main Unit Startup System

## Installation of Main Unit Startup System

As a part of the enhancement of our export control system, the CNC measuring machines (all the CNC Coordinate Measuring Machines, Vision Measuring Systems, and Form Measuring Machines) are equipped with a Main Unit Startup System (relocation detecting system). This system is designed to take a machine out of operation upon detecting the mechanical shock that accompanies relocation. If you intend to relocate a measuring machine fitted with this system, please contact us beforehand so that our service engineers can assist you. On the other hand, the system may be triggered in the event of a natural event such as a powerful earthquake. In this case, our service engineers will deal with the situation at the earliest opportunity.

**IP65**

**IP66**

**IP67**

## IP Codes

These are codes that indicate the degree of protection provided (by an enclosure) for the electrical function of a product against the ingress of foreign bodies, dust and water as defined in IEC standards (IEC 60529: 2001) and JIS C 0920: 2003. [IEC: International Electrotechnical Commission]

First characteristic numeral	Degrees of protection against solid foreign objects	
	Brief description	Definition
0	Unprotected	—
1	Protected against solid foreign objects of $\phi 50$ mm and greater	A $\phi 50$ mm object probe shall not fully penetrate enclosure*
2	Protected against solid foreign objects of $\phi 12.5$ mm and greater	A $\phi 12.5$ mm object probe shall not fully penetrate enclosure*
3	Protected against solid foreign objects of $\phi 2.5$ mm and greater	A $\phi 2.5$ mm object probe shall not fully penetrate enclosure*
4	Protected against solid foreign objects of $\phi 1.0$ mm and greater	A $\phi 1.0$ mm object probe shall not fully penetrate enclosure*
5	Protected against dust	Ingress of dust is not totally prevented, but dust that does penetrate must not interfere with satisfactory operation of the apparatus or impair safety.
6	Dust-proof	No ingress of dust allowed.
7	—	—
8	—	—

\*: For details of the test conditions used in evaluating each degree of protection, please refer to the original standard.

Second characteristic numeral	Degrees of protection against water	
	Brief description	Definition
0	Unprotected	—
1	Protected against vertical water drops	Vertically falling water drops shall have no harmful effects.
2	Protected against vertical water drops within a tilt angle of 15 degrees	Vertically falling water drops shall have no harmful effects when the enclosure is tilted at any angle up to 15° on either side of the vertical.
3	Protected against spraying water	Water sprayed at an angle up to 60° either side of the vertical shall have no harmful effects.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effects.
5	Protected against water jets	Water projected in jets against the enclosure from any direction shall have no harmful effects.
6	Protected against powerful water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
7	Protection against water penetration	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardised conditions of pressure and time.
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for IPX7.



## Independent Confirmation of Compliance

IP65, IP66 and IP67 protection level ratings for applicable Mitutoyo products have been independently confirmed by the German certification organisation, TÜV Rheinland.



## Metric/Inch

Mitutoyo offers this quality product also in an switchable Metric/Inch version. Please refer to your local Mitutoyo website for detailed information.

## Inch/Metric

Mitutoyo offers this quality product also in an switchable Inch/Metric version. Please refer to your local Mitutoyo website for detailed information.

## Inch

Mitutoyo offers this quality product also in an Inch version. Please refer to your local Mitutoyo website for detailed information.



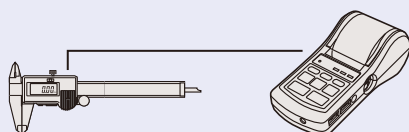
# Example of Measurement Data Management System Design

A system for recording and analysing measurement results from various Mitutoyo measuring instruments for quality assurance purposes.

## Implementation Step 1

### Recording measurement results

#### No more handwriting



DP-1VR

Measurement data can be printed easily. Data can be output to a PC for statistics calculations.

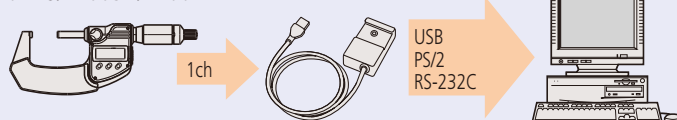
#### Direct data input to a PC

Connecting-cable-integrated USB-ITN



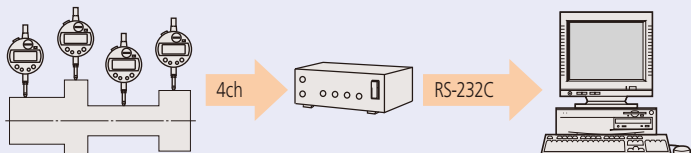
#### USB Input Tool Series

Lineups of three models with different output specifications  
IT-012U/IT-005D/IT-007R



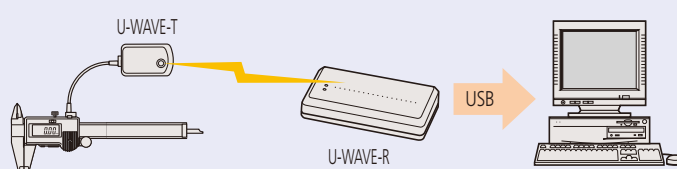
#### Input Tool Series

Connectable to a RS-232C interface PC with 4 channels and a sequencer



#### Multiplexer MUX-10F

#### Wireless

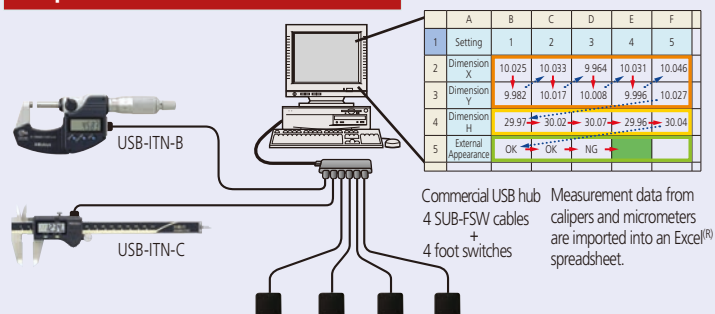


#### U-WAVE

## Implementation Step 2

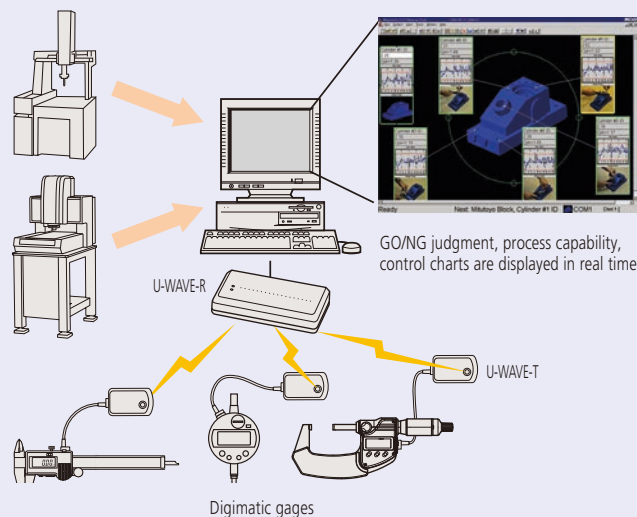
### Software dedicated to inspection and quality control

#### Inspection certificate creation



#### USB-ITPAK

#### Statistical process control

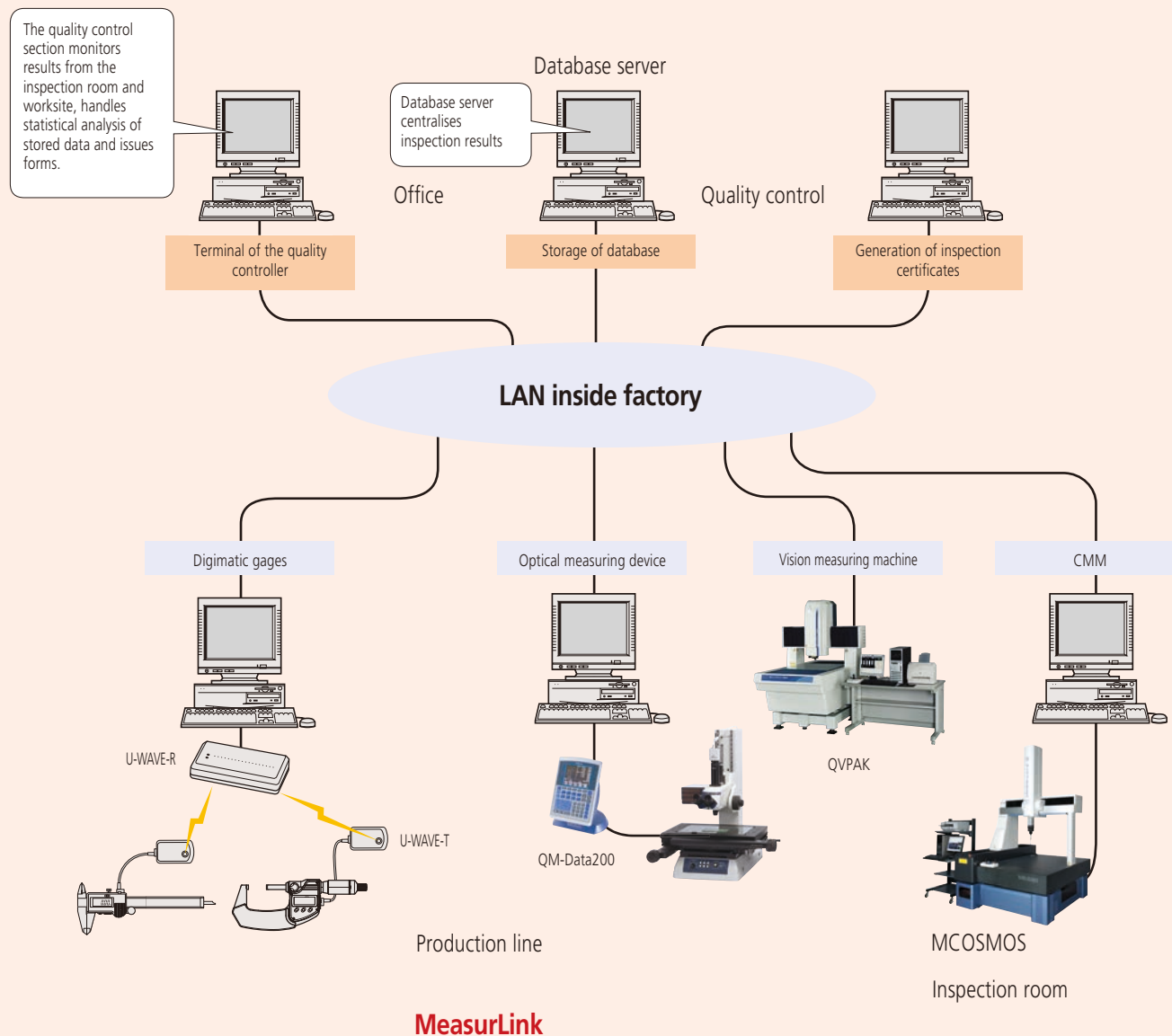


#### MeasurLink

## Implementation Step 3

Creating a quality control network covering a wide area within the factory

### Unify management of the quality test using the network in the factory



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**Digimatic Interface**  
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**Tolerancing, Timing, Display Units and Data Logger**  
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## An Integrated Solution for Quality Data Management

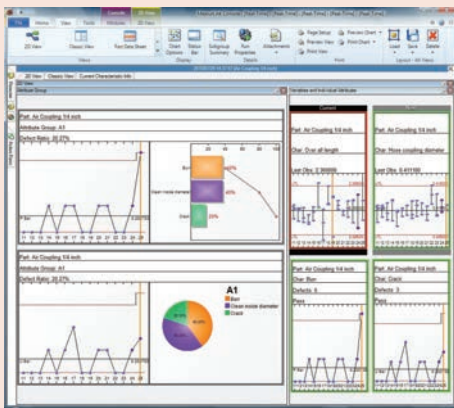
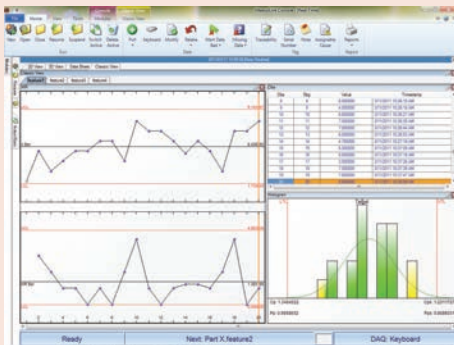
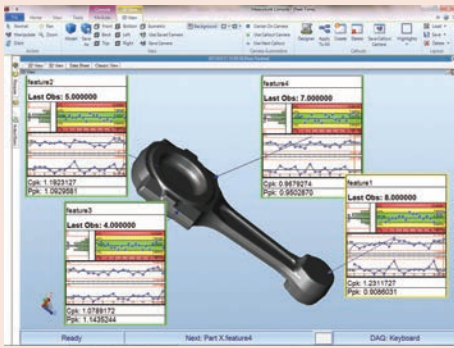
Most of Mitutoyo's electronic instruments can output data via optional connecting cables or wireless transmitters & receivers in the form of the Digimatic code. The Digimatic code can also be converted in RS-232C format by any of several available gage multiplexers. In this way, digital data can be sent to PCs for data acquisition and advanced statistical analysis.

As a client/server application, MeasurLink gives you the performance you need through distributed processing. Combined with a multi-user relational database, MeasurLink delivers a safe and organized data warehousing system making quality data available for viewing and analysis by any member of the production, engineering and managerial staff throughout your company. Inspection in the factory produces data for analysis, corrective action, and various reporting needs. As the backbone of your quality efforts, MeasurLink is guaranteed to reduce your production costs and increase your bottom line.

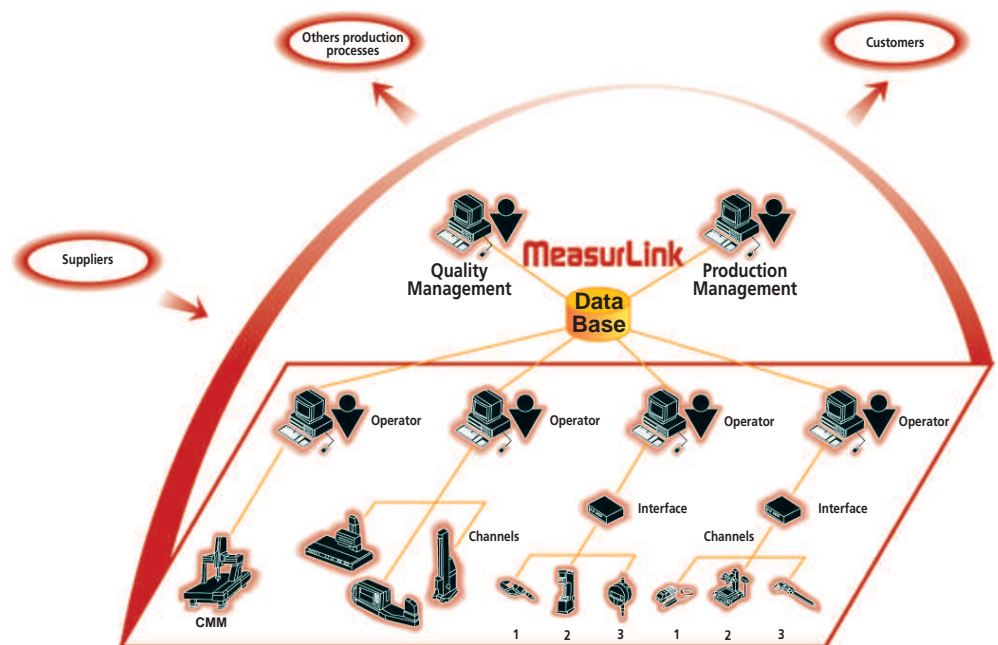
MeasurLink is capable of linking and managing multiple "islands" of inspection into a common database of part information, statistical data, gage information, process, etc. Information is shared across an entire manufacturing facility.

## Group Licensing

MeasurLink is available in several modules offering you a wide range of solutions, from data acquisition to manager views and gage management. Details about all modules can be found on the next pages. However, you can create your own package and combine modules by choosing one of the following license bundles:



MeasurLink brochure available on request



No.	Description
64AAB614FR	MeasurLink 9 Floating License - 30 Licenses*
64AAB614R	MeasurLink 9 Site License - 30 Licenses*
64AAB615FR	MeasurLink 9 Floating License - 15 Licenses*
64AAB615R	MeasurLink 9 Workgroup License - 15 Licenses*
64AAB617FR	MeasurLink 9 Floating License - 10 Licenses*
64AAB617R	MeasurLink 9 Workgroup License - 10 Licenses*
64AAB618FR	MeasurLink 9 Floating License - 5 Licenses*
64AAB618R	MeasurLink 9 Workgroup License - 5 Licenses*
64AAB619R	MeasurLink 9 Academic License - 20 Licenses*

\* Real-Time Professional 3D is not included

# MeasurLink 9

## MeasurLink Real-Time Standard Edition

Designed for customers who want to acquire and analyze data in real-time from Small Tools like calipers and micrometers.

### Features:

- Variable and attributive inspection
- Real-time graphics
- Run charts
- Control charts
- Histograms
- Statistics
- Customized Info View
- Full Reporting Template

**Supported data sources:** keyboard, RS232-C, USB devices

No.	Description
64AAB606R	MeasurLink 9 Real-Time Standard
64AAB606R-U	MeasurLink 9 Real-Time Standard Upgrade

## MeasurLink Real-Time Professional Edition

On-line Real-Time Data Collection

Acquire data directly from Mitutoyo devices such as:

- Coordinate Measuring Machines
- Form Measuring Instruments
- Vision Measurement Machines

Import data from other devices via:

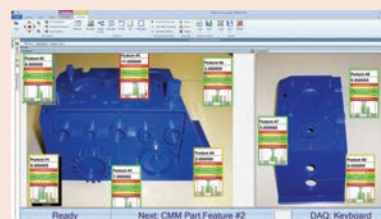
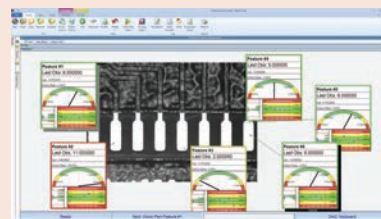
- ASCII
- QMD (xml based)

### Features:

- Variable and attributive inspection
- Real-time graphics
- Run charts
- Control charts
- Histograms
- Statistics
- Customized Info View
- Full Reporting Template
- **Data filter**

**Supported data sources:** keyboard, RS232, USB devices, **Mitutoyo DDE, ASCII, QMD.**

No.	Description
64AAB607R	MeasurLink 9 Real-Time Professional
64AAB607R-U	MeasurLink 9 Real-Time Professional Upgrade



# MeasurLink 9

## MeasurLink Real-Time Professional 3D Edition

### On-line Real-Time Data Collection

Designed for customers who wish to collect data using the Hoops 3D graphics view. Hoops 3D files can be exported from most CAD systems and provide the operator with a real view of the part. Acquire data directly from Mitutoyo devices such as:

- Coordinate Measuring Machines
- Form Measuring Instruments
- Vision Measurement Machines

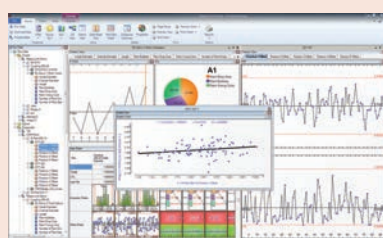
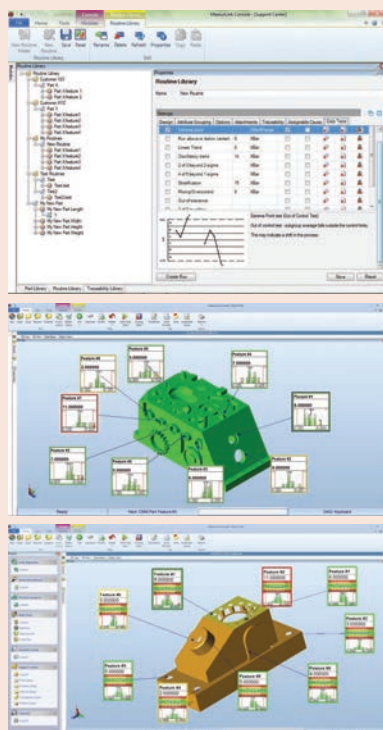
Import data from other devices via:

- ASCII
- QMD (xml based)

Features:

- Variable and attributive inspection
- Real-time graphics
- Run charts
- Control charts
- Histograms
- Statistics
- Customized Info View
- Full Reporting Template
- **Data filter**
- **3D View**
- **Flexible callout design**
- **Guided sequence**

**Supported data sources:** keyboard, RS232, USB devices, **Mitutoyo DDE, ASCII, QMD.**



## MeasurLink Process Analyze Professional Edition

### Data Analysis Software

Designed for more robust manipulation of Real-Time data in a networked environment.

- Slice and dice data in meaningful ways
- Contribute to quality control initiatives!
- Analyze your process
- Identify problem areas
- Take corrective action
- Improve your product's quality!

Features:

- Review inspection data
- Switch between databases
- Tree control navigation
- Reporting
- Group, search and sort data
- Merge data
- Scatter plots
- Electronic signatures

No.	Description
64AAB609R	MeasurLink 9 Process Analyzer Professional
64AAB609R-U	MeasurLink 9 Process Analyzer Professional Upgrade

# MeasurLink 9

## MeasurLink Process Manager Standard Edition

### Network Monitoring Software

Real-time monitoring of data as it is collected. The perfect tool for QC and Production Managers!

- Organize and maintain a shop-wide quality program at a glance.
- Audit the entire shop floor inspection activity from a single PC
- Get process information without leaving the office
- View current production across all machines
- Show clients your quality operation for the entire facility
- Establish Cpk thresholds for acceptability
- Stay up to the minute on production problem
- Drill down for details on certain
  - traceability
  - assignable cause
  - failed tests
  - serial numbers

No.	Description
64AAB610R	MeasurLink 9 Process Manager
64AAB610R-U	MeasurLink 9 Process Manager Upgrade

## MeasurLink Gage R&R

### Gage R and R

Designed according to standard ISO/TS 16949, Gage R&R allows you to use the methods of study AIAG :

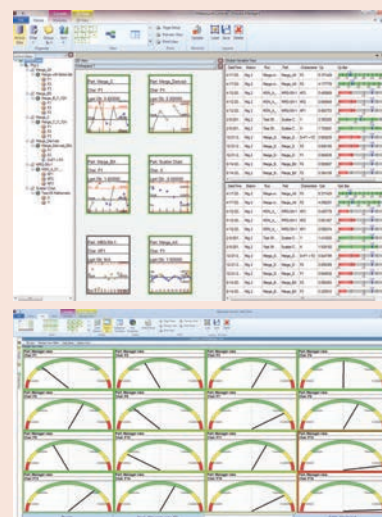
- Range
- Average and Range
- Average and Range including part variation
- Variance analysis
- Short method for attributive gages
- Bias study
- Linearity study
- Stability study

Features :

Graphical analysis tools :

- Xbar R chart
- Part by appraiser plot

No.	Description
64AAB611R	MeasurLink 9 Gage R&R
64AAB611R-U	MeasurLink 9 Gage R&R Upgrade





# MeasurLink 9

## MeasurLink Gage Management

### Gage Inventory and Calibration Control

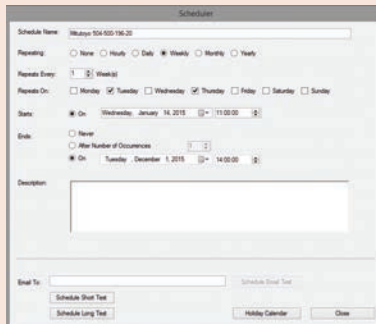
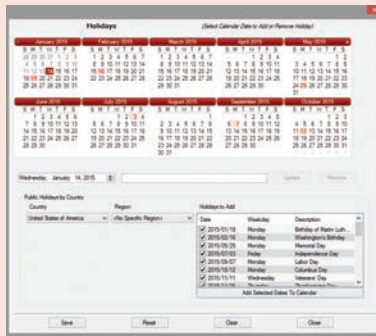
MeasurLink Gage Management allows customers to build a complete gage and fixture inventory. Calibration is made simple by supporting digital gages for both, variable and attributive features. Achieve optimal calibration frequencies - set-up individual calendars with:

- Gage in-service dates
- Calibration recall dates
- Gage R&R dates

#### Features:

- Vendor contact lists
- User lists
- Print and archive calibration certificates
- Incremental response methods
- Customized gage label printing

No.	Description
64AAB612R	MeasurLink 9 Gage Management
64AAB612R-U	MeasurLink 9 Gage Management Upgrade



## MeasurLink Report Scheduler V9

Report Scheduler Standard Edition is a tool that provides automated report distribution from a Windows service environment. Create reporting tasks that will run on a given schedule.

### Reporting Task Type

- Crystal Reports – Select a Crystal Reports template file and database connection to report on. Set values for parameters defined in template.
- MeasurLink Reports – Select a database connection, MeasurLink report template, run or feature run data to report on, and optionally select a filter to be applied to the data.

### Destinations

The reports can be printed, emailed, and exported in formats such as PDF. Multiple destinations can be assigned to a reporting task.

### Assign Schedule

Schedules can be defined on hourly, daily, weekly, monthly, and yearly intervals. Define a schedule and assign it to a report task.

### View Reports

Previewing the report allows validation of the output before scheduling the report task.

No.	Description
64AAB613R	MeasurLink 9 Report Scheduler
64AAB613R-U	MeasurLink 9 Report Scheduler Upgrade

# Digimatic Mini Processor DP-1VA LOGGER

## Series 264

This DP-1VA printer allows you to print measuring data, statistical evaluations a.s.o.

- Digimatic 2 support. 8 digits output for data printing and analysis even from high resolution or long stroke instruments.
- Statistical evaluations, and data printout from calipers, micrometers and other measuring devices equipped with a Digimatic port.
- Excellent printing speed, prints upon one-touch start and at low noise level. The thermosensitive paper has outstanding durability and chemical resistance for long-term storage.
- Timer function for timed measurement data loading
- Easy data transfer from printer to PC. USB (VCP/HID) output for PC (USB IT-PAK Vers. 2,1 or later, MeasurLink, Excel a.s.o.)
- Data Logger Function. Saves up to 1000 data records with time and date. Data can be saved even after the power is turned off.



264-505D

No.	Remarks	Mass [g]
264-505D	Digimatic Mini Processor DP-1VA	390

## Specifications

Data input	Digimatic, Digimatic 2, RS-232C Input (KA-Counter only)
Printer type	Thermal line printer
Printer speed	6,5 mm/s (using AC adapter)
Printer line number	7000 lines/roll (with large font) 10000 lines/roll (with normal font)
Printer paper	Width: 58 mm, length: 48 m
Processing capacity	Mode 0: 100000 data entries Mode 1/2: 9999 data entries Mode 3: sample size 10x subgroup 9999 = total number of data entries 99990
Logging of the measurement data (to store)	Max. 1000 points
Power supply	AC adapter 6V, battery: LR6 x 4 (alkaline) or AA x 4 Ni-MH (rechargeable, battery is not charged in the device)
Data output	USB, RS-232C at TTL level, tolerance judgment result (-NG, GO, +NG)
Battery life	Appr. 10000 lines (with 1600 mA Ni-MH and print 1 time/5 s)
Timer function	0,25 s; 1 s; 5 s; 30 s; 1 min; 30 min; 60 min (0,25 s only statistical function)

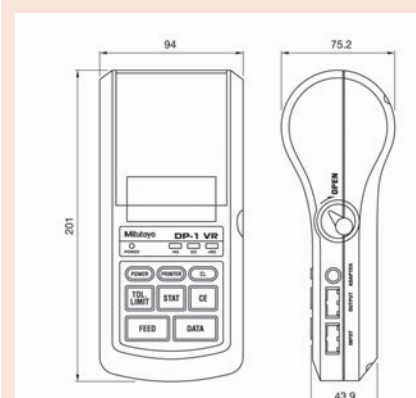
## Standard accessories

No.	Description
09EAA069D	Thermal Printer Paper DP1-VR-VA, 1 Roll
06AEG180D	AC-Adapter, 6V 2A, CEE Type

## Optional accessories

No.	Description
06AFM386	USB-ITPAK Version 2.1, Software with Dongle
09EAA084	RS-232C Cable, DP1-VR to PC, 1m, 9 Pin Connector
09EAA094	RS-232C Cable, DP1-VR-VA to KA-Counter, 1m, 25 Pin Connector
09EAA082-5	Thermal Printer Paper DP1-VR-VA, 5 Rolls
06AFZ050	USB Cable 1m
937179T	Footswitch for SPC
965516	GO/±NG judgement cable, for external device, 2m
011037	Battery LR6 (AA) 4x

09EAA084 and 965516 can not be used simultaneously.



Mitutoyo	
* DP-1VA *	
* MODE 1 *	
DATE 2018 / 2/27	
TIME 10:43	
*LIMIT DATA 1*	
LSL	26.44 mm
USL	27.00 mm
TOL	0.56 mm
↓ 1 27.02 mm	
↓ 2 26.43 mm	
↓ 3 26.42 mm	
↓ 4 26.56 mm	
↓ 5 26.56 mm	
↓ 6 26.63 mm	
↓ 7 26.62 mm	
↓ 8 26.46 mm	
↓ 9 26.48 mm	
↓ 10 26.70 mm	
PART NO.:	
DATE 2018 / 2/27	
TIME 10:43	
NAME:	
* RESULT *	
N	10
MAX	27.02 mm
MIN	26.42 mm
R	0.60 mm
X	26.5900 mm
σn-1	0.1673 mm
σn-1	0.1764 mm
-NG	
+NG	
P	30.000 %
Cp	0.529
Cpk	0.283
* HISTOGRAM *	
LSL	26.44 mm
USL	27.00 mm
TOL	0.56 mm
DIV 10	
-NG	
+NG	
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
D= 1	
A	26.4400 mm
B	26.4960 mm
C	26.5520 mm
D	26.6079 mm
E	26.6639 mm
F	26.7199 mm
G	26.7759 mm
H	26.8319 mm
I	26.8879 mm
J	26.9439 mm
	27.0000 mm

### Mode 0

GO/±NG judgment

### Modes 1,2

N : Number of data  
MAX : Maximum value  
MIN : Minimum value  
R : Range  
X : Average value  
σn-1 : Standard deviation of the sample (N)  
σn-1 : Sample standard deviation (N-1)  
-NG : Number of data smaller than lower limit value  
+NG : Number of data larger than upper limit value  
P : Fraction defective  
Cp : Process capability index  
Cpk : Process capability index (process target centered)

### Mode 3

N : Number of data  
MAX : Maximum value  
MIN : Minimum value  
n : Number of subgroup (Max.10)  
X : Average value of subgroup  
R : Range of subgroup  
X : Mean value  
X-UC : Upper control limit  
X-LCL : Lower control limit (R control)  
R-UC : Upper control limit (R control)  
R-LCL : Lower control limit (R control)

# Digimatic Data Cables

These data cables enable the connection of measuring instruments with a Digimatic interface to a PC – directly via USB or an interface box (e.g. DMX-Box).  
A wireless connection with U-WAVE-T transmitter is possible by using a connection cable.

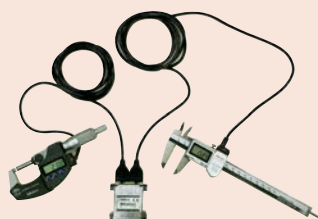
Your choice of Digimatic Data Cables (numbers refer to below schemes):

- USB Input Tool Direct Cable (1)
- Digimatic Cable and Interface Box or Printer DP-1 (2)
- U-WAVE-T Wireless System (3)

Please find the appropriate cables for your particular Digimatic measuring instrument in the "Optional Accessories" section of its catalogue entry.



(1)  
USB Input Tool Direct Cable  
2 m



(2)  
Standard Digimatic Cable  
1 m or 2 m

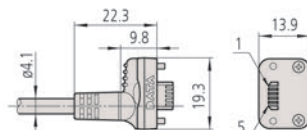


(3)  
U-WAVE Connection Cable  
(Standard)

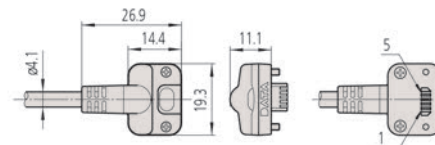


(3)  
U-WAVE Connection Cable  
with Footswitch Connector  
(FSW)

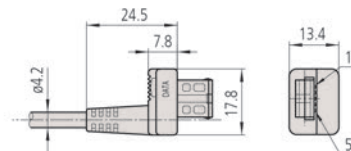
(1) 06AFM380A (2) 05CZA624 (1 m)  
05CZA625 (2 m) (3) 02AZD790A (Standard)  
02AZE140A (FSW)



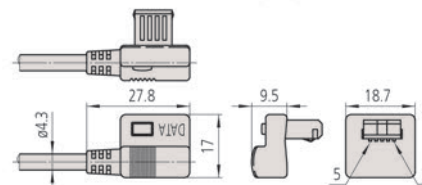
(1) 06AFM380B (2) 05CZA662 (1 m)  
05CZA663 (2 m) (3) 02AZD790B (Standard)  
02AZE140B (FSW)



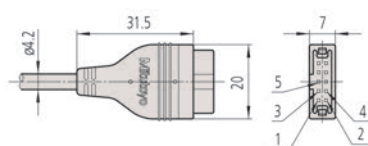
(1) 06AFM380C (2) 959149 (1 m)  
959150 (2 m) (3) 02AZD790C (Standard)  
02AZE140C (FSW)



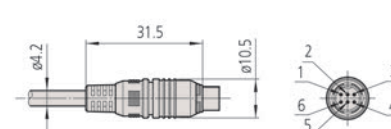
(1) No applicable models (2) 04AZB512 (1 m)  
04AZB513 (2 m) (3) No applicable models



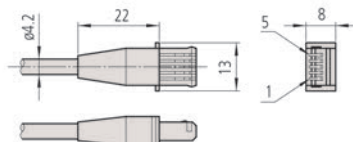
(1) 06AFM380D (2) 936937 (1 m)  
965014 (2 m) (3) 02AZD790D (Standard)  
02AZE140D (FSW)



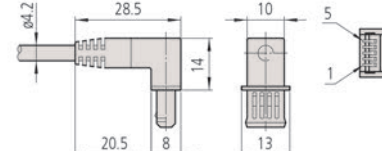
(1) 06AFM380E (2) 937387 (1 m)  
965013 (2 m) (3) 02AZD790E (Standard)  
02AZE140E (FSW)



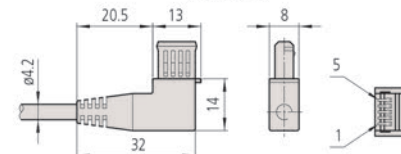
(1) 06AFM380F (2) 905338 (1 m)  
905409 (2 m) (3) 02AZD790F (Standard)  
02AZE140F (FSW)



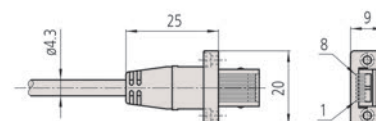
(1) No applicable models (2) 905689 (1 m)  
905690 (2 m) (3) No applicable models



(1) No applicable models (2) 905691 (1 m)  
905692 (2 m) (3) No applicable models



(1) 06AFM380G (2) 21EAA194 (1 m)  
21EAA190 (2 m) (3) 02AZD790G (Standard)  
02AZE140G (FSW)



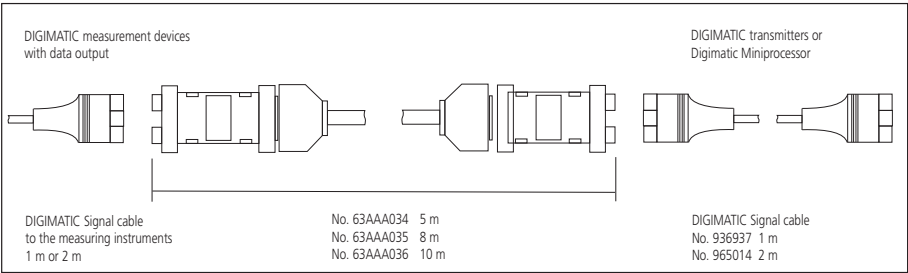
# Digimatic Extension Cables

## Series 63

- These extension cables allow you to extend Digimatic data cables up to 14 metres, extending the working distance between a measuring instrument and an external device such as a PC or DP-1VR.



63AAA036



No.	Length [m]
63AAA034	5
63AAA035	8
63AAA036	10

## Optional accessories

No.	Description
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m



# USB Input Tool Direct (Digimatic-USB cable)

## Specifications

Cable length	2 m
Output	USB (HID/VCP)
OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®/7 (32bit,64bit), Windows® 8, 8.1, 10 (32bit,64bit)
Max connectable devices	Microsoft® Windows® 2000, XP: 100 cables, Windows® Vista®, 7, 8, 8.1, 10: 20 cables

## Optional accessories

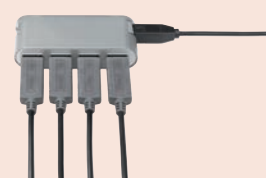
No.	Description
06AFM386	USB-ITPAK Version 2.1, Software with Dongle
937179T	Footswitch for SPC
06ADV384	USB Input Tool Direct, Footswitch Adapter



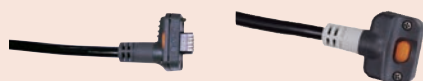
06AFM380C



937179T and 06ADV384



Common USB Hub



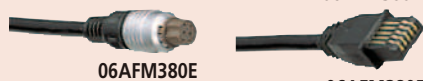
06AFM380A

06AFM380B



06AFM380C

06AFM380D



06AFM380E

06AFM380F



06AFM380G



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## Series 06AFM

This input tool allows you to directly connect Digimatic measuring devices to a USB interface, without needing additional software.

The USB Input Tool Direct offers the following benefits:

- Measurement data is converted into keyboard codes, enabling interaction with any program working with keyboard entries (HID).
- You can also connect to a USB with fixed COM assignment in Microsoft® Windows® as channel identification (VCP).
- The USB-ITPAK software lets you easily create Microsoft® Excel® worksheets.
- Multi-channel input for measurement values, Microsoft® Excel®.
- Cables can be cascaded via a standard USB hub.



## Data cable USB

No.	Model	Remarks
06AFM380A	A	IP USB Input Tool Direct Cable Straight With Data Switch (2m) e.g. for IP67 Caliper
06AFM380B	B	IP USB Input Tool Direct Cable Back Side With Data Switch (2m) e.g. for IP65 Micrometer
06AFM380C	C	USB Input Tool Direct Cable Straight With Data Switch (2m) e.g. for Standard Absolute Caliper
06AFM380D	D	USB Input Tool Direct Cable Plain (2m) e.g. for ID-H/ID-F Indicator
06AFM380E	E	USB Input Tool Direct Cable Round (2m) e.g. for Caliper Gauge Series 209
06AFM380F	F	USB Input Tool Direct Cable Straight (2m) e.g. for ID-C/ID-S Indicator
06AFM380G	G	IP USB Input Tool Direct Cable ID-N/ID-B (2m)

## Advantages of the new Digimatic USB connections

Application	Situation	Software USB-ITPAK	Data format	Remarks
Arbitrary software which expects a keyboard code	Only a USB Input tools signal cable required.	Software is not needed.	Measured value as keyboard format (HID = Human Interface Device)	Foot switch can not be connected.
Commercial statistics software like e.g. Mitutoyo MeasurLink	A USB input tools signal cable and the software USB ITPAK are required.	For each measuring instrument (cable) a fixedly assigned virtual COM-Port is generated once; afterwards Software USB IT PAK becomes inactive.	MUX-10 Specification (e.g. 01A+138626) with fixed COM assignment as channel identification	
Arbitrary software, which expects a keyboard code e.g. Word, txt-format		- Connected measuring instruments and foot switches are selected and assigned. - Terminator is determined. - Procedure is registered as a part program	Transmission of a measured value in text format (VCP = as virtual COM port)	
Microsoft® Excel®		- Connected measuring instruments and foot switches are selected and assigned. - Performs organization of the Microsoft® Excel®-table, i.e. the transferred measured values are written into the pre-defined cells.	Measuring report Microsoft® Excel®-format and character sequence of max. 31 characters (e.g. text input)	

# Wireless Communication System: U-WAVE

## U-WAVE and U-WAVE fit - Wireless Data transmission system

**U-WAVE** *fit*

- Approx. 20 m (within visible range).
- Communication frequency: 2,4GHz wireless system for reliable and secure data transmission.
- Easy data export to Easy data export to Microsoft® Excel® or other professional SPC software applications like Mitutoyo MeasurLink.
- Transmitter confirms data transfer by a buzzer sound or a red/green LED signal.
- An IP67 transmitter is available.
- Low power consumption: 400000 data transmissions with one battery.
- By using optional software (U-WAVE Event) it will also support a data request from a PC. This is ideal if the system is installed at an inaccessible side.

### Specifications

Wireless communication protocol	Proprietary (2,4 GHz by original specification based on IEEE 802.15.4)
Modulation method	DS-SS (Direct Sequence Spread Spectrum)
Communication distance	Approx. 20 m (within visible range)
Communication speed kbps	250
Communication with measuring tool	Digimatic (6 digits), Digimatic 2 (8 digits) automatic identification
Communication frequency	2,4 GHz band (2,405-2,475 GHz, 15 channels (5 MHz interval))
Transmission output	2,5 mW (4 dBm) or below
OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®, Windows® 7 (32bit, 64bit), Windows® 8, 8.1, 10 (32bit, 64bit)



PC with U-WAVE-R (Receiver)



For Caliper U-WAVE-TC with Connection Unit



For Micrometer U-WAVE-TM with Connection Unit



For miscellaneous measuring instruments U-WAVE-T with Connection Cable

# Wireless Communication System: U-WAVE

## U-WAVE-T and U-WAVE-TC/TM (U-WAVE fit) - Wireless Data transmission system

### Specifications

Wireless communication protocol	Proprietary (2,4 GHz by original specification based on IEEE 802.15.4)
Modulation method	DS-SS (Direct Sequence Spread Spectrum)
Communication distance	Approx. 20 m (within visible range)
Communication speed kbps	250
Communication with measuring tool	Digimatic (6 digits), Digimatic 2 (8 digits) automatic identification
Communication frequency	2,4 GHz band (2,405-2,475 GHz, 15 channels (5 MHz interval))
Transmission output	2,5 mW (4dBm) or below
OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®, Windows® 7 (32bit, 64bit), Windows® 8, 8. 1, 10 (32bit, 64bit)

### Standard accessories

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.

### Optional accessories

No.	Description
06AFM386	USB-ITPAK Version 2.1, Software with Dongle
02NDB003	U-WAVE Event Drive, 64 bit Version



02AZD810D  
U-WAVE-R (receiver)



264-620 + 02AZF310  
U-WAVE-TC + Connection Unit



264-622 + 02AZF310  
U-WAVE-TM + Connection Unit

### U-WAVE-R (Receiver) for all Mitutoyo Transmitter

No.	Type	Remarks	Software	Number of U-WAVE-R units that can be connected to PC	Number of U-WAVE-T units that can be connected	USB Cable length [m]	Mass [g]
02AZD810D	U-WAVE-R	U-WAVE-R + Software	U-WAVE PAK	Up to 16	Up to 100	1	130

\*For details of connectable measuring instruments please contact Mitutoyo or distributor

### U-WAVE-TC/TM (transmitter) for caliper and micrometer

No.	Type	Measuring Instruments*	Remarks	Data reception indication	Mass [g]
264-620	U-WAVE-TC	100, 150, 200, 300 mm IP67 caliper/standard caliper	IP67 model	LED (green, red, orange)	20
264-621	U-WAVE-TC	100, 150, 200, 300 mm IP67 caliper/standard caliper	Buzzer model	Buzzer and LED (green, red, orange)	20
264-622	U-WAVE-TM	COOLANT PROOF (IP65) micrometer	IP67 model	LED (green, red, orange)	20
264-623	U-WAVE-TM	COOLANT PROOF (IP65) micrometer	Buzzer model	Buzzer and LED (green, red, orange)	20
02AZF300	Connection Unit (Standard type)		Standard type		6
02AZF310	Connection Unit (Waterproof type)		Waterproof type		6

\*For details of connectable measuring instruments please contact Mitutoyo or distributor



Transmitter and connector for Caliper  
(U-WAVE-TC + 02AZF300)



Transmitter and connector for Micrometer  
(U-WAVE-TM + 02AZF310)

# Wireless Communication System: U-WAVE

## U-WAVE-T and U-WAVE-TC/TM (U-WAVE fit) - Wireless Data transmission system



02AZD730G + 02AZD790A  
U-WAVE-T and Connection Cable

U-WAVE-T for miscellaneous instruments

No.	Type	Measuring Instruments*	Remarks	Data reception indication	Mass [g]
02AZD730G	U-WAVE-T for miscellaneous instruments	Indicator, 3-Point Inside Micrometer, Carbon Fibre Caliper, Height Gauge, a.s.o	IP67 model	LED	23
02AZD880G	U-WAVE-T for miscellaneous instruments	Indicator, 3-Point Inside Micrometer, Carbon Fibre Caliper, Height Gauge, a.s.o	Standard model	LED and Buzzer	23

\*For details of connectable measuring instruments please contact Mitutoyo or distributor



Transmitter and connection cables

Application with Digital Indicator

(connection cables, see next page)



Application with Carbon Fibre Caliper



Application with Height Gauge



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### Specifications

Wireless communication protocol	Proprietary (2,4 GHz by original specification based on IEEE 802.15.4)
Modulation method	DS-SS (Direct Sequence Spread Spectrum)
Communication distance	Approx. 20 m (within visible range)
Communication speed kbps	250
Communication frequency	2,4 GHz band (2,405-2,475 GHz, 15 channels (5 MHz interval))
Communication with measuring tool	Digimatic (6 digits), Digimatic 2 (8 digits) automatic identification
Transmission output	2,5 mW (4 dBm) or below
OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®, Windows® 7 (32bit, 64bit), Windows® 8, 8. 1, 10 (32bit, 64bit)

### Standard accessories

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.

### Optional accessories

No.	Description
06AFM386	USB-ITPAK Version 2.1, Software with Dongle
02NDB003	U-WAVE Event Drive, 64 bit Version
02AZE200	Holder for U-WAVE T
02AZE990	U-WAVE-T Mounting Plate
63BAA057	U-WAVE T External Power Supply Adapter

### Consumable spares

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.

By using optional Software (U-WAVE Event Drive) it will also support a data request from a PC.

This is ideal if the system is installed at an inaccessible side.

The Event Drive Mode will reduce the battery life.

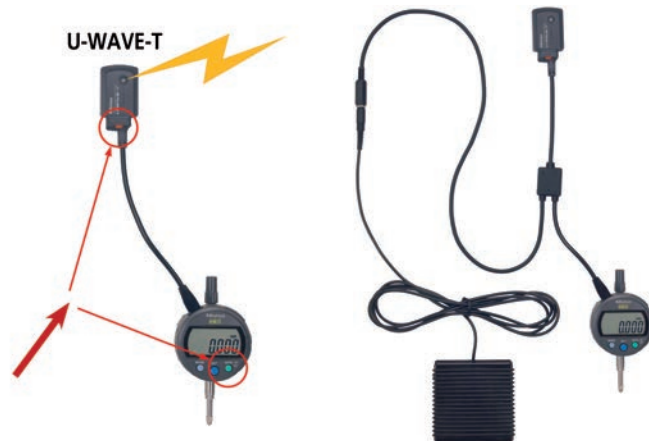
With power supply adapter (63BAA057) external power supply can be provided.



# U-WAVE-T Connection Cables

## Series 02AZD / 02AZE

- This connecting cable connects a measuring tool to its U-WAVE T unit. Choose the appropriate cable for your measuring tool from the seven types below, A to G.



Cable without footswitch connection

Cable with footswitch connection  
Footswitch: 937179T (optional)

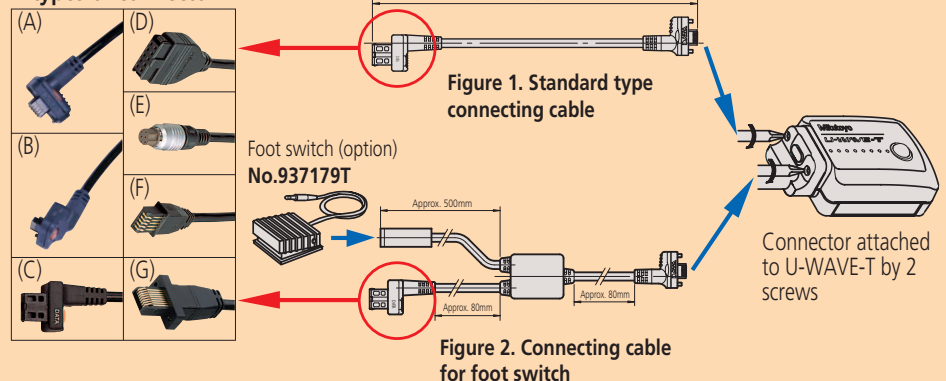
### 1 Cable without footswitch connection

No.	Model	Remarks
02AZD790A	A	IP U-WAVE Data Cable Straight with Data Switch e.g. for IP66 Carbon Fibre Caliper
02AZD790B	B	IP U-WAVE Data Cable Back Side with Data Switch e.g. for IP65 Holtest
02AZD790C	C	U-WAVE Data Cable Straight with Data Switch e.g. for Height Gauge
02AZD790D	D	U-WAVE Data Cable Plain e.g. for ID-H/ID-F Indicator
02AZD790E	E	U-WAVE Data Cable Round e.g. for Digital Caliper Gauge Series 209
02AZD790F	F	U-WAVE Data Cable Straight e.g. for ID-C/ID-S Indicator
02AZD790G	G	IP U-WAVE Data Cable e.g. for ID-N/ID-B Indicator

### 2 Cable with footswitch connection

No.	Model	Remarks
02AZE140A	A	IP U-WAVE Data Cable Straight with Data Switch/FootSwitch Connector e.g. for IP66 Carbon Fibre Caliper
02AZE140B	B	IP U-WAVE Data Cable Back Side with Data Switch/FootSwitch Connector e.g. for IP65 Holtest
02AZE140C	C	U-WAVE Data Cable Straight with Data Switch/FootSwitch Connector e.g. for Height Gauge
02AZE140D	D	U-WAVE Data Cable Plain with FootSwitch Connector e.g. for ID-H/ID-F Indicator
02AZE140E	E	U-WAVE Data Cable Round with FootSwitch Connector e.g. for Digital Caliper Gauge Series 209
02AZE140F	F	U-WAVE Data Cable Straight with FootSwitch Connector e.g. for ID-C/ID-S Indicator
02AZE140G	G	IP U-WAVE Data Cable with FootSwitch Connector e.g. for ID-N/ID-B Indicator

### 7 types of connector



## Standard accessories

No.	Description
02AZD770	Clip for Cable Fixing - U-WAVE T
05CZA619	Screw Driver

## Optional accessories

No.	Description
06AFM386	USB-ITPAK Version 2.1, Software with Dongle
02NDB003	U-WAVE Event Drive, 64 bit Version
02AZE200	Holder for U-WAVE T
02AZE990	U-WAVE-T Mounting Plate
63BAA057	U-WAVE T External Power Supply Adapter
937179T	Footswitch for SPC



02AZE200  
Holder for U-WAVE-T  
for Indicator, Carbon  
Fibre Caliper



02AZE990  
Holder for U-WAVE-T  
for QM-Height



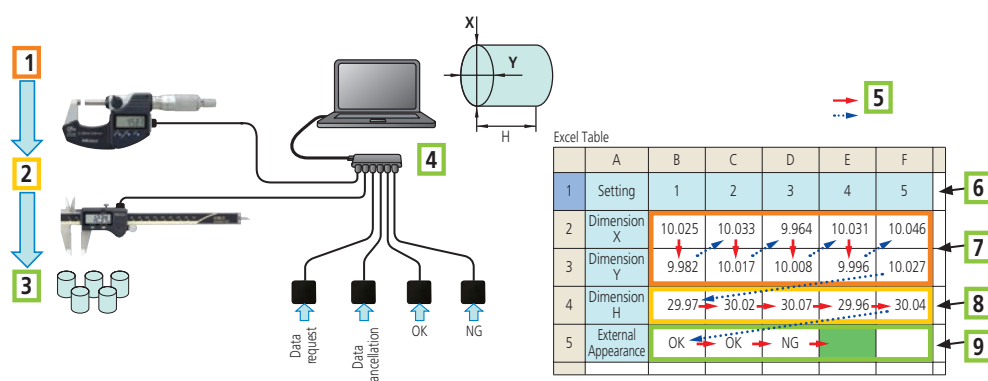
# USB-ITPAK

## Series 06AFM

- USB-ITPAK is a setting and data collection software for collection data from measuring instruments with Digimatic/Digimatic 2 output for entry to Microsoft® Excel®.
- USB Input Tool Direct cable, U-WAVE Wireless communication system and USB Footswitch adapter can be used to send the data to a Microsoft® Excel® worksheet.

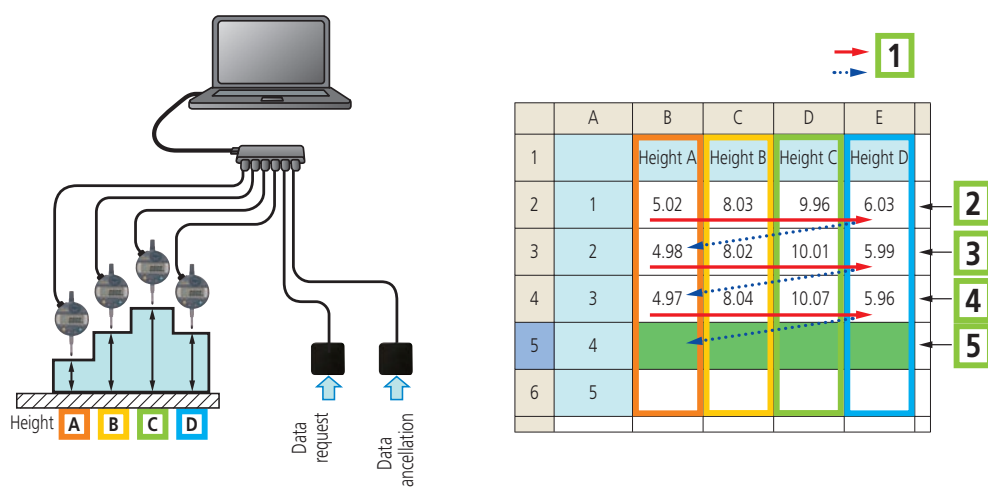


No.	Remarks
06AFM386	Can be used for Wireless Communication (U-WAVE), USB Input Tool Direct Cable and USB-Input Tool No. 264-016-10



### Sequential Measurement

1: Micrometer for diameters X and Y; 2: Caliper for height measurement H; 3: Inspection by attributes OK/NG with foot switch e.g. scratches in the surface; 4: standard USB-Hub; 5 Measurement direction; 6: Workpiece No. 7: Measuring result X/Y; 8: Measuring result H; 9: OK/NG judgement (e.g. scratches)



### Simultaneous Measurement

1: Measurement direction; 2: First measurement: press foot switch once = 4 complete data batches; 3: second measurement: press foot switch once = 4 complete data batches; 4: third measurement: press foot switch once = 4 complete data batches; 5: is waiting for the next batch measurement

## Specifications

OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®/7 (32bit,64bit), Windows® 8, 8.1, 10 (32bit,64bit)
Applicable MS Excel Version	Microsoft® Excel® 2002/2003/2007/2010/2013/2016
Functions	- setting of Microsoft® Excel® input (workbook, worksheet, cell range a.s.o.) - data collection: USB Input Tool Direct cable wireless communication system U-WAVE - selection of measuring input (sequential, simultaneous, individual) - control of data input (mouse, foot switch, keyboard) - character string input by foot switch - timer function - measurement time input
Language for display	English, German, French, Italian, Spanish, Turkish, Czech, Polish, Hungarian, Swedish, Russian, Japanese, Korean, Simplified Chinese, Traditional Chinese
Delivered	License Key, Software CD

Microsoft® Excel® Worksheet waiting for data



Scan QR Code with your mobile device and watch our product videos on YouTube

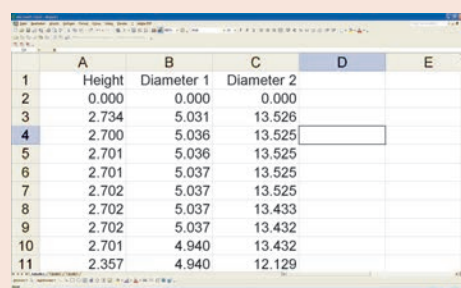
# USB Input Tool

## Specifications

Dimensions (WxDxH)	38 x 64 x 21 mm
Cable length	1 m
Power supply	Bus power
Max. connectable devices	Microsoft® Windows® 2000, XP: 100 cables, Windows® Vista®, 7, 8, 8.1, 10: 20 cables
OS compatibility	Microsoft® Windows® 2000, XP, Vista®, 7, 8, 8.1, 10 (32bit, 64bit)

## Optional accessories

No.	Description
937179T	Footswitch for SPC
06AFM386	USB-ITPAK Version 2.1, Software with Dongle



	A	B	C	D	E
1	Height	Diameter 1	Diameter 2		
2	0.000	0.000	0.000		
3	2.734	5.031	13.526		
4	2.700	5.036	13.525		
5	2.701	5.036	13.525		
6	2.701	5.037	13.525		
7	2.702	5.037	13.525		
8	2.702	5.037	13.433		
9	2.702	5.037	13.432		
10	2.701	4.940	13.432		
11	2.357	4.940	12.129		

## Series 264 - Keyboard Interface

The input tool allows you to directly connect Digimatic measuring devices to a USB interface, without needing additional software.

The USB Input Tool Direct offers the following benefits:

- Measurement data is converted into keyboard codes, enabling interaction with any program working with keyboard entries. (HID)
- You can also connect to a USB with fixed COM assignment in Microsoft Windows as a channel identification (VCP) with USB IT PAK software only.
- The USB-IT PAK software lets you easily create Microsoft Excel worksheets.



264-016-10

No.	Data input	Data output	Output decimal mark	Footswitch connector	Mass [g]
264-016-10	1x Digimatic/ Digimatic 2	USB Virtual COM-Port (VCP) with USB IT PAK, USB keyboard signal (HID)	Emulates the local setting	Yes	56

# DMX-3T / FS2 USB

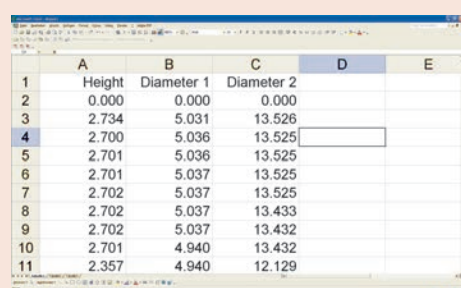
## Series 63 - Keyboard Interface

- The DMX-3 T/FS2 USB is a keyboard interface that transmits measurement data from measuring instruments equipped with Digimatic interfaces to a PC. Measurement data is converted into keyboard codes, allowing you to easily access it with any program working with keyboard entries, regardless of the operating system. The USB and data conversation interfaces also allow you to directly input the measurement data into a spreadsheet.



63AAA041

rear panel



	A	B	C	D	E
1	Height	Diameter 1	Diameter 2		
2	0.000	0.000	0.000		
3	2.734	5.031	13.526		
4	2.700	5.036	13.525		
5	2.701	5.036	13.525		
6	2.701	5.037	13.525		
7	2.702	5.037	13.525		
8	2.702	5.037	13.433		
9	2.702	5.037	13.432		
10	2.701	4.940	13.432		
11	2.357	4.940	12.129		

No.	Data input	Data output	Output decimal mark	Footswitch connector	Mass [g]
63AAA041	3 x Digimatic	USB keyboard signal (HID)	point or comma (selectable)	Yes	330

# DMX-1

## Series 63

This DMX-1 D-SUB9 serial interface is a microcontrolled interface for connecting one single measurement device, with Digimatic output, to the RS-232C interface of a computer. The DMX-1 offers the following benefits:

- Easily connect a measuring device to a computer's RS-232C serial port.
- No external power supply is needed, as the small level of power needed is supplied by the handshake lines RTS and DTR.

No.	Data input	Data output	Footswitch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA029	1 x Digimatic	RS-232C	Yes	D-SUB 9	9600	8	1	none

# DMX-1 USB

## Series 63

- The DMX-1 USB is a micro-controlled interface for connecting 1 Digimatic-output measurement device to the USB interface of a computer. The device appears as a virtual COM-PORT (VCP) to the computer.



63AAA040

rear panel

No.	Data input	Data output	Footswitch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA040	1 x Digimatic	USB virtual COM-Port (VCP)	Yes	USB	9600	8	1	none

# DMX-2 S

## Series 63

This DMX-2 S D-SUB5 serial interface is a microcontrolled interface for connecting two measurement devices, with Digimatic output, to the RS-232C serial port of a computer. The DMX-2 S offers the following benefits:

- Easily connect two measuring devices to a computer's RS-232C serial port.
- No external power supply is needed, as the small level of power needed is supplied by the handshake lines RTS and DTR.



63AAA038

No.	Data input	Data output	Footswitch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA038	2 x Digimatic	RS-232C	Yes	D-SUB 25	9600	8	1	none

## Specifications

Dimensions (WxDxH)	58 x 62 x 18 mm
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## Optional accessories

No.	Description
937179T	Footswitch for SPC
63AAA027	RS-232C Signal Cable, D-Sub9-D-Sub9, 2m



63AAA029

## Specifications

OS compatibility	Microsoft® Windows® 2000, XP, Vista®, 7, 8, 10 (32bit, 64bit)
Dimensions (WxDxH)	33 x 57 x 20 mm
Delivered	USB cable (1.8 m) Driver Software

## Optional accessories

No.	Description
937179T	Footswitch for SPC

## Specifications

Dimensions (WxDxH)	58 x 62 x 18 mm
--------------------	-----------------

## Optional accessories

No.	Description
63AAA108	RS-232C Signal Cable, D-Sub-25-D-Sub-9, 2m
63AAA028	Adapter D-Sub25-D-Sub9, 0,2m
937179T	Footswitch for SPC



Sample application with footswitch (optional accessory)

#### Specifications

OS compatibility	Microsoft® Windows® 2000, XP, Vista®, 7, 8, 8. 1, 10 (32bit, 64bit)
Output decimal mark (HID)	point or comma
Dimensions (WxDxH)	61 x 76 x 35 mm
Delivered	USB cable (1.8 m) Driver Software

#### Optional accessories

No.	Description
937179T	Footswitch for SPC

#### Specifications

OS compatibility	Microsoft® Windows® 2000, XP, Vista®, 7, 8, 8. 1, 10 (32bit, 64bit)
Dimensions (WxDxH)	170 x 128 x 55 mm
Delivered	USB cable (1.8 m) Driver Software AC Adapter (only for serial cable connection)

#### Optional accessories

No.	Description
937179T	Footswitch for SPC
63AAA027	RS-232C Signal Cable, D-Sub9-D-Sub9, 2m

## DMX-2 USB

### Series 63

Connecting two measurement devices, with Digimatic-output, to a USB port.

The DMX-2 USB offers the following benefits:

- It appears either as a virtual COM-Port (VCP) or as a keyboard (HID) on the computer.
- It has a mode switch available to easily swap between keyboard format (HID) and virtual COM-Port (VCP).



63AAA037



rear panel

No.	Data input	Data output	Footswitch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA037	2 x Digimatic	USB virtual COM-Port (VCP) USB keyboard signal (HID) (switchable on the box)	Yes	USB	9600	8	1	none

## DMX-3 USB

### Series 63

The DMX-3 3 channel USB VCP interface/ D-SUB9 serial interface is a microcontrolled interface that connects three measurement devices, with Digimatic output, to either the RS-232C serial port or USB port of a computer.

The DMX-3 USB offers the following benefits:

- If the USB output is used, the measuring device will appear as a virtual COM-Port (VCP) on the computer.
- Power is supplied by an AC/DC adapter, which is a standard accessory only required for serial cable D-Sub 9 connection.



63AAA039



rear panel

No.	Data input	Data output	Foot-switch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA039	3 x Digimatic	USB virtual COM-Port (VCP), RS-232C	Yes	For serial cable: D-SUB 9 for USB: cable type B	1200/9600 (adjustable with jumper)	8	1	none



# MUX-10F

## Series 264

The MUX-10F 4 channel D-SUB9 serial interface is a microcontrolled interface that connects four measurement devices, with Digimatic output, to the RS-232C serial port of a computer.

- You can connect four measurement devices to an RS-232C serial port.



264-002D



rear panel

No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
264-002D	4 x Digimatic	RS-232C	D-SUB 9	Yes	300, 600, 1200, 2400, 9600, 19200	8	1	none

# DMX-8/2

## Series 63

The DMX-8/2 8 channel D-SUB9 serial interface is a microcontrolled interface for connecting eight measurement devices, with Digimatic output, to the RS-232C serial port of a computer. The DMX-8/2 model provides power and an ABS/Zero button to operate Series 575 ABS Linear Gauges.



63AAA033



rear panel

No.	Data input	Data output	Footswitch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA033	8 x Digimatic	RS-232C	Yes	D-SUB 9	9600	8	1	none

# DMX-16 / DMX-16C

## Series 63

- The DMX-16/16C is a micro controlled Interface for connecting 16 Digimatic output measurement devices to the RS-232C interface of a computer
- DMX-16C features integrated microprocessors for data processing, thus enabling simultaneous input and output from all measurement instruments and increasing data processing speed.
- The DMX-16 and DMX-16C provides power and an ABS/ZERO button to operate Series 575 ABS Linear Gauges

No.	Remarks	Type	Data input	Data output	Interface cable connection	Foot-switch connector	Baud rate	Data bits	Stop bits	Parity
63AAA026	successive data reception	DMX-16	16 x Digimatic	RS-232C	D-SUB 9	Yes	9600	8	1	none
63AAA106	simultaneous data reception	DMX-16C	16 x Digimatic	RS-232C	D-SUB 9	Yes	9600	8	1	none

## Specifications

Dimensions (WxDxH)	91,4 x 92,5 x 50,4 mm
Delivered	AC Adapter

## Optional accessories

No.	Description
937179T	Footswitch for SPC
63AAA027	RS-232C Signal Cable, D-Sub9-D-Sub9, 2m

## Specifications

Power supply	220-240V 50Hz
Dimensions (WxDxH)	158 x 204 x 66 mm
Delivered	Power cable

## Optional accessories

No.	Description
937179T	Footswitch for SPC
63AAA027	RS-232C Signal Cable, D-Sub9-D-Sub9, 2m

## Specifications

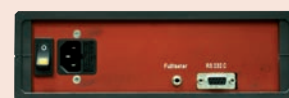
Power supply	220-240V 50 Hz
Dimensions (WxDxH)	225 x 204 x 75 mm
Delivered	Power cable

## Optional accessories

No.	Description
937179T	Footswitch for SPC
63AAA027	RS-232C Signal Cable, D-Sub9-D-Sub9, 2m



63AAA106



rear panel



### Specifications

Timer function	interval 0-99 s or 0-99 min
Mitutoyo measuring instruments with RS232C output	KA-Counter Protractor Series 950 EH, EF, EV-Counter Printer DP1-VA Linear Height LH-600 QM-Data 200 Litematic VL-50 Laser Scan Micrometer LSM QM-Height MF-Microscope Series PJ A3000 Projector PJ H30 Projector ID-H Indicator
OS compatibility	Microsoft® Windows® 2000, XP, Vista®, 7, 8, 8.1, 10 (32bit, 64bit)
Output decimal mark (HID)	point or comma
Dimensions (WxDxH)	170 x 128 x 55 mm
Max. no. of cascable interface	3 via optional link cable
Delivered	USB cable (1.8 m) Driver Software

### Optional accessories

No.	Description
937179T	Footswitch for SPC
63AAA105	Link Cable DMX-3T/FS2

### Specifications

Power supply	AC-Adaptor 10 V, 120 mA or USB bus power
Timer function	1 s-99 h 59 min 59 s (100 h)
Dimensions (WxDxH)	55 x 58 x 31 mm
Timer tolerance	±8 s/24 h
Delivered	USB connection cable (0,8 m) AC adaptor Footswitch cable TTB1 (0,52 m)
Mass	84 g



Sample application with DMX Box

## DMX-3-2 USB

### Series 63

This DMX-3-2 USB is a three channel USB interface for connecting three measurement devices, with Digimatic output, and two devices with RS232C output (such as the Mitutoyo QM-Data 200) to the USB interface of a computer.

The DMX-3-2 USB offers the following benefits:

- It can connect more than 70 different measuring instruments with RS232C output, including Mitutoyo devices as well as other brands (a list is available on request).
- The interface converts the different signals from the connected measuring instruments into the same format: keyboard signal (HID) or virtual COM-Port MUX-10 or MUX-50 (VCP).



63AAA042



Rear panel

No.	Data input	Data output	Footswitch connector	Interface cable connection	Baud rate	Data bits	Stop bits	Parity
63AAA042	3 x Digimatic 2 x RS-232C	USB virtual COM-Port (VCP) USB keyboard signal (HID)	Yes	USB	9600	8	1	none

## Digimatic Timerbox

### Series 63

This timerbox allows you to connect to the footswitch connector of a Mitutoyo interface to trigger data transfer, based on a time interval.

The Digimatic Timerbox offers the following benefits:

- Software neutral for all applications.
- It can be used with all Mitutoyo interfaces featuring 3,5mm TRS Foot switch connectors (Mono) such as USB Input Tool Direct.
- It works as a time-controlled footswitch.



63AAA107



Sample application with USB Input Tool Direct

No.
63AAA107

# Digimatic Display Unit

## Series 542

For devices equipped with SPC Digimatic output e.g. Indicator a.s.o.



542-007D



542-072D



For more details (functions a.s.o) please refer to counters and displays under "Linear Gages".

# Digimatic Switch Box

## Series 63/939

This switch box is a distribution box that connects 3-5 Digimatic tools to one channel interface (for example a DMX-1 USB).



63AAA030



939039

No.	Data output	Data input	Footswitch connector
63AAA030	1 x Digimatic (1 channel)	5 x Digimatic	Yes
939039	1 x Digimatic (1 channel)	3 x Digimatic	No

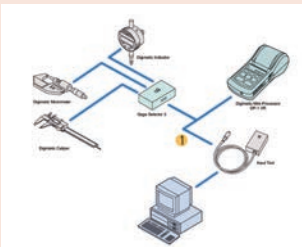
## Specifications

Delivered	AC Adapter (63AAA030)
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## Optional accessories

No.	Description
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
937179T	Footswitch for SPC

937179T for 63AAA030 only



1: cable 936937 (1 m), 965014 (2 m)

# Digimatic Tolerance Box

## Series 011

This tolerance box allows you to connect Digimatic measuring instruments for visual -NG/GO/+NG evaluations.

The Digimatic Tolerance Box offers the following benefits:

- Simple connection to Digimatic measuring instruments.



011516



No.	Remarks
011516	Tolerance setting with the measuring instrument

## Specifications

Power supply	AC adapter or 2 batteries LR6 (AA)
Dimensions (WxDxH)	117 x 73 x 24 mm
Delivered	With AC adapter

## Optional accessories

No.	Description
011037	Battery LR6 (AA) 4x

## Micrometers



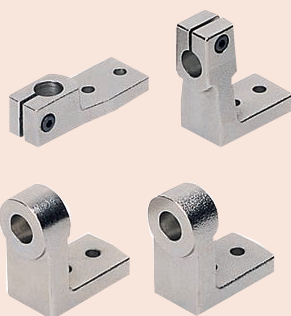
**Digimatic Micrometers and Mechanical Micrometers**  
**Page 36**



**Micrometer Accessories**  
**Page 95**



**Micrometer Heads**  
**Page 104**



**Micrometer Head Accessories**  
**Page 128**

# High Accuracy Digital Micrometer

## Series 293

This Micrometer enables 0,1 µm resolution measurements and is ideal for customers who need to make highly accurate measurements with a hand-held tool (such as Gauge R & R analysis).

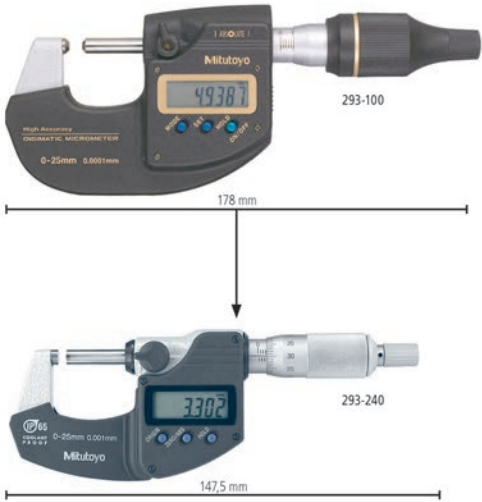
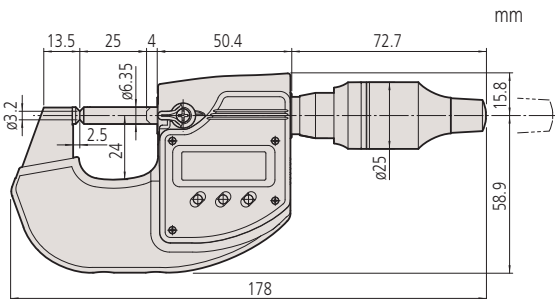
The Absolute High-Accuracy Micrometer offers the following benefits:

- It delivers higher accuracy without sacrificing operability, by using Mitutoyo's innovative 0,1 µm resolution ABS (absolute) rotary sensor and high accuracy screw machining technology which reduces instrumental error to just 0,5 µm.
- Its highly rigid frame and high-performance constant-force mechanism (7-9 N) enable more stable measurement.



### Metric

No.	Range [mm]	Digital step	Instrumental error	Flatness	Parallelism	Mass [g]
293-100-10	0-25	0,1 µm or 0,5 µm	±0,5 µm	0,3 µm	0,6 µm	400



### Comparative sizes:

High Accuracy-Micrometer with a highly rigid frame and a common Micrometer with a standard frame



Functions	Series 293
ON/OFF	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
HOLD	●
Data output	●
PRESET	●
Resolution switching	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Measuring surface	ø3,2 mm, carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, ø6,35 mm, spindle pitch 0,5 mm
Power supply	Lithium battery (CR-2032) x 1
Measuring system	Electromagnetic induction type ABS rotary sensor
Measuring force	7-9 N
Battery life	approx. 2 years
Delivered	Including box, key, driver, 1 battery, heat insulating cover, certificate of inspection

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

### Consumable spares

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.



0,1µm digital step



Scan QR Code with your mobile device and watch our product videos on YouTube

Functions	Series 293
ORIGIN (until 100 mm)	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
HOLD	●

Specifications	
Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Thimble and sleeve satin chrome finish
Digital step	0,001 mm
Measuring surfaces	carbide-tipped, micro-lap finish
Measuring spindle	With spindle lock, ø6,35mm, 2 mm spindle pitch
Measuring force	7-12 N
Battery life	approx. 2,4 years
Delivered	Including box, key, 1 battery, setting standard (from 25 mm upward), certificate of inspection (0-50 mm range)

#### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
04GAA899	Color speeder, for Ratched Thimble Black
04GAA900	Color speeder, for Ratched Thimble Red
04GAA901	Color speeder, for Ratched Thimble Yellow
04GAA902	Color speeder, for Ratched Thimble Green
04GAA903	Color speeder, for Ratched Thimble Blue
04AAB208	Color speeder, for Ratched Thimble Grey

#### Consumable spares

No.	Description
938882	Battery SR44 1.5V



With Wireless System U-WAVE fit

# Digimatic Micrometer QuantuMike IP65

## Series 293

This is an IP65 micrometer offering movement four times as fast as a standard micrometer. It presents you with the following benefits:

- Faster measurement is achieved by using a coarser thread which feeds the spindle by 2 mm per thimble rotation.
- Extraordinary battery life of 2,4 years
- Outstanding accuracy
- Ratched thimble mechanism ensures easy single-handed or stand operation.
- Excellent resistance against water and dust (IP65 protection level) enables this micrometer to be used in machining situations that include splashing coolant fluid.

## QuantuMike®



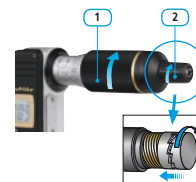
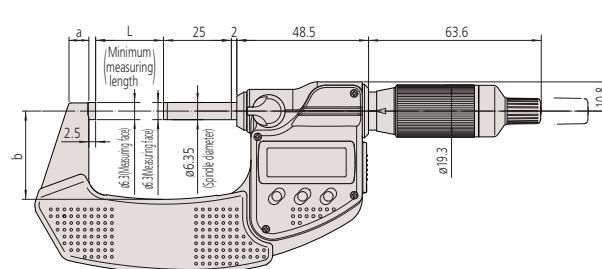
293-140-30



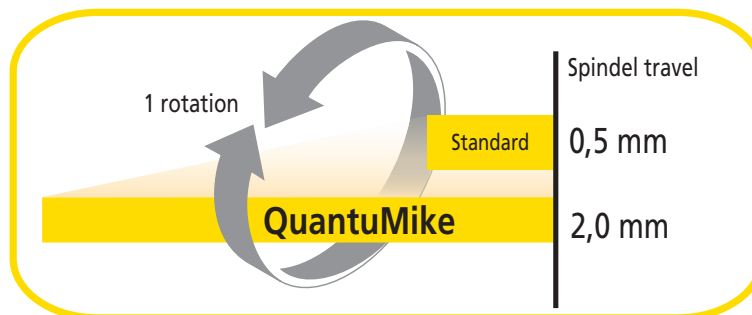
Coloured speeders

### Metric

No.	Range [mm]	Accuracy [µm]	Flatness	Parallelism	Data output	L [mm]	a [mm]	b [mm]	Mass [g]
293-140-30	0-25	±1	0,3 µm	1 µm	●	0	9	25	265
293-145-30	0-25	±1	0,3 µm	1 µm	●	0	9	25	265
293-141-30	25-50	±1	0,3 µm	1 µm	●	25	9,8	32	325
293-146-30	25-50	±1	0,3 µm	1 µm	●	25	9,8	32	325
293-142-30	50-75	±1	0,3 µm	2 µm	●	50	12,6	47	465
293-147-30	50-75	±1	0,3 µm	2 µm	●	50	12,6	47	465
293-143-30	75-100	±2	0,3 µm	2 µm	●	75	14	60	620
293-148-30	75-100	±2	0,3 µm	2 µm	●	75	14	60	620



1 : Ratchet on thimble  
2 : Ratchet on speeder





# Digimatic Micrometer IP65 Metric

## Series 293

This IP65 micrometer offers outstanding accuracy, with and without data input, is highly robust and offers the following benefits:

- Outstanding accuracy and oil-resistant material used for all plastic parts
- Extraordinary battery life of 2,4 years
- Excellent resistance against water and dust (IP65 protection level) enables this micrometer to be used in machining situations that include splashing coolant fluid.



**IP65**



Only for 0-25, 25-50 mm



293-234-30 with ratched thimble



293-230-30 with ratched stop



293-252-30



Excellent resistance against water and dust  
IP65

### Metric

With ratchet stop

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	Data output	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
293-230-30	0-25	±1	0,3 μm	1 μm	●	0	6,5	25	2,5	270
293-240-30	0-25	±1	0,3 μm	1 μm	●	0	6,5	25	2,5	270
293-231-30	25-50	±1	0,3 μm	1 μm	●	25	7,3	32,5	2,5	330
293-241-30	25-50	±1	0,3 μm	1 μm	●	25	7,5	32,5	2,5	330
293-232-30	50-75	±1	0,3 μm	2 μm	●	50	10,1	47	2,5	470
293-242-30	50-75	±1	0,3 μm	2 μm	●	50	10,1	47	2,5	470
293-233-30	75-100	±2	0,3 μm	2 μm	●	75	11,5	60	2,5	625
293-243-30	75-100	±2	0,3 μm	2 μm	●	75	11,5	60	2,5	625
293-250-30	100-125	±2	0,3 μm	5 μm	●	100	16,7	76	5,3	600
293-251-30	125-150	±2	0,3 μm	5 μm	●	125	18,8	90	5,7	740
293-252-30	150-175	±3	0,3 μm	5 μm	●	150	19,1	103	6,1	800
293-253-30	175-200	±3	0,3 μm	5 μm	●	175	18,2	115	6,3	970
293-254-30	200-225	±3	0,3 μm	5 μm	●	200	16,8	126	6,7	1100
293-255-30	225-250	±4	0,3 μm	5 μm	●	225	18	139	5,5	1270
293-256-30	250-275	±4	0,3 μm	5 μm	●	250	18	152	6,5	1340
293-257-30	275-300	±4	0,3 μm	5 μm	●	275	18	166	6,5	1540

Dimensions see next page

### Metric

With ratchet thimble

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	Data output	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
293-234-30	0-25	±1	0,3 μm	1 μm	●	0	6,5	25	2,5	270
293-244-30	0-25	±1	0,3 μm	1 μm	●	0	6,5	25	2,5	270
293-235-30	25-50	±1	0,3 μm	1 μm	●	25	7,3	32,5	2,5	330
293-245-30	25-50	±1	0,3 μm	1 μm	●	25	7,3	32,5	2,5	330
293-236-30	50-75	±1	0,3 μm	2 μm	●	50	10,1	47	2,5	470
293-246-30	50-75	±1	0,3 μm	2 μm	●	50	10,1	47	2,5	470
293-237-30	75-100	±2	0,3 μm	2 μm	●	75	11,5	60	2,5	625
293-247-30	75-100	±2	0,3 μm	2 μm	●	75	11,5	60	2,5	625

Dimensions see next page

Functions	Series 293
ORIGIN (until 100 mm)	●
ZERO/ABS	●
2 x PRESET (over 100 mm)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Digital step	0,001 mm
Measuring surfaces	carbide-tipped, micro-lap finish
Measuring spindle	With spindle lock, ø 6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx. 2,4 years for models up to 100 mm 1,2 years for >100 mm
Delivered	Including box, key, 1 battery, setting standard (from 25 mm upward) certificate of inspection (0-50 mm range)

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



With Wireless System U-WAVE fit



Scan QR Code with your mobile device and watch our product videos on YouTube

### Series 293 - Micrometers in set

## Specifications

### Optional accessories

### Consumable spares




A hand is holding a digital depth gauge against a stack of metal rods. The gauge has a black handle and a silver frame. The digital display shows a reading. The rods are stacked vertically, and the gauge is positioned to measure their length.

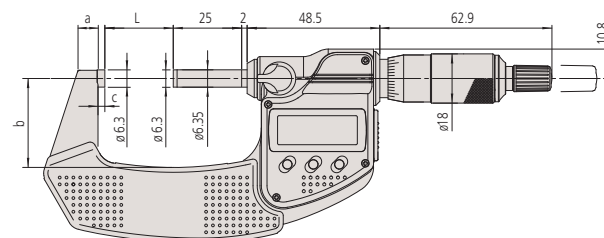
**With Wireless System U-WAVE fit**

This metric micrometer offers outstanding accuracy, with and without data output.

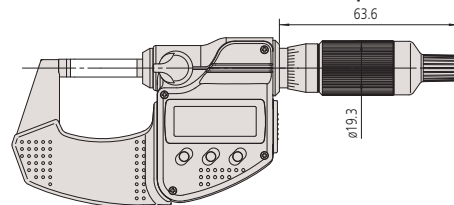


293-963-30

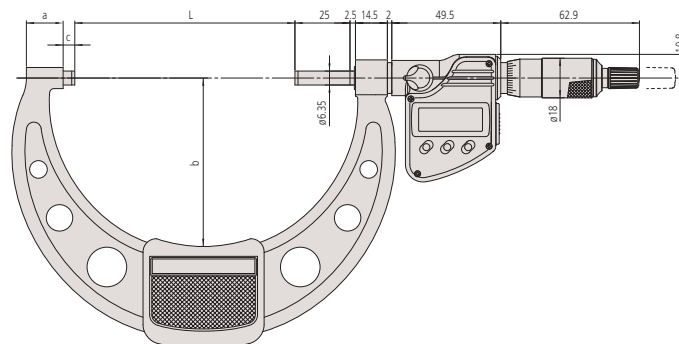
Metric					
Set/With ratchet stop					
No.	Range [mm]	Flatness	Parallelism	Data output	Set combination
293-966-30	0-50	0,3 µm	1 µm		293-230-30 / 293-231-30 + setting standard 25 mm (ceramic gauge block grade 1)
293-962-30	0-75	0,3 µm	1 µm for 0-50 mm 2 µm for 50-100 mm		293-230-30 / 293-231-30 / 293-232-30 + setting standard 25 mm and 50 mm
293-963-30	0-100	0,3 µm	1 µm for 0-50 mm 2 µm for 50-100 mm		293-230-30 / 293-231-30 / 293-232-30 / 293-233-30 + setting standard 25 mm, 50 mm and 75 mm



### Ratchet stop



### Ratchet thimble



### Ratchet stop type over 100 mm



only for 0-25mm,  
25-50mm

# Digimatic Micrometer 300-500 mm

## Series 293

The Digimatic Micrometer 300-500 mm has a measuring range of 300-500 mm and offers the following benefits:

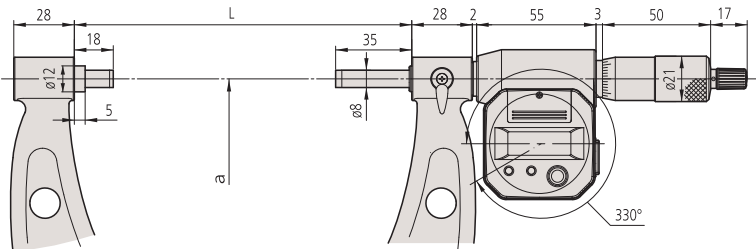
- The micrometer's 330° rotatable display unit enables easy reading in all measurement positions.
- 300-500 mm measuring range.



293-582

### Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	Mass [g]
293-582	300-325	±6	0,6 μm	5 μm	353	187	2000
293-583	325-350	±6	0,6 μm	5 μm	378	199	2150
293-584	350-375	±6	0,6 μm	5 μm	403	212	2300
293-585	375-400	±7	0,6 μm	6 μm	428	224	2450
293-586	400-425	±7	0,6 μm	6 μm	453	236	2600
293-587	425-450	±7	0,6 μm	6 μm	478	248	2750
293-588	450-475	±8	0,6 μm	6 μm	503	261	2900
293-589	475-500	±8	0,6 μm	7 μm	528	273	3100



The display is 330° rotatable

Functions	Series 293
ZERO/ABS	●
2 x PRESET (over 100 mm)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

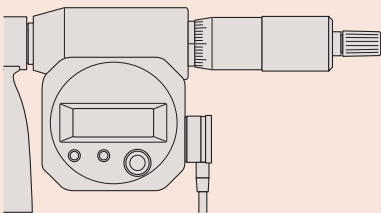
Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Thimble and sleeve satin chrome finish
Digital step	0,001 mm
Measuring surfaces	Carbide tipped, micro lap finish
Measuring spindle	with spindle lock, ø 8 mm, single pitch 0,5 mm
Measuring force	10-14 N
Battery life	approx. 1,8 years
Delivered	Including box, setting standard, key, 2 batteries

### Optional accessories

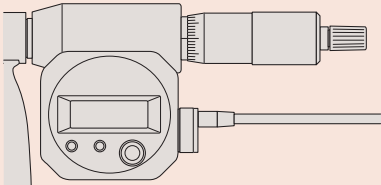
No.	Description
04AZB512	Digimatic Cable with Data Button, 1m, Flat L-Shape Left Type
04AZB513	Digimatic Cable with Data Button, 2m, Flat L-Shape Left Type
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

### Consumable spares




No.	Description
938882	Battery SR44 1.5V



Cable orientation downwards  
04AZB512, 04AZB513



Cable orientation in thimble direction  
959149, 959150

Functions	Series 293
ORIGIN	
Auto Power OFF after 20 min. non use	
Low voltage alarm	

Specifications	
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish ø18 mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	ø 6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx. 2,4 years (approx. 8700 hours)
Delivered	Including box, key, 1 battery, certificate of inspection

Consumable spares	
No.	Description
938882	Battery SR44 1.5V

# Digimatic Micrometer

## Series 293

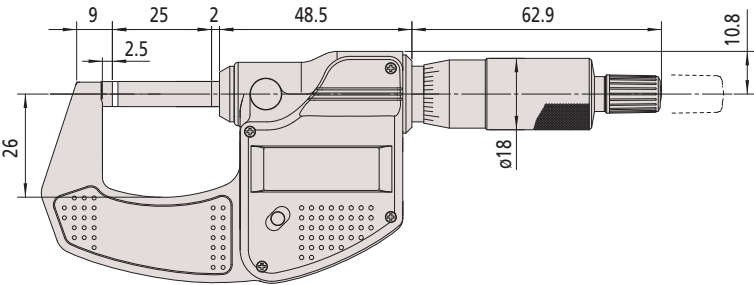
This standard model digimatic micrometer is an affordable device that offers the following benefits:

- It is cost-effective with simplified functionality for standard applications.
- Extraordinary battery life of 2,4 years. Without data output.
- Constant measuring force



293-821-30

Metric		With ratchet stop			
No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	Mass [g]
293-821-30	0-25	±2	0,3 μm	2 μm	275





# Outside Micrometer Non-Rotating Spindle Type

## Series 406

This micrometer features a non-rotating spindle, and offers the following benefits:

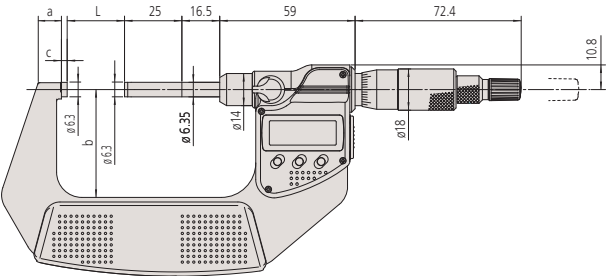
- Sliding spindle, not rotating.
- Ratchet stop.
- Data output.



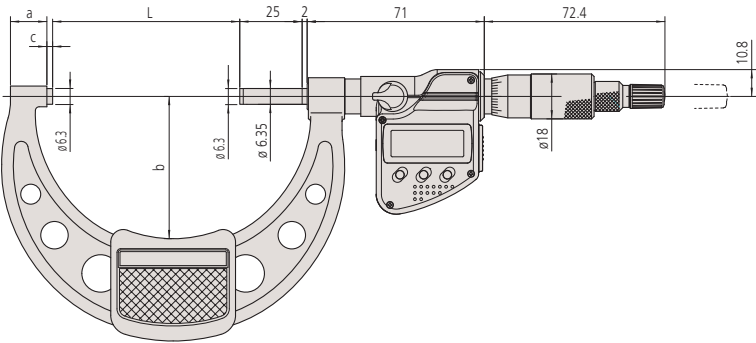
406-250-30

### Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
406-250-30	0-25	±3	0,3 μm	3 μm	0	7	32	2,8	330
406-251-30	25-50	±3	0,3 μm	3 μm	25	9,8	47	2,8	470
406-252-30	50-75	±3	0,3 μm	3 μm	50	11,2	60	2,8	625
406-253-30	75-100	±4	0,3 μm	4 μm	75	14,6	57	2,3	460



0 - 75 mm



75 - 100 mm

Functions	Series 406
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Thimble and sleeve satin chrome finish ø 18 mm
Digital step	0,001 mm
Measuring surfaces	carbide-tipped, micro-lap finish
Measuring spindle	With spindle lock, ø 6,35 mm, spindle pitch 0,5mm
Measuring force	3-8 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



With Wireless System U-WAVE fit

# ABSOLUTE Digimatic Micrometer Quickmike

ABSOLUTE®

IP65

## Series 293

This Quickmike, with a non-rotating spindle, delivers much faster movement than standard models and offers the following benefits:

- With 10 mm feed per revolution, it delivers twenty times as fast as standard devices.
- Excellent resistance against water and dust (IP65) enables this micrometer to be used in machining situations that include splashing coolant fluid.
- ABSOLUTE linear scale means no restriction on adjustment speed.
- Larger measuring range - 30 mm compared with 25 mm - than standard micrometer.

Series 293	
<b>Functions</b>	
ORIGIN	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●
HOLD	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	ø6,35 mm, non-rotating, 10 mm pitch
Measuring force	5-12 N
Battery life	approx. 5 years under normal use
Display	LCD, character height 10 mm
Delivered	Including box, setting standard (from 25 mm upward), 1 battery

## Optional accessories

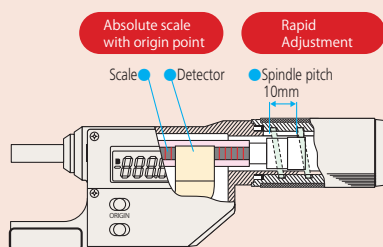
No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



293-666-20 with fixing device 156-101-10 (optional accessories)



This micrometer has a spindle mechanism enabling a spindle drive of 10 mm/rev. The drive rate is therefore twenty times as fast as conventional micrometers.



293-666-20



293-667-20



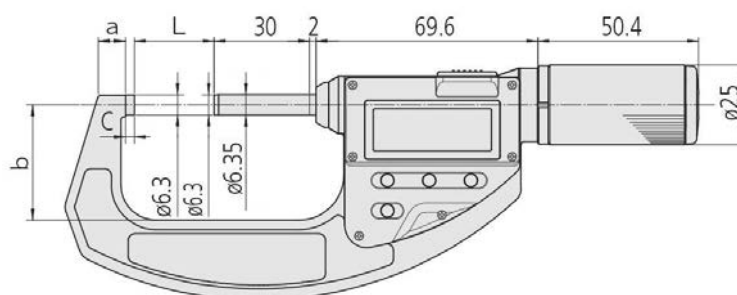
293-668-20



293-669-20

## Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
293-666-20	0-30	±2	0,3 μm	2 μm	0	7	25	2	275
293-667-20	25-55	±2	0,3 μm	2 μm	25	8,5	36	2,8	340
293-668-20	50-80	±3	0,3 μm	2 μm	50	10,3	47	2,8	480
293-669-20	75-105	±3	0,3 μm	3 μm	75	10,7	60	2,8	585



# ABSOLUTE Digimatic Micrometer Quickmike

## Series 227

This micrometer has an adjustable measuring force to suit various kinds of workpieces.

The ABSOLUTE Digimatic Micrometer Quickmike offers the following benefits:

- It's dedicated to applications requiring a constant/low measuring force such as measuring wire, paper and plastic/rubber parts.
- Constant and low measuring force mechanism in the thimble.
- Non-rotating spindle.
- Speedy spindle feed of 10mm/rev.

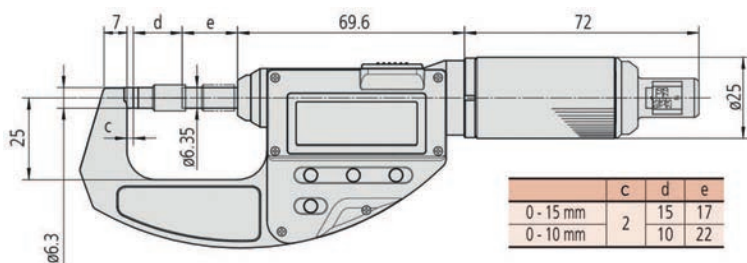


227-201-20

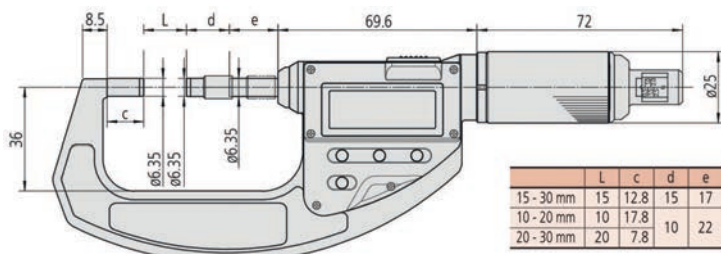
### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Measuring force settings <sup>(1)</sup> [N]	Measuring force accuracy <sup>(1)</sup> [N]	Mass [g]
227-201-20	0-15	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	0,5; 1; 1,5; 2; 2,5	$\pm 0,1 + (\text{force setting}/10)$	300
227-203-20	15-30	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	0,5; 1; 1,5; 2; 2,5	$\pm 0,1 + (\text{force setting}/10)$	380
227-205-20	0-10	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	2; 4; 6; 8; 10	$\pm 0,4 + (\text{force setting}/10)$	345
227-206-20	10-20	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	2; 4; 6; 8; 10	$\pm 0,4 + (\text{force setting}/10)$	425
227-207-20	20-30	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	2; 4; 6; 8; 10	$\pm 0,4 + (\text{force setting}/10)$	415

<sup>(1)</sup> Only valid for instrument orientation within  $\pm 3$  degrees of horizontal when measuring.



227-201-20, 227-205-20



227-203-20, 227-206-20, 227-207-20

ABSOLUTE®

## Series 227

	227-201-20	227-203-20 up to 227-207-20
Functions		
ZERO/ABS	●	
ON/OFF	●	
Data output	●	●

### Specifications

Measuring direction	horizontal
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Measuring surfaces	carbide-tipped, micro-lap finish
Measuring spindle	$\varnothing 6,35$ mm, non-rotating, 10 mm pitch
Battery life	Approx. 5 years under normal use
Display	LCD, character height 10 mm
Delivered	Including box, setting standard (for 10-30 mm models), screwdriver, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



## Series 102

### Optional accessories

### Consumable spares



- It works both from the thimble and the speeder, enabling easy, one-handed operation.
- Ratchet's clearly audible operation provides reassurance that measurements are being taken at a constant, preset measuring force.
- Heat insulating frame



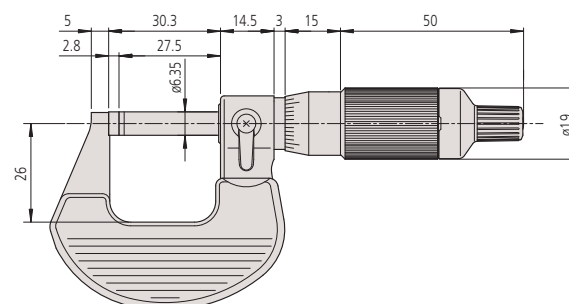
102-701



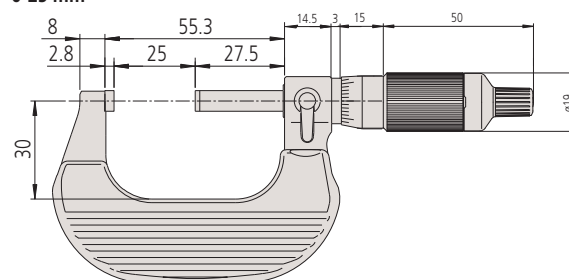
102-702

## Metric

No.	Range [mm]	Graduation	Accuracy [μm]	Flatness	Parallelism	Mass [g]
102-701	0-25	0,01 mm	±2	0,6 μm	2 μm	180
102-707	0-25	0,001 mm	±2	0,6 μm	2 μm	180
102-702	25-50	0,01 mm	±2	0,6 μm	2 μm	270
102-708	25-50	0,001 mm	±2	0,6 μm	2 μm	270



0-25 mm



25-50 mm



Coloured ratchet caps  
(optional accessories)





# Outside Micrometer

## Series 102

This outside micrometer is an accurate and reliable device that offers you the following benefits:

- Cut-away frame (behind anvil) for measurements in hard-to-reach places
- Ratchet stop delivers a constant measuring force.



Only for 0-25, 25-50 mm



102-301

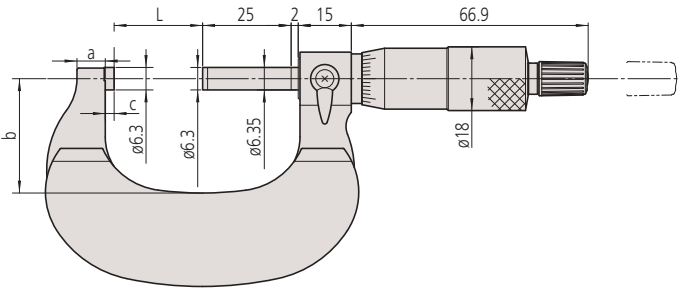


102-911-40

Metric								
Graduation 0,001 mm is obtained with vernier on sleeve								
No.	Range [mm]	Accuracy [μm]	Flatness	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
102-311	0-25	±2	0,3 μm	0	5	26	2,5	180
102-312	25-50	±2	0,3 μm	25	7,8	32	2,5	270

Metric								
Graduation 0,01 mm								
No.	Range [mm]	Accuracy [μm]	Flatness	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
102-301	0-25	±2	0,6 μm	0	5	26	2,5	180
102-302	25-50	±2	0,6 μm	25	7,8	32	2,5	270
102-303	50-75	±2	0,6 μm	50	10,6	45	2,5	375
102-304	75-100	±3	0,6 μm	75	11	58	2,5	490

Metric					Micrometer set	
No.	Range [mm]	Flatness	Content of Set			Mass [g]
102-911-40	0-100	0,6 μm	102-301, 102-302, 102-303, 102-304, 3 setting standards			1200



Specifications	
Accuracy	Refer to the list of specifications
Scale	Thimble and sleeve satin chrome finish ø18 mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, ø6,35 mm, spindle pitch 0,5 mm
Parallelism	2 μm for 0 to 75 mm model 3 μm for models 75-100 mm
Measuring force	5-10 N
Delivered	Including box, key, setting standard (from 25 mm upward), certificate of inspection (0-50 mm range)

# Outside Micrometer

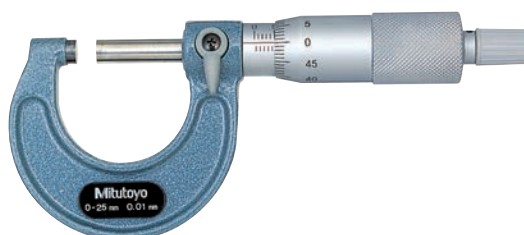
## Series 103



Only for 0-25 and 25-50 mm

### Specifications

Accuracy	Refer to the list of specifications
Scale	Thimble and sleeve satin chrome finish
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	with spindle lock, spindle pitch 0,5 mm
Parallelism	$(2+L/100) \mu\text{m}$ , L = max. range (mm)
Measuring force	5-10 N (from 100 mm upward : 5-15 N)
Delivered	Including box, setting standard (from 25 mm upward), key, certificate of inspection (0-50 mm range)



103-137

### Metric

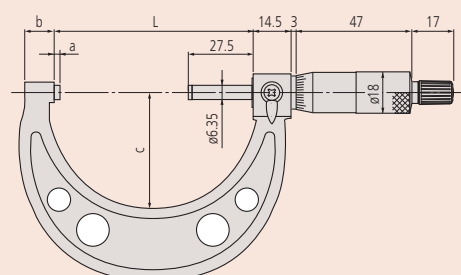
Graduation 0,001 mm is obtained with vernier on sleeve

No.	Range [mm]	Accuracy [ $\mu\text{m}$ ]	Flatness	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
103-129	0-25	$\pm 2$	0,6 $\mu\text{m}$	30,3	2,8	9	28	6,35	175
103-130	25-50	$\pm 2$	0,6 $\mu\text{m}$	55,3	2,8	10	38	6,35	215

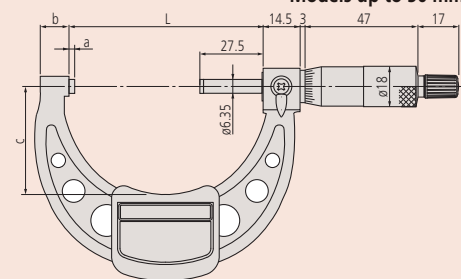
### Metric

Graduation 0,01 mm

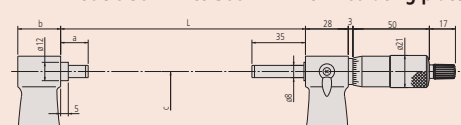
No.	Range [mm]	Accuracy [ $\mu\text{m}$ ]	Flatness	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
103-137	0-25	$\pm 2$	0,6 $\mu\text{m}$	30,3	2,8	9	28	6,35	175
103-138	25-50	$\pm 2$	0,6 $\mu\text{m}$	55,3	2,8	10	38	6,35	215
103-139-10	50-75	$\pm 2$	0,6 $\mu\text{m}$	80,3	2,8	12	46	6,35	315
103-140-10	75-100	$\pm 3$	0,6 $\mu\text{m}$	105,3	2,8	14	57	6,35	375
103-141-10	100-125	$\pm 3$	0,6 $\mu\text{m}$	132,8	5,3	17	76	6,35	515
103-142-10	125-150	$\pm 3$	0,6 $\mu\text{m}$	158,2	5,7	19	90	6,35	665
103-143-10	150-175	$\pm 4$	0,6 $\mu\text{m}$	183,6	6,1	20	102	6,35	720
103-144-10	175-200	$\pm 4$	0,6 $\mu\text{m}$	208,8	6,3	19	115	6,35	920
103-145-10	200-225	$\pm 4$	0,6 $\mu\text{m}$	234,2	6,7	18	127	6,35	1080
103-146-10	225-250	$\pm 5$	0,6 $\mu\text{m}$	258	5,5	18	139	6,35	1255
103-147-10	250-275	$\pm 5$	0,6 $\mu\text{m}$	284	6,5	18	152	6,35	1405
103-148-10	275-300	$\pm 5$	0,6 $\mu\text{m}$	309	6,5	18	166	6,35	1565
103-149	300-325	$\pm 6$	1 $\mu\text{m}$	353	18	28	187	8	1985
103-150	325-350	$\pm 6$	1 $\mu\text{m}$	378	18	28	199	8	2155
103-151	350-375	$\pm 6$	1 $\mu\text{m}$	403	18	28	212	8	2305
103-152	375-400	$\pm 7$	1 $\mu\text{m}$	428	18	28	224	8	2455
103-153	400-425	$\pm 7$	1 $\mu\text{m}$	453	18	28	236	8	2715
103-154	425-450	$\pm 7$	1 $\mu\text{m}$	478	18	28	248	8	2965
103-155	450-475	$\pm 8$	1 $\mu\text{m}$	503	18	28	261	8	3215
103-156	475-500	$\pm 8$	1 $\mu\text{m}$	528	18	28	273	8	3450
103-157	500-525	$\pm 9$	1 $\mu\text{m}$	575	40	28	307	8	4060
103-158	525-550	$\pm 9$	1 $\mu\text{m}$	575	15	28	307	8	4080
103-159	550-575	$\pm 9$	1 $\mu\text{m}$	625	40	28	332	8	4500
103-160	575-600	$\pm 9$	1 $\mu\text{m}$	625	15	28	332	8	4525
103-161	600-625	$\pm 9$	1 $\mu\text{m}$	675	40	28	355	8	4915
103-162	625-650	$\pm 9$	1 $\mu\text{m}$	675	15	28	355	8	4930
103-163	650-675	$\pm 9$	1 $\mu\text{m}$	725	40	28	382	8	5200
103-164	675-700	$\pm 9$	1 $\mu\text{m}$	725	15	28	382	8	5215
103-165	700-725	$\pm 9$	1 $\mu\text{m}$	775	40	28	405	8	5835
103-166	725-750	$\pm 9$	1 $\mu\text{m}$	775	15	28	405	8	5860
103-167	750-775	$\pm 9$	1 $\mu\text{m}$	825	40	28	430	8	6385
103-168	775-800	$\pm 9$	1 $\mu\text{m}$	825	15	28	430	8	6410
103-169	800-825	$\pm 9$	1 $\mu\text{m}$	875	40	28	455	8	6925
103-170	825-850	$\pm 9$	1 $\mu\text{m}$	875	15	28	455	8	6940
103-171	850-875	$\pm 9$	1 $\mu\text{m}$	925	40	28	480	8	7565
103-172	875-900	$\pm 9$	1 $\mu\text{m}$	925	15	28	480	8	7590
103-173	900-925	$\pm 9$	1 $\mu\text{m}$	975	40	28	505	8	8215
103-174	925-950	$\pm 9$	1 $\mu\text{m}$	975	15	28	505	8	8240
103-175	950-975	$\pm 9$	1 $\mu\text{m}$	1025	40	28	530	8	8860
103-176	975-1000	$\pm 9$	1 $\mu\text{m}$	1025	15	28	530	8	8880



Models up to 50 mm



Models 50 mm to 300 mm with insulating plate



Models over 300 mm

# Outside Micrometers in Set

## Series 103

These outside micrometers are accurate and reliable. They offer you the following benefits:

- Lightweight workshop design
- Ratchet stop delivers a constant measuring force.



103-913-50

Metric

Micrometer set

No.	Range [mm]	Content of Set	Mass [g]
103-927-10	0-75	103-137, 103-138, 103-139-10, 2 setting standards	750
103-913-50	0-150	103-137, 103-138, 103-139-10, 103-140-10, 103-141-10, 103-142-10, 5 setting standards	2260
103-915-10	150-300	103-143-10, 103-144-10, 103-145-10, 103-146-10, 103-147-10, 103-148-10, 6 setting standards	7695
103-914-50	0-300	All micrometers of 103-913-50 and 103-915-10 in one set, 11 setting standards	9300

## Specifications

Graduation	0,01 mm
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# Digit Outside Micrometer

## Series 193

This digit outside micrometer comes with a mechanical counter and offers you the following benefits:

- Mechanical digit counter
- Quick and error-free reading



193-101



193-902

### Metric

Graduation 0,001 mm is obtained with vernier on sleeve

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
193-111	0-25	±2	0,6 μm	(2+L/100) μm, L = max. range	30	2,5	5	26	224
193-112	25-50	±2	0,6 μm	(2+L/100) μm, L = max. range	55	2	8	32	275
193-113	50-75	±2	0,6 μm	(2+L/100) μm, L = max. range	80	2	9	45	379
193-114	75-100	±3	0,6 μm	(2+L/100) μm, L = max. range	105	2	9	57	489

### Metric

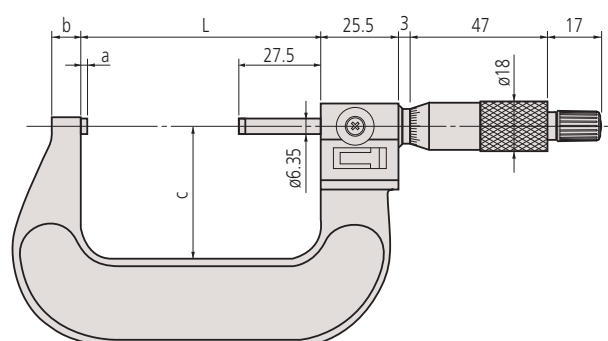
Graduation 0,01 mm

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
193-101	0-25	±2	0,6 μm	(2+L/100) μm, L = max. range	30	2,5	5	26	224
193-102	25-50	±2	0,6 μm	(2+L/100) μm, L = max. range	55	2	8	32	275
193-103	50-75	±2	0,6 μm	(2+L/100) μm, L = max. range	80	2	9	45	379
193-104	75-100	±3	0,6 μm	(2+L/100) μm, L = max. range	105	2	9	57	489

### Metric

Micrometer set

No.	Range [mm]	Flatness	Parallelism	Content of Set	Mass [g]
193-901	0-75	0,6 μm	(2+L/100) μm, L = max. range	193-101, 193-102, 193-103, 2 setting standards	820
193-902	0-100	0,6 μm	(2+L/100) μm, L = max. range	193-101, 193-102, 193-103, 193-104, 3 setting standards	1367



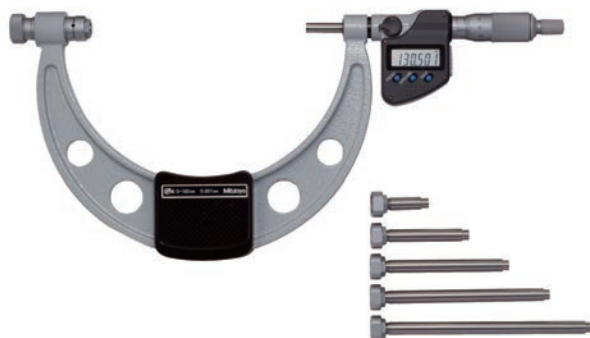


# Digimatic Micrometer with Interchangeable Anvils

## Series 340

This Digimatic Micrometer offers you an extra wide measuring range, and has the following benefits:

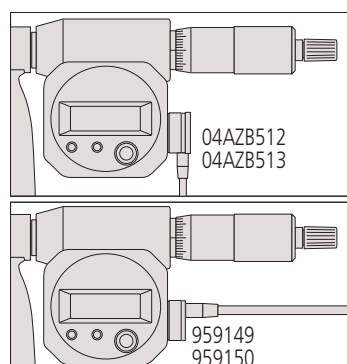
- Easy, interchangeable anvils allow a wide range of measurements.
- Ratchet stop for constant force.



340-251-30

### Metric

No.	Range [mm]	Flatness	Parallelism	Interchangeable anvils	Protection IP65	Setting standard	Mass [kg]
340-251-30	0-150	0,6 µm	(2+L/100) µm, L = max. range	6	●	5	0,96
340-252-30	150-300	0,6 µm	(2+L/100) µm, L = max. range	6	●	6	1,88
340-520	300-400	0,6 µm	(2+L/100) µm, L = max. range	4		4	2,6
340-521	400-500	0,6 µm	(2+L/100) µm, L = max. range	4		4	4,1
340-522	500-600	0,6 µm	(2+L/100) µm, L = max. range	4		4	5,5
340-523	600-700	0,6 µm	(2+L/100) µm, L = max. range	4		4	6,8
340-524	700-800	0,6 µm	(2+L/100) µm, L = max. range	4		4	8,2
340-525	800-900	0,6 µm	(2+L/100) µm, L = max. range	4		4	9,5
340-526	900-1000	0,6 µm	(2+L/100) µm, L = max. range	4		4	10,9



Models over 300 mm

	340-251-30	340-252-30	340-520 up to 340-526
<b>Functions</b>			
ZERO/ABS	●	●	●
ON	●	●	●
Auto Power OFF after 20 min. non use	●	●	●
2 x PRESET	●	●	●
Low voltage alarm	●	●	●
Function lock	●	●	●
Data output	●	●	●
HOLD	●	●	●

### Specifications

Accuracy	±(4+L/75) µm, L = max. range (mm) (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish ø18 mm, ø21 mm (over 300 mm)
Measuring surfaces	Hardened, lapped (anvil), carbide tipped, lapped (spindle side)
Measuring spindle	With spindle lock, ø6,35 mm, ø8 mm (over 300 mm), spindle pitch 0,5 mm
Measuring force	5-10 N, 10-14 N (over 300 mm)
Battery life	approx. 2,4 years, approx. 1,8 years (over 300 mm)
Delivered	Including box, setting standard, anvils, key, 1 battery (2 batteries over 300 mm)

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
04AZB512	Digimatic Cable with Data Button, 1m, Flat L-Shape Left Type
04AZB513	Digimatic Cable with Data Button, 2m, Flat L-Shape Left Type
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

05CZA662/05CZA663/06AFM380B/264-622/264-623/02AZF310 for models up to 300 mm  
959149/959150/04AZB512/04AZB513/06AFM380C/02AZD730G/02AZD880G/02AZD790C for models over 300 mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Outside Micrometer with Interchangeable Anvils

## Specifications

Accuracy	$\pm(4+L/75) \mu\text{m}$ , L = max. range (mm)
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish $\varnothing 18$ mm (up to 300 mm) $\varnothing 21$ mm (over 300 mm)
Measuring surfaces	Hardened, lapped (anvil), carbide tipped, lapped (spindle side)
Measuring spindle	With spindle lock, $\varnothing 6,35$ mm (up to 300 mm) $\varnothing 8$ mm (over 300 mm), spindle pitch 0,5 mm
Measuring force	5-10 N, 10-14 N (over 300 mm)
Delivered	Including box, setting standard, anvils, key

## Series 104

This outside micrometer offers you an extra wide measuring range and presents you with the following benefits:

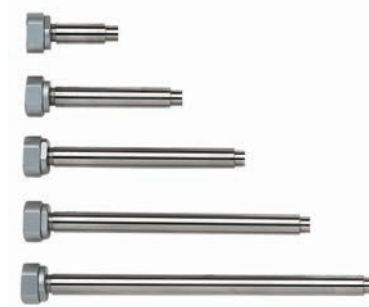
- Easy, interchangeable anvils allow a wide range of measurements.
- Ratchet stop delivers a constant measuring force.



104-171



104-135A



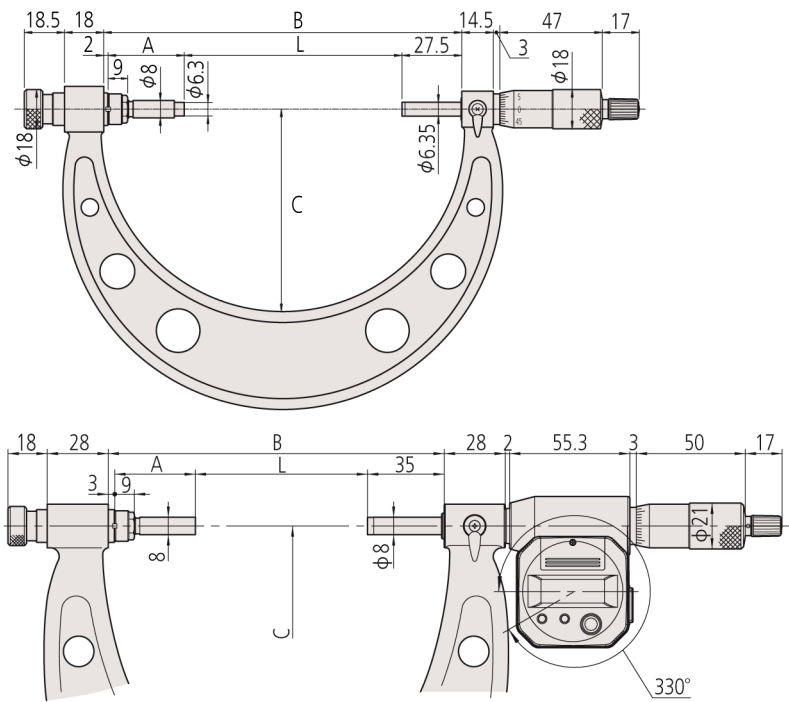
## Metric

No.	Range [mm]	Flatness	Parallelism	Interchangeable anvils	Setting standard	Mass [kg]
104-171	0-50	0,6 $\mu\text{m}$	2 $\mu\text{m}$	1	1	0,32
104-139A	0-100	0,6 $\mu\text{m}$	3 $\mu\text{m}$	4	3	0,79
104-135A	0-150	0,6 $\mu\text{m}$	2 $\mu\text{m}$ for 0-75 mm 3 $\mu\text{m}$ for 75-150 mm	6	5	1,35
104-161A	50-150	0,6 $\mu\text{m}$	2 $\mu\text{m}$ for 0-75 mm 3 $\mu\text{m}$ for 75-150 mm	4	4	1,35
104-140A	100-200	0,6 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	1,38
104-136A	150-300	0,6 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	6	6	2,65
104-141A	200-300	0,6 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	2,22
104-142A	300-400	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	3,31
104-143A	400-500	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	4,81
104-144A	500-600	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	6,35
104-145A	600-700	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	7,72
104-146A	700-800	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	9,08
104-147A	800-900	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	10,41
104-148A	900-1000	1 $\mu\text{m}$	$(2+L/100) \mu\text{m}$ , L = max. range	4	4	11,78

# Outside Micrometer with Interchangeable Anvils

## Series 104/340

These are optional interchangeable anvils you can use with the 104 and 340 series.



**Note:** The values for B mm and C mm are valid for all products shown in the tables below:

**B mm:**

Value for measuring range:

0/150 mm: 164,5; 150/300 mm: 314,5; 300/400 mm: 425; 400/500 mm: 525; 500/600 mm: 625; 600/700 mm: 725; 700/800 mm: 825; 800/900 mm: 925; 900/1.000 mm: 1.025

**C mm:**

Value for measuring range:

0/150 mm: 93; 150/300 mm: 166; 300/400 mm: 224; 400/500 mm: 273; 500/600 mm: 332; 600/700 mm: 382; 700/800 mm: 430; 800/900 mm: 480; 900/1.000 mm: 530

0 - 300 mm

Interchangeable anvil ident	M1 mm	M2 mm	M3 mm	M4 mm	M5 mm	M6 mm
No.	303950	303951	303952	303953	303954	303955
L=0/150 mm	0-25	25-50	50-75	75-100	100-125	125-150
L=150/300 mm	150-175	175-200	200-225	225-250	250-275	275-300
A mm	135	110	85	60	35	10

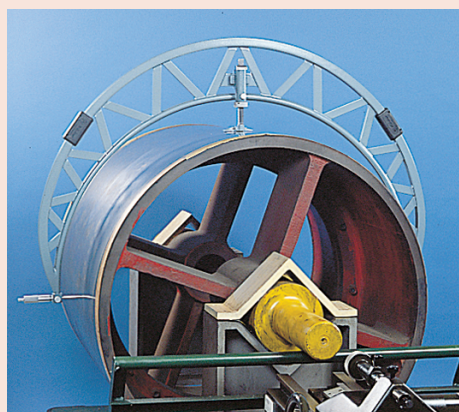
300 - 1000 mm

Interchangeable anvil ident	M3 mm	M4 mm	M5 mm	M6 mm
No.	304001	304002	304003	304004
L=300/400 mm	300-325	325-350	350-375	375-400
L=400/500 mm	400-425	425-450	450-475	475-500
L=500/600 mm	500-525	525-550	550-575	575-600
L=600/700 mm	600-625	625-650	650-675	675-700
L=700/800 mm	700-725	725-750	750-775	775-800
L=800/900 mm	800-825	825-850	850-875	875-900
L=900/1000 mm	900-925	925-950	950-975	975-1000
A mm	87	62	37	12

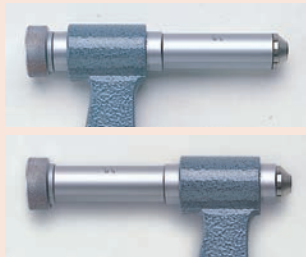
# Outside Micrometer with Anvil Extension Collars

## Specifications

Accuracy	$\pm(6+L/75) \mu\text{m}$ , L = max. range (mm)
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\phi 21$ mm
Parallelism	$(2+L/100) \mu\text{m}$ , L = max. range (mm)
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, $\phi 8$ mm spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standards (2 pieces), adjustable stop (for models over 1.000 mm range)



Application with adjustable stop on workpiece



Anvil extension collar

Range	L	a (distance to workpiece stopper)
1000 - 1200 mm	1225	500 - 600
1200 - 1400 mm	1425	600 - 700
1400 - 1600 mm	1625	700 - 800
1600 - 1800 mm	1825	800 - 900
1800 - 2000 mm	2025	900 - 1000

## Series 105

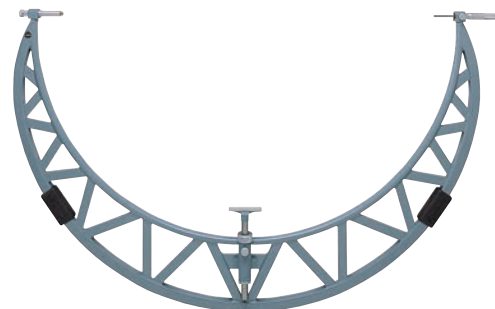
This Outside Micrometer comes with Extension Anvil Collars.

It offers you the following benefits:

- The collars have a stable and rugged yet lightweight tube construction, and are ideal for large micrometers.
- The 50mm spindle stroke gives you extended range compared to standard spindle types.
- Anvil collars extend the measuring range even further.
- The setting standards supplied cover the whole measuring range.



105-105



105-408

## Metric

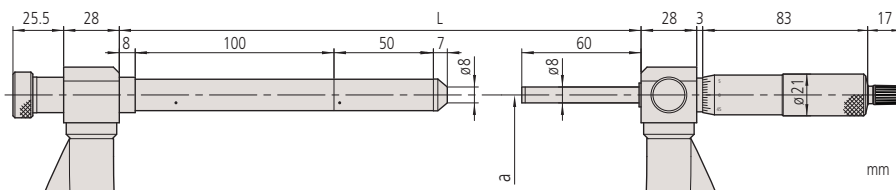
Extension Collar: 50 mm

No.	Range [mm]	Flatness	Extension collar [mm]	Mass [kg]
105-103	500-600	1,3 $\mu\text{m}$	50	5,53
105-104	600-700	1,3 $\mu\text{m}$	50	6,35
105-105	700-800	1,3 $\mu\text{m}$	50	7,17
105-106	800-900	1,3 $\mu\text{m}$	50	7,99
105-107	900-1000	1,3 $\mu\text{m}$	50	8,81
105-408	1000-1100	1,3 $\mu\text{m}$	50	10,49
105-409	1100-1200	1,3 $\mu\text{m}$	50	11,28
105-410	1200-1300	1,3 $\mu\text{m}$	50	12,05
105-411	1300-1400	1,3 $\mu\text{m}$	50	12,72
105-412	1400-1500	1,3 $\mu\text{m}$	50	13,4
105-413	1500-1600	1,3 $\mu\text{m}$	50	14,33
105-414	1600-1700	1,3 $\mu\text{m}$	50	15,26
105-415	1700-1800	1,3 $\mu\text{m}$	50	16,44
105-416	1800-1900	1,3 $\mu\text{m}$	50	18,1
105-417	1900-2000	1,3 $\mu\text{m}$	50	19,76

## Metric

Extension Collar: 50 mm, 100 mm

No.	Range [mm]	Flatness	Extension collar [mm]	Mass [kg]
105-418	1000-1200	1,3 $\mu\text{m}$	50, 100	13,77
105-419	1200-1400	1,3 $\mu\text{m}$	50, 100	15,77
105-420	1400-1600	1,3 $\mu\text{m}$	50, 100	17,91
105-421	1600-1800	1,3 $\mu\text{m}$	50, 100	20,8
105-422	1800-2000	1,3 $\mu\text{m}$	50, 100	22,76





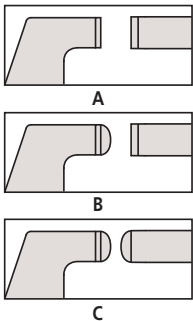
# Digimatic Sheet Metal Micrometer

## Series 389

This Digimatic Sheet Metal Micrometer is designed with a deep frame, for measuring the thickness of sheet material.

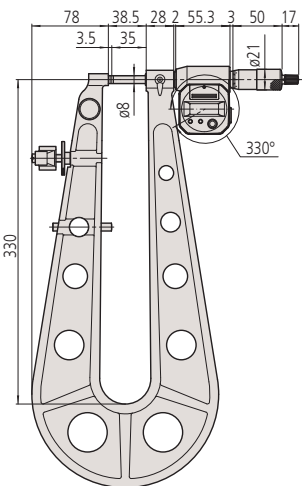


389-251-30

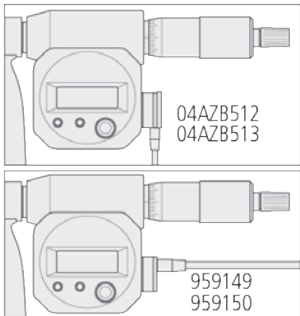


### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Anvil/ Tip	IP65	Mass [g]
389-251-30	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	A		840
389-261-30	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	B		840
389-271-30	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	C		840
389-514	0-25	$\pm 5$	1 $\mu$ m	3 $\mu$ m	A		2750
389-252-30	25-50	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	A		920
389-262-30	25-50	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	B		920
389-272-30	25-50	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	C		920



389-514



Digimatic cable for 389-514

Functions	Series 389
ORIGIN	
ZERO/ABS	
Auto Power OFF after 20 min. non use	
2 x PRESET	
Low voltage alarm	
Function lock	
Data output	
HOLD	

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Measuring force	3-8, 10-14 (389-514) N
Scale	Thimble and sleeve satin chrome finish, $\phi$ 18 mm/ $\phi$ 21 mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, $\phi$ 6,35 mm/ $\phi$ 8 mm (389-514), spindle pitch 0,5 mm
Battery life	approx. 2,4 years, approx. 1,8 years (389-514)
Delivered	Including box, key, 1 battery/ 2 batteries (389-514)

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
04AZB512	Digimatic Cable with Data Button, 1m, Flat L-Shape Left Type
04AZB513	Digimatic Cable with Data Button, 2m, Flat L-Shape Left Type
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

04AZB512/04AZB513/959149/959150/  
06AFM380C/  
02AZD880G/02AZD730G/02AZD790C  
for 389-514

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Sheet Metal Micrometer

## Series 118

This Sheet Metal Micrometer is designed with a deep frame for measuring the thickness of sheet material.



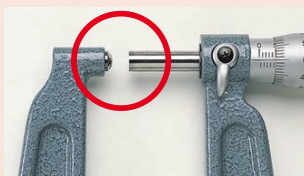
118-102

### Specifications

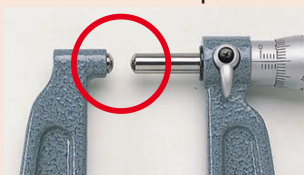
Accuracy	Refer to the list of specifications
Graduation	0,01mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm or $\varnothing 21$ mm
Measuring surfaces	Carbide-tipped, micro-lap finish
Measuring spindle	With spindle lock, throat depth up to 150 mm : $\varnothing 6,35$ mm throat depth up to 300 mm : $\varnothing 8$ mm, spindle pitch 0,5 mm
Measuring force	3-8 N
Delivered	Including box, key, setting standard (from 25 mm upward)



Type A  
Flat-Flat



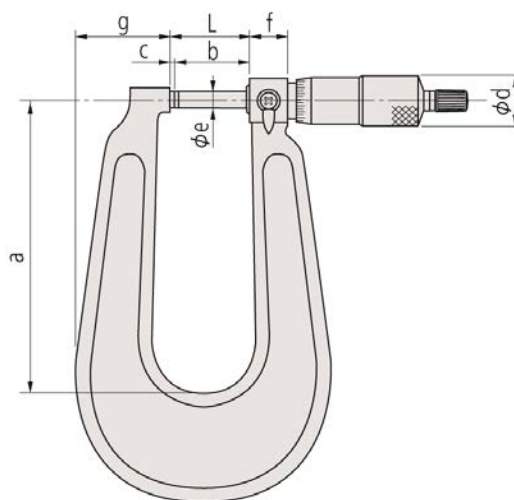
Type B  
Spherical-Flat



Type C  
Spherical-Spherical

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Anvil/Tip	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	Mass [g]
118-101	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	A	30,3	110	27,5	2,8	18	6,35	14,5	39	445
118-102	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	A	30,3	160	27,5	2,8	18	6,35	14,5	48	740
118-103	0-25	$\pm 5$	1 $\mu$ m	3 $\mu$ m	A	38,5	330	35	3,5	21	8	28	84	2650
118-110	25-50	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	A	55,3	165	27,5	2,5	18	6,35	14,5	45	820
118-114	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	B	30,3	160	27,5	2,8	18	6,35	14,5	48	740
118-118	0-25	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	C	30,3	160	27,5	2,8	18	6,35	14,5	48	740
118-126	25-50	$\pm 4$	0,6 $\mu$ m	3 $\mu$ m	C	55,3	165	27,5	2,5	18	6,35	14,5	48	820



# Sheet Metal Micrometer Graduated Dial

## Series 119

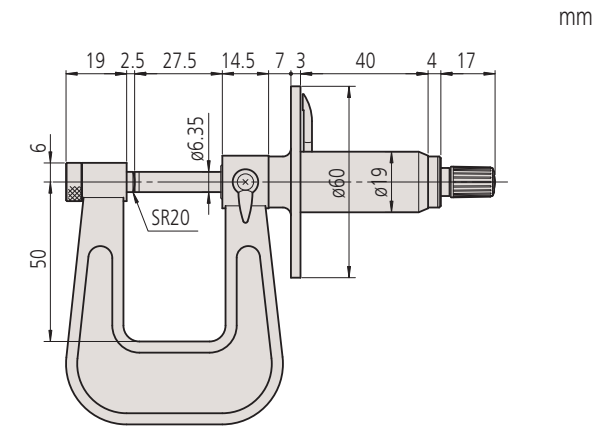
This Sheet Metal Micrometer comes with a graduated dial. It offers you the following features:

- A deep frame that enables you to measure the thickness of sheet material.
- Easy-to-read graduated dial.



119-202

Metric		Dial reading model		
No.	Range [mm]	Accuracy [μm]	Throat [mm]	Mass [g]
119-202	0-25	±4	50	305



Specifications	
Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Measuring surfaces	Convex anvil and flat spindle
Measuring spindle	With spindle lock, Ø 6,35 mm



The Series 119 is provided with a dial for making easy and quick reading.

# Digimatic Caliper Jaw Micrometer

## Series 343

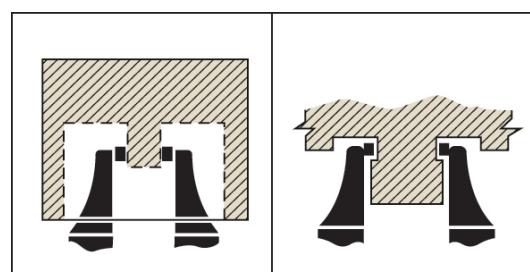
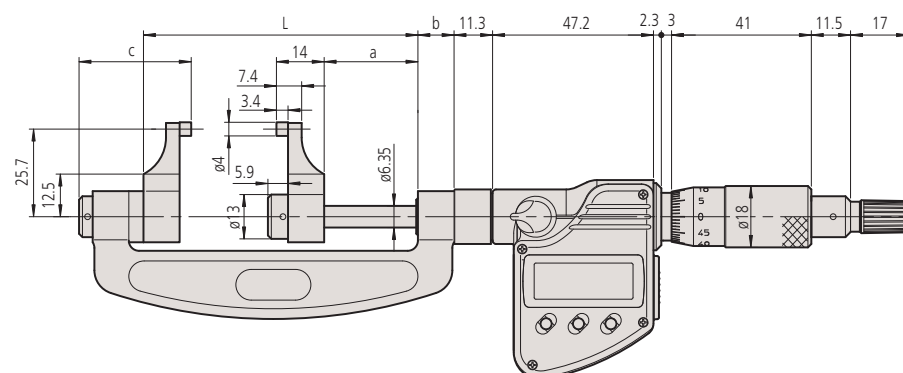
This Digimatic Caliper Jaw Micrometer has been specially designed for measuring in hard-to-reach places.



343-250-30

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
343-250-30	0-25	$\pm 5$	0,3 $\mu$ m	(3+L/75) $\mu$ m, L = max. range	55,5	27,5	10,6	32,9	320
343-251-30	25-50	$\pm 6$	0,3 $\mu$ m	(3+L/75) $\mu$ m, L = max. range	80,5	27,5	10,6	32,9	340
343-252-30	50-75	$\pm 7$	0,3 $\mu$ m	(3+L/75) $\mu$ m, L = max. range	105,5	27,5	10,6	32,9	390
343-253-30	75-100	$\pm 8$	0,3 $\mu$ m	(3+L/75) $\mu$ m, L = max. range	130,5	27,5	10,6	32,9	440



Functions	Series 343
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, ø 6,35 mm, spindle pitch 0,5 mm
Measuring force	1-6 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V







# Universal Micrometer

## Series 116

This Universal Micrometer should be used with optional interchangeable tips. It offers you the following benefits:

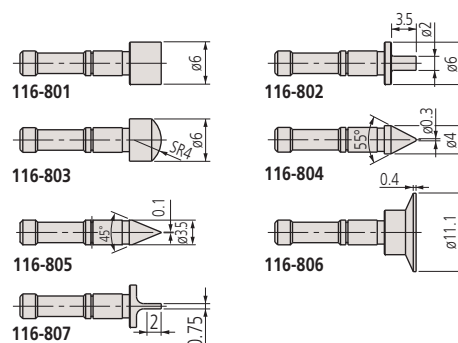
- Its non-rotating spindle accepts seven forms of optional interchangeable anvil/spindle tip (including flat, spline, spherical, point, knife-edge, disc, and blade) allowing you to use it in a wide range of applications.
- Optional anvils/spindle-tips for screw thread measurement (matching V and cone) are also available.



116-101

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Mass [g]
116-101	0-25	$\pm 4$	250
116-102	25-50	$\pm 4$	300



Optional interchangeable tips



Optional interchangeable tips

### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Measuring spindle	$\varnothing 8$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, plain and 60.0° thread, setting standard (from 25.0 mm upward), key Interchangeable anvils/spindle-tips not included

### Optional accessories

No.	Description
116-801	Measuring Tip, Flat
116-802	Measuring Tip, Spline
116-803	Measuring Tip, Spherical
116-804	Measuring Tip Point
116-805	Measuring Tip, Knife-edge
116-806	Measuring Tip, Disk
116-807	Measuring Tip Blade
116-800	Measuring Tip Set, 7 Pairs
116-830	Measuring Tip Thread Measurement Set, 6 Pairs

116-830 :  
0,4-0,5 mm/64-48TPI (116-831)  
0,6-0,9 mm/44-28TPI (116-832)  
1-1,75 mm/24-14TPI (116-833)  
2-3 mm/13-9TPI (116-834)  
3,5-5mm/8-5TPI (116-835)  
5,5-7mm/4,5-3,5TPI (116-836)

# Digimatic Screw Thread Micrometer with Interchangeable Tips

## Series 326

This Digimatic Screw Thread Micrometer should be used with optional, interchangeable, anvils/spindle-tips that allow you to measure a wide range of metric/unified and Whitworth screw-thread pitch diameters.



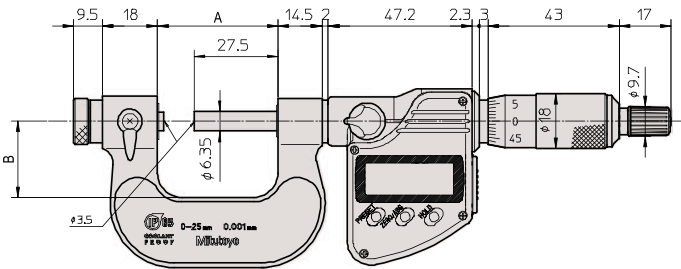
326-251-30 with optional accessories



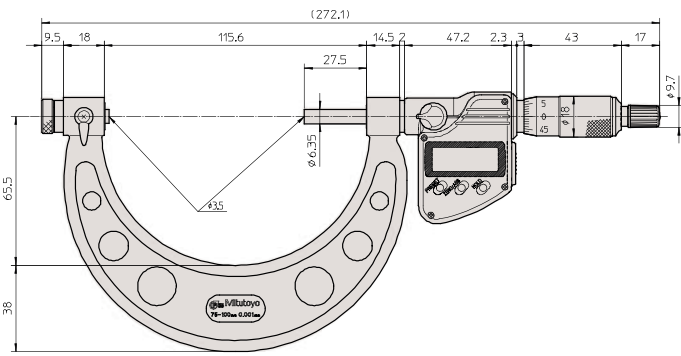
Interchangeable anvils/spindle tips in matching pairs

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	A [mm]	B [mm]	Mass [g]
326-251-30	0-25	$\pm 4$	39,5	25	350
326-252-30	25-50	$\pm 4$	64,5	32	380
326-253-30	50-75	$\pm 4$	90	45	470
326-254-30	75-100	$\pm 5$	115,6	65,5	510



0-75 mm



75-100 mm



Anvil/spindle-tip matching pair

Functions	Series 326
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, $\phi 18$ mm
Measuring spindle	With spindle lock, $\phi 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (60°) (from 25 mm upward), key, 1 battery Interchangeable anvils/spindle tips not included

### Standard accessories

No.	Description
167-261	Setting Standard Screw Thread Micrometer, 60°, Length: 25mm
167-262	Setting Standard Screw Thread Micrometer, 60°, Length: 50mm
167-263	Setting Standard Screw Thread Micrometer, 60°, Length: 75mm

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
167-272	Setting Standard Screw Thread Micrometer, 55°, Length: 25mm
167-273	Setting Standard Screw Thread Micrometer, 55°, Length: 50mm
167-274	Setting Standard Screw Thread Micrometer, 55°, Length: 75mm
167-275	Setting Standard Screw Thread Micrometer, 55°, Length: 100mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Screw Thread Micrometer with Interchangeable Tips

## Specifications

Accuracy	Refer to the list of specifications
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Graduation	0,01 mm
Measuring spindle	With spindle lock, $\varnothing 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standard (60°) (from 25 mm upward), key Interchangeable anvils/spindle tips not included

## Standard accessories

No.	Description
167-261	Setting Standard Screw Thread Micrometer, 60°, Length: 25mm
167-262	Setting Standard Screw Thread Micrometer, 60°, Length: 50mm
167-263	Setting Standard Screw Thread Micrometer, 60°, Length: 75mm
167-264	Setting Standard Screw Thread Micrometer, 60°, Length: 100mm
167-265	Setting Standard Screw Thread Micrometer, 60°, Length: 125mm
167-266	Setting Standard Screw Thread Micrometer, 60°, Length: 150mm
167-267	Setting Standard Screw Thread Micrometer, 60°, Length: 175mm
167-268	Setting Standard Screw Thread Micrometer, 60°, Length: 200mm
167-269	Setting Standard Screw Thread Micrometer, 60°, Length: 225mm
167-270	Setting Standard Screw Thread Micrometer, 60°, Length: 250mm
167-271	Setting Standard Screw Thread Micrometer, 60°, Length: 275mm

## Optional accessories

No.	Description
167-272	Setting Standard Screw Thread Micrometer, 55°, Length: 25mm
167-273	Setting Standard Screw Thread Micrometer, 55°, Length: 50mm
167-274	Setting Standard Screw Thread Micrometer, 55°, Length: 75mm
167-275	Setting Standard Screw Thread Micrometer, 55°, Length: 100mm
167-276	Setting Standard Screw Thread Micrometer, 55°, Length: 125mm
167-277	Setting Standard Screw Thread Micrometer, 55°, Length: 150mm
167-278	Setting Standard Screw Thread Micrometer, 55°, Length: 175mm
167-279	Setting Standard Screw Thread Micrometer, 55°, Length: 200mm
167-280	Setting Standard Screw Thread Micrometer, 55°, Length: 225mm

## Series 126

This Screw Thread Micrometer should be used with optional, interchangeable, anvils/spindle-tips that allow you to measure a wide range of metric/unified and Whitworth screw-thread pitch diameters.



126-125 with optional accessories

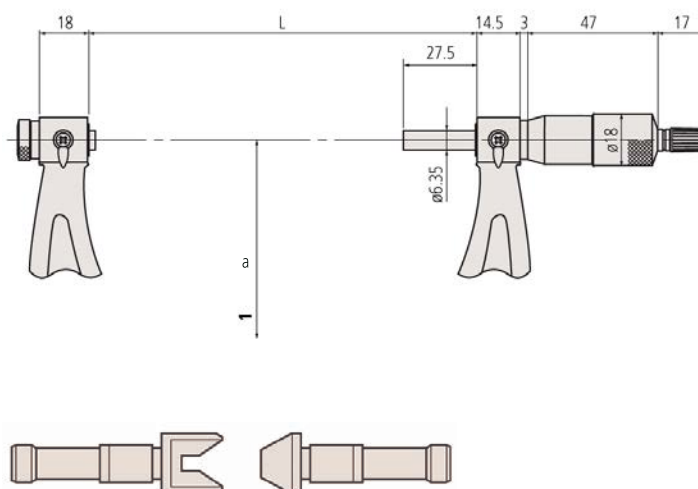


Interchangeable anvils/spindle tips in matching pairs

## Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	L [mm]	a [mm]	Mass [g]
126-125	0-25	$\pm 4$	39,5	25	240
126-126	25-50	$\pm 4$	64,5	32	290
126-127	50-75	$\pm 4$	90	45	390
126-128	75-100	$\pm 5$	115,6	65	450
126-129	100-125	$\pm 5$	140,6	79	530
126-130	125-150	$\pm 5$	165,6	93	620
126-131	150-175	$\pm 6$	190,5	105	730
126-132	175-200	$\pm 6$	214,5	120	860
126-133	200-225	$\pm 6$	240,5	131	1030
126-134	225-250	$\pm 7$	265,5	144	1200
126-135	250-275	$\pm 7$	290,5	156	1370
126-136	275-300	$\pm 7$	314,5	171	1540

mm



Anvil/spindle-tip matching pair



# Screw Thread Micrometer with Interchangeable Tips

## Series 126

Optional accessories anvils/spindle-tips



Individual measuring anvil/spindle-tip pairs

No.	Accuracy	Remarks	Metric pitch	UNF threads/inch	Whitworth threads/inch
126-801	±30'	M1 (U1)	0,4 - 0,5 mm	64 - 48 TPI	
126-802	±20'	M2 (U2)	0,6 - 0,9 mm	44 - 28 TPI	
126-803	±15'	M3 (U3)	1 - 1,75 mm	24 - 14 TPI	
126-804	±10'	M4 (U4)	2 - 3 mm	13 - 9 TPI	
126-805	±10'	M5 (U5)	3,5 - 5 mm	8 - 5 TPI	
126-806	±10'	M6 (U6)	5,5 - 7 mm	4,5 - 3,5 TPI	
126-811	±30'	W1			60 - 48 TPI
126-812	±30'	W2			48 - 40 TPI
126-813	±20'	W3			40 - 32 TPI
126-814	±20'	W4			32 - 24 TPI
126-815	±15'	W5			24 - 18 TPI
126-816	±15'	W6			18 - 14 TPI
126-817	±10'	W7			14 - 10 TPI
126-818	±10'	W8			10 - 7 TPI
126-819	±10'	W9			7 - 4,5 TPI
126-820	±10'	W10			4,5 - 3,5 TPI

Measuring anvil/spindle-tip set Metric UNF (consists of No. 126-801 to 126-806)

No.	Remarks
126-800	M1 to M6

Measuring anvil/spindle-tip set Whitworth (consists of No. 126-811 to 126-820)

No.	Remarks
126-810	W1 to W10

Ø	Thread pitch	Pitch
Nominal	P	Ø
		d2
M 1	0,25	0,838
M 1,2	0,25	1,038
M 1,4	0,30	1,205
M 1,7	0,35	1,473
M 2	0,40	1,740
M 2,3	0,40	2,040
M 2,6	0,45	2,308
M 3	0,50	2,675
M 3,5	0,60	3,110
M 4	0,70	3,545
M 5	0,80	4,480
M 6	1,00	5,350
M 8	1,25	7,188
M 10	1,50	9,026
M 12	1,75	10,863

Ø	Thread pitch	Pitch
Nominal	P	Ø
		d2
M 14	2,00	12,701
M 16	2,00	14,701
M 20	2,50	18,376
M 22	2,50	20,376
M 24	3,00	22,051
M 27	3,00	25,051
M 30	3,50	27,727
M 33	3,50	30,727
M 36	4,00	33,402
M 39	4,00	36,402
M 42	4,50	39,077
M 45	4,50	42,077
M 48	5,00	44,752
M 52	5,00	48,752
M 56	5,50	52,428
M 60	5,50	56,428

# Screw Thread Micrometer

## Series 125

This Screw Thread Micrometer has a fixed anvil, offering the following benefits:

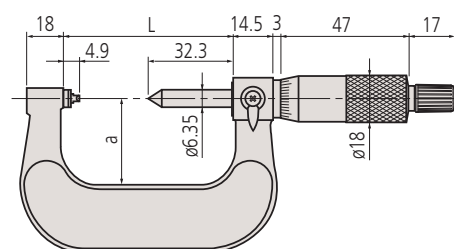
- Fixed anvil type.
- It directly indicates screw pitch diameter, meaning no need for calculation.



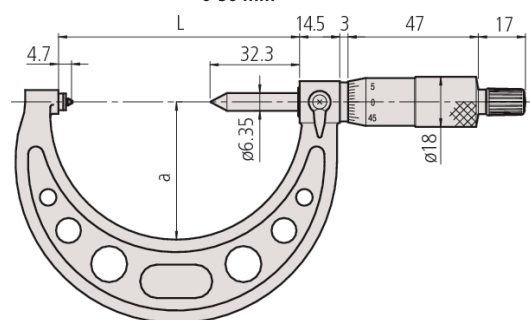
125-103

### Metric

No.	Range [mm]	Thread to be measured (Metric/Unified)	L [mm]	a [mm]	Mass [g]
125-101	0-25	0,4-0,5 mm / 64-48 TPI	37,2	25	200
125-102	0-25	0,6-0,9 mm / 44-28 TPI	37,2	25	200
125-103	0-25	1-1,75 mm / 24-14 TPI	37,2	25	200
125-104	0-25	2-3 mm / 13-9 TPI	37,2	25	200
125-105	0-25	3,5-5 mm / 8-5 TPI	37,2	25	200
125-106	25-50	0,4-0,5 mm / 64-48 TPI	62,2	32	250
125-107	25-50	0,6-0,9 mm / 44-28 TPI	62,2	32	250
125-108	25-50	1-1,75 mm / 24-14 TPI	62,2	32	250
125-109	25-50	2-3 mm / 13-9 TPI	62,2	32	250
125-110	25-50	3,5-5 mm / 8-5 TPI	62,2	32	250
125-111	50-75	0,6-0,9 mm / 44-28 TPI	87	49	260
125-112	50-75	1-1,75 mm / 24-14 TPI	87	49	260
125-113	50-75	2-3 mm / 13-9 TPI	87	49	260
125-114	50-75	3,5-5 mm / 8-5 TPI	87	49	260
125-115	50-75	5,5-7 mm / 4,5-3,5 TPI	87	49	260
125-116	75-100	0,6-0,9 mm / 44-28 TPI	112	63	330
125-117	75-100	1-1,75 mm / 24-14 TPI	112	63	330
125-118	75-100	2-3 mm / 13-9 TPI	112	63	330
125-119	75-100	3,5-5 mm / 8-5 TPI	112	63	330
125-120	75-100	5,5-7 mm / 4,5-3,5 TPI	112	63	330



0-50 mm



50-100 mm

# Digimatic Gear Tooth Micrometer

## Series 324

This Gear Tooth Micrometer has an interchangeable ball insert.

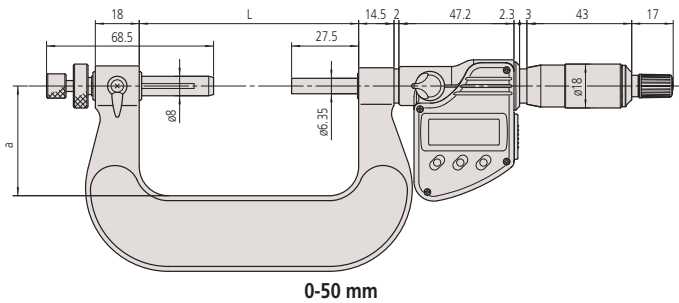
- Measuring the over-pin diameter of gears with precision.
- It has interchangeable ball inserts that allow you to measure modules sized between 0,5-5,25 mm.



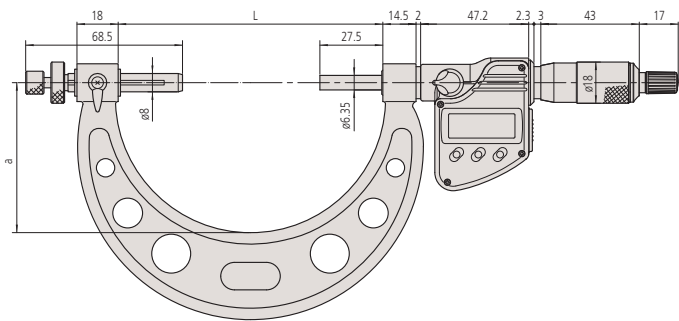
324-251-30 with optional accessories

### Metric Digital model

No.	Range [mm]	Accuracy [μm]	L [mm]	a [mm]	Mass [g]
324-251-30	0-25	±4	64,5	32	400
324-252-30	25-50	±4	90	45	490
324-253-30	50-75	±4	115,6	65,5	530
324-254-30	75-100	±5	140,6	79	600



0-50 mm



50-100 mm

Functions	Series 324
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
PRESET	●
HOLD	●

### Specifications

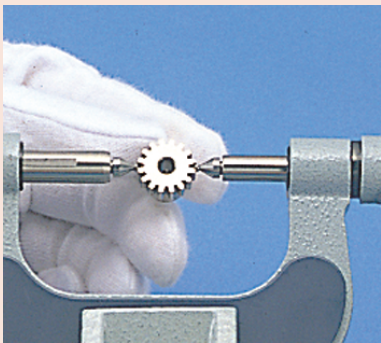
Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Digital step	0,001 mm
Measuring spindle	With spindle lock, ø6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery Interchangeable anvils/spindle tips not included

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



# Gear Tooth Micrometer

## Series 124



124-173 with optional accessories

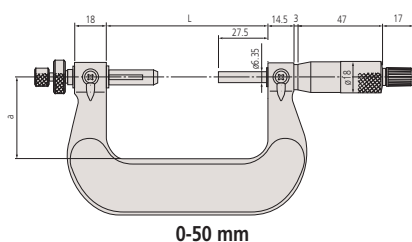
### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, Ø18 mm
Measuring spindle	With spindle lock, Ø6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standard (from 25 mm upward), key, interchangeable anvils/spindle tips not included

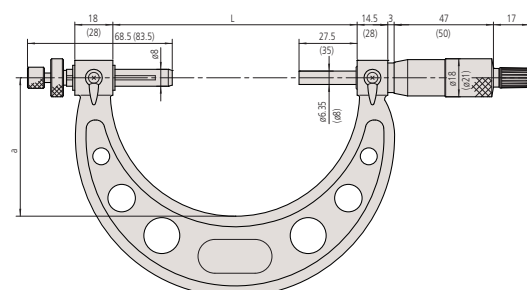
### Metric

#### Analogue model

No.	Range [mm]	Accuracy [µm]	L [mm]	a [mm]	Mass [g]
124-173	0-25	±4	64,5	32	295
124-174	25-50	±4	90	45	400
124-175	50-75	±4	115,6	65	460
124-176	75-100	±5	140,6	79	540
124-177	100-125	±5	165,6	93	640
124-178	125-150	±5	190,5	105	760
124-179	150-175	±6	214,5	120	900
124-180	175-200	±6	240,5	131	1060
124-181	200-225	±6	265,5	144	1230
124-182	225-250	±7	290,5	156	1430
124-183	250-275	±7	314,5	171	1620
124-195	275-300	±7	353	187	2070



0-50 mm

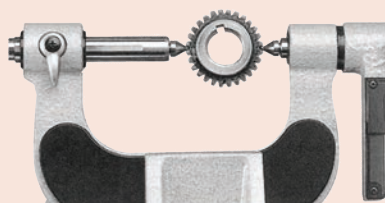


50-300 mm

## Interchangeable Ball Anvil/Spindle Tip Set

### Series 124/ 324

These optional interchangeable anvils allow you to measure the over-pin diameter of gears with precision.



### Metric

No.	Diameter	Remarks	Gear module	Dia. pitch
124-801	0,8 mm	carbide-tipped type	0,5-0,55	50
124-802	1 mm	carbide-tipped type	0,6-0,65	45
124-821	1,5 mm	carbide-tipped type	0,9-1	28-26
124-805	2 mm	carbide-tipped type	1,25	22
124-822	2,5 mm		1,5	17
124-807	3 mm		1,75	15
124-823	3,5 mm		2	13
124-810	4 mm		2,25	11
124-824	4,5 mm		2,5	10
124-812	5 mm		2,75	9
124-814	6 mm		3,5	7
124-816	7 mm		4	6,5
124-819	8 mm		4,75	5,5



# Digimatic Disc Micrometer

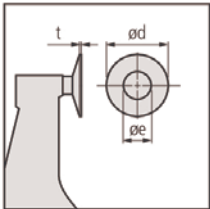
## Series 323

This Digimatic Disc Micrometer enables you to measure hard-to-reach features, offering you the following benefits:

- Measuring the root tangent length of spur and helical gears.
- You can measure recessed features that are difficult to reach with a standard micrometer.

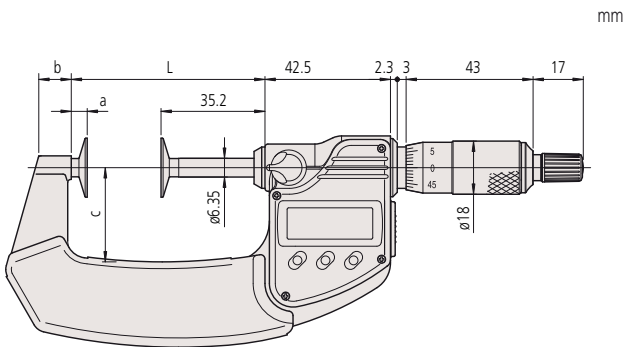


323-250-30

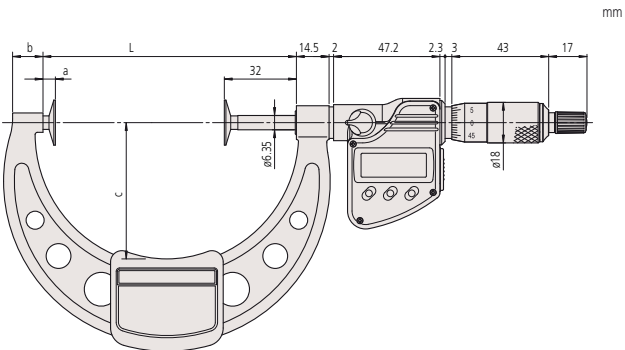


### Metric

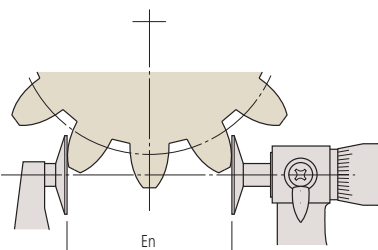
No.	Range [mm]	Accuracy [µm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	e [mm]	d [mm]	t [mm]	Mass [g]
323-250-30	0-25	±4	1 µm	4 µm	39,7	4,5	9,2	25	8	20	0,7	290
323-251-30	25-50	±4	1 µm	4 µm	65,6	5,4	11	31	8	20	0,7	355
323-252-30	50-75	±6	1 µm	6 µm	90,7	5,5	12,2	50	8	20	0,7	555
323-253-30	75-100	±6	1 µm	6 µm	112,5	5,5	13,5	60	8	20	0,7	610



0-75 mm



75-100 mm



Root tangent length of gear (En)

Functions	Series 323
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring spindle	With spindle lock, spindle pitch 0,5 mm
Measurable module	0,5-6
Measuring force	5-10 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

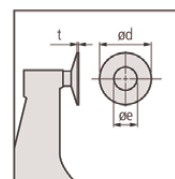


# Disc Micrometer

## Series 123

This Disc Micrometer enables you to measure hard-to-reach features, offering you the following benefits:

- Measuring the root tangent length of spur and helical gears.
- You can measure recessed features that are difficult to reach with a standard micrometer.



123-101

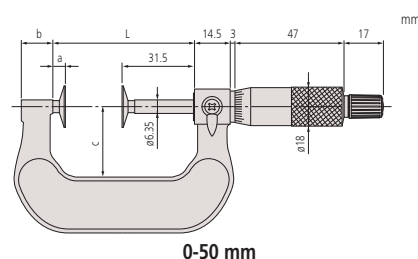
### Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	e [mm]	d [mm]	t [mm]	Mass [g]
123-101	0-25	±4	1 μm	4 μm	37,5	6	14	25	8	20	0,7	200
123-102	25-50	±4	1 μm	4 μm	62,5	6	14	32	8	20	0,7	250
123-103	50-75	±6	1 μm	6 μm	87	5,5	11	49	8	20	0,7	300
123-104	75-100	±6	1 μm	6 μm	112	5,5	11	63	8	20	0,7	375
123-105	100-125	±7	1,6 μm	(5+L/75) μm, L = max. range	137,5	6	12	79	12	30	1	520
123-106	125-150	±7	1,6 μm	(5+L/75) μm, L = max. range	162,5	6	15	94	12	30	1	570
123-107	150-175	±8	1,6 μm	(5+L/75) μm, L = max. range	187,5	6	16	106	12	30	1	730
123-108	175-200	±8	1,6 μm	(5+L/75) μm, L = max. range	212,5	6	15	118	12	30	1	890
123-109	200-225	±8	1,6 μm	(5+L/75) μm, L = max. range	237,5	6	14	130	12	30	1	1000
123-110	225-250	±9	1,6 μm	(5+L/75) μm, L = max. range	262,5	6	14	143	12	30	1	1200
123-111	250-275	±9	1,6 μm	(5+L/75) μm, L = max. range	287,5	6	15	156	12	30	1	1410
123-112	275-300	±9	1,6 μm	(5+L/75) μm, L = max. range	312,5	6	15	169	12	30	1	1680

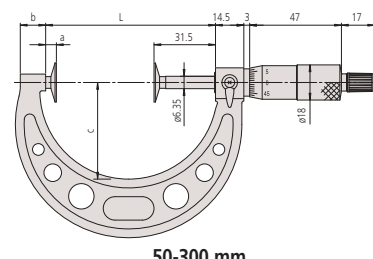
### Metric

disks have carbide tips

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	e [mm]	d [mm]	t [mm]	Mass [g]
123-113	0-25	±4	1 μm	4 μm	39,7	4,5	9,2	25	9,8	20	0,7	200
123-114	25-50	±4	1 μm	4 μm	65,6	5,4	11	31	9,8	20	0,7	250
123-115	50-75	±6	1 μm	6 μm	90,7	5,5	12,2	50	9,8	20	0,7	300
123-116	75-100	±6	1 μm	6 μm	112,5	5,5	13,5	60	9,8	20	0,7	375



0-50 mm



50-300 mm

# Digimatic Disc Micrometer Non-Rotating Spindle Type

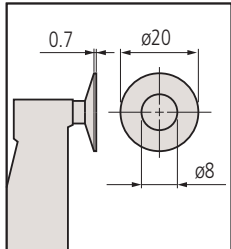
## Series 369

This Digimatic Disc Micrometer allows you to measure a range of different materials. It offers you the following benefits:

- Non-rotating spindle and disc-shaped measuring surfaces.
- Measuring the root tangent length of spur and helical gears
- Measurable range of gear pitch: 0,5-6 module
- Suitable for measuring felt, rubber, cardboard, fabric etc.

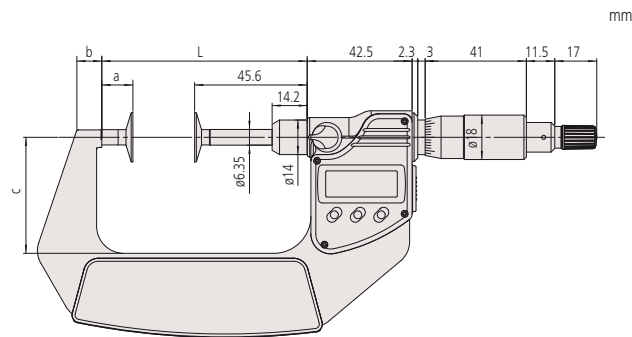


369-250-30

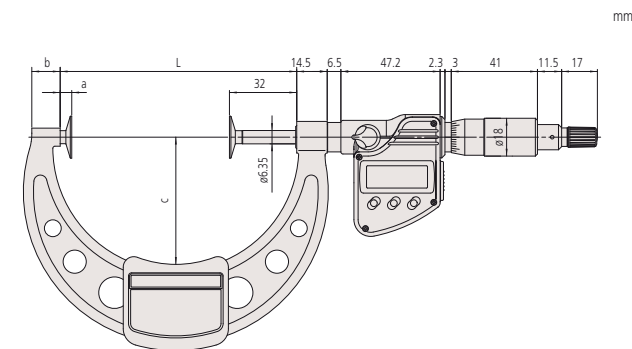


### Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
369-250-30	0-25	±4	1 μm	4 μm	58,5	12,9	7	32	340
369-251-30	25-50	±4	1 μm	4 μm	83,5	12,9	9,8	47	480
369-252-30	50-75	±6	1 μm	6 μm	108,5	12,9	11,2	60	635
369-253-30	75-100	±6	1 μm	6 μm	112,5	5,5	13,5	60	775



0-75 mm



75-100 mm

Functions	Series 369
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring spindle	With spindle lock, spindle pitch 0,5 mm
Measurable module	0,5-6
Measuring force	3-8 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



# ABSOLUTE Digimatic Disc Micrometer Quickmike

ABSOLUTE®

IP65

369-411-20  
369-412-20

Functions	Series 369 and Series 227
ORIGIN	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●
HOLD	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Measuring surfaces	Hardened steel, micro-lap finish
Measuring spindle	Non-rotating, 10 mm pitch
Measurable module	0,5-6 0,4-3 Series 227
Measuring force	3-8 N
Battery life	Approx. 5 years under normal use
Display	LCD, character height 10 mm
Delivered	Including box, setting standard (from 25 mm upward), 1 battery

## Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



Adjustable Measuring Force  
227-221-20  
227-223-20

(1) Only valid for instrument orientation within  $\pm 3$  degrees of horizontal when measuring.

## Series 369 and Series 227

The ABSOLUTE Digimatic Disc Micrometer Quickmike allows you to measure with a fast spindle feed of 10 mm/rev. It offers you the following benefits:

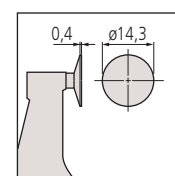
- Suitable for measuring felt, rubber, cardboard, fabric etc.
- Suitable to measure "root tangent length" of spur gears and helical gears.
- With a non-rotating spindle and disc-shaped measuring surface.
- Measuring force is adjustable for various kinds of workpieces (series 227)



369-411-20



227-221-20



Series 227 without recess

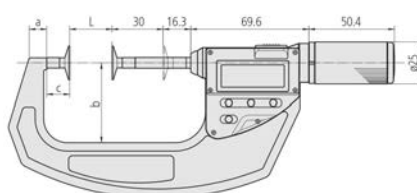
## Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
369-411-20	0-30	$\pm 4$	1 $\mu$ m	4 $\mu$ m	0	8,5	36	13,5	360
369-412-20	25-55	$\pm 4$	1 $\mu$ m	4 $\mu$ m	25	10,3	47	13,5	490

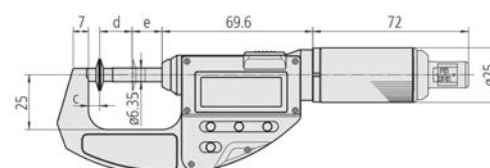
## Metric

Quickmike type with adjustable measuring force

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	c [mm]	d [mm]	e [mm]	Measuring force settings <sup>(1)</sup> [N]	Measuring force accuracy <sup>(1)</sup> [N]	Mass [g]
227-221-20	0-15	$\pm 4$	1 $\mu$ m	3 $\mu$ m	5,2	15	13,8	0,5; 1; 1,5; 2; 2,5	$\pm 0,1$ + (for setting/10)	300
227-223-20	0-10	$\pm 4$	1 $\mu$ m	3 $\mu$ m	5,2	10	18,8	2; 4; 6; 8; 10	$\pm 0,4$ + (for setting/10)	340



369-411-20, 369-412-20



227-221-20, 227-223-20

# Disc Micrometer Non-Rotating Spindle Type

## Series 169

This Disc Micrometer has a non-rotating spindle and allows you measure a range of different materials.

It offers you the following benefits:

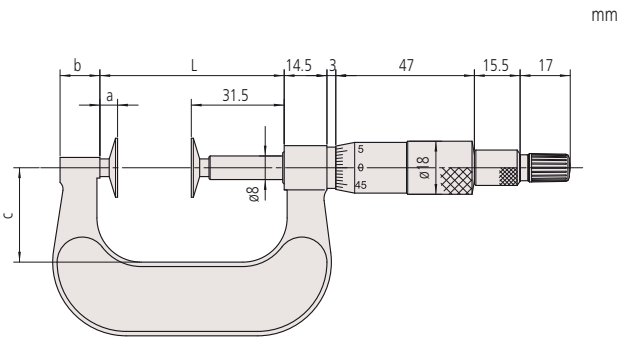
- It features a non-rotating spindle and disc-shaped measuring surfaces.
- Measuring the root tangent length of spur and helical gears
- Measurable range of gear pitch: 0,5-6 module
- It's suitable for measuring materials such as felt, rubber, cardboard and fabric.



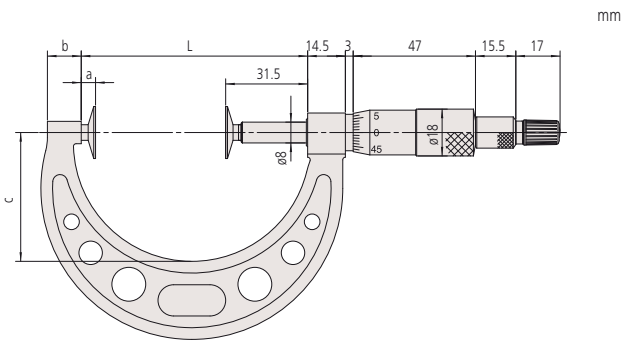
169-201

### Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
169-101	0-25	±4	1 μm	3 μm	37,5	6	13,5	25	230
169-201	0-25	±4	1 μm	4 μm	37,5	6	13,5	25	230
169-202	25-50	±4	1 μm	4 μm	62,5	6	13,5	32	280
169-205	50-75	±6	1 μm	6 μm	87	5,5	13	49	315
169-207	75-100	±6	1 μm	6 μm	112	5,5	13	63	400



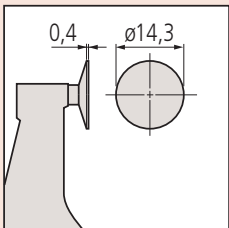
0-50 mm



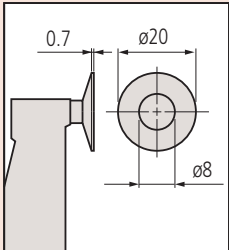
50-100 mm

### Specifications

Accuracy	Refer to the list of specifications.
Graduation	0,01mm
Scale	Thimble and sleeve satin chrome finish, ø 18 mm
Measuring spindle	ø 8 mm, spindle pitch 0,5 mm
Measuring force	8,02 N ± 0,8 N (169-101) 5-10 N
Delivered	Including box, setting standard (from 25 mm upward), key



169-101 no central recess



With annular measuring surfaces



# Digimatic Spline Micrometer



Functions	Series 331
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

## Specifications

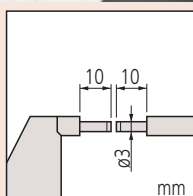
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, $\phi 18$ mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, $\phi 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

## Optional accessories

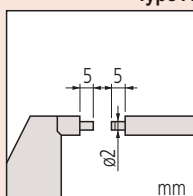
No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



Type A



Type B

## Series 331

This digimatic spline micrometer makes it easy for you to measure grooves and shaped parts. It offers you the following benefits:

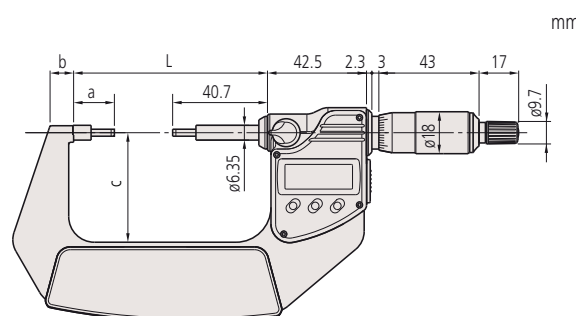
- Outstanding accuracy and oil-resistant material used for all plastic parts (IP65)
- Anvil and spindle are of small diameter for measuring splined shafts, slots and keyways.
- Excellent resistance against water and dust (IP65 protection level) enables this micrometer to be used in machining situations that include splashing coolant fluid.



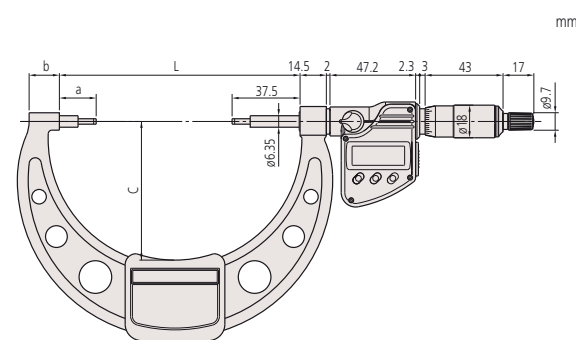
331-251-30

## Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Anvil/ Tip	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
331-251-30	0-25	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	A	58,2	17,5	7,3	32	330
331-261-30	0-25	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	B	58,2	17,5	7,3	32	330
331-252-30	25-50	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	A	83,2	17,5	10,1	47	470
331-262-30	25-50	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	B	83,2	17,5	10,1	47	470
331-253-30	50-75	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	A	108,2	17,5	11,5	60	625
331-263-30	50-75	$\pm 2$	0,3 $\mu$ m	2 $\mu$ m	B	108,2	17,5	11,5	60	625
331-254-30	75-100	$\pm 3$	0,3 $\mu$ m	3 $\mu$ m	A	132,8	20,3	16,7	76	565
331-264-30	75-100	$\pm 3$	0,3 $\mu$ m	3 $\mu$ m	B	132,8	20,3	16,7	76	565



0-75 mm



75-100 mm

# Spline Micrometer

## Series 111

This Spline Micrometer makes it easy for you to measure grooves and shaped parts. It offers you the following benefits:

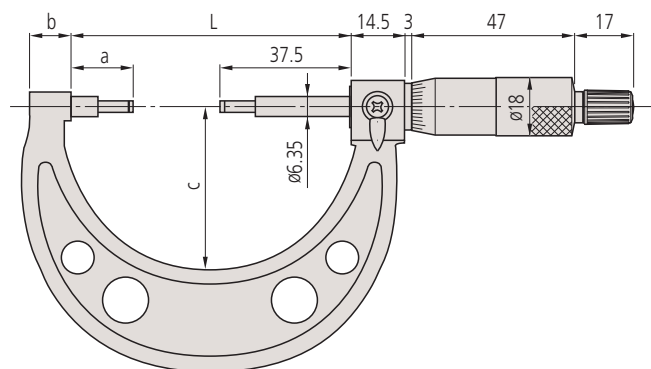
- Stepped measuring surfaces.
- Suitable for measuring grooves, splined shafts, recesses, shaped parts, etc.



111-115

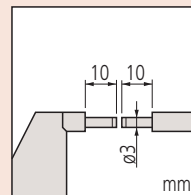
### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Anvil/ Tip	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
111-115	0-25	$\pm 3$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	54,5	17,5	10	38	205
111-215	0-25	$\pm 3$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	B	54,5	17,8	10	38	205
111-116	25-50	$\pm 3$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	79,5	17,8	12	49	305
111-117	50-75	$\pm 3$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	104,5	17,8	14	60	370
111-118	75-100	$\pm 4$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	132,3	20,3	16,7	79	500
111-119	100-125	$\pm 4$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	157,7	20,7	18,8	94	655
111-120	125-150	$\pm 4$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	183,1	21,1	19,1	106	710
111-121	150-175	$\pm 5$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	208,3	21,3	18,2	118	900
111-122	175-200	$\pm 5$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	233,7	21,7	16,8	130	1040
111-123	200-225	$\pm 5$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	257,5	20,5	18	143	1245
111-124	225-250	$\pm 6$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	283,5	21,5	18	156	1395
111-125	250-275	$\pm 6$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	308,5	21,5	18	169	1555
111-126	275-300	$\pm 6$	0,3 $\mu$ m	(2+L/100) $\mu$ m, L = max. range	A	333,5	21,5	18	181	1975

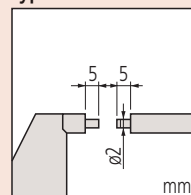


## Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish $\varnothing 18$ mm
Measuring surfaces	carbide-tipped, micro-lap finish, stepped
Measuring spindle	With spindle lock, $\varnothing 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standard (from 25 mm upward), key



Type A



Type B

# Digimatic Tube Micrometer

## Series 395

This Digimatic Tube Micrometer allows you to measure curved surfaces such as the wall thickness of tubes, bearings and rings.



395-251-30

### Metric

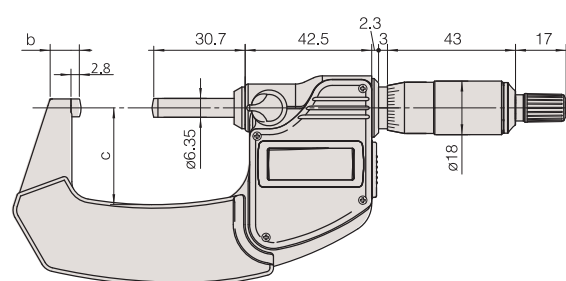
Model with spherical anvil

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Anvil/ Tip	D [mm]	b [mm]	c [mm]	Mass [g]
395-251-30	0-25	$\pm 2$	0,3 $\mu$ m	Type A	15	9	25	270
395-252-30	25-50	$\pm 2$	0,3 $\mu$ m	Type A	15	9,8	32	330
395-253-30	50-75	$\pm 2$	0,3 $\mu$ m	Type A	19	12,6	47	470
395-254-30	75-100	$\pm 3$	0,3 $\mu$ m	Type A	20	14	60	625

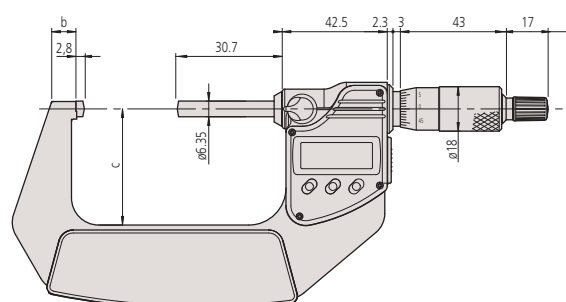
### Metric

Model with spherical anvil and spindle

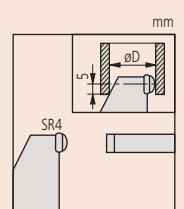
No.	Range [mm]	Accuracy [ $\mu$ m]	Anvil/ Tip	D [mm]	b [mm]	c [mm]	Mass [g]
395-271-30	0-25	$\pm 2$	Type B	15	9	25	270
395-272-30	25-50	$\pm 2$	Type B	15	9,8	32	330
395-273-30	50-75	$\pm 2$	Type B	19	12,6	32	470
395-274-30	75-100	$\pm 3$	Type B	20	14	60	625



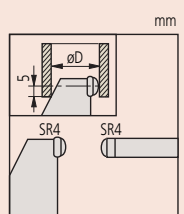
0-50 mm



50-100 mm



Type A



Type B

Functions	Series 395
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	With spindle lock, ø 6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Digimatic Tube Micrometer

## Series 395

This Digimatic Tube Micrometer allows you to measure curved surfaces such as the wall thickness of tubes, bearings and rings.



395-261-30



395-262-30



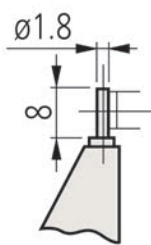
395-263-30



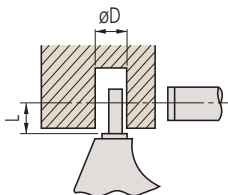
395-264-30

### Metric

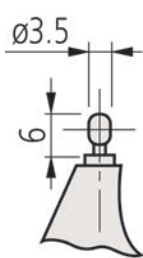
No.	Range [mm]	Accuracy [μm]	Flatness	Anvil/ Tip	L [mm]	D [mm]	Mass [g]
395-261-30	0-25	±3	0,3 μm	Type A	4	2	270
395-262-30	0-25	±3	0,3 μm	Type B	4	3,6	270
395-263-30	0-25	±3	0,3 μm	Type C	12	4,8	310
395-264-30	0-25	±3	0,3 μm	Type D	22	8,2	310



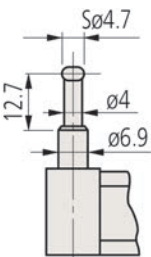
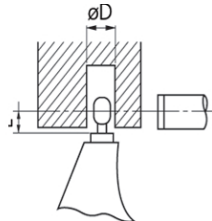
Type A



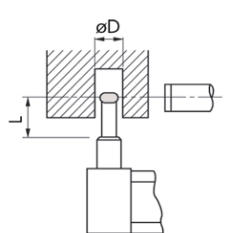
Type B



Type D



Type C



Functions	Series 395
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide tipped, micro-lap finish (spindle) anvil: hardened steel
Measuring spindle	with spindle lock, ø6,35 mm, spindle pitch 0,5 mm
Measuring force	3-8 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

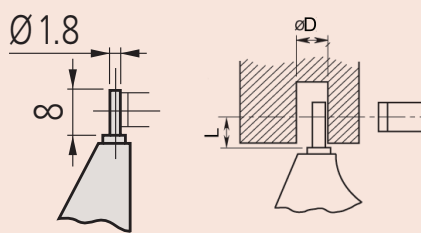
### Consumable spares

No.	Description
938882	Battery SR44 1.5V

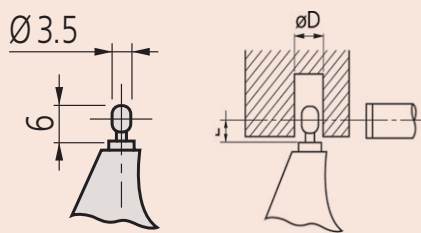


## Specifications

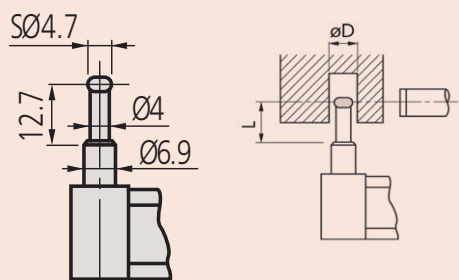
Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Measuring surfaces	Spindle and anvil: carbide-tipped, micro-lap finish (115-1xx, 115-2xx) spindle: carbide tipped anvil: hardened steel (115-3xx)
Measuring spindle	With spindle lock, $\varnothing 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N (Type E, F) 3-8 N (Type A, B, C, D)
Delivered	Including box, setting standard (from 25 mm upward), key



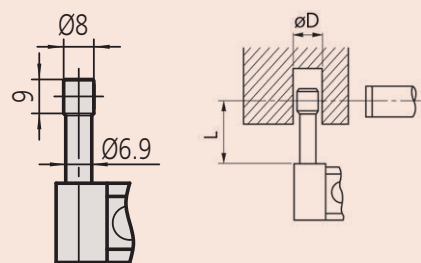
Type A



Type B



Type C



Type D

# Tube Micrometer

## Series 115

This Tube Micrometer allows you to measure curved surfaces such as the wall thickness of tubes, bearings and rings.



115-215

## Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Remarks	L [mm]	D [mm]	Mass [g]
115-302	0-25	$\pm 3$	0,6 $\mu$ m	Type A	4	2	180
115-308	0-25	$\pm 3$	0,6 $\mu$ m	Type B	4	3,6	180
115-315	0-25	$\pm 3$	0,6 $\mu$ m	Type C	12	4,8	180
115-316	0-25	$\pm 3$	0,6 $\mu$ m	Type D	22	8,2	180
115-303	25-50	$\pm 3$	0,6 $\mu$ m	Type A	4	2	240
115-309	25-50	$\pm 3$	0,6 $\mu$ m	Type B	4	3,6	240

## Metric

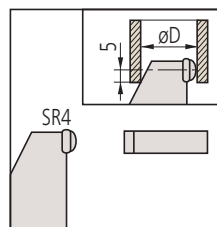
Model with spherical anvil

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Remarks	D [mm]	Mass [g]
115-115	0-25	$\pm 3$	0,6 $\mu$ m	Type E	10	180
115-116	25-50	$\pm 3$	0,6 $\mu$ m	Type E	11	240
115-117	50-75	$\pm 3$	0,6 $\mu$ m	Type E	17	315
115-118	75-100	$\pm 4$	0,6 $\mu$ m	Type E	18	375

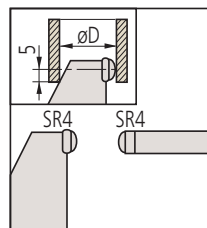
## Metric

Model with spherical anvil and spindle face

No.	Range [mm]	Accuracy [ $\mu$ m]	Remarks	D [mm]	Mass [g]
115-215	0-25	$\pm 3$	Type F	10	180
115-216	25-50	$\pm 3$	Type F	11	240
115-217	50-75	$\pm 3$	Type F	17	315
115-218	75-100	$\pm 4$	Type F	18	375



Type E



Type F



# Digimatic Point Micrometer

## Series 342

This Digimatic Point Micrometer features a pointed anvil and spindle, and offers the following benefits:

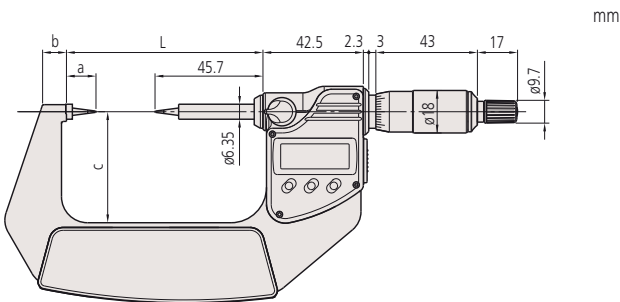
- Its pointed anvil and spindle has a choice of included angle, ending in small-radius contact points.
- You can use it to measure grooves, steps and similar.



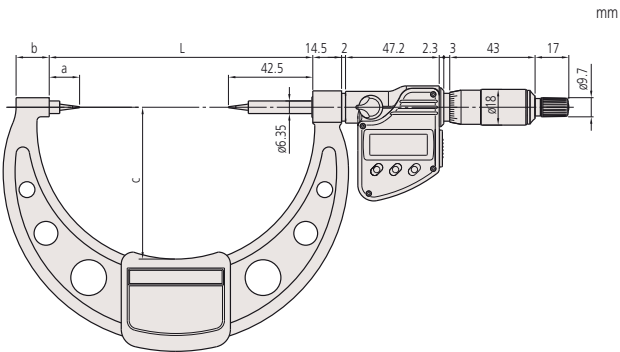
342-251-30

### Metric

No.	Range [mm]	Accuracy [μm]	L [mm]	a [mm]	b [mm]	c [mm]	Point	Mass [g]
342-251-30	0-25	±2	58,2	12,5	7,3	32	15°	330
342-261-30	0-25	±2	58,2	12,5	7,3	32	30°	330
342-252-30	25-50	±2	83,2	12,5	10,1	47	15°	470
342-262-30	25-50	±2	83,2	12,5	10,1	47	30°	470
342-253-30	50-75	±2	108,2	12,5	11,5	60	15°	625
342-263-30	50-75	±2	108,2	12,5	11,5	60	30°	625
342-254-30	75-100	±3	132,8	15,3	16,7	76	15°	565
342-264-30	75-100	±3	132,8	15,3	16,7	76	30°	565



0-75 mm



75-100 mm

Functions	Series 342
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●

### Specifications

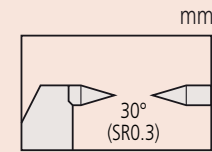
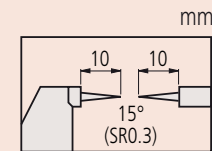
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide tipped and conical spindle and anvil, measuring point radius 0,3 mm
Measuring spindle	with spindle lock, ø 6,35 mm, spindle pitch 0,5 mm
Measuring force	3-8 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



# Point Micrometer

## Series 112

This Point Micrometer features a pointed anvil and spindle, and offers the following benefits:

- Its pointed anvil and spindle has a choice of included angle, ending in small-radius contact points.
- You can use it to measure grooves, steps and similar.



112-201

### Metric

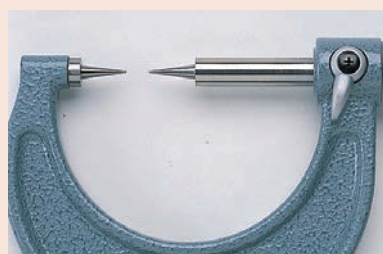
#### Carbide tip

No.	Range [mm]	Accuracy [ $\mu$ m]	Point	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
112-165	0-25	$\pm 3$	15°	55,3	12,8	10	38	205
112-213	0-25	$\pm 3$	30°	55,3	12,8	10	38	205
112-166	25-50	$\pm 3$	15°	80,3	12,8	12	49	305
112-214	25-50	$\pm 3$	30°	80,3	12,8	12	49	305
112-167	50-75	$\pm 3$	15°	105,3	12,8	14	60	370
112-215	50-75	$\pm 3$	30°	105,3	12,8	14	60	370
112-168	75-100	$\pm 4$	15°	132,8	15,3	17	79	500
112-216	75-100	$\pm 4$	30°	132,8	15,3	17	79	500

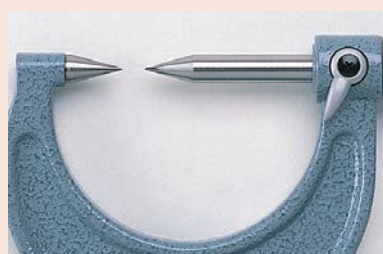
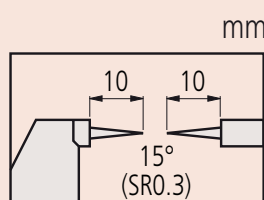
### Metric

#### Hardened steel tip

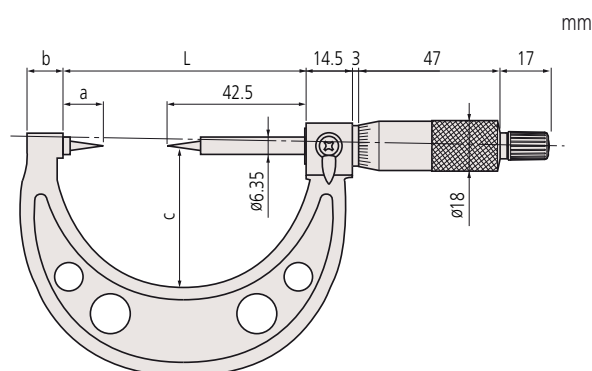
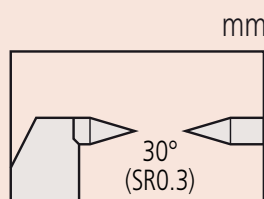
No.	Range [mm]	Accuracy [ $\mu$ m]	Point	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
112-153	0-25	$\pm 3$	15°	55,3	12,8	10	38	205
112-201	0-25	$\pm 3$	30°	55,3	12,8	10	38	205
112-154	25-50	$\pm 3$	15°	80,3	12,8	12	49	305
112-202	25-50	$\pm 3$	30°	80,3	12,8	12	49	305
112-155	50-75	$\pm 3$	15°	105,3	12,8	14	60	370
112-203	50-75	$\pm 3$	30°	105,3	12,8	14	60	370
112-156	75-100	$\pm 4$	15°	132,8	15,3	17	79	500
112-204	75-100	$\pm 4$	30°	132,8	15,3	17	79	500



Type angle : 15°



Type angle : 30°



## Crimp Height Micrometer

## Series 342/ Series 112

This crimp height micrometer that features a flat anvil and pointed spindle offers you the following benefits:

- It allows you to measure the crimped height of electrical contacts.
- Outstanding accuracy and oil-resistant material used for all plastic parts
- Excellent resistance against water and dust enables this micrometer to be used in machining situations that include splashing coolant fluid.



112-401



342-271-30

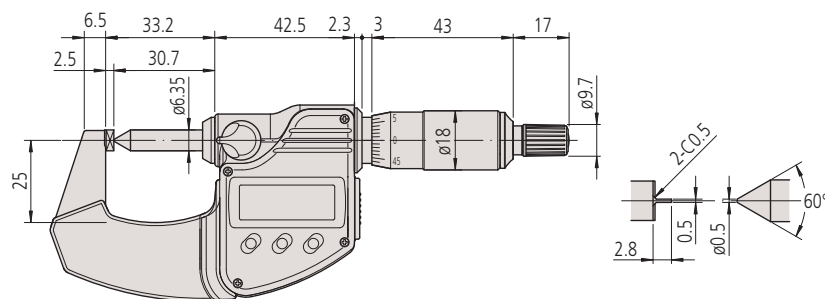


342-451-20

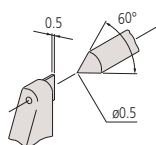
Metric		Analog model	
No.	Range [mm]	Accuracy [μm]	Mass [g]
112-401	0-25	±3	165

Metric		Digital model	
No.	Range [mm]	Accuracy [ $\mu$ m]	Mass [g]
342-271-30	0-25	$\pm 3$	270

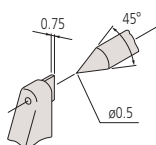
Metric		Quickmike	
No.	Range [mm]	Accuracy [μm]	Mass [g]
342-451-20	0-15	±3	270



342-271-30















342-271-30  
112-401



342-451-20



**ABSOLUTE®**  
342-451-20

	Series 342/ Series 112	
	342-271-30	342-451-20
<b>Functions</b>		
ORIGIN		
ZERO/ABS		
ON/OFF		
Auto Power OFF after 20 min. non use		
Low voltage alarm		
Function lock		
Data output		
HOLD		

## Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Digital step	0,001 mm
Measuring force	3-8 N 4-6 (342-451-20) N
Scale	Thimble and sleeve satin chrome finish, ø 18 mm (342-271-30, 112-401)
Measuring surfaces	Hardened and precision ground
Measuring spindle	With spindle lock, ø 6,35 mm, spindle pitch 0,5 mm (342-271-30, 112-401) without spindle lock ø 6,35 mm, spindle pitch 10 mm (342-451-20)
Battery life	Appr. 2,4 years (342-271-30), 5 years under normal use (342-451-20)
Delivered	Including box, 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

02AZD880G, 02AZD730G, 02AZD790B  
Wireless Sytem for 342-451-20



# Digimatic Blade Micrometer

## Series 422

This digimatic blade micrometer is designed to help you measure hard-to-reach features. It offers the following benefits:

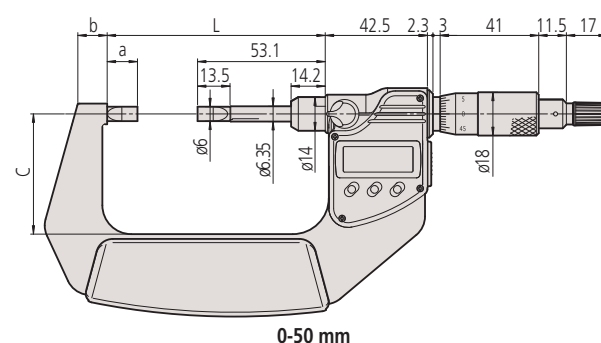
- Blade-shaped anvil and spindle for measuring the groove diameter of shafts, keyways and other hard-to reach features
- Non-rotating spindle



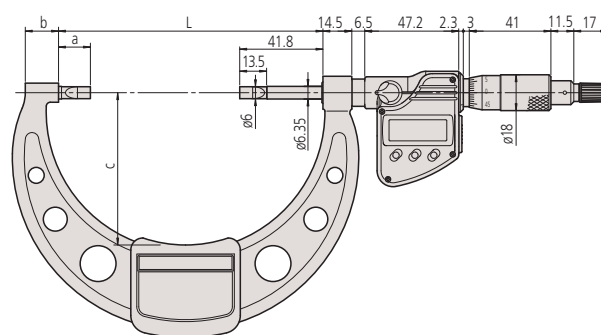
422-230-30

## Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Anvil/ Tip	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
422-230-30	0-25	$\pm 3$	Type A	3 $\mu$ m	65,6	12,5	11	31	365
422-260-30	0-25	$\pm 3$	Type B	3 $\mu$ m	65,6	12,5	11	31	365
422-270-30	0-25	$\pm 3$	Type C	3 $\mu$ m	65,6	12,5	11	31	365
422-271-30	0-25	$\pm 3$	Type D	3 $\mu$ m	65,6	12,5	11	31	365
422-231-30	25-50	$\pm 3$	Type A	3 $\mu$ m	90,7	12,6	12,2	50	565
422-261-30	25-50	$\pm 3$	Type B	3 $\mu$ m	90,7	12,6	12,2	50	565
422-232-30	50-75	$\pm 3$	Type A	3 $\mu$ m	105,3	13,5	14,1	57	465
422-233-30	75-100	$\pm 4$	Type A	4 $\mu$ m	132,8	16	16,7	76	580



0-50 mm



50-100 mm

Functions	Series 422
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

## Specifications

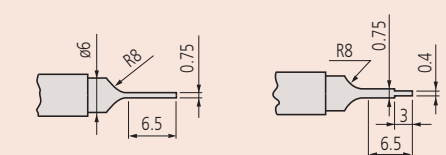
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, $\phi$ 18 mm
Measuring spindle	With spindle lock, $\phi$ 6,35 mm, spindle pitch 0,5 mm
Measuring force	3-8 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery

## Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

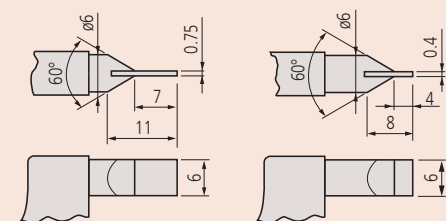
## Consumable spares

No.	Description
938882	Battery SR44 1.5V



Type A (hardened steel)

Type B (hardened steel)



Type C (carbide-tipped)

Type D (carbide-tipped)

# ABSOLUTE Digimatic Blade Micrometer Quickmike

## Series 422

This ABSOLUTE digimatic blade micrometer Quickmike is designed to help you measure hard-to-reach features. It offers the following benefits:

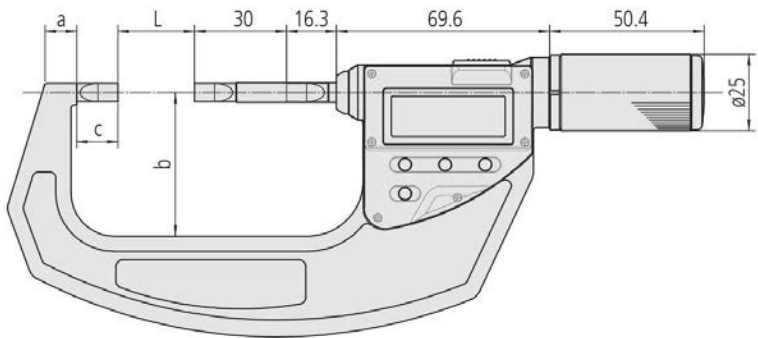
- Blade-shaped anvil and spindle for measuring the groove diameter of shafts, key-ways and other hard-to reach features
- Non-rotating spindle
- Fast spindle feed of 10 mm / revolution



422-411-20

### Metric

No.	Range [mm]	Accuracy [μm]	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
422-411-20	0-30	± 3	3 μm	0	8,5	36	13,5	350
422-412-20	25-55	± 3	3 μm	25	10,3	47	13,5	490



Functions	Series 422
ORIGIN	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●
HOLD	●

### Specifications

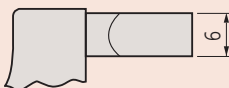
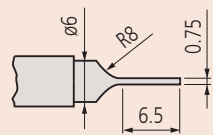
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Measuring spindle	ø6,35 mm, spindle pitch 10 mm
Battery life	approx. 5 years under normal use
Display	LCD, character height 10 mm
Delivered	Including box, setting standard (from 25 mm upward), 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



Type A (hardened steel)



# Blade Micrometer

## Series 122

This Blade Micrometer is designed to help you measure hard-to-reach features. It offers the following benefits:

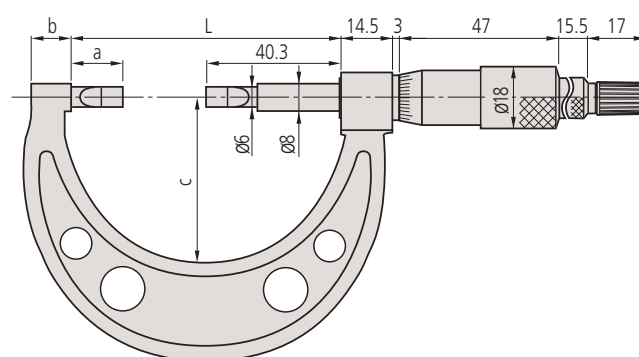
- Blade-shaped anvil and spindle for measuring the groove diameter of shafts, keyways, and other hard-to reach features.
- Non-rotating spindle.



122-101

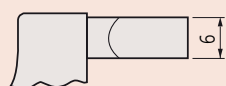
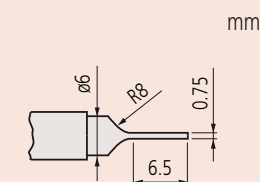
### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Anvil/ Tip	Parallelism	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
122-101	0-25	$\pm 3$	A	3 $\mu$ m	55,3	15	8	30	260
122-111	0-25	$\pm 3$	B	3 $\mu$ m	55,3	15	8	30	260
122-161	0-25	$\pm 3$	C	3 $\mu$ m	55,3	15	8	30	275
122-141	0-25	$\pm 3$	D	3 $\mu$ m	55,3	15	8	30	275
122-102	25-50	$\pm 3$	A	3 $\mu$ m	80,3	15	12	49	300
122-112	25-50	$\pm 3$	B	3 $\mu$ m	80,3	15	12	49	300
122-162	25-50	$\pm 3$	C	3 $\mu$ m	80,3	15	12	49	315
122-142	25-50	$\pm 3$	D	3 $\mu$ m	80,3	15	12	49	315
122-103	50-75	$\pm 3$	A	3 $\mu$ m	105,3	15	13	60	360
122-104	75-100	$\pm 4$	A	4 $\mu$ m	132,8	17,5	17	79	525
122-105	100-125	$\pm 4$	A	4 $\mu$ m	158,2	17,9	19	94	670
122-106	125-150	$\pm 4$	A	4 $\mu$ m	183,6	18,3	20	106	775
122-107	150-175	$\pm 5$	A	5 $\mu$ m	208,8	18,5	19	118	950
122-108	175-200	$\pm 5$	A	5 $\mu$ m	234,2	18,9	19	118	1140
122-109	200-225	$\pm 5$	A	5 $\mu$ m	258	17,7	18	143	1300
122-110	225-250	$\pm 6$	A	6 $\mu$ m	284	18,7	18	156	1450
122-115	250-275	$\pm 6$	A	6 $\mu$ m	309	18,7	18	169	1600
122-116	275-300	$\pm 6$	A	6 $\mu$ m	334	18,7	18	181	2020

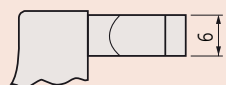
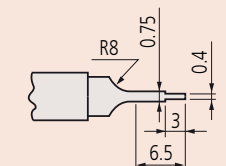


### Specifications

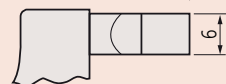
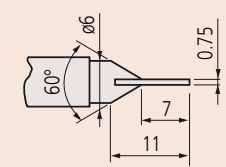
Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\phi 18$ mm
Measuring spindle	$\phi 8$ mm, spindle pitch 0,5 mm
Measuring force	3-8 N
Delivered	Including box, setting standard (from 25 mm upward), key



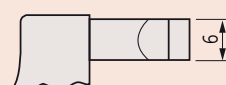
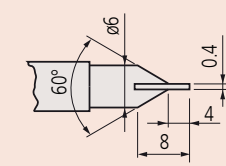
Type A  
(hardened steel)



Type B  
(hardened steel)



Type C (carbide-tipped)



Type D (carbide-tipped)



# V-Anvil Micrometer

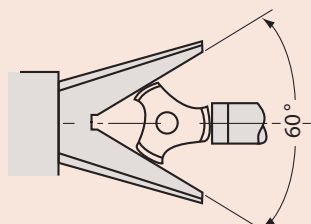
## Series 114

This V-Anvil Micrometer helps you measure cutting tools and taps. It offers the following benefits:

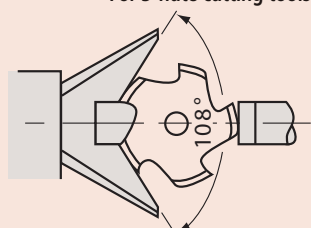
- It measures the outside diameter of cutting tools (such as taps, reamers, end mills) which have three or five flutes.
- V-anvils with a centreline groove are available for measuring the pitch diameter of taps by the single-wire method.

### Specifications

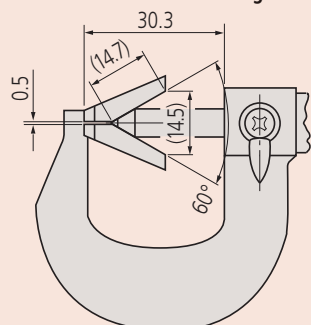
Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Measuring surfaces	Prism angle $60^\circ/108^\circ$
Measuring spindle	With spindle lock, $\varnothing 6,35$ mm, spindle pitch 0,75 mm
Measuring force	5-10 N
Delivered	Including box, setting standard, key



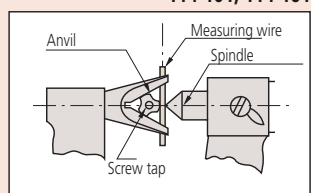
For 3-flute cutting tools



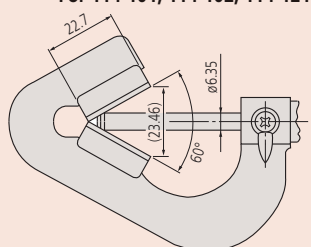
For 5-flute cutting tools



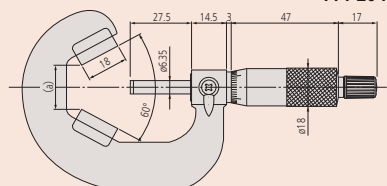
114-101, 114-161



For 114-101, 114-102, 114-121



114-204



114-102 to 114-110



114-102



114-121

### Metric

For 3-flute cutting tools ( $60^\circ$ )

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Remarks	Setting standard	a [mm]	Mass [g]
114-101	1-15	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	with groove	167-327 $\varnothing$ 5 mm	0,5	120
114-161	1-15	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-327 $\varnothing$ 5 mm	0,5	120
114-204	2,3-25	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-327 $\varnothing$ 5 mm	0,5	290
114-102	10-25	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	with groove	167-328 $\varnothing$ 10 mm	6,2	280
114-162	10-25	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-328 $\varnothing$ 10 mm	6,2	280
114-103	25-40	$\pm 5$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-329 $\varnothing$ 25 mm	19,14	400
114-104	40-55	$\pm 6$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-330 $\varnothing$ 40 mm	32,13	465
114-105	55-70	$\pm 6$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-331 $\varnothing$ 55 mm	45,12	675
114-106	70-85	$\pm 7$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-332 $\varnothing$ 70 mm	58,11	910
114-107	85-100	$\pm 7$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-333 $\varnothing$ 85 mm	71,1	1160
114-108	100-115	$\pm 8$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-334 $\varnothing$ 100 mm	84,1	1480
114-109	115-130	$\pm 8$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-335 $\varnothing$ 115 mm	97,09	2080
114-110	130-145	$\pm 9$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-336 $\varnothing$ 130 mm	110,1	2880

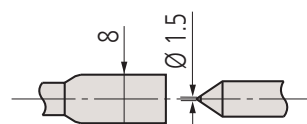
114-204, 114-137: carbide-tipped anvil and spindle  
others: carbide tipped spindle

### Metric

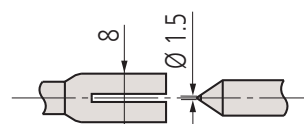
For 5-flute cutting tools ( $108^\circ$ )

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Remarks	Setting standard	Mass [g]
114-121	5-25	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	with groove	167-327 $\varnothing$ 5 mm	255
114-165	5-25	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-327 $\varnothing$ 5 mm	255
114-137	2,3-25	$\pm 4$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-327 $\varnothing$ 5 mm	220
114-122	25-45	$\pm 5$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-329 $\varnothing$ 25 mm	400
114-123	45-65	$\pm 6$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-331 $\varnothing$ 55 mm	540
114-124	65-85	$\pm 7$	0,6 $\mu$ m (spindle) 1,3 $\mu$ m (anvil)	-	167-332 $\varnothing$ 70 mm	760

114-204, 114-137: carbide-tipped anvil and spindle  
others: carbide tipped spindle



Plain anvil model



Grooved anvil model

# Can Seam Micrometer

## Series 147

This Can Seam Micrometer allows you to measure different types of can seams. It offers the following benefits:

- Designed to measure the width, height and depth of can seams.
- Three types are available, for steel, aluminium and spray cans.



147-103



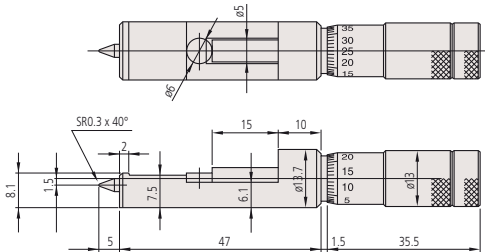
147-105



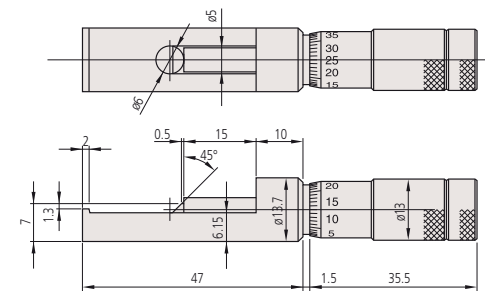
147-202

### Metric

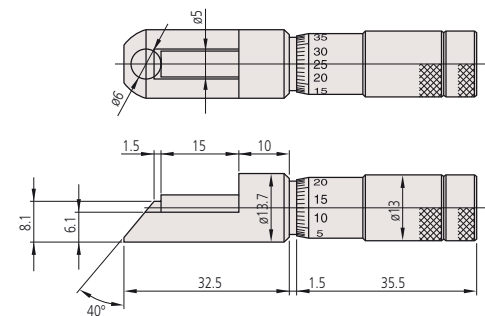
No.	Range [mm]	Remarks	Mass [g]
147-103	0-13	For steel cans	65
147-105	0-13	For aluminium cans	65
147-202	0-13	For spray cans	65



147-103



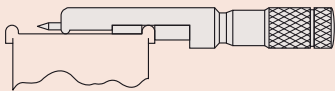
147-105



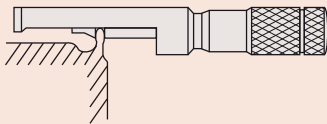
147-202

## Specifications

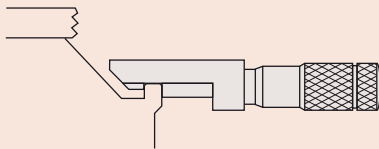
Accuracy	3 µm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, ø13 mm
Delivered	Including box, key



147-103  
For steel cans



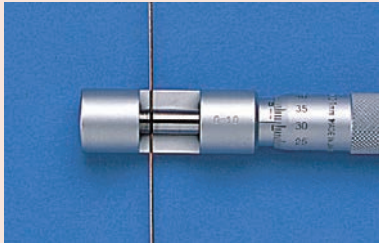
147-105  
For aluminium cans



147-202  
For spray cans

### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 15$ mm
Measuring surfaces	Carbide tipped, micro-lap finish
Measuring spindle	$\varnothing 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, key



## Wire Micrometer

### Series 147

This Wire Micrometer takes easy, accurate measurements and offers the following benefits:

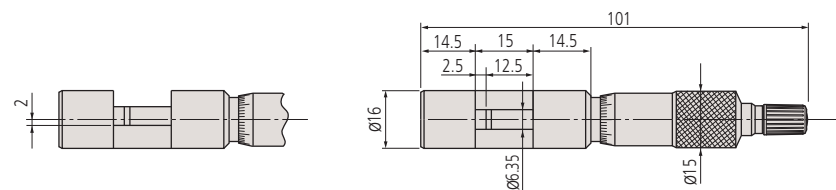
- Designed for measuring wire thickness.
- You can also use it to measure the diameter of small balls.



147-401

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Mass [g]
147-401	0-10	$\pm 3$	0,6 $\mu$ m	1,3 $\mu$ m	65



## Hub Micrometer

### Series 147

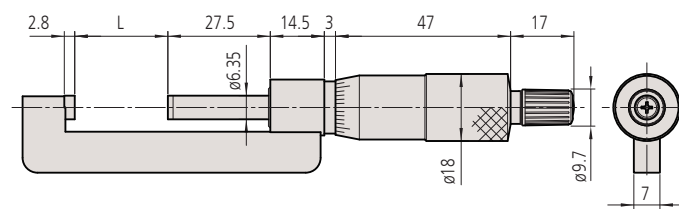
This Hub Micrometer is designed with a very small throat depth, allowing you to measure hub thickness, shouldered features inside a bore and bearing bushings.



147-301

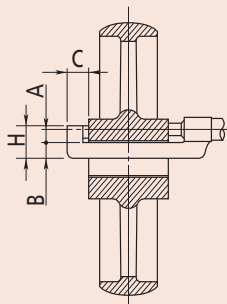
### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	L [mm]	A [mm]	B [mm]	C [mm]	H [mm]	Mass [g]
147-301	0-25	$\pm 2$	0,6 $\mu$ m	3 $\mu$ m	0	6	8,5	13,5	17,5	135
147-302	25-50	$\pm 2$	0,6 $\mu$ m	3 $\mu$ m	25	6,5	11	14	20,5	150
147-303	50-75	$\pm 2$	0,6 $\mu$ m	3 $\mu$ m	50	6,5	11	13	20,5	170
147-304	75-100	$\pm 3$	0,6 $\mu$ m	3 $\mu$ m	75	6,5	11	13	20,5	185



### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Measuring surfaces	carbide-tipped, micro-lap finish
Measuring spindle	$\varnothing 6,35$ mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standard (from 25 mm upward), key





# Digimatic Micrometer Interchangeable Anvil Type

## Series 317

This Digimatic Micrometer Interchangeable Anvil Type lets you measure a range of different features. It offers the following benefits:

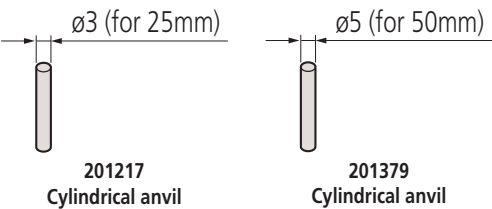
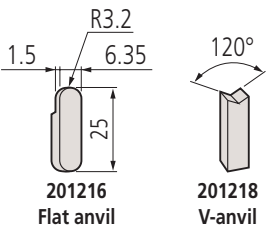
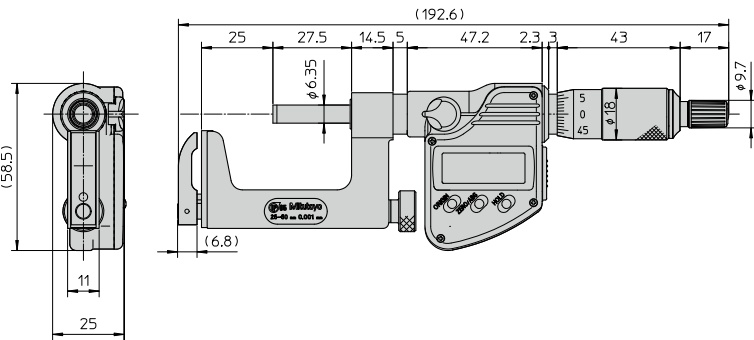
- It is designed to accept interchangeable anvils shaped for specific tasks.
- You can use it to measure the wall thickness of tubes, as well as openings and slots from edge to edge, and features in hard-to-reach locations.



317-251-30

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Anvils included	Mass [g]
317-251-30	0-25	$\pm 4$	0,6 $\mu$ m (spindle) 2 $\mu$ m (anvil)	3 $\mu$ m	201217, 201216	335
317-252-30	25-50	$\pm 4$	0,6 $\mu$ m (spindle) 2 $\mu$ m (anvil)	3 $\mu$ m	201379, 201216	360



Functions	Series 317
ORIGIN	●
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide tipped (spindle)
Measuring spindle	With spindle lock, ø6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Battery life	approx. 2,4 years
Delivered	Including box, setting standard (from 25 mm upward), key, 1 battery, anvils

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
950758	Round Base for Series 117, for 0-25mm
201218	V-Anvil

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
201217	Cylindrical Anvil 3mm
201379	Cylindrical Anvil 5mm
201216	Flat Anvil



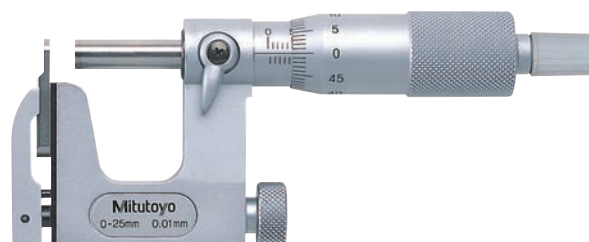
950758 with micrometer

# Micrometer Interchangeable Anvil Type

## Series 117

This Micrometer Interchangeable Anvil Type lets you measure a range of different features. It offers the following benefits:

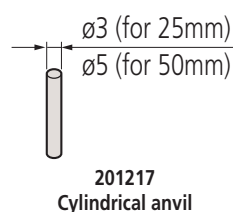
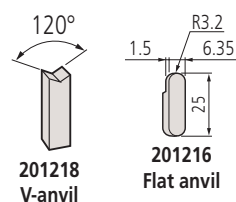
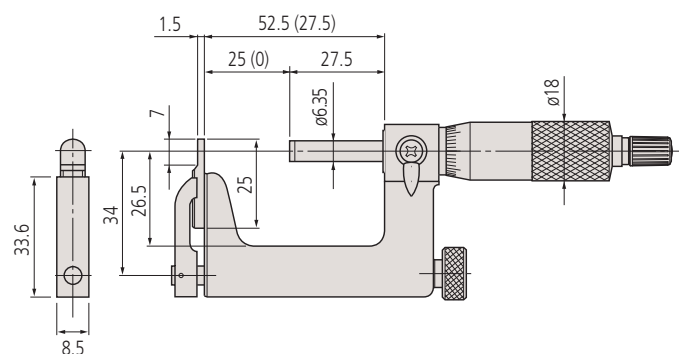
- It is designed to accept interchangeable anvils shaped for specific tasks.
- You can use it to measure the wall thickness of tubes, as well as openings and slots from edge to edge, and features in hard-to-reach locations.



117-101

### Metric

No.	Range [mm]	Accuracy [ $\mu$ m]	Flatness	Parallelism	Anvils included	Mass [g]
117-101	0-25	$\pm 4$	0,6 $\mu$ m (spindle) 2 $\mu$ m (anvil)	3 $\mu$ m	201217, 201216	255
117-102	25-50	$\pm 4$	0,6 $\mu$ m (spindle) 2 $\mu$ m (anvil)	3 $\mu$ m	201379, 201216	320



### Specifications

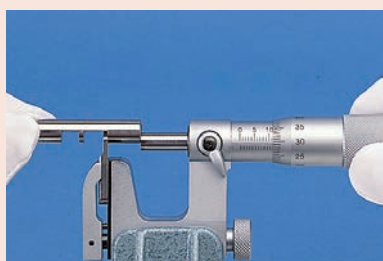
Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing$ 18 mm
Measuring surfaces	Carbide tipped (spindle)
Measuring spindle	With spindle lock, $\varnothing$ 6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standard (from 25 mm upward), key, anvils

### Optional accessories

No.	Description
201218	V-Anvil
950758	Round Base for Series 117, for 0-25mm

### Consumable spares

No.	Description
201217	Cylindrical Anvil 3mm
201379	Cylindrical Anvil 5mm
201216	Flat Anvil



950758 with micrometer



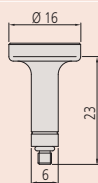
## Specifications

Graduation	0,001 mm
Graduation dial comparator	0,001 mm
Accuracy micrometer	2 µm
Accuracy dial comparator	1 µm
Scale	Thimble and sleeve satin chrome finish, ø 21 mm
Measuring surfaces	Carbide-tipped, micro-lap finish, ø 8 mm
Measuring force	5-10 N
Delivered	Including box, key

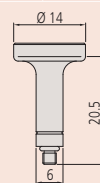
## Optional accessories

No.	Description
04AZA124	Workpiece Stopper Indicating Micrometer, 23mm
04AZA125	Workpiece Stopper Indicating Micrometer, 20,5mm
04AZA126	Workpiece Stopper Indicating Micrometer, 15mm

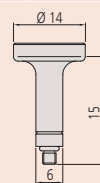
Measuring range mm	Nr.	Diameter range of workpiece supported		
		A Ø mm	B Ø mm	C Ø mm
0- 25	510-121	—	4-16	15- 25
25- 50	510-122	25-37	30-42	41- 50
50- 75	510-123	50-61	54-66	65- 75
75-100	510-124	75-87	80-92	91-100



04AZA124  
Workpiece stop A



04AZA125  
Workpiece stop B



04AZA126  
Workpiece stop C



Adjusting screw for dial comparator ± 5 µm

# Indicating Micrometer

## Series 510

This is an indicating micrometer with a dial comparator that enables you to take fast and highly accurate measurements. It offers you the following benefits:

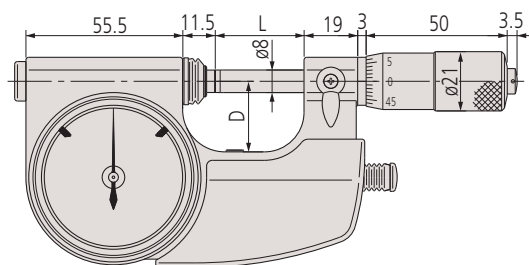
- It is easy to use when operated one-handed due to retractable anvil.
- Protection level IP54 and large and easy to read characters on the dial plate
- Large dial comparator for easy reading (± 0,06 mm)
- Tolerance markers for GO/NG measurements
- 8 mm spindle diameter gives you easy positioning and highly accurate measurements.



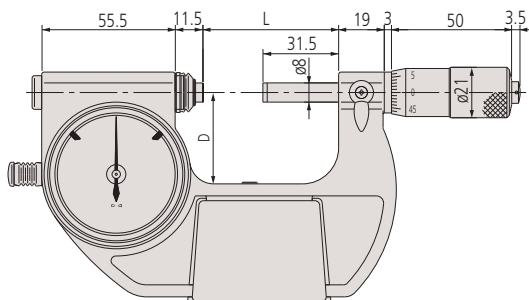
510-121

## Metric

No.	Range [mm]	Anvil retracting stroke	Flatness	Parallelism	Indicating range	Operating button	L [mm]	D [mm]	Mass [g]
510-121	0-25	2 mm	0,3 µm	0,6 µm	±0,06 mm	Right	31,5	25	520
510-141	0-25	2 mm	0,3 µm	0,6 µm	±0,06 mm	Left	31,5	25	520
510-122	25-50	2 mm	0,3 µm	0,6 µm	±0,06 mm	Left	56,5	38	670
510-123	50-75	2 mm	0,3 µm	1 µm	±0,06 mm	Left	81,5	50	820
510-124	75-100	2 mm	0,3 µm	1 µm	±0,06 mm	Left	106,5	63	970



0-25 mm



25-100 mm

# Indicating Snap Gauge

## Series 523

This is a snap gauge with integrated dial comparator. It offers you the following benefits:

- It is ideal for rapidly inspecting workpieces, especially cylindrical, in batch or mass production situations.
- It can be set with external length standards such as block gauges.
- Easy-to-operate retracting button



Specifications	
Graduation dial comparator	0,001 mm
Accuracy dial comparator	1 µm
Measuring surfaces	Carbide tipped, micro-lap finish ø 10,8 mm
Measuring force	5-10 N
Delivered	Including box, workpiece rest

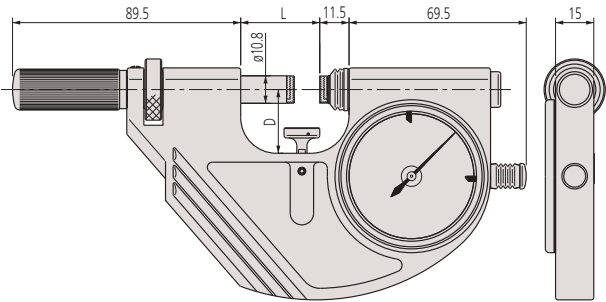


523-121



### Metric

No.	Range [mm]	Anvil retracting stroke	Flatness	Parallelism	Indicating range	L [mm]	D [mm]	Mass [g]
523-121	0-25	2 mm	0,3 µm	0,6 µm	±0,06 mm	31	25	740
523-122	25-50	2 mm	0,3 µm	0,6 µm	±0,06 mm	56	35	840
523-123	50-75	2 mm	0,3 µm	1 µm	±0,06 mm	81	47,5	950
523-124	75-100	2 mm	0,3 µm	1 µm	±0,06 mm	106	60	1080



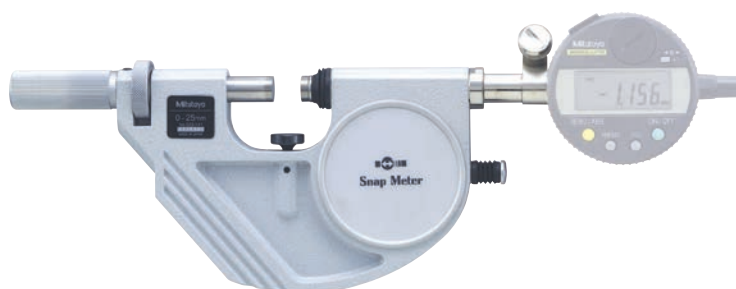


# Snap Gauge

## Series 523

This Snap Gauge designed to mount an indicator to suit the measurement application, and offers the following benefits:

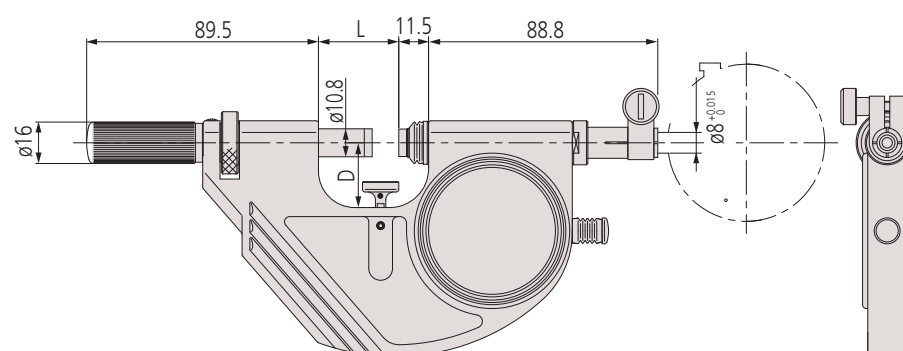
- It's ideal for rapidly inspecting workpieces, especially cylindrical, in batch or mass production situations, when you need an indication of where a measurement falls within the tolerance band.
- You can set it with external length standards such as block gauges.
- Easy-to-operate retracting button.



523-141 with optional indicator

### Metric

No.	Range [mm]	Anvil retracting stroke	Flatness	Parallelism	Repeatability [μm]	L [mm]	D [mm]	Mass [g]
523-141	0-25	2 mm	0,3 μm	0,6 μm	0,4	31	25	710
523-142	25-50	2 mm	0,3 μm	0,6 μm	0,4	56	35	810
523-143	50-75	2 mm	0,3 μm	1 μm	0,4	81	47,5	920
523-144	75-100	2 mm	0,3 μm	1 μm	0,4	106	60	1050



Sample application:  
with dial indicator



Sample application:  
with digital indicator



Sample application:  
with Linear Gauge

# Dial Gauge Micrometer

## Series 107

This Dial Gauge Micrometer allows you to quickly measure mass-produced parts. It offers the following benefits:

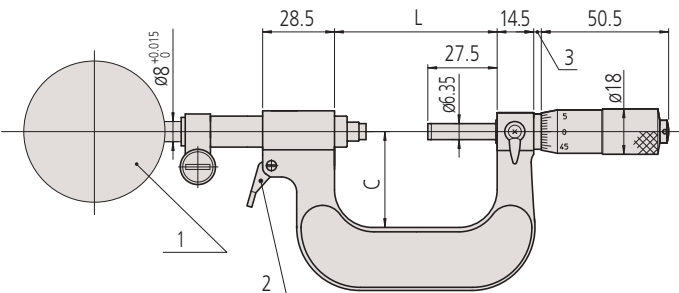
- Designed to mount a dial or a digital indicator for direct GO/NG judgement of mass-produced parts.
- You can take rapid measurements thanks to its anvil retracting trigger.
- 3mm anvil retracting stroke.



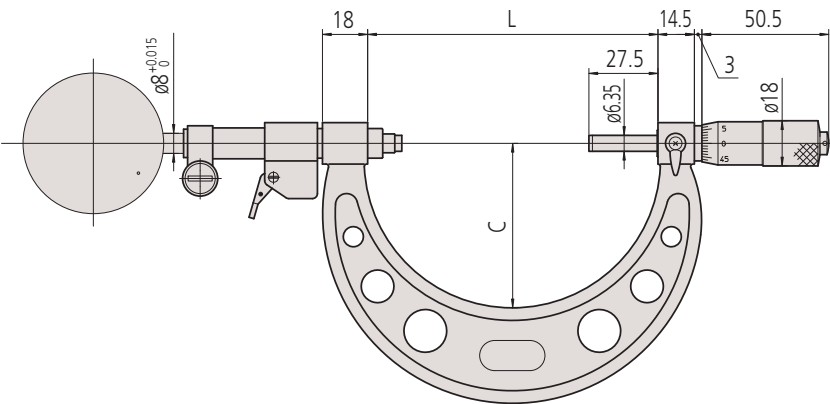
107-201 with optional dial indicator

### Metric

No.	Range [mm]	Accuracy [μm]	Flatness	Parallelism	L [mm]	C [mm]	Mass [g]
107-201	0-25	±2	0,6μm	(2+L/100) μm, L = max. range	39,5	30	480
107-202	25-50	±2	0,6μm	(2+L/100) μm, L = max. range	64,5	38	520
107-203	50-75	±2	0,6μm	(2+L/100) μm, L = max. range	90	45	585
107-204	75-100	±3	0,6μm	(2+L/100) μm, L = max. range	115,6	65	630
107-205	100-125	±3	0,6μm	(2+L/100) μm, L = max. range	140,6	79	725
107-206	125-150	±3	0,6μm	(2+L/100) μm, L = max. range	165,6	93	810
107-207	150-175	±4	0,6μm	(2+L/100) μm, L = max. range	190,5	105	1050
107-208	175-200	±4	0,6μm	(2+L/100) μm, L = max. range	215,5	120	1170



1: dial indicator - 2: retracting trigger (0 - 50 mm)



50 - 200 mm

### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,01 mm
Anvil retracting stroke	3 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide-tipped, micro-lap finish
Measuring spindle	With spindle lock, Ø 6,35 mm, spindle pitch 0,5 mm
Measuring force	5-10 N
Delivered	Including box, setting standard (from 25 mm upward), key



2900SB-10 (1μm)



543-390B (1μm)



542-181 (0,1 μm)

Optional  
See dial indicators section

Specifications

Anvil retracting stroke	2 mm
Anvil positioning range	25 mm
Measuring force	15 N $\pm$ 3
Delivered	Including hand guard Adjustable workpiece stop Suitable for dial indicators with $\varnothing$ 8 mm stem (metric)

Optional accessories

No.	Description
2046SB	Dial Indicator, Flat Back, 10mm, 0,01mm
2109SB-10	Dial Indicator, Flat Back, 1mm, 0,001mm, Shockproof
21DZA000	Protector for Indicator (plastic cover)
2972TB	Dial Indicator, Flat Back, 1mm, 0,01mm, One Revolution, Shockproof



201-101 with optional accessories:  
Stand 156-101-10  
Dial indicator 2109SB-10

Dial Snap Gauges

Series 201

These Dial Snap Gauges are designed to let you quickly carry out GO/NG judgement of the diameters of cylinders and shafts in machining processes.

They offer the following benefits:

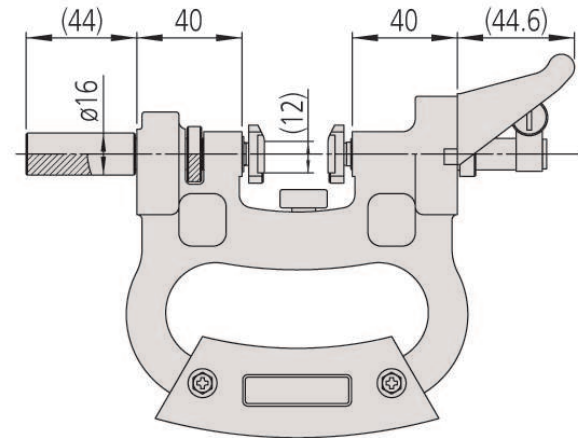
- Wide, flat carbide anvils.
- 2mm anvil retracting stroke.
- You can adjust the measuring range with an adjustment nut.



201-101 with optional accessories

Metric

No.	Range [mm]	Flatness	Parallelism	Mass [g]
201-101	0-25	1 $\mu$ m	5 $\mu$ m	570
201-102	25-50	1 $\mu$ m	5 $\mu$ m	660
201-103	50-75	1 $\mu$ m	5 $\mu$ m	700
201-104	75-100	1 $\mu$ m	5 $\mu$ m	770
201-105	100-125	1 $\mu$ m	5 $\mu$ m	870
201-106	125-150	1 $\mu$ m	5 $\mu$ m	950
201-107	150-175	1 $\mu$ m	5 $\mu$ m	1070
201-108	175-200	1 $\mu$ m	5 $\mu$ m	1160
201-109	200-225	1 $\mu$ m	5 $\mu$ m	1260
201-110	225-250	1 $\mu$ m	5 $\mu$ m	1350
201-111	250-275	1 $\mu$ m	5 $\mu$ m	1470
201-112	275-300	1 $\mu$ m	5 $\mu$ m	1620



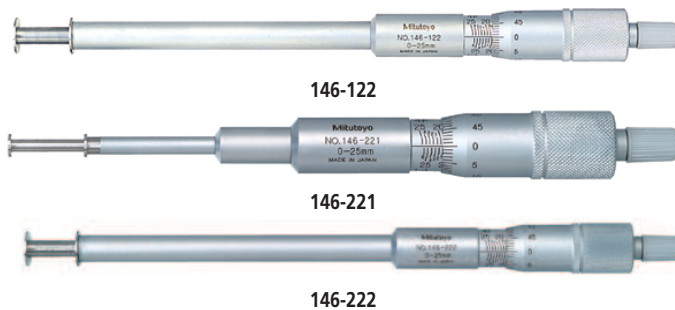
# Internal Groove Micrometer

## Series 146

This Internal Groove Micrometer is designed to measure the width and location of grooves cut into bore walls.

It offers the following features:

- Two-directional ratchet stop.
- Non-rotating spindle models are also available.

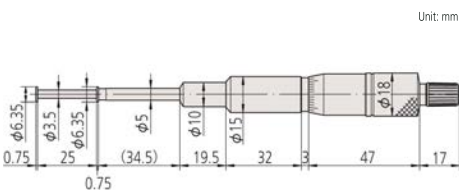


### Metric Non-rotating spindle type

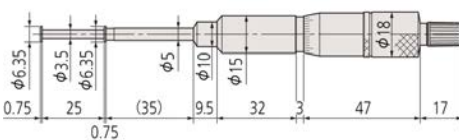
No.	Range Outside	Range Inside	Parallelism	Diameter of measuring plate [mm]	l [mm]	L [mm]	Mass [g]
146-221	0-25 mm	1,6-26,5 mm	10 µm	6,35			135
146-222	0-25 mm	1,6-26,5 mm	10 µm	12,7	115	25	185
146-223	25-50 mm	26,5-51,5 mm	10 µm	12,7	90	50	175
146-224	50-75 mm	51,5-76,5 mm	10 µm	12,7	65	75	165
146-225	75-100 mm	76,5-101,5 mm	10 µm	12,7	40	100	160

### Metric Rotating spindle type

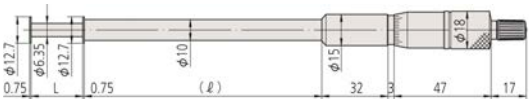
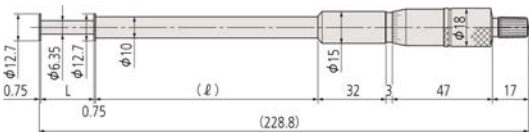
No.	Range Outside	Range Inside	Parallelism	Diameter of measuring plate [mm]	l [mm]	L [mm]	Mass [g]
146-121	0-25 mm	1,6-26,5 mm	10 µm	6,35			135
146-122	0-25 mm	1,6-26,5 mm	10 µm	12,7	103,3	25	185
146-123	25-50 mm	26,5-51,5 mm	10 µm	12,7	78,3	50	175
146-124	50-75 mm	51,5-76,5 mm	10 µm	12,7	53,3	75	165
146-125	75-100 mm	76,5-101,5 mm	10 µm	12,7	28,3	100	160



146-221

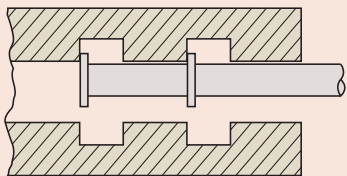
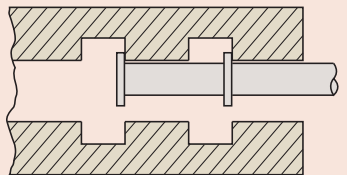
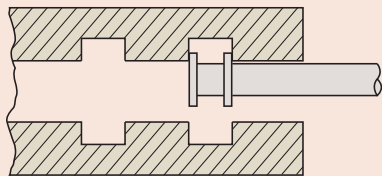
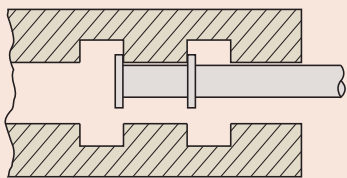
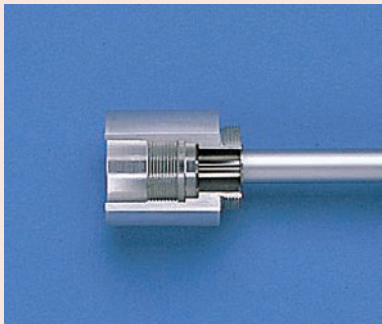


146-121



## Specifications

Accuracy	±10 µm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	hardened
Measuring spindle	Spindle pitch 0,5 mm
Ratchet	Can be used in both directions
Delivered	Including box, key



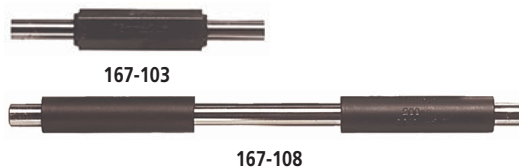
# Micrometer Setting Standards ≤ 1000 mm

## Specifications

Accuracy	Refer to the list of specifications (Tolerance on deviation of measured central length from nominal at 20°C.)
Flatness	0,3 µm
Parallelism	2 µm
Measuring surfaces	micro-lap finish



## Series 167



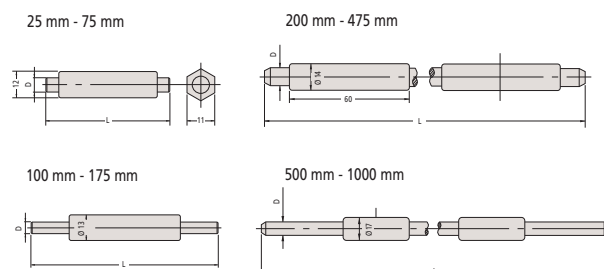
## Metric

No.	Length [mm]	Accuracy [µm]	Diameter (D) [mm]
167-101	25	±1,5	6,35
167-102	50	±2	6,35
167-103	75	±2,5	6,35
167-104	100	±3	7,9
167-105	125	±3,5	7,9
167-106	150	±4	7,9
167-107	175	±4,5	7,9
167-108	200	±5	9,4
167-109	225	±5,5	9,4
167-110	250	±6	9,4
167-111	275	±6,5	9,4
167-112	300	±7	9,4
167-113	325	±7,5	9,4
167-114	350	±8	9,4
167-115	375	±8,5	9,4
167-116	400	±9	9,4
167-117	425	±9,5	9,4
167-118	450	±10	9,4
167-119	475	±10,5	9,4
167-120	500	±11	11,9
167-121	525	±11,5	11,9
167-122	550	±12	11,9
167-123	575	±12,5	11,9
167-124	600	±13	11,9
167-125	625	±13,5	11,9
167-126	650	±14	11,9
167-127	675	±14,5	11,9
167-128	700	±15	11,9
167-129	725	±15,5	11,9
167-130	750	±16	11,9
167-131	775	±16,5	11,9
167-132	800	±17	11,9
167-133	825	±17,5	11,9
167-134	850	±18	11,9
167-135	875	±18,5	11,9
167-136	900	±19	11,9
167-137	925	±19,5	11,9
167-138	950	±20	11,9
167-139	975	±20,5	11,9
167-140	1000	±21	11,9

## Metric

### Sets

No.	Length [mm]	Number of standards
167-902	25-125	5
167-903	25-275	11





# Micrometer Setting Standards > 1000 mm

## Series 167

This Micrometer Setting Standards 1000mm lets you accurately set outside micrometers at either end of the measuring range.



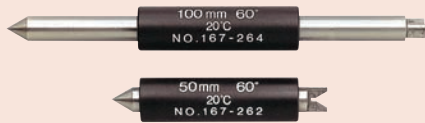
Metric		
No.	Length [mm]	Diameter (D) [mm]
167-365	1025	11,9
167-366	1050	11,9
167-367	1075	11,9
167-368	1100	11,9
167-369	1125	11,9
167-370	1150	11,9
167-371	1175	11,9
167-372	1200	11,9
167-373	1225	11,9
167-374	1250	11,9
167-375	1275	11,9
167-376	1300	11,9
167-377	1325	11,9
167-378	1350	11,9
167-379	1375	11,9
167-380	1400	11,9
167-381	1425	11,9
167-382	1450	11,9
167-383	1475	11,9
167-384	1500	11,9
167-385	1525	11,9
167-386	1550	11,9
167-387	1575	11,9
167-388	1600	11,9
167-389	1625	11,9
167-390	1650	11,9
167-391	1675	11,9
167-392	1700	11,9
167-393	1725	11,9
167-394	1750	11,9
167-395	1775	11,9
167-396	1800	11,9
167-397	1825	11,9
167-398	1850	11,9
167-399	1875	11,9
167-400	1900	11,9
167-401	1925	11,9
167-402	1950	11,9
167-403	1975	11,9
167-404	2000	11,9

## Specifications

Accuracy	±(1+L/50) μm
Flatness	0,3 μm
Parallelism	2 μm
Measuring surfaces	Micro-lap finish

#### Specifications

Accuracy Refer to the list of specifications



## Setting Standards for Screw Thread Micrometers

### Series 167

These Setting Standards are specially designed to allow you to accurately set Screw Thread Micrometers.

Metric		Angle 55°
No.	Length [mm]	Accuracy [μm]
167-272	25	±4
167-273	50	±5
167-274	75	±6
167-275	100	±7
167-276	125	±8
167-277	150	±9
167-278	175	±10
167-279	200	±11
167-280	225	±12
167-281	250	±13
167-282	275	±14

Metric		Angle 60°
No.	Length [mm]	Accuracy [μm]
167-261	25	±4
167-262	50	±5
167-263	75	±6
167-264	100	±7
167-265	125	±8
167-266	150	±9
167-267	175	±10
167-268	200	±11
167-269	225	±12
167-270	250	±13
167-271	275	±14

#### Specifications

Accuracy Refer to the list of specifications



167-329

## Setting Standards for V-Anvil Micrometers

### Series 167

These Setting Standards are designed so you can accurately set V-Anvil Micrometers.

Metric		
No.	Length [mm]	Accuracy [μm]
167-327	5	±2
167-328	10	±2
167-329	25	±2
167-330	40	±3
167-331	55	±3
167-332	70	±3
167-333	85	±3

# 3-Wire Measuring Process

## Series 313

This three-wire measuring process is one of the most precise procedures for determining the pitch diameter of threads. It offers you the following benefits:

- The measuring wires are hardened and precision-lapped.
- They are placed onto the spindle and anvil of an outside micrometer, allowing you to measure the pitch diameter of threads.



313-101

1) Wire in set

No.	Spindle diameter [mm]
313-101	6,35
313-102	8

Individual wires (content of 313-101)

One pair, support spindle ø 6,35 mm

No.	Measuring wire ø [mm]
952131	0,17
952132	0,195
952133	0,22
952134	0,25
952135	0,29
952136	0,335
952137	0,39
952138	0,455
952139	0,53
952140	0,62
952141	0,725
952142	0,895
952143	1,1
952144	1,35
952145	1,65
952146	2,05
952147	2,55
952148	3,2

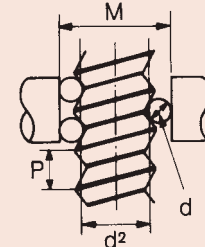
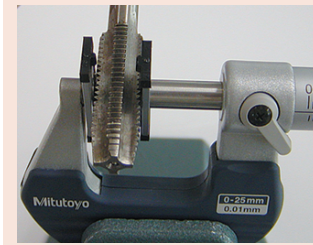
Individual wires (content of 313-102)

One pair, support spindle ø 8 mm

No.	Measuring wire ø [mm]
952149	0,17
952150	0,195
952151	0,22
952152	0,25
952153	0,29
952154	0,335
952155	0,39
952156	0,455
952157	0,53
952158	0,62
952159	0,725
952160	0,895
952161	1,1
952162	1,35
952163	1,65
952164	2,05
952165	2,55
952166	3,2

## Specifications

Accuracy wires	DIN 2269, Grade 1
Tolerance wires	± 1 µm
Contents	18 pairs of wires ø 0,17 mm up to ø 3,2 mm



$$P = \text{thread pitch}$$

$$d_0 = \text{measuring wire } \varnothing$$

$$d_2 = \text{pitch diameter}$$

$$M = \text{theoretical dimension at measuring pressure } d$$

$$a = \text{pitch angle}$$

$$d = \text{correction factor}$$

$$M = d_2 + \frac{d_0}{\sin \frac{a}{2}} - \frac{P}{2 \tan \frac{a}{2}} + d_0 + d$$

$$d = \frac{d_0}{2} \cdot \frac{P^2}{p^2} \cdot \frac{\cos \frac{a}{2} \cdot \cot \frac{a}{2}}{d_2^2}$$

ø Nominal	Thread pitch P	Pitch ø d2	Measuring wire ø d0	Measurement over wire M	(M-d2)
M 14	2,00	12,701	1,350	15,021	2,320
M 16	2,00	14,701	1,350	17,021	2,320
M 20	2,50	18,376	1,650	21,163	2,787
M 22	2,50	20,376	1,650	23,163	2,787
M 24	3,00	22,051	2,050	25,606	3,555
M 27	3,00	25,051	2,050	28,605	3,554
M 30	3,50	27,727	2,050	30,848	3,121
M 33	3,50	30,727	2,050	33,848	3,121
M 36	4,00	33,402	2,550	37,591	4,189
M 39	4,00	36,402	2,550	40,590	4,188
M 42	4,50	39,077	2,550	42,832	3,755
M 45	4,50	42,077	2,550	45,832	3,755
M 48	5,00	44,752	3,200	50,025	5,273
M 52	5,00	48,752	3,200	54,024	5,272
M 56	5,50	52,428	3,200	57,267	4,839
M 60	5,50	56,428	3,200	61,267	4,839

ø Nominal	Thread pitch P	Pitch ø d2	Measuring wire ø d0	Measurement over wire M	(M-d2)
M 1	0,25	0,838	0,170	1,133	0,295
M 1,2	0,25	1,038	0,170	1,332	0,294
M 1,4	0,30	1,205	0,170	1,456	0,251
M 1,7	0,35	1,473	0,220	1,831	0,358
M 2	0,40	1,740	0,250	2,145	0,405
M 2,3	0,40	2,040	0,250	2,444	0,404
M 2,6	0,45	2,308	0,290	2,789	0,481
M 3	0,50	2,675	0,290	3,113	0,438
M 3,5	0,60	3,110	0,335	3,596	0,486
M 4	0,70	3,545	0,455	4,305	0,760
M 5	0,80	4,480	0,455	5,153	0,673
M 6	1,00	5,350	0,620	6,346	0,996
M 8	1,25	7,188	0,725	8,282	1,094
M 10	1,50	9,026	0,895	10,414	1,388
M 12	1,75	10,863	1,100	12,650	1,787

# Micrometer Stands

## Series 156

This is a micrometer stand that offers you the following benefits:

- Keeps both hands free for operating the micrometer and positioning the workpiece.
- Designed for batch or mass production measurements in manufacturing and quality assurance.



156-105-10

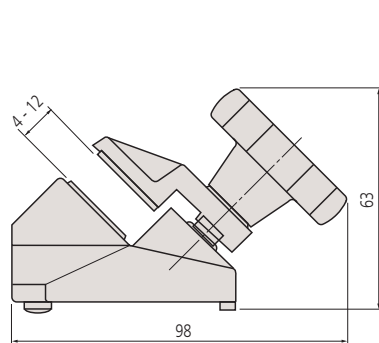


156-101-10

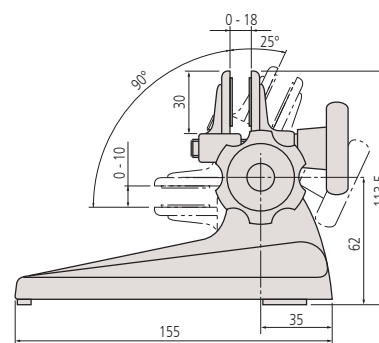


156-102

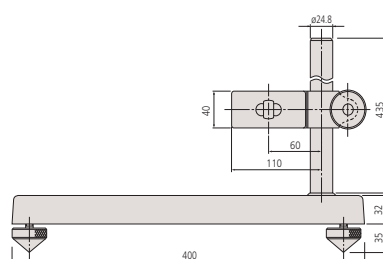
No.	Micrometer range	Remarks	Mass [g]
156-105-10	0-50 mm	Fixed angle type 45°	700
156-101-10	0 - 100 mm	Adjustable angle type	1210
156-102	100-300 mm	Vertical type	9000
156-103	300-1000 mm	Vertical type	8500



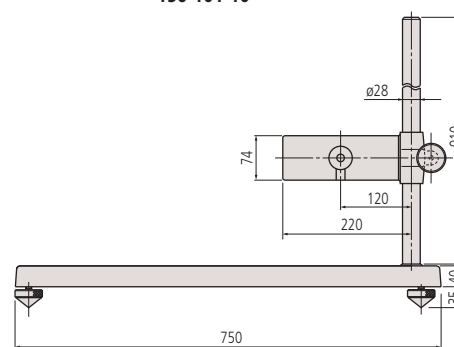
156-105-10



156-101-10



156-102



156-103

# Colour Coded Ratchets and Speeders

## Micrometer accessories



Colour-coded ratchets



Colour-coded speeders for Ratchet Thimble Micrometer series 102-7XX, QuantuMike and Series 293 with ratched thimble



Colour-coded ratchets for analogue micrometer 0-300 mm

No.	Colour
985056	Black
985061	Red
985081	Blue
985071	Yellow
985076	Green
985066	Brown
04GZA239	Grey

Colour-coded ratchets for analogue micrometer 300-1000 mm

No.	Colour
04GZA243	Grey

Colour-coded speeders for digital micrometer 0-300 mm

No.	Colour
04GZA241	Grey

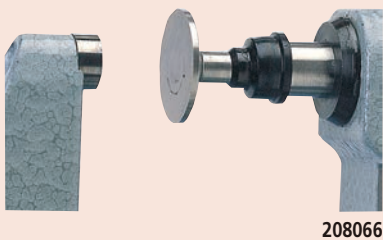
Colour-coded speeders for series 102-7XX, QuantuMike and series 293 with ratched thimble

No.	Colour
04AAB208	Grey
04GAA899	Black
04GAA900	Red
04GAA901	Yellow
04GAA902	Green
04GAA903	Blue



Specifications

Tip length 10 mm ±5 µm



208066

Spindle attachment tips

Micrometer accessories

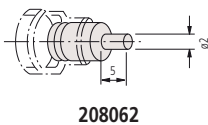
These spindle attachment tips give you an economical way to adapt a micrometer spindle for different tasks.

They offer the following benefits:

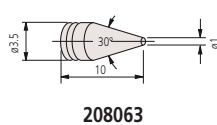
- You can use the tips on a micrometer spindle as an economical adaptation for particular measurement applications.
- They can also be mounted on micrometer anvils  $\varnothing$  6,35 mm.
- The measuring range changes when a spindle attachment tip is mounted.



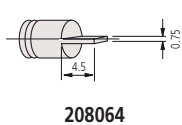
No.	Description
208062	Spline
208063	Spherical
208064	Knife edge
208065	Knife edge
208066	Tray



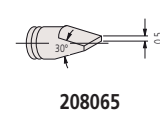
208062



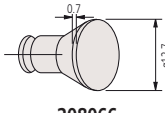
208063



208064



208065



208066

Ball attachment

Micrometer accessories

- Ball attachment to fit micrometer anvils ( $\varnothing$  6,35 mm only)



Sample application



101468M

Metric	
No.	$\varnothing$ ball [mm]
101468M	5

# Optical parallels

## Series 157

These Optical Parallels allow you to inspect micrometers and other measuring tools. They offer the following benefits:

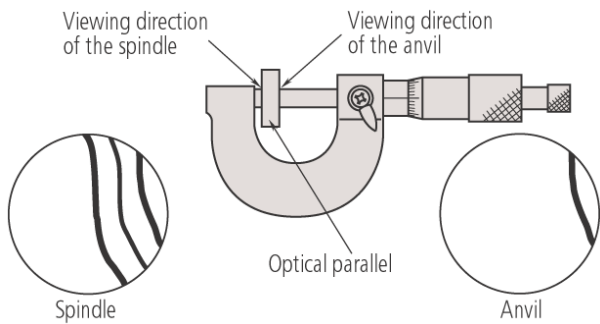
- Using optical interference, they can inspect the measuring faces of micrometers for parallelism and flatness.
- Each set consists of 4 sizes designed for testing at each quarter revolution.



157-903

### Metric

No.	Contents	Range of micrometer to be checked	Sizes of parallels included in set
157-903	157-101	0-25 mm	12 mm
	157-102		12,12 mm
	157-103		12,25 mm
	157-104		12,37 mm
157-904	157-105	25-50 mm	25 mm
	157-106		25,12 mm
	157-107		25,25 mm
	157-108		25,37 mm



Testing a micrometer for flatness and parallelism of anvil and spindle faces : flatness is indicated by straightness and regular spacing of interference fringes, and parallelism by how many fringes are visible.

## Specifications

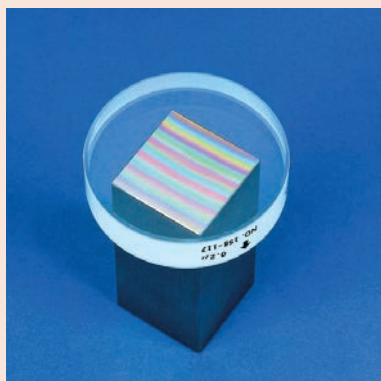
Flatness	0,1 μm
Parallelism	0,2 μm
Diameter	30 mm



# Optical flats

## Series 158

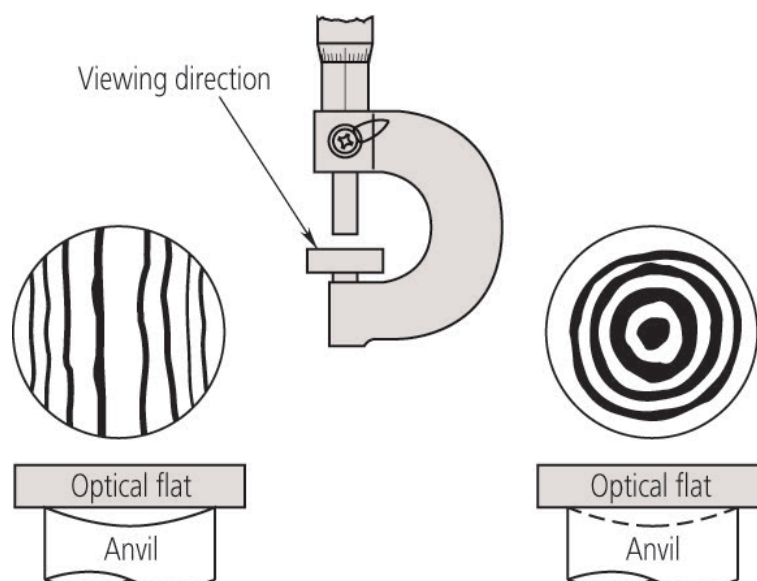
These optical flats are an essential tool for you to test the flatness of reflective surfaces such as gauge blocks and setting standards, through optical interference technology.



158-118

### Metric

No.	Flatness	Diameter [mm]
158-117	0,2 μm	45
158-119	0,2 μm	60
158-118	0,1 μm	45
158-120	0,1 μm	60



# Survey Micrometer Head

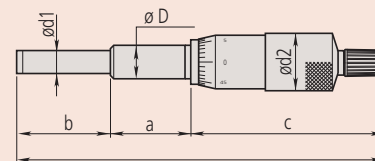
## Micrometer Head Selector

Stem w/ locknut No.	Plain stem No.	Range mm	1)	2)	4	5)	6)	Grad. mm	x mm	y mm	a mm	b mm	c mm	Ø D mm	Ø d1 mm	Ø d2 mm
110-105.		0-1				●	●	0,001			12,7	25	62,5	12	8	21
110-106.		0-1				●	●	0,0001			12,7	25	62,5	12	8	21
110-107.		0-1	●			●	●	0,001			12,7	25	62,5	12	8	21
110-108.		0-1	●			●	●	0,0001			12,7	25	62,5	12	8	21
110-101.		0-2,5				●	●	0,001			12,7	25	70	12	8	21
110-102.		0-2,5				●	●	0,0001			12,7	25	70	12	8	21
148-216.	148-215.	0-5	●					0,02	5,5	1,8	5	6,5	20,5	3,5	2	6
	148-201.	0-6,5						0,01			6	9	21,7	6	3,5	9,3
148-203.		0-6,5						0,01	8	3	7,5	7,5	21,7	6	3,5	9,3
148-302.	148-301.	0-6,5						0,01	14	4	9,5	9	23,5	9,5	6,35	15
148-304.	148-303.	0-6,5						0,01	14	4	9,5	9	23,5	9,5	6,35	20
148-306.	148-305.	0-6,5						0,01	14	4	9,5	9	23,5	9,5	6,35	29
148-221.	148-220.	0-6,5		●				0,01			15	9	22,5	6	3,5	9,3
148-223.	148-222.	0-6,5		●				0,01			17	7,5	22,5	6	3,5	9,3
148-317.	148-316.	0-6,5		●				0,01			18,7	9	22,5	9,5	6,35	15
148-319.	148-318.	0-6,5		●				0,01								
148-207.	148-205.	0-6,5	●					0,01	8	3	7,5	7,5	21,7	6	3,5	9,3
148-323.	148-322.	0-6,5	●					0,01	14	4	9,5	9	23,5	9,5	6,35	15
148-143.	148-142.	0-6,5	●					0,002	14	4	9,5	14	31,5	9,5	5	13
148-343.	148-342.	0-6,5	●					0,002	14	4	9,5	9	23,5	9,5	6,35	15
148-243.	148-242.	0-6,5	●					0,002	8	3	6	9	21,9	6	3,5	9,3
152-283.		0-10				●		0,002	16	4	26	19	53	12	6,35	49
110-502.		0-13	●			●		0,0005			15	15	67,5	9,5	5	13
148-133.	148-132.	0-13	●					0,01	14	4	9,5	17,5	31,5	9,5	5	13
148-802.	148-801.	0-13	●					0,01	14	4	9,5	17,5	31,5	9,5	5	13
	148-853.	0-13	●					0,01			9,5	15,5	37	9,5	5	13
148-804.	148-803.	0-13	●	●				0,01	14	4	9,5	17,5	40	9,5	5	13
148-854.		0-13	●	●				0,01	14	4	9,5	15,5	45,5	9,5	5	13
	148-104.	0-13						0,001	14	4	9,5	17,5	31,5	9,5	5	13
148-103.		0-13						0,01	14	4	9,5	17,5	31,5	9,5	5	13
148-308.	148-307.	0-13						0,01	14	4	9,5	15,5	30	9,5	6,35	15
148-310.	148-309.	0-13						0,01	14	4	9,5	15,5	30	9,5	6,35	20
148-312.	148-311.	0-13						0,01	14	4	9,5	15,5	30	9,5	6,35	29
148-508.	148-503.	0-13						0,01	14	4	9,5	15,5	37	9,5	5	13
	148-513.	0-13						0,01			9,5	15,5	37	9,5	5	13
148-120.	148-121.	0-13		●				0,01	14	4	9,5	17,5	40,1	9,5	5	13
148-504.	148-506.	0-13		●				0,01	14	4	9,5	15,5	45,6	9,5	5	13
148-151.	148-150.	0-13		●				9,5			18,7	17,5	31	12	5	13
148-153.	148-152.	0-13		●				9,5			18,7	17,5	31	12	5	13
149-131.	149-132.	0-15				●		0,01	14	4	15	17	43,5	9,5	6,35	15
	152-101.	0-15				●		0,01			16	18	60	12	8	30
	153-101.	0-15				●	●	0,01			10	17	58,5	9,5	6,35	15,3
149-184.	149-183.	0-15		●		●		0,01	14	4	9,5	17	49	9,5	6,35	15
149-802.	149-801.	0-15	●			●		0,01	14	4	15	17	43,5	9,5	6,35	15
150-189.	150-190.	0-25			●	●		0,001	14	4	15	27	67	10	6,35	18
151-221.	151-222.	0-25			●	●		0,001	16	4	29	34	70	12	8	21
150-191.	150-192.	0-25			●	●		0,01	14	4	15	27	67	10	6,35	18
151-223.	151-224.	0-25			●	●		0,01	16	4	29	34	70	12	8	21
150-195.	150-196.	0-25				●		0,01	14	4	15	27	54	10	6,35	18
	152-102.	0-25				●		0,01			16	28	69	12	8	30
	152-332.	0-25				●		0,002			29	34	66	12	8	49

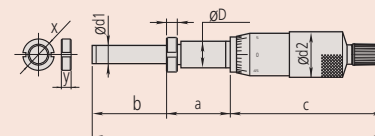
1) Spherical measuring surface 2) With spindle lock 4 With ratchet 5) With non-rotating spindle 6) Carbide tipped  
x and y apply to heads with clamp nut

## Specifications

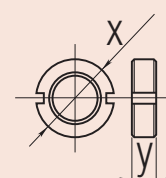
Graduation 0,001mm/ 0,0005mm/ 0,0001mm



Total length  $l = a + b + c$



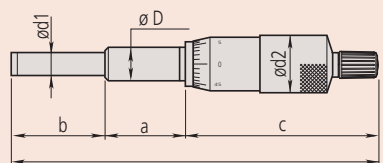
Total length  $l = a + b + c$



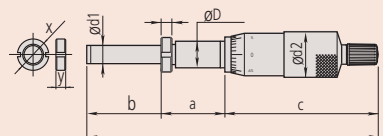
# Survey Micrometer Head

## Specifications

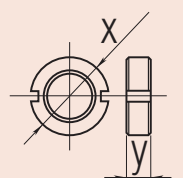
Graduation 0,001mm/ 0,0005mm/ 0,0001mm



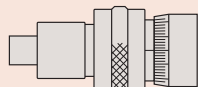
Total length  $l = a + b + c$



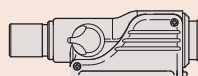
Total length  $l = a + b + c$



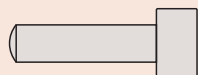
With clamp nut



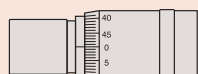
With spindle lock



With spindle lock 250-301 / 350-2XX



With spherical measuring surfaces



With reverse reading

## Micrometer Head Selector

Stem w/ locknut No.	Plain stem No.	Range	1)	2)	3)	4	5)	6)	7)	Grad. mm	x mm	y mm	a mm	b mm	c mm	Ø D mm	Ø d1 mm	Ø d2 mm
150-220.	150-219.	0 - 25								0,01	14	4	15	65	53,5	10	6,35	18
	153-203.	0 - 25								0,01			10	27	70,5	12	8	18
	153-204.	0 - 25								0,001			10	27	71	12	8	18
	153-301.	0 - 25								0,0005				28,6	31,8	18	8	85,5
	153-201.	0 - 25								0,01			10	27	87,5	12	8	18
	153-202.	0 - 25								0,001			10	27	88	12	8	18
150-210.	150-209.	0 - 25								0,01	14	4	15	27	78,5	10	6,35	18
	250-301.	0 - 25								0,01			15	27	94	10	6,35	18
350-252-30.	350-251-30.	0 - 25								0,001	14	4		27	114,5	10	6,35	18
350-272-30.	350-271-30.	0 - 25								0,001				27	113,5	12	6,35	18
350-282-30.	350-281-30.	0 - 25								0,001	16	4		27	114,5	12	6,35	18
150-212.	150-211.	0 - 25								0,01	14	4	15	27	65	10	6,35	18
151-226.	151-225.	0 - 25								0,01	16	4	19	34,5	66	12	8	21
350-261-30.		0 - 25								0,001				38,7	101	12	6,35	18
150-802.	150-801.	0 - 25								0,01	14	4	15	27	67	10	6,35	18
350-254-30.	350-253-30.	0 - 25								0,001	14	4		27	113,5	10	6,35	18
350-274-30.	350-273-30.	0 - 25								0,001	16	4		27	113,5	12	6,35	18
350-284-30.	350-283-30.	0 - 25								0,001	16	4		27	114,5	12	6,35	18
	152-348.	0-25-0								0,002			29	34	66	12	8	49
	152-401.	0-25-0								0,001			14	41,7	84,3	18	8	49
151-255.	151-256.	0 - 50								0,01	16	4	29	59	103	12	8	21
151-259.	151-260.	0 - 50								0,01	16	4	29	59	90	12	8	21
	152-103.	0 - 50								0,01			16	53	94	12	8	30
	164-163.	0 - 50								0,001			14	65	143	18	11	49
	197-101.	0 - 50								0,005			14	65	64	18	8	49
	152-380.	0-50-0								0,002			29	34	66	12	8	49
148-211.	148-209.	6,5-0								0,01	8	3	7,5	7,5	21,7	6	3,5	9
148-822.	148-821.	13-0								0,01	14	4	9,5	17,5	31,5	9,5	5	13
	148-863.	13-0								0,01			9,5	15,5	37	9,5	5	13
148-824.	148-823.	13-0								0,01	16	4	9,5	17,5	40,1	9,5	5	13
	148-864.	13-0								0,01			9,5	15,5	45,6	9,5	5	13
149-822.	149-821.	15-0								0,01	16	4	15	17	43,5	9,5	6,35	15
150-822.	150-821.	25-0								0,01	16	4	15	27	84	10	6,35	18

1) Spherical measuring surface 2) With spindle lock 3) Reverse reading 4 With ratchet 5) With non-rotating spindle 6) Carbide tipped 7) Non-rotating measuring surface

x and y apply to heads with clamp nut



# Digital Micrometer Head

## Series 164

This is a digital micrometer head with non-rotating spindle. It offers you the following benefits:

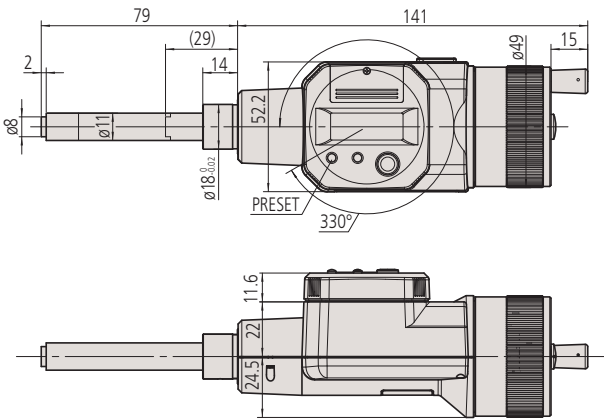
- Rotatable display, carbide tipped and non-rotating spindle
- It is perfect for integration into machinery and measuring instruments.



164-163

### Metric

No.	Range [mm]	Accuracy	Spindle end	Stem Ø	Remarks	Mass [g]
164-163	0-50	±3 µm	Carbide tipped	18 mm	Non-rotating spindle	490



164-163  
( ): with spindle full retracted

Functions	Series 164
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Data output	●
Counting direction switchable	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm
Measuring spindle	spindle pitch 0,5 mm
Power supply	2 batteries SR-44
Battery life	approx. 1,8 years
Display	LCD character height 7,5 mm

### Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



# Digital Micrometer Head with 10 mm Stem

## Series 350

This Micrometer Head has a 25 mm range and a 10 mm stem, and offers the following benefits:

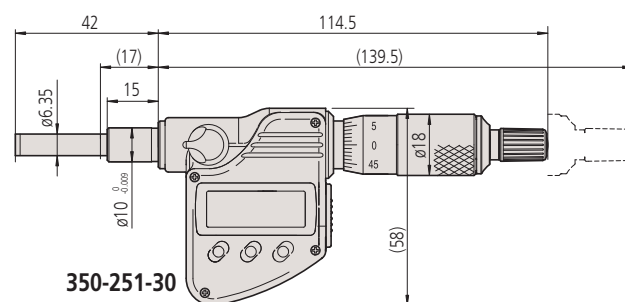
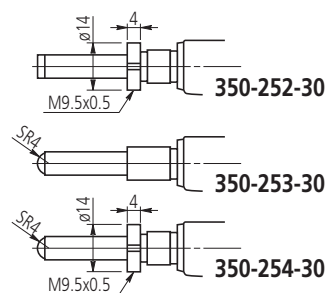
- You can integrate it into machinery and measuring instruments.
- Measurement values are clearly displayed in 0,001mm increments.
- Stem diameter: 10 mm.



350-251-30

## Metric

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
350-251-30	0-25	Flat (carbide tip)	Plain	10 mm		230
350-252-30	0-25	Flat (carbide tip)	w/ clamp nut	10 mm	11,5	230
350-253-30	0-25	Spherical (SR4)	Plain	10 mm		230
350-254-30	0-25	Spherical (SR4)	w/ clamp nut	10 mm	11,5	230



( ): with spindle full retracted

Functions	Series 350
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Function lock	●
Data output	●
HOLD	●

## Specifications

Accuracy	±2 µm (excluding quantizing error)
Digital step	0,001 mm
Measuring spindle	With spindle lock, ø 6,35 mm, spindle pitch 0,5 mm
Power supply	Battery SR-44
Battery life	approx. 2,4 years
Display	LCD, Character Height 7,5 mm

## Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Digital Micrometer Head with 12 mm Stem

## Series 350

This Micrometer Head has a 25 mm range and a 12 mm stem, and offers the following benefits:

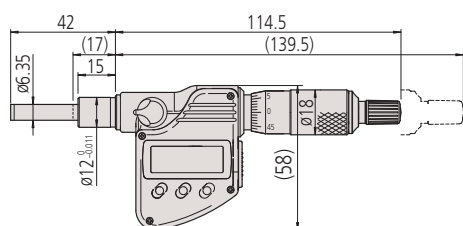
- You can integrate it into machinery and measuring instruments.
- Its excellent water and dust resistance (IP65 protection level) lets you use it in machining situations that include splashing coolant fluid (except types with threaded stem).
- Measurement values are clearly displayed in 0,001 mm increments.



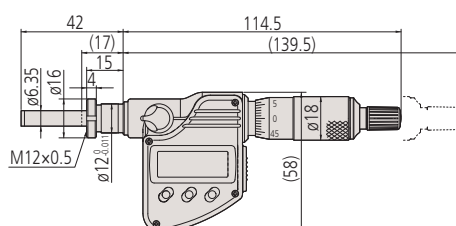
350-281-30

## Metric

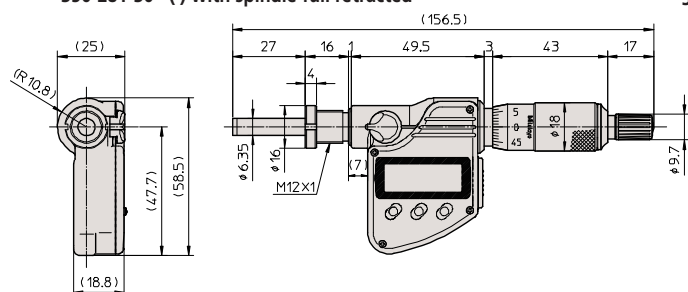
No.	Range [mm]	Spindle end	Remarks	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
350-271-30	0-25	Flat (carbide tip)	IP65	Plain	12 / 18 mm		230
350-272-30	0-25	Flat (carbide tip)	threaded stem	w/ clamp nut	M12 x 1	11,5	230
350-273-30	0-25	Spherical (SR4)	IP65	Plain	12 / 18 mm		230
350-274-30	0-25	Spherical (SR4)	threaded stem	w/ clamp nut	M12 x 1	11,5	230
350-281-30	0-25	Flat (carbide tip)	IP65	Plain	12 mm		230
350-282-30	0-25	Flat (carbide tip)	IP65	w/ clamp nut	12 mm	11,5	230
350-283-30	0-25	Spherical (SR4)	IP65	Plain	12 mm		230
350-284-30	0-25	Spherical (SR4)	IP65	w/ clamp nut	12 mm	11,5	230
350-261-30	0-25	Flat	IP65, w/ non-rotating measuring face w/o ratched stop	Plain	12/18 mm		235



350-281-30 ( ) with spindle full retracted



350-282-30



350-272-30

Functions	Series 350
ZERO/ABS	
Auto Power OFF after 20 min. non use	
2 x PRESET	
Function lock	
Data output	
HOLD	

## Specifications

Accuracy	±2 μm (excluding quantizing error)
Digital step	0,001 mm
Measuring spindle	With spindle lock, ø 6,35 mm spindle pitch 0,5 mm
Power supply	Battery SR-44
Battery life	approx. 2,4 years
Display	LCD, Character Height 7,5 mm

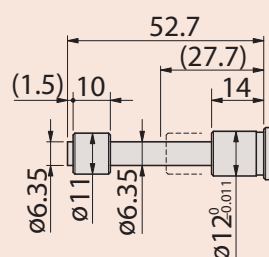
## Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

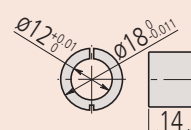
## Consumable spares

No.	Description
938882	Battery SR44 1.5V
305307	Bush, Series 350, Ø 12/18 mm, 14 mm length
306625	Bush, Series 350, Ø 12/18 mm, 16 mm length

306625 Standard for 350-271-30, 350-273-30  
305307 Standard for 350-261-30



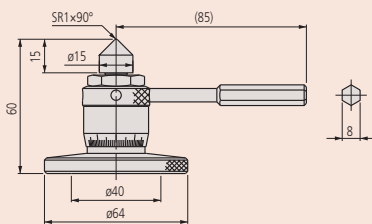
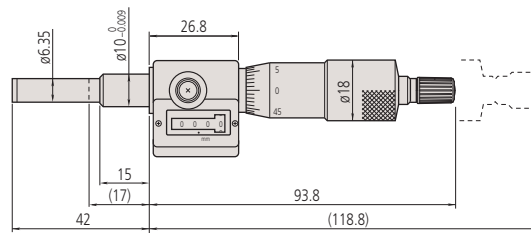
350-261-10



305307

Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome
Measuring spindle	With spindle lock, $\varnothing$ 6,35 mm, spindle pitch 0,5 mm

No.	Range [mm]	Accuracy	Spindle end	Stem Ø	Stem	Mass [g]
250-301	0-25	±2 µm	Flat (carbide tip)	10 mm	Plain	165



No.	Range [mm]	Remarks
7850	60-75	Max. load : 400kg

# Fine Spindle Feed Micrometer Head 5 mm and 6.5 mm Range

## Series 148 - Very fine spindle feed of 0,1/rev

These micrometer heads have a very fine spindle feed of 0,1 mm/rev. They offer the following benefits:

- Small size micrometer heads with extremely fine pitch of 0,1 mm.
- Ideal for fine adjustment applications in scientific apparatus.

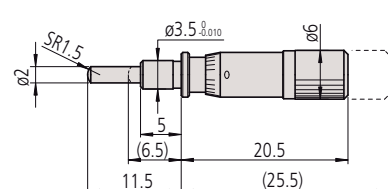


148-143

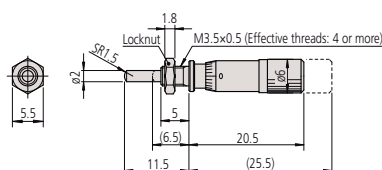
148-243

### Metric

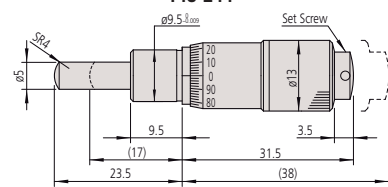
No.	Range [mm]	Accuracy [μm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-244	0-5	±5	Spherical (SR1,5)	Plain	3,5 mm		4
148-245	0-5	±5	Spherical (SR1,5)	w/ clamp nut	3,5 mm	3	5
148-142	0-6,5	±2	Spherical (SR4)	Plain	9,5 mm		31
148-143	0-6,5	±2	Spherical (SR4)	w/ clamp nut	9,5 mm	6	34
148-342	0-6,5	±2	Spherical (SR4)	Plain	9,5 mm		29
148-343	0-6,5	±2	Spherical (SR4)	w/ clamp nut	9,5 mm	6	31
148-242	0-6,5	±5	Spherical (SR3)	Plain	6 mm		10
148-243	0-6,5	±5	Spherical (SR3)	w/ clamp nut	6 mm	4	10



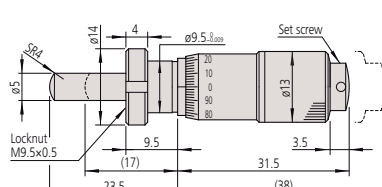
148-244



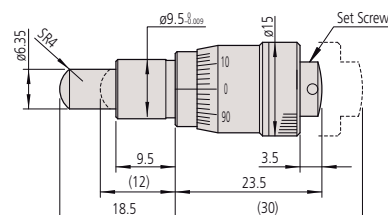
148-245



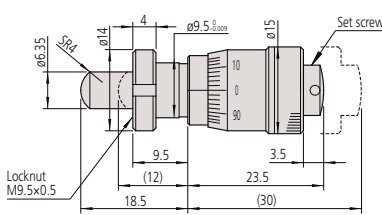
148-142



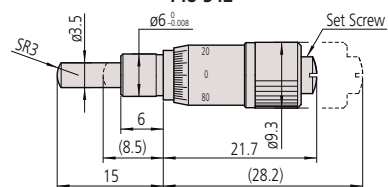
148-143



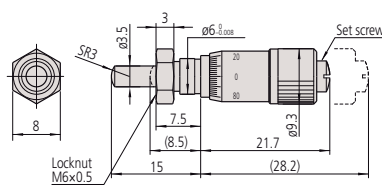
148-342



148-343



148-242

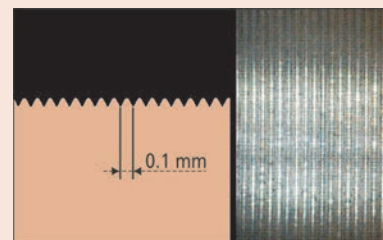


148-243

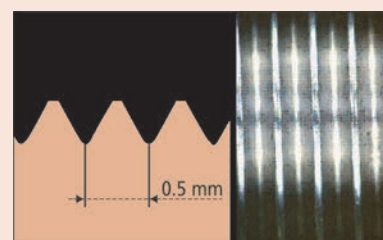
( ): with spindle full retracted

### Specifications

Graduation	0,002 mm 0,004 mm (148-244, 148-245)
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,1 mm
Measuring surfaces	Hardened steel (>60 HRC)



Pitch 0,1 mm



Pitch 0,5 mm



# Micrometer Head 5 mm and 6,5 mm Range

## Specifications

Accuracy	±5 µm
Graduation	0,02 mm 0,01 mm (148-215, 148-216)
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Hardened steel (>60 HRC)



## Series 148 - Ultra small

This ultra-small micrometer head allows you to easily incorporate it into machines and offers you the following benefits:

- Plain stem and a flat spindle end
- Hardened steel measuring surface



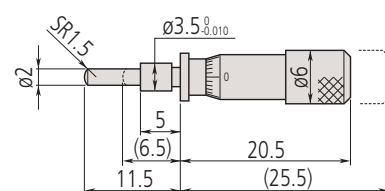
148-201



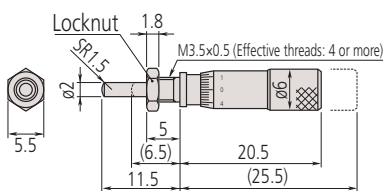
148-215

## Metric

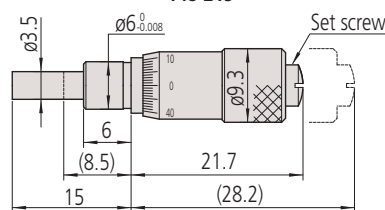
No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
148-215	0-5	Spherical (SR1,5)	3,5 mm	Plain		-	4
148-216	0-5	Spherical (SR1,5)	3,5 mm	w/ clamp nut	3	-	4
148-201	0-6,5	Flat	6 mm	Plain		-	10
148-203	0-6,5	Flat	6 mm	w/ clamp nut	4	-	10
148-205	0-6,5	Spherical (SR3)	6 mm	Plain		-	10
148-207	0-6,5	Spherical (SR3)	6 mm	w/ clamp nut	4	-	10
148-209	0-6,5	Flat	6 mm	Plain		Reverse reading	10
148-211	0-6,5	Flat	6 mm	w/ clamp nut	4	Reverse reading	10



148-215

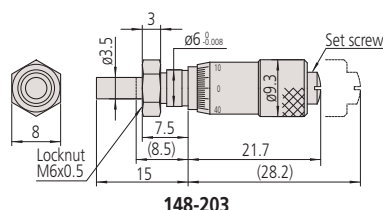


148-216



148-201

( ): with spindle full retracted



148-203

# Micrometer Head 6,5 mm and 13 mm Range

## Series 148 - Fine spindle feed of 0,25/rev

These micrometer heads are a standard, small-sized type with a 6,5 mm and 13 mm measuring range.

They offer the following benefits:

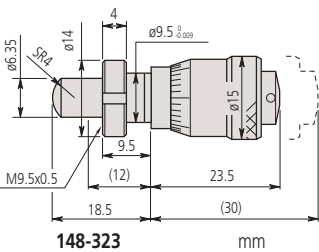
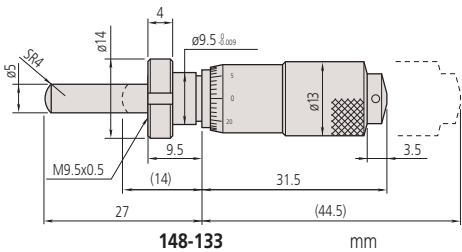
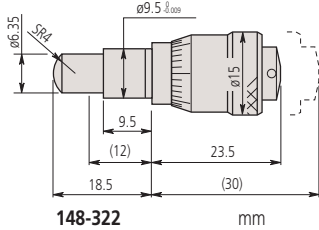
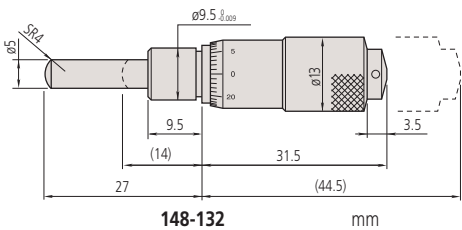
- Fine spindle feed of 0,25 mm/rev for fine adjustment.



148-132

### Metric

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-322	0-6,5	Spherical (SR4)	Plain	9,5 mm		30
148-323	0-6,5	Spherical (SR4)	w/ clamp nut	9,5 mm	6	35
148-132	0-13	Spherical (SR4)	Plain	9,5 mm		30
148-133	0-13	Spherical (SR4)	w/ clamp nut	9,5 mm	6	35



( ): with spindle full retracted

### Specifications

Accuracy	±2 μm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,25 mm
Measuring surfaces	Hardened steel (> 60 HRC)

# Micrometer Head 6,5 mm and 13 mm Range

## Specifications

Accuracy	±2 µm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Hardened steel (>60 HRC)

## Series 148 - Large Thimble Diameter for Easy Reading

These micrometer heads feature a locking screw so you can lock the spindle in any position with the knurled locking screw.

### Metric

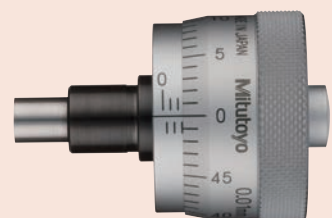
No.	Range [mm]	Spindle end	Stem	Stem Ø	Thimble Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-301	0-6,5	Flat	Plain	9,5 mm	15 mm		26
148-302	0-6,5	Flat	w/ clamp nut	9,5 mm	15 mm	6	26
148-303	0-6,5	Flat	Plain	9,5 mm	20 mm		39
148-304	0-6,5	Flat	w/ clamp nut	9,5 mm	20 mm	6	39
148-305	0-6,5	Flat	Plain	9,5 mm	29 mm		71
148-306	0-6,5	Flat	w/ clamp nut	9,5 mm	29 mm	6	71
148-313	0-6,5	Spherical (SR4)	Plain	9,5 mm	15 mm		26
148-314	0-6,5	Spherical (SR4)	w/ clamp nut	9,5 mm	15 mm	6	26
148-307	0-13	Flat	Plain	9,5 mm	15 mm		35
148-308	0-13	Flat	w/ clamp nut	9,5 mm	15 mm	6	35
148-309	0-13	Flat	Plain	9,5 mm	20 mm		55
148-310	0-13	Flat	w/ clamp nut	9,5 mm	20 mm	6	55
148-311	0-13	Flat	Plain	9,5 mm	29 mm		103
148-312	0-13	Flat	w/ clamp nut	9,5 mm	29 mm	6	103



148-301



148-303



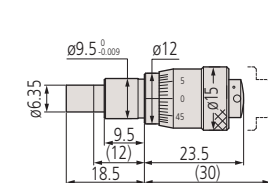
148-305



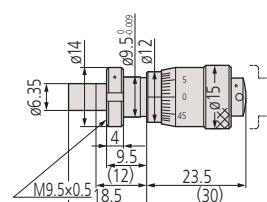
148-313



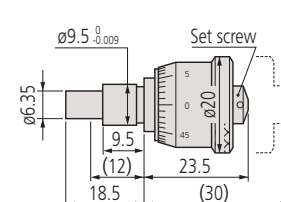
148-314



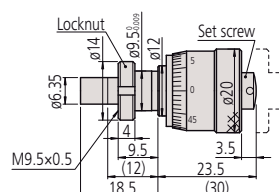
148-301



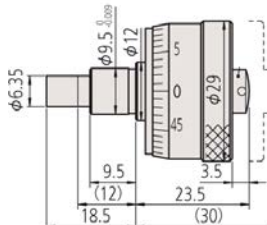
148-302



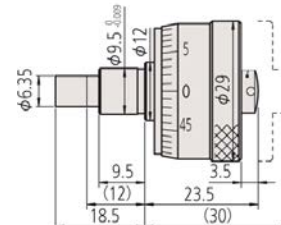
148-303



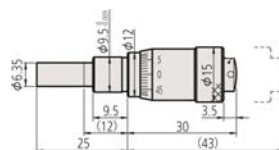
148-304



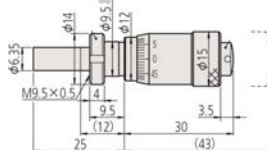
148-305



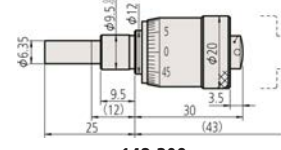
148-306



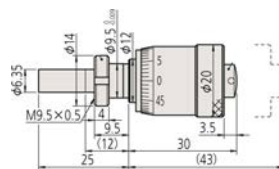
148-307



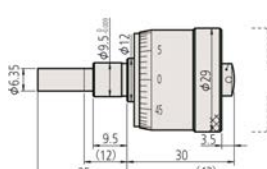
148-308



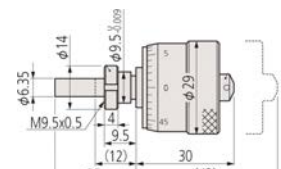
148-309



148-310



148-311



148-312

( ): with spindle full retracted

# Micrometer Head 6,5 mm Range with Spindle Lock

## Series 148 - Locking screw Type

These micrometer heads feature a knurled locking screw so you can lock the spindle in any position with the knurled locking screw.

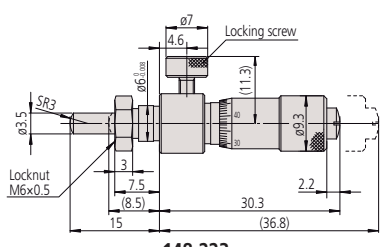
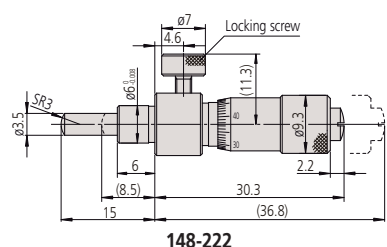
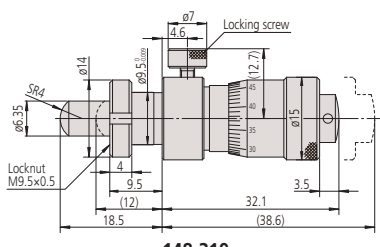
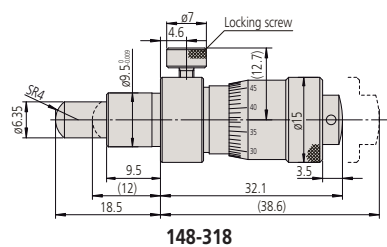
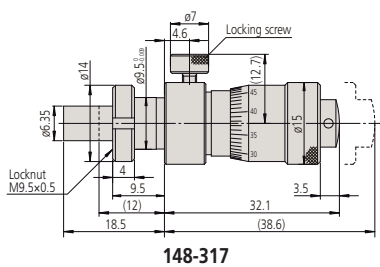
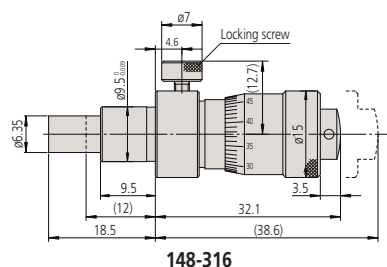
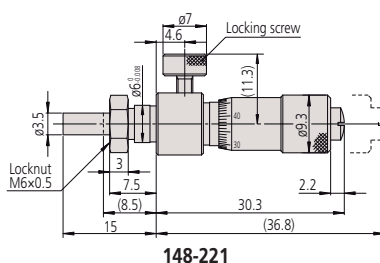
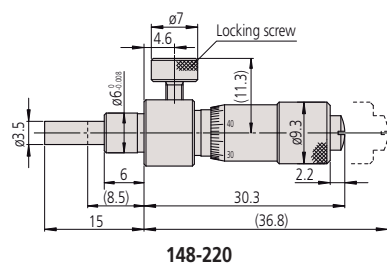


### Specifications

Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Hardened steel (>60 HRC)

### Metric

No.	Range [mm]	Accuracy [μm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-220	0-6,5	±5	Flat	Plain	6 mm		16
148-221	0-6,5	±5	Flat	w/ clamp nut	6 mm	4	17
148-222	0-6,5	±5	Spherical (SR3)	Plain	6 mm		16
148-223	0-6,5	±5	Spherical (SR3)	w/ clamp nut	6 mm	4	17
148-316	0-6,5	±2	Flat	Plain	9,5 mm		40
148-317	0-6,5	±2	Flat	w/ clamp nut	9,5 mm	6	43
148-318	0-6,5	±2	Spherical (SR4)	Plain	9,5 mm		40
148-319	0-6,5	±2	Spherical (SR4)	w/ clamp nut	9,5 mm	6	43



( ): with spindle full retracted

# Micrometer Head 13 mm Range with Spindle Lock

## Specifications

Accuracy	±2 µm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Hardened steel (>60 HRC)

## Series 148 - Locking screw Type

These micrometer heads feature a locking screw so you can lock the spindle in any position with the knurled locking screw.

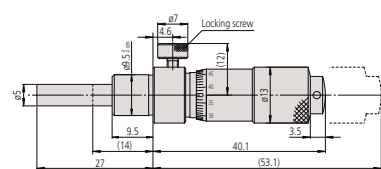


148-150

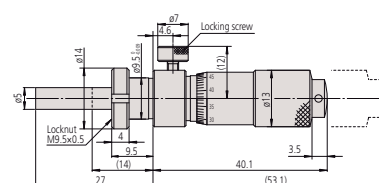
148-153

## Metric

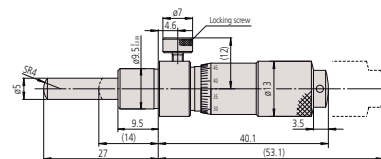
No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Mass [g]
148-150	0-13	Flat	9,5 mm	Plain		40
148-151	0-13	Flat	9,5 mm	w/ clamp nut	6	43
148-152	0-13	Spherical (SR4)	9,5 mm	Plain		40
148-153	0-13	Spherical (SR4)	9,5 mm	w/ clamp nut	6	43



148-150

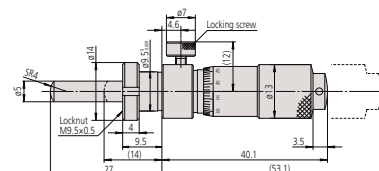


148-151



148-152

( ): with spindle full retracted



148-153



# Micrometer Head 13 mm Range with Zero Thimble

**Series 148 - Standard type, small size with zero-adjustable thimble.**

These are a standard type of small size micrometer heads with a zero-adjustable thimble. They offer the following benefits:

- You can make a zero-setting at any position by loosening the setscrew in the thimble.



148-503



148-504

## Metric

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
148-503	0-13	Flat	Plain	9,5 mm		-	35
148-513	0-13	Flat	Plain	9,5 mm		Stainless steel	35
148-508	0-13	Flat	w/ clamp nut	9,5 mm	6	-	40
148-853	0-13	Spherical (SR4)	Plain	9,5 mm		-	40
148-518	0-13	Flat	w/ clamp nut	9,5 mm	6	Stainless steel	40
148-858	0-13	Spherical (SR4)	w/ clamp nut	9,5 mm	6	-	40

## Metric

Reverse reading

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-863	0-13	Flat	Plain	9,5 mm		35
148-868	0-13	Flat	w/ clamp nut	9,5 mm	6	40

## Metric

Reverse reading / with spindle lock

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-864	0-13	Flat	w/ clamp nut	9,5 mm	6	40
148-866	0-13	Flat	Plain	9,5 mm		35

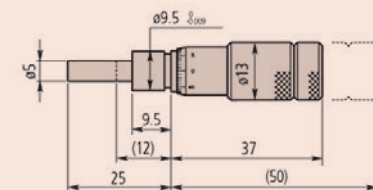
## Metric

With spindle lock

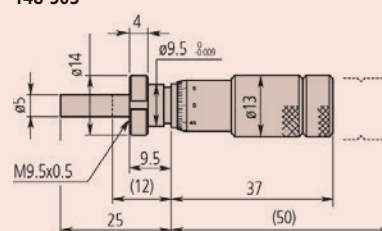
No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Mass [g]
148-506	0-13	Flat	Plain	9,5 mm		35
148-504	0-13	Flat	w/ clamp nut	9,5 mm	6	40
148-854	0-13	Spherical (SR4)	w/ clamp nut	9,5 mm	6	40
148-856	0-13	Spherical (SR4)	Plain	9,5 mm		35

## Specifications

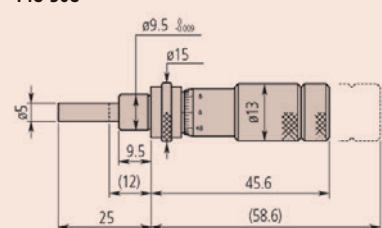
Accuracy	±2 µm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Hardened steel (> 60 HRC)



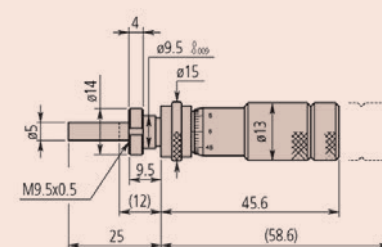
148-503



148-508



148-506



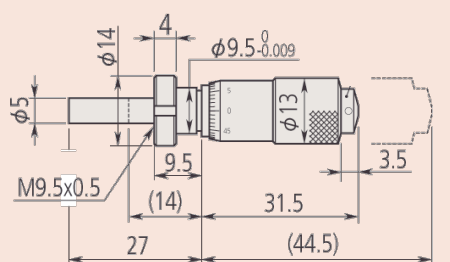
148-504

( ): with spindle full retracted

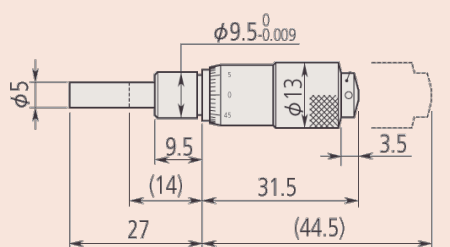
# Micrometer Head 13 mm Range

## Specifications

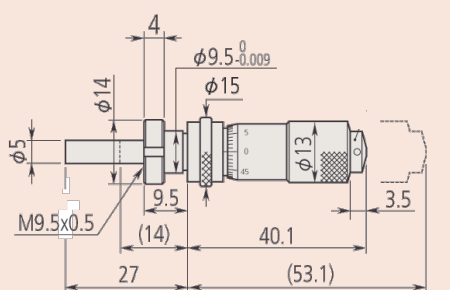
Accuracy	±2 μm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Hardened steel (> 60 HRC)



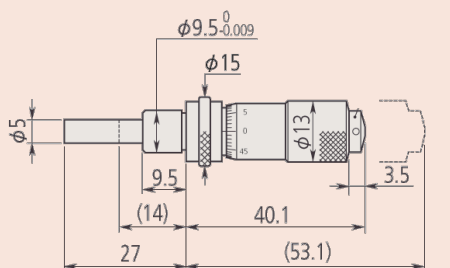
148-103



148-104



148-120



148-121

( ) with spindle full retracted

## Series 148 - Small standard type

This is a standard, small-sized micrometer head which offers you the following benefits:

- Plain stem and a flat spindle end
- Hardened steel measuring surface



148-104



148-103



148-121



148-120

## Metric

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
148-104	0-13	Flat	Plain	9,5 mm		-	30
148-103	0-13	Flat	w/ clamp nut	9,5 mm	6	-	35
148-801	0-13	Spherical (SR4)	Plain	9,5 mm		-	30
148-802	0-13	Spherical (SR4)	w/ clamp nut	9,5 mm	6	-	35
148-821	0-13	Flat	Plain	9,5 mm		Reverse reading	30
148-822	0-13	Flat	w/ clamp nut	9,5 mm	6	Reverse reading	35

## Metric

With spindle lock

No.	Range [mm]	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
148-121	0-13	Flat	Plain	9,5 mm		-	40
148-120	0-13	Flat	w/ clamp nut	9,5 mm	6	-	45
148-803	0-13	Spherical (SR4)	Plain	9,5 mm		-	40
148-804	0-13	Spherical (SR4)	w/ clamp nut	9,5 mm	6	-	45
148-823	0-13	Flat	Plain	9,5 mm		Reverse reading	40
148-824	0-13	Flat	w/ clamp nut	9,5 mm	6	Reverse reading	45

# Micrometer Head 15 mm Range

## Series 149 - Small standard type with carbide-tipped spindle

This small micrometer head with tungsten carbide measuring surface offers you the following benefits:

- Stem with clamp nut and a flat spindle end
- Stem with carbide-tipped spindle



149-132

149-184

### Specifications

Accuracy	±2 μm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Carbide tipped

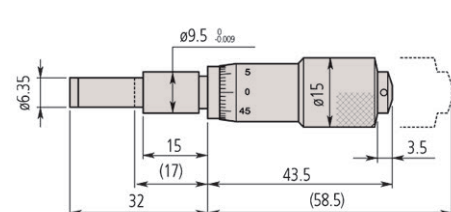
### Metric

No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
149-132	0-15	Flat (carbide tip)	9,5 mm	Plain		-	55
149-131	0-15	Flat (carbide tip)	9,5 mm	w/ clamp nut	11,5	-	60
149-801	0-15	Spherical (SR4)	9,5 mm	Plain		-	55
149-802	0-15	Spherical (SR4)	9,5 mm	w/ clamp nut	11,5	-	60
149-821	0-15	Flat (carbide tip)	9,5 mm	Plain		Reverse reading	55
149-822	0-15	Flat (carbide tip)	9,5 mm	w/ clamp nut	11,5	Reverse reading	60

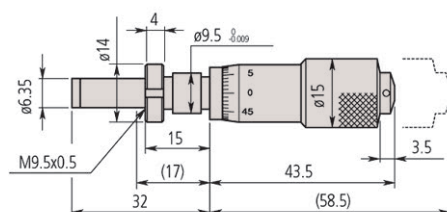
### Metric

With spindle lock

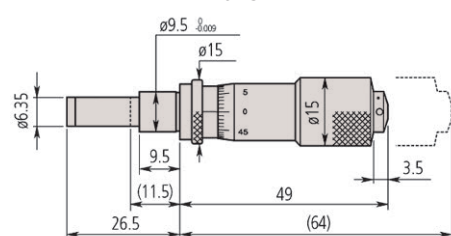
No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
149-183	0-15	Flat (carbide tip)	9,5 mm	Plain		-	55
149-184	0-15	Flat (carbide tip)	9,5 mm	w/ clamp nut	6	-	60
149-803	0-15	Spherical (SR4)	9,5 mm	Plain		-	55
149-804	0-15	Spherical (SR4)	9,5 mm	w/ clamp nut	6	-	60
149-823	0-15	Flat (carbide tip)	9,5 mm	Plain		Reverse reading	55
149-824	0-15	Flat (carbide tip)	9,5 mm	w/ clamp nut	6	Reverse reading	60



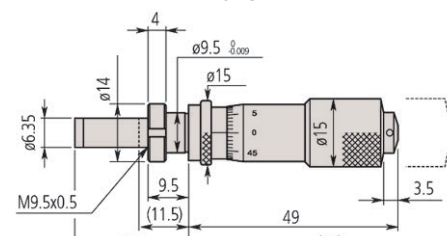
149-132



149-131



149-183



149-184

( ): with spindle full retracted

# Micrometer Head 25 mm Range

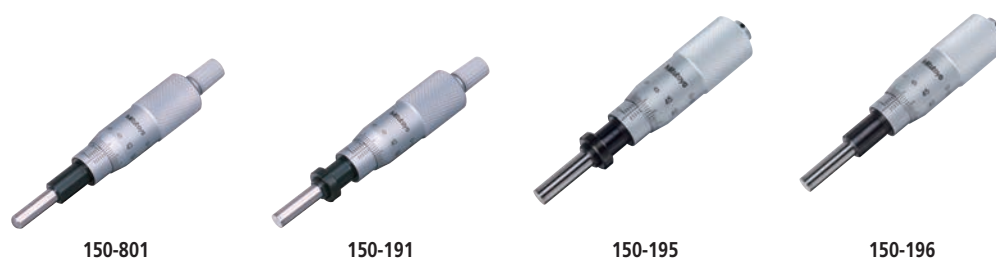
## Specifications

Accuracy	±2 µm
Graduation	0,01 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Carbide tipped

## Series 150 - Medium-sized standard type

This is a standard, medium-size micrometer head that offers you the following benefits:

- Plain stem and a flat spindle end
- With carbide-tipped spindle



## Metric

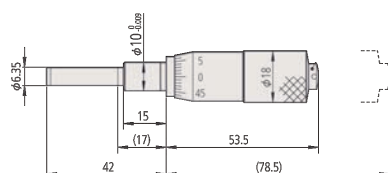
No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
150-192	0-25	Flat (carbide tip)	10 mm	Plain		-	95
150-191	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	-	100
150-801	0-25	Spherical (SR4)	10 mm	Plain		-	95
150-802	0-25	Spherical (SR4)	10 mm	w/ clamp nut	11,5	-	100
150-190	0-25	Flat (carbide tip)	10 mm	Plain		Graduation 0,001 mm	95
150-189	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	Graduation 0,001 mm	100
150-196	0-25	Flat (carbide tip)	10 mm	Plain		w/o ratchet stop	95
150-195	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	w/o ratchet stop	110
150-219	0-25	Flat	10 mm	Plain		Long spindle	95
150-220	0-25	Flat	10 mm	w/ clamp nut	11,5	Long spindle	100
150-821	0-25	Flat (carbide tip)	10 mm	Plain		Reverse reading	95
150-822	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	Reverse reading	100

## Metric

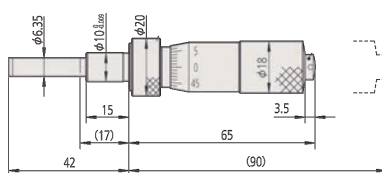
With spindle lock

No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
150-209	0-25	Flat (carbide tip)	10 mm	Plain		-	110
150-183	0-25	Flat (carbide tip)	10 mm	Plain		Graduation 0,001 mm	110
150-184	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	Graduation 0,001 mm	115
150-211	0-25	Flat (carbide tip)	10 mm	Plain		w/o ratchet stop	115
150-210	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	-	115
150-212	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	w/o ratchet stop	115
150-803	0-25	Spherical (SR4)	10 mm	Plain		-	110
150-804	0-25	Spherical (SR4)	10 mm	w/ clamp nut	11,5	-	115
150-823	0-25	Flat (carbide tip)	10 mm	Plain		Reverse reading	110
150-824	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	Reverse reading	115
150-223	0-25	Flat (carbide tip)	10 mm	Plain		Long spindle/ w/o/ratched stop	110
150-224	0-25	Flat (carbide tip)	10 mm	w/ clamp nut	11,5	Long spindle/ w/o/ratched stop	115

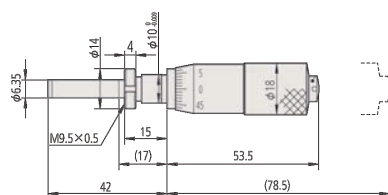
# Micrometer Head 25 mm Range



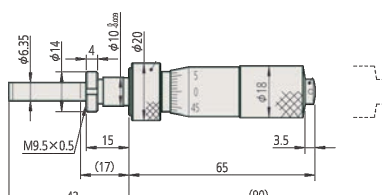
150-196



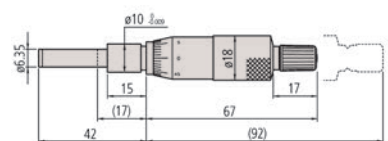
150-211



150-195



150-212



150-192



150-801

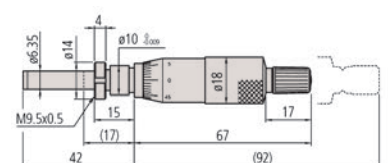


150-821



150-190

150-219



150-191



150-802

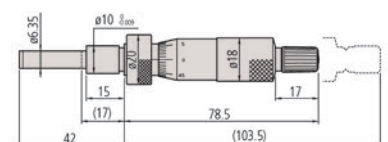


150-822



150-189

150-220



150-209



150-803

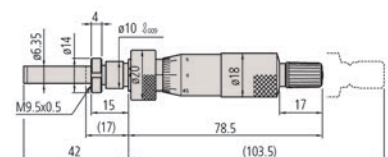


150-823



150-183

150-223



150-210

( ): with spindle full retracted



150-804



150-824



150-184

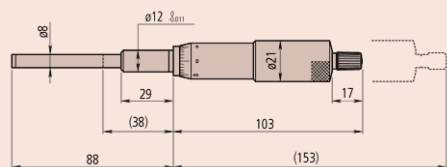
150-224



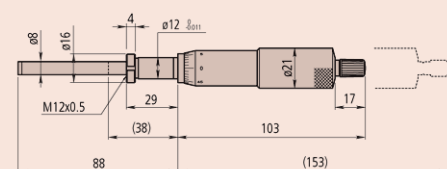
# Micrometer Head 25 mm and 50 mm Range

## Specifications

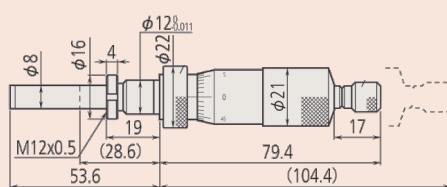
Accuracy	±2 μm ±4 μm (50 mm)
Graduation	0,01 mm/0,001 mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Carbide tipped



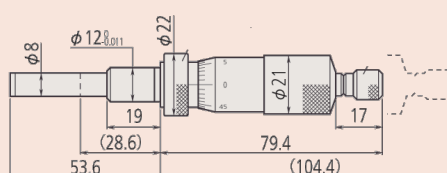
151-256



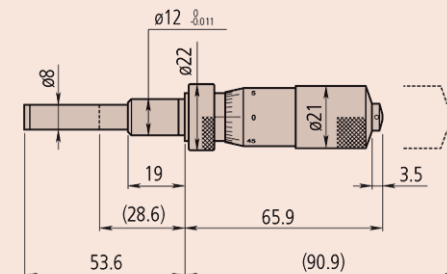
151-255



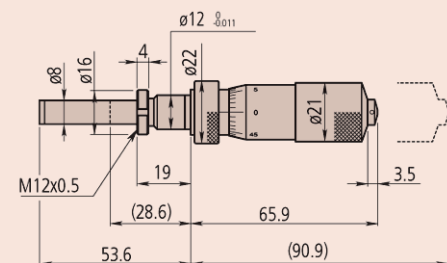
151-213



151-214



151-225



151-226

( ): with spindle full retracted

## Series 151 - Medium-sized standard type with 8 diameter spindle.

These micrometer heads are a medium-sized, standard type.

They offer the following benefits:

- 8 mm diameter spindle
- Extremely sturdy micrometer head with or without a ratchet.



151-224

151-223



151-255

151-256

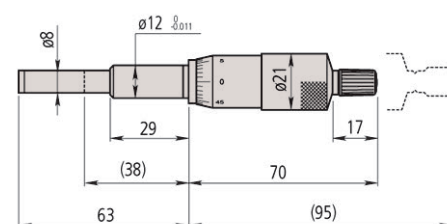
## Metric

No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
151-224	0-25	Flat (carbide tip)	12 mm	Plain		-	150
151-223	0-25	Flat (carbide tip)	12 mm	w/ clamp nut	25,5	-	155
151-222	0-25	Flat (carbide tip)	12 mm	Plain		Graduation 0,001 mm	150
151-221	0-25	Flat (carbide tip)	12 mm	w/ clamp nut	25,5	Graduation 0,001 mm	155
151-227	0-25	Flat (carbide tip)	12 mm	Plain		w/o ratchet stop	150
151-228	0-25	Flat (carbide tip)	12 mm	w/ clamp nut	25,5	w/o ratchet stop	155
151-256	0-50	Flat (carbide tip)	12 mm	Plain		-	240
151-255	0-50	Flat (carbide tip)	12 mm	w/ clamp nut	25,5	-	250
151-260	0-50	Flat (carbide tip)	12 mm	Plain		w/o ratchet stop	240
151-259	0-50	Flat (carbide tip)	12 mm	w/ clamp nut	25,5	w/o ratchet stop	250

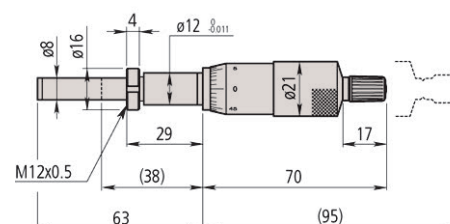
## Metric

With spindle lock

No.	Range [mm]	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
151-214	0-25	Flat (carbide tip)	12 mm	Plain		-	160
151-213	0-25	Flat (carbide tip)	12 mm	w/ clamp nut	15,5	-	165
151-212	0-25	Flat (carbide tip)	12 mm	Plain		Graduation 0,001 mm	160
151-211	0-25	Flat (carbide tip)	12 mm	w/ clamp nut	15,5	Graduation 0,001 mm	165
151-225	0-25	Flat (carbide tip)	12 mm	Plain		w/o ratchet stop	165
151-226	0-25	Flat (carbide tip)	12 mm	w/ clamp nut	15,5	w/o ratchet stop	165



151-224



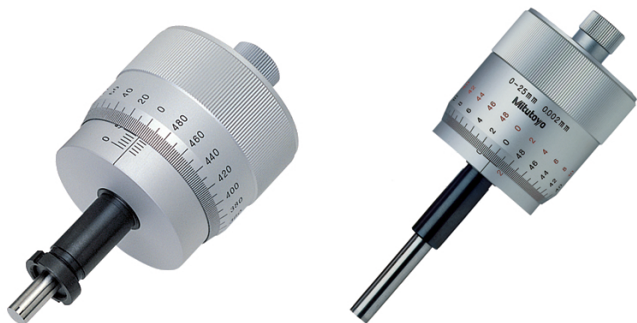
151-223

# Micrometer Heads with Large Thimble

## Series 152 - Large thimble type for fine adjustment

These micrometer heads come with a large thimble, allowing you to make fine adjustments. They offer the following benefits:

- The large scale drum allows fine graduation and very easy rotation.



152-283

152-348

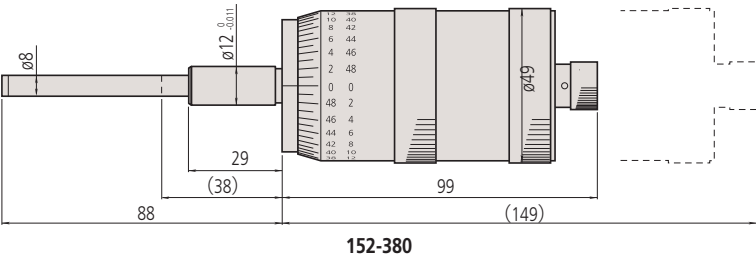
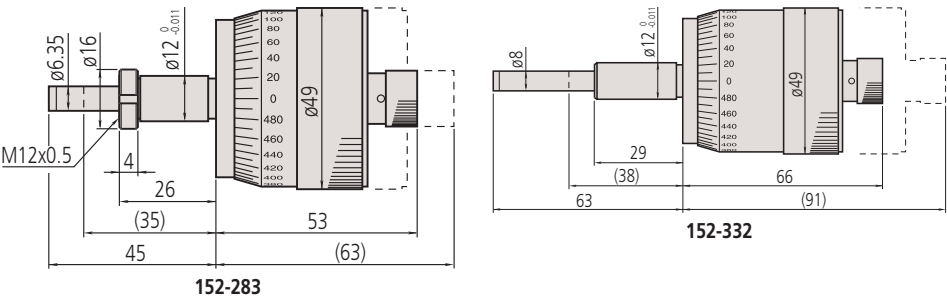
### Metric

No.	Range [mm]	Accuracy	Spindle end	Stem	Stem Ø	Fixture thickness for clamp nut [mm]	Special features	Mass [g]
152-283	0-10	±2 µm	Flat (carbide tip)	w/ clamp nut	12 mm	22,5	-	190
152-332	0-25	±2 µm	Flat (carbide tip)	Plain	12 mm		-	310

### Metric

Black and red scaling in both directions

No.	Range [mm]	Accuracy	Spindle end	Stem	Stem Ø	Special features	Mass [g]
152-348	0-25	±2 µm	Flat (carbide tip)	Plain	12 mm	Bidirectional graduation	310
152-380	0-50	±4 µm	Flat (carbide tip)	Plain	12 mm	Bidirectional graduation	460



( ): with spindle full retracted

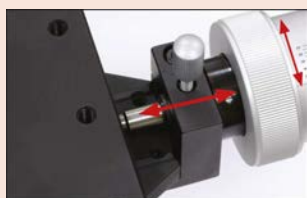
### Specifications

Accuracy	0,002 mm
Scale	White anodized aluminium
Spindle pitch	0,5 mm
Measuring surfaces	Carbide tipped

# Micrometer Head for XY-Stage

## Specifications

Accuracy	±2 µm
Graduation	0,005 mm (152-390, 152-389) 0,001 mm (152-402, 152-401)
Scale	White anodized aluminium
Spindle pitch	1 mm
Measuring surfaces	Hardened steel (>60 HRC) 152-390, 152-389, 152-392, 152-391 Carbide tipped 152-402, 152-401



152-402, 152-401

The zero point setting ring allows spindle travel without changing the scale drum position, thus simplifying zero point setting.

## Series 152 - XY Stage type

These XY Stage type micrometer heads let you read measurement values easily. They offer the following benefits:

- Micrometer head with rotating spindle, non-rotating measuring surface and bidirectional reading 152-390, 152-389.
- Graduations for each direction are engraved in a different colour (black or red).
- You can read measurement values directly from the 100-step graduation thimble without having to consider 1/2 mm values, reducing the chance of error.



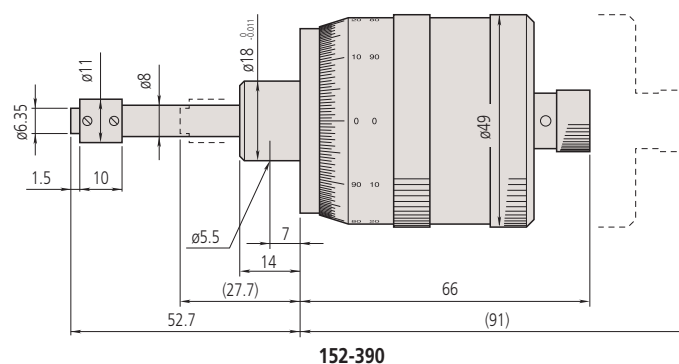
152-390



152-402

## Metric

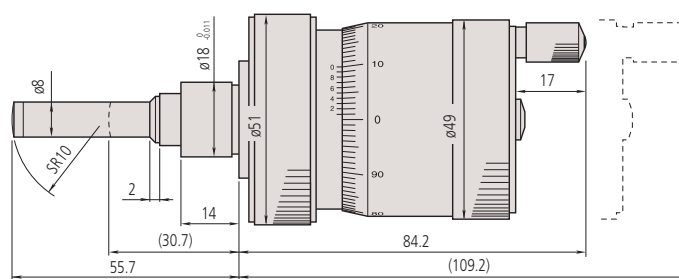
No.	Range [mm]	Spindle end	Stem	Stem Ø	Special features	Mass [g]
152-390	0-25	Flat (hardened) with non-rotating device	Plain	18 mm	For X-axis Bidirectional grad.	270
152-389	0-25	Flat (hardened) with non-rotating device	Plain	18 mm	For Y-axis Bidirectional grad.	270
152-402	0-25	Spherical with carbide tip (SR10)	Plain	18 mm	For X-axis	460
152-401	0-25	Spherical with carbide tip (SR10)	Plain	18 mm	For Y-axis	460



152-390



152-389



152-402

(): with spindle full retracted



152-401

# Quick Spindle Feed Micrometer Head

Series 152 - Quick spindle feed of 1/rev

This is a quick spindle micrometer head.

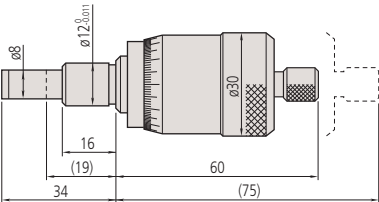
It offers you the following benefits:

- Micrometer head with 1 mm / rotation

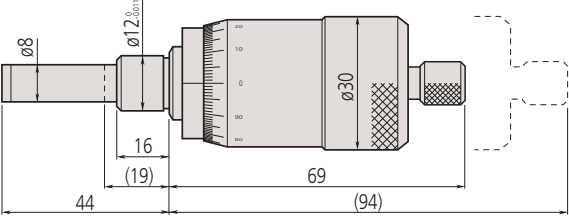


## Metric

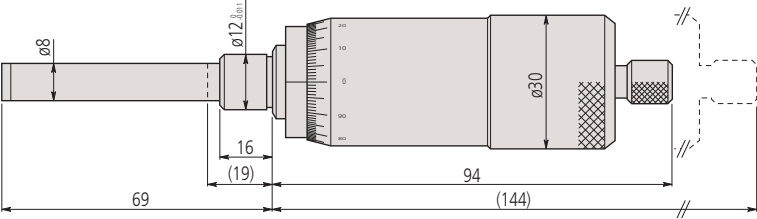
No.	Range [mm]	Accuracy [μm]	Spindle end	Stem	Stem Ø	Mass [g]
152-101	0-15	±2	Flat (carbide tip)	Plain	12 mm	205
152-102	0-25	±2	Flat (carbide tip)	Plain	12 mm	230
152-103	0-50	±4	Flat (carbide tip)	Plain	12 mm	355



152-101



152-102



152-103

( ): with spindle full retracted

## Specifications

Graduation	0,01mm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	1 mm
Measuring surfaces	Carbide tipped

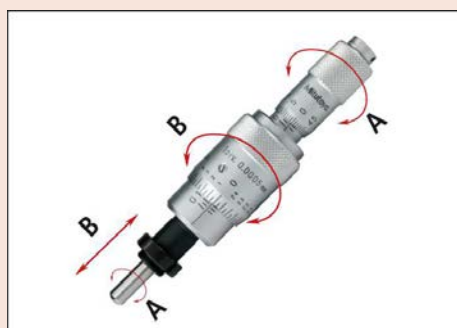
# Micrometer Head with Non-Rotating Spindle

## Specifications

Accuracy	±3 µm (1 mm) ±5 µm (2,5 mm) ±3 µm (13 mm)
Scale	Thimble and sleeve satin chrome finish
Measuring surfaces	Carbide tipped



Version with non-rotating spindle



Version with rotating spindle  
110-502

## Series 110 - Differential screw translator (Extra-fine feed) type

This is a differential screw translator (extra-fine feed) type of micrometer head. It offers you the following benefits:

- Micrometer head with ultra-fine rate of travel.
- With its non-rotating spindle it is particularly suited to fine adjustments.
- The differential travel mechanism with double spindle enables ultra-sensitive travel



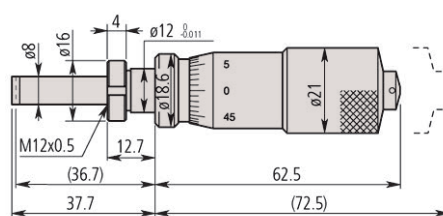
110-102



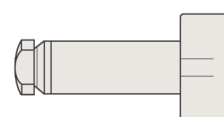
110-502

## Metric

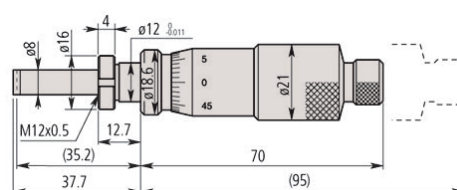
No.	Range	Graduation	Spindle end	Stem Ø	Stem	Fixture thickness for clamp nut [mm]	Mass [g]
110-105	0 - 1	0,001 mm	Flat (carbide tip)	12 mm	w/ clamp nut	9,5	150
110-106	0 - 1	0,0001 mm	Flat (carbide tip)	12 mm	w/ clamp nut	9,5	150
110-107	0 - 1	0,001 mm	Spherical (SR10)	12 mm	w/ clamp nut	9,5	150
110-108	0 - 1	0,0001 mm	Spherical (SR10)	12 mm	w/ clamp nut	9,5	150
110-101	0 - 2.5	0,001 mm	Flat (carbide tip)	12 mm	w/ clamp nut	9,5	150
110-102	0 - 2.5	0,0001 mm	Flat (carbide tip)	12 mm	w/ clamp nut	9,5	150
110-502	A: 0-13 B: 0-0,2	A: 0,01 mm B: 0,0005mm	Spherical (SR3)	9,5 mm	w/ clamp nut	11,5	100



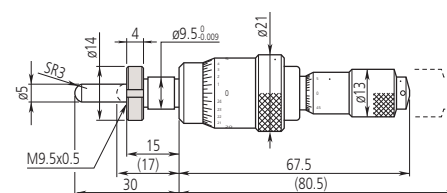
110-105  
110-106



110-107  
110-108



110-101  
110-102



110-502

( ): with spindle full retracted



# Micrometer Head with Non-Rotating Spindle

Series 153



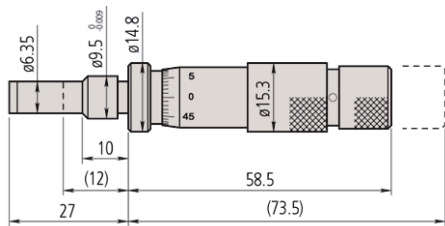
## Metric

No.	Range [mm]	Graduation	Spindle end	Stem Ø	Stem	Special features	Mass [g]
153-101	0-15	0,01 mm	Flat (carbide tip)	9,5 mm	Plain		70
153-203	0-25	0,01 mm	Flat (carbide tip)	12 mm	Plain		125
153-204	0-25	0,001 mm	Flat (carbide tip)	12 mm	Plain	Graduation with vernier	125

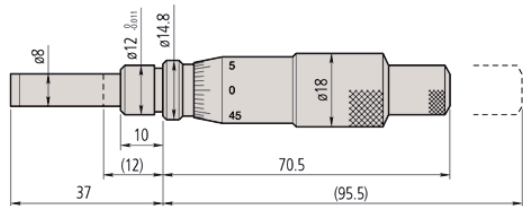
## Metric

With ratchet stop

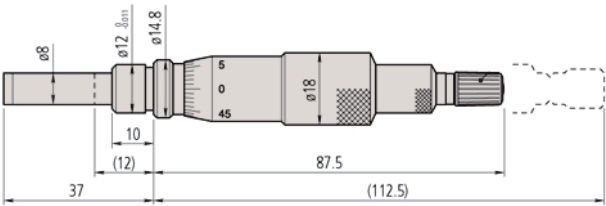
No.	Range [mm]	Graduation	Spindle end	Stem Ø	Stem	Special features	Mass [g]
153-201	0-25	0,01 mm	Flat (carbide tip)	12 mm	Plain		125
153-202	0-25	0,001 mm	Flat (carbide tip)	12 mm	Plain	Graduation with vernier	125



153-101



153-203 + 153-204



153-201 + 153-202

( ): with spindle full retracted

## Specifications

Accuracy	±3 µm
Scale	Thimble and sleeve satin chrome finish
Spindle pitch	0,5 mm
Measuring surfaces	Carbide tipped

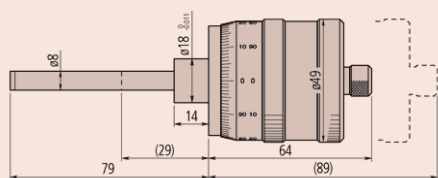


Version with non-rotating spindle

# Micrometer Head with Non-Rotating Spindle

## Specifications

Accuracy	±5 µm
Scale	White anodized aluminium
Spindle pitch	1 mm
Measuring surfaces	Carbide tipped



197-101

## Series 197 - Non-rotating spindle and large thimble

- Micrometer Head with non-rotating spindle and 1 mm spindle pitch.
- Measurement values can be read directly from the 100-step graduation thimble without the complication of having to consider 1/2 mm values, which simplifies reading and therefore reduces the chance of error.
- The scale is set to zero by rotating the barrel.



197-101

## Metric

No.	Range [mm]	Spindle end	Stem Ø	Stem	Special features	Mass [g]
197-101	0-50	Flat (carbide tip)	18 mm	Plain	Bidirectional graduation	300

## Specifications

Accuracy	±1 µm
Scale	White anodized aluminium
Spindle pitch	0,5 mm
Measuring surfaces	Carbide tipped

## Series 153 - Fine graduation and high accuracy

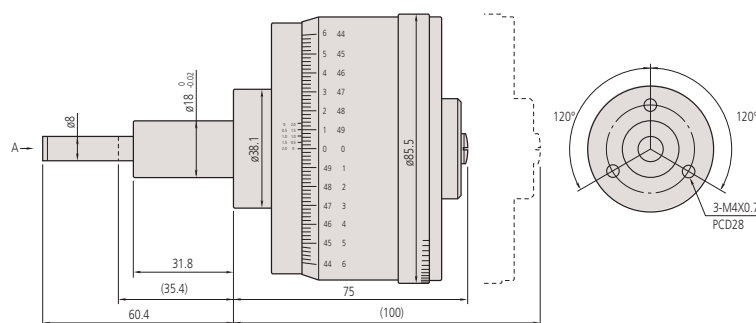
- Extra-large-diameter micrometer head with non-rotating spindle.



153-301

## Metric

No.	Range [mm]	Spindle end	Stem Ø	Stem	Special features	Mass [g]
153-301	0-25	Flat (carbide tip)	18 mm	Plain	Bidirectional graduation	750



153-301

# Fixtures for Micrometer Head

Mitutoyo offers various types of fixture designed for micrometer heads, which you can use for a wide range of applications, that have the following benefits:

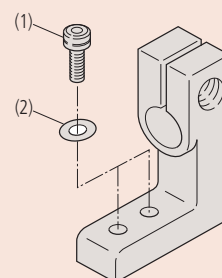
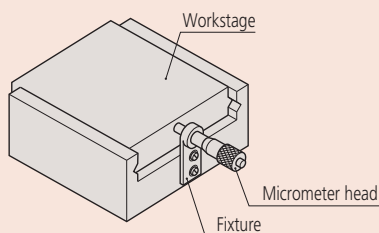
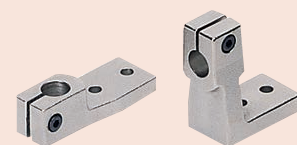
- These fixtures are high quality and durable, manufactured from nickel-plated cast iron.
- Two types of fixture for micrometer heads are available, depending on whether the head has a plain stem or is a clamp nut type.

Fixtures for micrometer heads with clamp nut

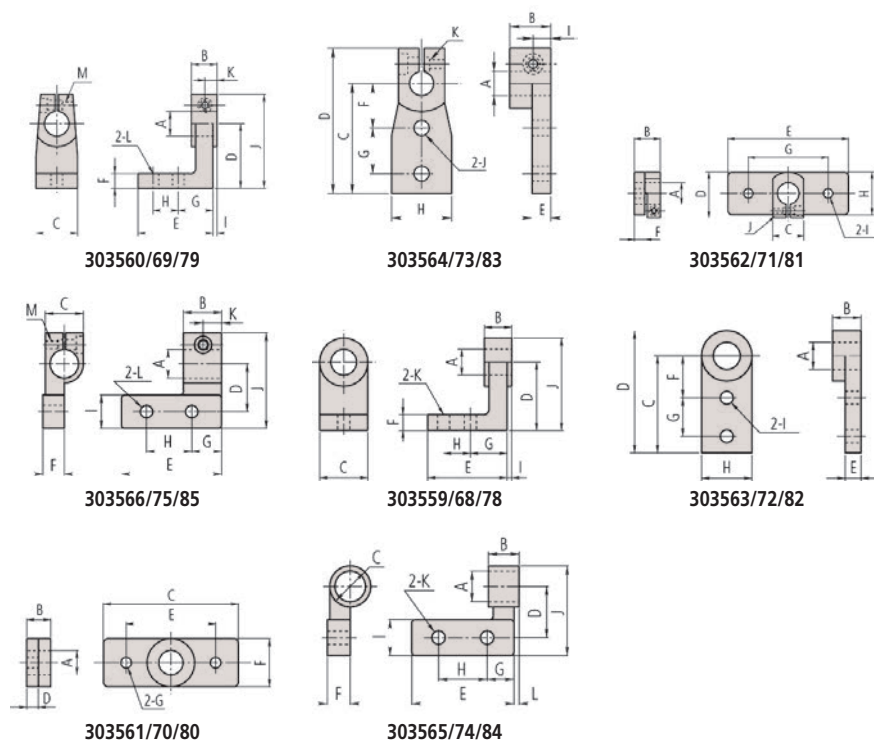
No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	J [mm]	K [mm]	L [mm]
303559	9,5	6	15	20	24	5	11	8	0,5	27,5	3,4	
303568	9,5	11,5	20	30	35	7	16	12	1,75	40	4,5	
303578	10	11,5	20	30	35	7	16	12	1,75	40	4,5	
303563	9,5	6	30	37,5	4,5	15	10	15	3,4			
303572	9,5	11,5	40	50	6,5	18	15	20	4,5			
303582	10	11,5	40	50	6,5	18	15	20	4,5			
303561	9,5	6	40	3,5	30	15	3,4					
303570	9,5	11,5	60	5,5	40	20	4,5					
303580	10	11,5	60	5,5	40	20	4,5					
303565	9,5	6	15	15	25	8,5	7,5	10	10	27,5	3,4	0,75
303574	9,5	11,5	15	20	40	8,5	10	20	15	35	4,5	1,25
303584	10	11,5	15	20	40	8,5	10	20	15	35	4,5	1,25

Fixtures for plain stem type micrometer heads

No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	J [mm]	K [mm]	L [mm]	M [mm]
303560	9,5	9	15	20	23	5	11	8	1,5	32,5	4,5	ø3,4	M3x0,5
303569	9,5	14,5	20	30	35	7	16	12	3,25	42,5	7,25	4,5	M3x0,5
303579	10	14,5	20	30	35	7	16	12	3,25	42,5	7,25	4,5	M3x0,5
303564	9,5	9	30	42,5	4	15	10	15	4,5	3,4	M3x0,5		
303573	9,5	14,5	40	52,5	6	18	15	20	7,25	4,5	M3x0,5		
303583	10	14,5	40	52,5	6	18	15	20	7,25	4,5	M3x0,5		
303562	9,5	9	15	20	40	3	30	15	3,4	M3x0,5			
303571	9,5	14,5	15	22,5	60	5	40	20	4,5	M3x0,5			
303581	10	14,5	15	22,5	60	5	40	20	4,5	M3x0,5			
303566	9,5	9	15	15	25	8,5	7,5	10	10	32,5	4,5	3,4	M3x0,5
303575	9,5	14,5	15	20	40	8,5	10	20	15	40	7,25	4,5	M3x0,5
303585	10	14,5	15	20	40	8,5	10	20	15	40	7,25	4,5	M3x0,5



Fixtures for use with plain stem type micrometer heads are split, and clamp the stem by tightening a socket head screw (M3x0.5x12 mm).

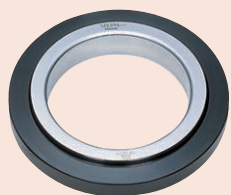




**Inside Micrometer**  
**Page 130**



**Bore Gauges**  
**Page 152**



**Inside Measuring Instruments Accessories**  
**Page 165**

# Digimatic Holtest Individual

## Series 468

These are three-point internal micrometers that offer you the following benefits:

- Individual micrometer.
- Titanium-coated measuring pins give you excellent durability and impact resistance.
- They also have excellent resistance against water and dust (IP65 protection level), allowing you to use this product in machining situations that include splashing coolant fluid.
- Large LCD display with character height of 7,5 mm enables you to read measurements easily.
- Without setting rings or extensions.



Titanium coated measuring surfaces for durability

### Metric

No.	Range [mm]	Mass [g]
468-161	6-8	370
468-162	8-10	370
468-163	10-12	370
468-164	12-16	400
468-165	16-20	400
468-166	20-25	470
468-167	25-30	480
468-168	30-40	480
468-169	40-50	500
468-170	50-63	620
468-171	62-75	630
468-172	75-88	960
468-173	87-100	970
468-174	100-125	940
468-175	125-150	1030
468-176	150-175	1120
468-177	175-200	1210
468-178	200-225	1300
468-179	225-250	1390
468-180	250-275	1480
468-181	275-300	1570



Functions	Series 468
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	6-20 mm : $\pm 2 \mu\text{m}$ 20-100 mm : $\pm 3 \mu\text{m}$ 100-300 : $\pm 5 \mu\text{m}$ (excluding quantizing error) - The given values require close contact of the measuring surfaces.
Digital step	0,001 mm
Measuring pins	Titanium coated tungsten carbide (6-12 mm) Titanium coated hardened steel (12-300 mm) Taper: tungsten carbide
Battery life	approx. 1,2 years
Display	LCD, character height 7,5 mm
Delivered	Including box, key, 1 battery, certificate of inspection

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type
952322	Holtest, Borematic Extension 100mm, 6-12mm
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm
04AZB157	Holder for Micrometer Stand, for Series 468
156-101-10	Micrometer Stand, Adjustable Angle Type, for Micrometer 0-100mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



# Digimatic Holtest Individual



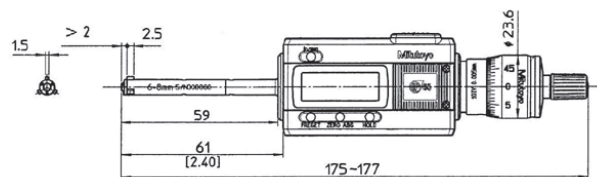
Holtest with optional accessories  
Stand 156-101-10  
Printer DP1-VA 264-505D  
Holder 04AZB157  
Cable 05CZA662



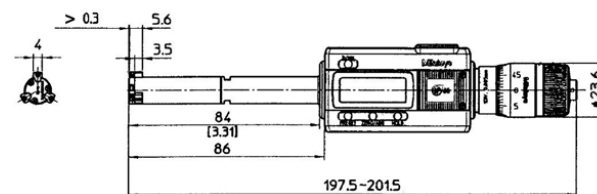
04AZB157



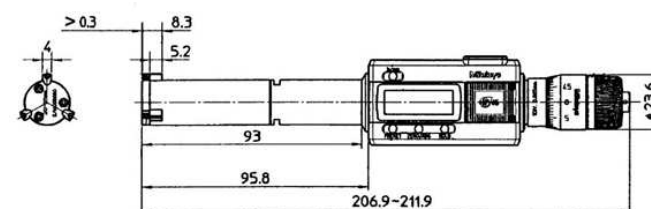
Extension rod for deep holes



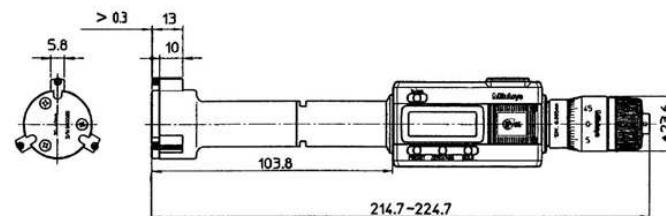
468-161, 468-162, 468-163



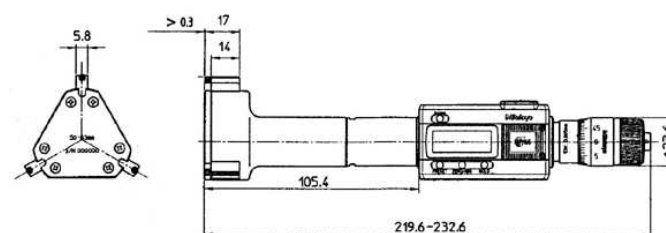
468-164, 468-165



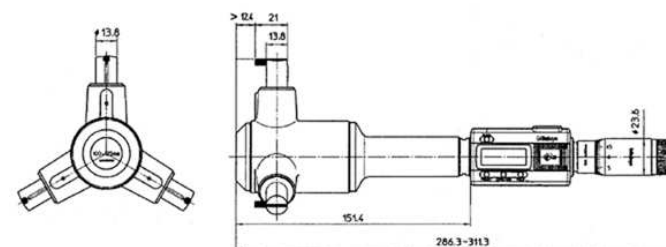
468-166, 468-167



468-168, 468-169



468-170, 468-171, 468-172, 468-173



468-174, 468-175, 468-176, 468-177, 468-178, 468-179, 468-180, 468-181

# Digimatic Holtest Interchangeable Head Set

## Series 468

These are three-point internal micrometers that offer you the following benefits:

- Interchangeable head set.
- Titanium-coated measuring pins give you excellent durability and impact resistance.
- They also have excellent resistance against water and dust (IP65 protection level), allowing you to use this product in machining situations that include splashing coolant fluid.
- Large LCD display with character height of 7,5 mm enables you to read measurements easily.
- With setting rings and extensions.



468-973



Titanium coated measuring surfaces for durability

### Metric

No.	Range [mm]	Remarks	Individual ranges [mm]	Setting rings included	Mass [g]
468-971	6-12	100 mm extension	6-8, 8-10, 10-12	ø8 mm (177-125) ø10 mm (177-126)	420
468-972	12-20	150 mm extension	12-16, 16-20	ø16 mm (177-177)	560
468-973	20-50	150 mm extension	20-25, 25-30, 30-40, 40-50	ø25 mm (177-139) ø40 mm (177-290)	1170
468-974	50-100	150 mm extension	50-63, 62-75, 75-88, 87-100	ø62 mm (177-314) ø87 mm (177-318)	2420
468-975	100-200	150 mm extension	100-125, 125-150, 150-175, 175-200	ø125 mm (177-298) ø175 mm (177-302)	3540



Holtest with optional accessories  
Stand 156-101-10  
Printer DP1-VA 264-505D  
Holder 04AZB157  
Cable 05CZA662

Functions	Series 468
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

### Specifications

Accuracy	6-20 mm : $\pm 2 \mu\text{m}$ 20-100 mm : $\pm 3 \mu\text{m}$ 100-200 mm : $\pm 5 \mu\text{m}$ (excluding quantizing error) - The given value require close contact of the measuring surfaces.
Digital step	0,001 mm
Measuring pins	Titanium coated tungsten carbide (6-12 mm) Titanium coated hardened steel (12-200 mm) Taper: tungsten carbide
Battery life	approx. 1,2 years
Display	LCD, character height 7,5 mm
Delivered	Including box, key, 1 battery, setting ring, extension, certificate of inspection (instruments only - certificate of inspection for setting rings not included).

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type
156-101-10	Micrometer Stand, Adjustable Angle Type, for Micrometer 0-100mm
04AZB157	Holder for Micrometer Stand, for Series 468
952322	Holtest, Borematic Extension 100mm, 6-12mm
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



04AZB157



Extension

# Digimatic Holtest Complete Unit Set

Functions	Series 468
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Function lock	●
Data output	●
HOLD	●

## Specifications

Accuracy	6-20 mm : $\pm 2 \mu\text{m}$ 20-100 mm : $\pm 3 \mu\text{m}$ (excluding quantizing error) - The given values require close contact of the measuring surfaces.
Digital step	0,001 mm
Measuring pins	Titanium coated tungsten carbide (6-12 mm) Titanium coated hardened steel (12-100 mm) Taper: tungsten carbide
Battery life	approx. 1,2 years
Display	LCD, character height 7,5 mm
Delivered	Including box, key, 1.0 battery, setting ring, certificate of inspection (instruments only - certificate of inspection for setting rings not included).

## Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type
04AZB157	Holder for Micrometer Stand, for Series 468
156-101-10	Micrometer Stand, Adjustable Angle Type, for Micrometer 0-100mm
952322	Holtest, Borematic Extension 100mm, 6-12mm
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



04AZB157



Extension

## Series 468

These are three-point internal micrometers that offer you the following benefits:

- Complete unit set.
- Titanium-coated measuring pins give you excellent durability and impact resistance.
- They also have excellent resistance against water and dust (IP65 protection level), allowing you to use this product in machining situations that include splashing coolant fluid.
- Large LCD display with character height of 7,5 mm enables you to read measurements easily.
- With setting rings but without extensions.



468-983



Titanium coated measuring surfaces for durability

## Metric

Measuring surfaces titanium coated. Carbide taper and contact points.

No.	Range [mm]	Individual ranges	Models included	Setting rings included	Mass [g]
468-981	6-12	6-8, 8-10, 10-12 mm	468-161 / 468-162 / 468-163	ø8 mm (177-125) ø10 mm (177-126)	1160
468-982	12-25	12-16, 16-20, 20-25 mm	468-164 / 468-165 / 468-166	ø16 mm (177-177) ø20 mm (177-286)	1290
468-983	25-50	25-30, 30-40, 40-50 mm	468-167 / 468-168 / 468-169	ø30 mm (177-288) ø40 mm (177-290)	1480
468-984	50-75	50-63, 62-75 mm	468-170 / 468-171	ø62 mm (177-314)	1270
468-985	75-100	75-88, 87-100 mm	468-172 / 468-173	ø87 mm (177-318)	1990



Holtest with optional accessories  
Stand 156-101-10  
Printer DP1-VA 264-505D  
Holder 04AZB157  
Cable 05CZA662



# Holtest Metric

## Series 368

These are metric three-point and two-point internal micrometers that offer you the following benefits:

- Titanium-coated measuring pins give you excellent durability and impact resistance.
- Three-point micrometer allows stable measurement through automatic centring.
- It is delivered without setting rings or extensions.

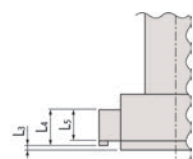


### Specifications

Graduation	up to 12 mm : 0,001 mm over 12 mm : 0,005 mm
Accuracy	2-20 mm : $\pm 2 \mu\text{m}$ 20-100 mm : $\pm 3 \mu\text{m}$ 100-300 mm : $\pm 5 \mu\text{m}$
Scale	Thimble and sleeve satin chrome finish, Up to 12 mm : $\varnothing 17 \text{ mm}$ Over 12 mm : $\varnothing 23 \text{ mm}$
Measuring Surface/Pins	2 - 6 mm: carbide 6 - 12 mm: titanium coated tungsten carbide 12 - 300 mm: titanium coated hardened steel taper: tungsten carbide
Measuring spindle	Spindle pitch 0,5 mm
Measuring method	2-6 mm : 2-point 6-300 mm : 3-point
Delivered	Including box, key, certificate of inspection

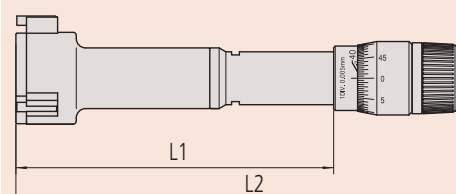
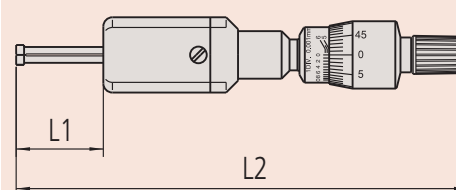
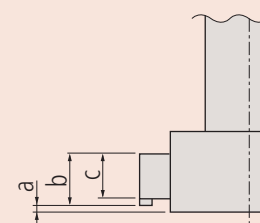
### Optional accessories

No.	Description
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm
952322	Holtest, Borematic Extension 100mm, 6-12mm



### Metric

No.	Range [mm]	L1 [mm]	L2 [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
368-001	2-2,5	12	103,5-104			2	88
368-002	2,5-3	12	103,5-104			2	88
368-003	3-4	22	113-114			2	91
368-004	4-5	22	113-114			2	91
368-005	5-6	22	113-114			2	91
368-161	6-8	59	102-104	2		2,5	60
368-162	8-10	59	102-104	2		2,5	60
368-163	10-12	59	102-104	2		2,5	60
368-164	12-16	82	126-130	0,3	5,6	3,5	150
368-165	16-20	82	126-130	0,3	5,6	3,5	160
368-166	20-25	94	126-130	0,3	8,3	5,2	260
368-167	25-30	94	137-142	0,3	8,3	5,2	280
368-168	30-40	102	145-155	0,3	13	10	290
368-169	40-50	102	145-155	0,3	13	10	330
368-170	50-63	105	150-163	0,3	17	14	440
368-171	62-75	105	150-163	0,3	17	14	450
368-172	75-88	105	150-165	0,3	17	14	570
368-173	87-100	105	150-165	0,3	17	14	580
368-174	100-125	161	227-252	12,4	21	13,8	1030
368-175	125-150	161	227-252	12,4	21	13,8	1120
368-176	150-175	161	227-252	12,4	21	13,8	1210
368-177	175-200	161	227-252	12,4	21	13,8	1320
368-178	200-225	161	227-252	12,4	21	13,8	1430
368-179	225-250	161	227-252	12,4	21	13,8	1550
368-180	250-275	161	227-252	12,4	21	13,8	1700
368-181	275-300	161	227-252	12,4	21	13,8	1870





## Specifications

Graduation	0,001 mm 0,005 mm (models over 12 mm)
Accuracy	2-20 mm : 2 µm 20-100 mm : 3 µm 100-300 mm : 5 µm
Scale	Thimble and sleeve satin chrome finish, Up to 12 mm : ø17 mm Over 12 mm : ø23 mm
Measuring method	2-6 mm 2-point 6-200 mm 3-point
Delivered	Including box, key, setting ring, extension, certificate of inspection (instruments only - certificate of inspection for setting rings not included).



368-906



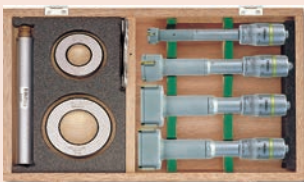
368-907



368-911



368-912



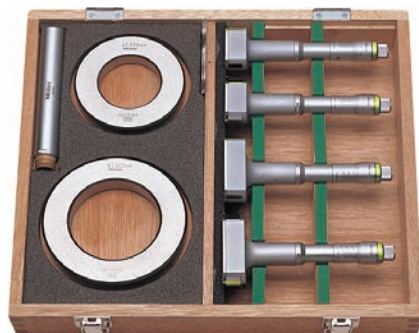
368-913

# Holtest Set

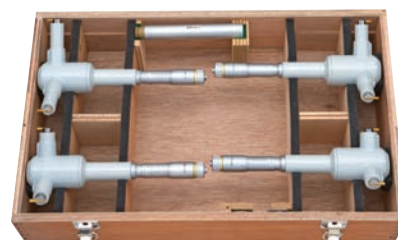
## Series 368

This is a set of three-point and two-point internal micrometers that offers you the following benefits:

- Complete unit set.
- Carbide measuring surface (2-6 mm range)
- Titanium-coated measuring pins (> 6 mm range) give you excellent durability and impact resistance.
- With setting rings and extensions, except for models 368-906, 368-907 which are supplied with setting rings only.



368-914



368-915

## Metric

No.	Range [mm]	Individual ranges	Models included	Setting rings included	Extension rod	Mass [g]
368-906	2-3	2-2,5, 2,5-3 mm	368-001 / 368-002	ø2,5 mm (177-208)		310
368-907	3-6	3-4, 4-5, 5-6 mm	368-003 / 368-004 / 368-005	ø4 mm (177-204) ø5 mm (177-205)		505
368-911	6-12	6-8, 8-10, 10-12 mm	368-161 / 368-162 / 368-163	ø8 mm (177-125) ø10 mm (177-126)	952322	180
368-912	12-20	12-16, 16-20 mm	368-164 / 368-165	ø16 mm (177-177)	952621	280
368-913	20-50	20-25, 25-30, 30-40, 40-50 mm	368-166 / 368-167 / 368-168 / 368-169	ø25 mm (177-139) ø40 mm (177-290)	952622	960
368-914	50-100	50-63, 62-75, 75-88, 87-100 mm	368-170 / 368-171 / 368-172 / 368-173	ø62 mm (177-314) ø87 mm (177-318)	952623	2030
368-915	100-200	100-125, 125-150, 150-175, 175-200 mm	368-174 / 368-175 / 368-176 / 368-177	ø125 mm (177-298) ø175 mm (177-302)	952623	4680

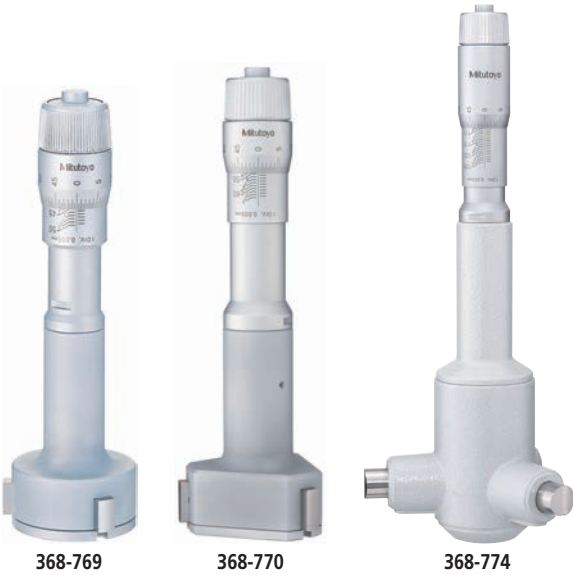


# Economy Holtest

## Series 368

This is an economy version of a three-point internal micrometer, that offers you the following benefits:

- Hardened tool steel anvils and tapers allow a more economically priced and affordable tool.
- Individual types without setting rings or extensions.



### Metric

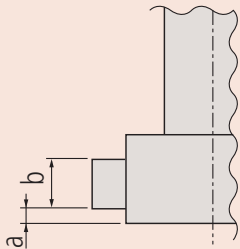
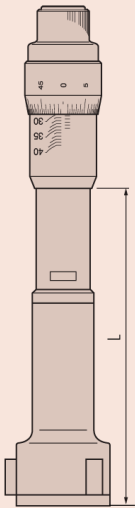
No.	Range [mm]	L [mm]	a [mm]	b [mm]	Mass [g]
368-764	12-16	82	2,6	3,5	150
368-765	16-20	82	2,6	3,5	150
368-766	20-25	94	3,4	5,2	260
368-767	25-30	94	3,4	5,2	280
368-768	30-40	102	3,4	10	290
368-769	40-50	102	3,4	10	330
368-770	50-63	105	3,4	14	440
368-771	62-75	105	3,4	14	450
368-772	75-88	105	3,4	14	560
368-773	87-100	105	3,4	14	570
368-774	100-125	161	19,6	13,8	1020
368-775	125-150	161	19,6	13,8	1110
368-776	150-175	161	19,6	13,8	1200
368-777	175-200	161	19,6	13,8	1300
368-778	200-225	161	19,6	13,8	1420
368-779	225-250	161	19,6	13,8	1540
368-780	250-275	161	19,6	13,8	1690
368-781	275-300	161	19,6	13,8	1860

## Specifications

Graduation	0,005 mm
Accuracy	12-20 mm : $\pm 2 \mu\text{m}$ 20-100 mm : $\pm 3 \mu\text{m}$ 100-300 mm : $\pm 5 \mu\text{m}$
Scale	Thimble and sleeve satin chrome finish, Up to 12 mm : $\varnothing 17 \text{ mm}$ Over 12 mm : $\varnothing 23 \text{ mm}$
Measuring surfaces	hardened steel Taper: hardened steel
Measuring spindle	Spindle pitch 0,5 mm
Measuring method	3-point
Delivered	Including box, key, certificate of inspection

## Optional accessories

No.	Description
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm



# Economy Holtest Set

## Specifications

Graduation	up to 12 mm: 0,001 mm over 12 mm: 0,005 mm
Accuracy	12-20 mm : $\pm 2 \mu\text{m}$ 20-100 mm : $\pm 3 \mu\text{m}$ 100-300 mm : $\pm 5 \mu\text{m}$
Scale	Thimble and sleeve satin chrome finish, Up to 12 mm : $\varnothing 17 \text{ mm}$ Over 12 mm : $\varnothing 23 \text{ mm}$
Delivered	Including box, key, setting ring, extension, certificate of inspection (instruments only - certificate of inspection for setting rings not included).

## Optional accessories

No.	Description
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm



Extension

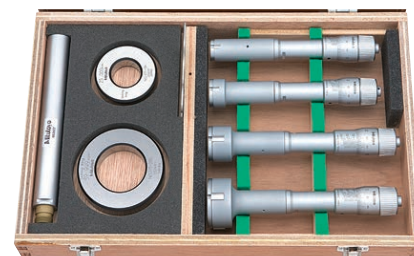
## Series 368

This is an economy version of a three-point internal micrometer, that offers you the following benefits:

- Hardened tool steel anvils and tapers allow a more economically priced and affordable tool.
- Individual types without setting rings or extensions.
- Sets with setting rings and extensions.



368-991



368-992



368-993



368-994

## Metric

No.	Range [mm]	Individual ranges	Models included	Setting rings included	Extension rod	Mass [g]
368-991	12-20	12-16, 16-20 mm	368-764 / 368-765	$\varnothing 16 \text{ mm}$ (177-177)	952621	310
368-992	20-50	20-25, 25-30, 30-40, 40-50 mm	368-766 / 368-767 368-768 / 368-769	$\varnothing 25 \text{ mm}$ (177-139) $\varnothing 40 \text{ mm}$ (177-290)	952622	1160
368-993	50-100	50-63, 62-75, 75-88, 87-100 mm	368-770 / 368-771 / 368-772 / 368-773	$\varnothing 62 \text{ mm}$ (177-314) $\varnothing 87 \text{ mm}$ (177-318)	952623	2020
368-994	100-200	100-125, 125-150, 150-175, 175-200 mm	368-774 / 368-775 / 368-776 / 368-777	$\varnothing 125 \text{ mm}$ (177-298) $\varnothing 175 \text{ mm}$ (177-302)	952623	4630

# ABSOLUTE Borematic

## Series 568

This is a three-point Digimatic snap open bore gauge. The Absolute Borematic offers you the following benefits:

- It enables you to take measurements easily and quickly.
- Titanium-coated measuring pins gives you excellent durability and impact resistance.
- A large LCD display with character height of 11mm makes measurements easy to read.
- 330° rotatable display unit also gives you easy reading at any angle.
- GO/NG tolerance judgement function.
- It has a function lock to protect the setup against unauthorised use.

ABSOLUTE®



Functions	Series 568
ZERO/ABS	●
GO/±NG judgement	●
ON/OFF	●
DATA/HOLD	●
2 x PRESET	●
Function lock	●
Data output	●

### Specifications

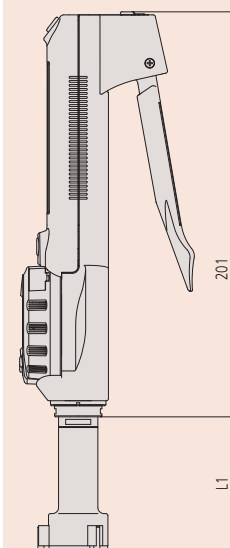
Accuracy	6-20 mm : ±5 µm 20-125 mm : ±6 µm (excluding quantizing error)
Digital step	0,001 mm
Measuring pins	Titanium coated tungsten carbide (6 - 12 mm) Titanium coated hardened steel (12 - 125 mm)
Battery life	approx. 5000 hours
Display	LCD, character height: 11 mm
Delivered	Including box, key, 1 battery, certificate of inspection

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm
952322	Holtest, Borematic Extension 100mm, 6-12mm

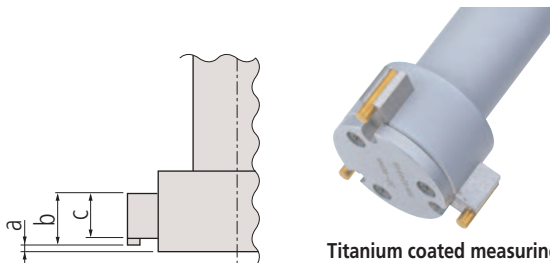
### Consumable spares

No.	Description
938882	Battery SR44 1.5V



### Metric

No.	Range [mm]	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
568-361	6-8	83	2		2,5	480
568-362	8-10	83	2		2,5	485
568-363	10-12	83	2		2,5	485
568-364	12-16	53	0,3	5,6	3,5	475
568-365	16-20	53	0,3	5,6	3,5	480
568-366	20-25	59,3	0,3	8,3	5,2	540
568-367	25-30	59,3	0,3	8,3	5,2	555
568-368	30-40	67,3	0,3	13	10	565
568-369	40-50	67,3	0,3	13	10	610
568-370	50-63	75,4	0,3	17	14	730
568-371	62-75	75,4	0,3	17	14	740
568-372	75-88	75,4	0,3	17	14	790
568-373	87-100	75,4	0,3	17	14	800
568-374	100-113	75,4	0,3	17	14	900
568-375	112-125	75,4	0,3	17	14	910



Titanium coated measuring surfaces for durability

# ABSOLUTE Borematic

ABSOLUTE®



Functions	Series 568
ZERO/ABS	●
GO/±NG judgement	●
ON/OFF	●
DATA/HOLD	●
2 x PRESET	●
Function lock	●
Data output	●

## Specifications

Accuracy	6-20 mm : ±5 µm 20-125 mm : ±6 µm (excluding quantizing error)
Digital step	0,001 mm
Measuring pins	Titanium coated tungsten carbide (6 - 12 mm) Titanium coated hardened steel (12 - 125 mm)
Battery life	approx. 5000 hours
Display	LCD, character height: 11 mm
Delivered	Including box, key, 1 battery, setting ring, certificate of inspection (instruments only - certificate of inspection for setting rings not included).

## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
952322	Holtest, Borematic Extension 100mm, 6-12mm
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm

## Consumable spares

No.	Description
938882	Battery 5R44 1.5V



Titanium coated measuring surfaces for durability

## Series 568

This is a three-point Digimatic snap open bore gauge. Each set includes one display unit with interchangeable measuring heads of the sizes specified.

The Absolute Borematic offers you the following benefits:

- It enables you to take measurements easily and quickly.
- Titanium-coated measuring pins gives you excellent durability and impact resistance.
- A large LCD display with character height of 11mm makes measurements easy to read.
- 330° rotatable display unit also gives you easy reading at any angle.
- GO/NG tolerance judgement function.
- It has a function lock to protect the setup against unauthorised use.



568-924



568-926

## Metric

No.	Range [mm]	Individual ranges	Setting rings included	Mass [g]
568-924	6-12	6-8 mm 8-10 mm 10-12 mm	Ø8 mm (177-125) Ø10 mm (177-126)	530
568-925	12-25	12-16 mm 16-20 mm 20-25 mm	Ø16 mm (177-177) Ø20 mm (177-286)	690
568-926	25-50	25-30 mm 30-40 mm 40-50 mm	Ø30 mm (177-288) Ø40 mm (177-290)	930
568-927	50-100	50-63 mm 62-75 mm 75-88 mm 87-100 mm	Ø62 mm (177-314) Ø87 mm (177-318)	1850

# ABSOLUTE Borematic

## Series 568

This is a three-point Digimatic snap open bore gauge.  
Each set includes display units and measuring heads for each size.  
The Absolute Borematic offers you the following benefits:

- It enables you to take measurements easily and quickly.
- Titanium-coated measuring pins gives you excellent durability and impact resistance.
- A large LCD display with character height of 11mm makes measurements easy to read.
- 330° rotatable display unit also gives you easy reading at any angle.
- GO/NG tolerance judgement function.
- It has a function lock to protect the setup against unauthorised use.



568-959

### Metric

No.	Range [mm]	Individual ranges	Setting rings included	Mass [g]
568-955	6-12	6-8 mm 8-10 mm 10-12 mm	Ø8 mm (177-125) Ø10 mm (177-126)	1450
568-956	12-25	12-16 mm 16-20 mm 20-25 mm	Ø16 mm (177-177) Ø20 mm (177-286)	1520
568-957	25-50	25-30 mm 30-40 mm 40-50 mm	Ø30 mm (177-288) Ø40 mm (177-290)	1750
568-958	50-75	50-63 mm 62-75 mm	Ø62 mm (177-314)	1490
568-959	75-100	75-88 mm 87-100 mm	Ø87 mm (177-318)	1610

ABSOLUTE®



Functions	Series 568
ZERO/ABS	●
GO/±NG judgement	●
ON/OFF	●
DATA/HOLD	●
2 x PRESET	●
Function lock	●
Data output	●

### Specifications

Accuracy	6-20 mm : ±5 µm 20-125 mm : ±6 µm (excluding quantizing error)
Digital step	0,001 mm
Measuring pins	Titanium coated tungsten carbide (6 - 12 mm) Titanium coated hardened steel (12 - 125 mm)
Battery life	approx. 5000 hours
Display	LCD, character height: 11 mm
Delivered	Including box, key, battery, setting ring, certificate of inspection (instruments only - certificate of inspection for setting rings not included).

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
952322	Holtest, Borematic Extension 100mm, 6-12mm
952621	Holtest, Borematic Extension 150mm, 12-20mm
952622	Holtest, Borematic Extension 150mm, 20-50mm
952623	Holtest, Borematic Extension 150mm, 50-300mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



Titanium coated measuring surfaces for durability



# Measuring Heads for Borematic

## Series 568

- 1 : Measuring head
- 2 : Adapter
- 3 : Display unit Borematic



**Metric** Display unit Borematic

**No.**  
**568-014**

**Metric** Measuring heads

No.	Range [mm]
04AZB136	6-8
04AZB137	8-10
04AZB138	10-12
04AZA719	12-16
04AZA720	16-20
04AZA728	20-25
04AZA729	25-30
04AZA737	30-40
04AZA738	40-50
04AZA750	50-63
04AZA751	62-75
04AZA752	75-88
04AZA753	87-100
04AZA941	100-113
04AZA942	112-125

Adapter

No.	Range [mm]
954595	6-12
216556	12-20
216557	20-50
216558	50-125

Note : These adapters are necessary to adapt measuring heads to the Borematic display unit.

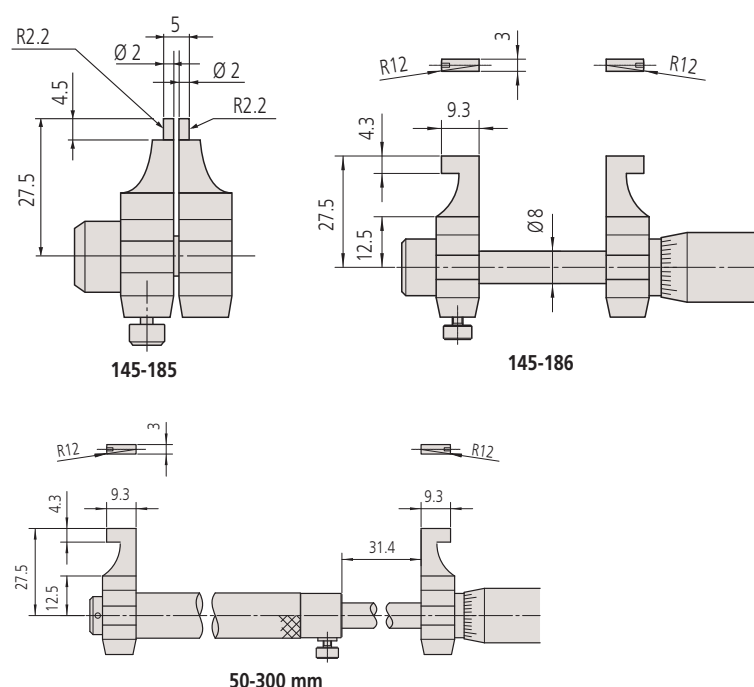


## Series 145

- Carbide measuring faces
- A setting standard is needed to accurately set the micrometer to the reference point.

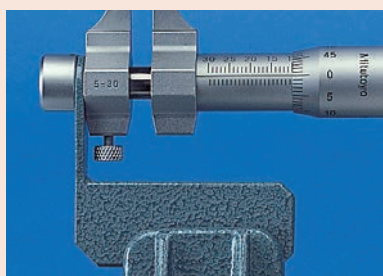


No.	Range [mm]	Accuracy [μm]	Mass [g]
145-185	5-30	±5	130
145-186	25-50	±6	140
145-187	50-75	±7	160
145-188	75-100	±8	180
145-189	100-125	±9	210
145-190	125-150	±9	230
145-191	150-175	±10	250
145-192	175-200	±10	270
145-217	200-225	±11	310
145-218	225-250	±11	330
145-219	250-275	±12	350
145-220	275-300	±12	370



Graduation	0,01 mm
Accuracy	Refer to the list of specifications
Scale	Thimble and sleeve satin chrome finish, ø18 mm
Measuring surfaces	Carbide tipped
Measuring spindle	With spindle lock, spindle pitch 0,5 mm
Measuring force	1-6 N
Delivered	Including box, key

No.	Description
300400	Holder for Series 145
300401	Cap for Series 145



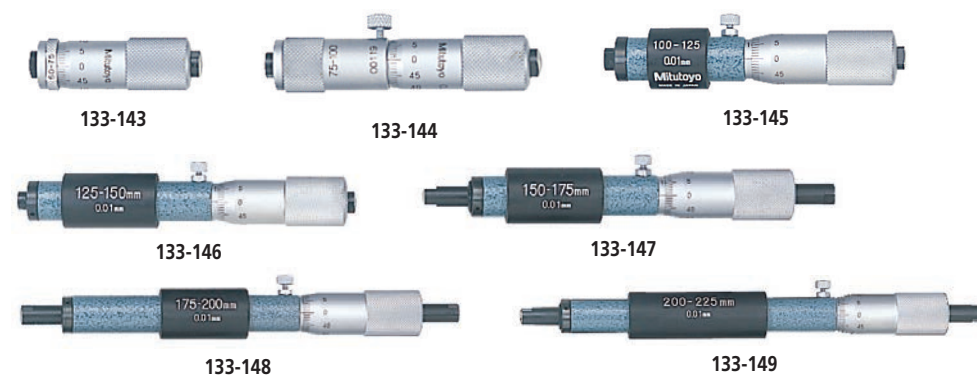
Holder and cap for:  
145-185, 145-186, 145-193, 145-194

# Tubular Inside Micrometer

## Series 133

This is a standard single rod type inside micrometer, with the following features:

- Standard single rod.
- Carbide measuring faces.

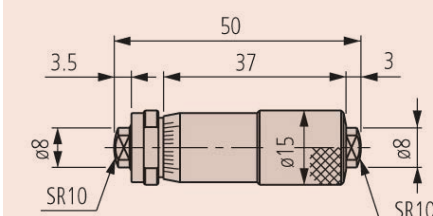
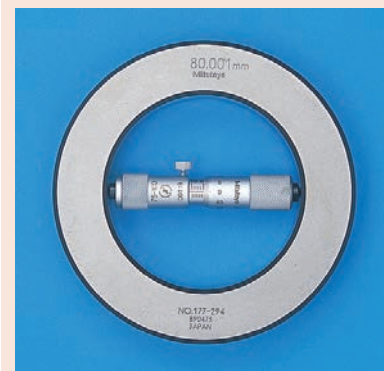


## Metric

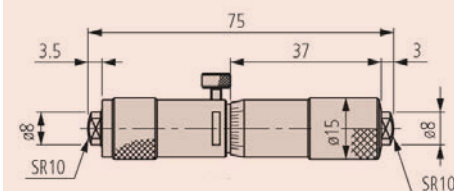
No.	Range [mm]	Accuracy [ $\mu$ m]	L [mm]	a [mm]	b [mm]	Mass [g]
133-143	50-75	$\pm 3$				50
133-144	75-100	$\pm 4$				75
133-145	100-125	$\pm 5$	100	5	3	130
133-146	125-150	$\pm 5$	125	5	3	160
133-147	150-175	$\pm 5$	150	18	15	170
133-148	175-200	$\pm 5$	175	18	15	180
133-149	200-225	$\pm 5$	200	18	15	200
133-150	225-250	$\pm 6$	225	18	15	210
133-151	250-275	$\pm 6$	250	18	15	235
133-152	275-300	$\pm 6$	275	18	15	245
133-153	300-325	$\pm 7$	300	18	15	265
133-154	325-350	$\pm 7$	325	18	15	285
133-155	350-375	$\pm 7$	350	18	15	300
133-156	375-400	$\pm 8$	375	18	15	315
133-157	400-425	$\pm 8$	400	18	15	330
133-158	425-450	$\pm 8$	425	18	15	340
133-159	450-475	$\pm 9$	450	18	15	360
133-160	475-500	$\pm 9$	475	18	15	370
133-161	500-525	$\pm 9$	500	18	15	390
133-162	525-550	$\pm 10$	525	18	15	400
133-163	550-575	$\pm 10$	550	18	15	410
133-164	575-600	$\pm 10$	575	18	15	415
133-165	600-625	$\pm 11$	600	18	15	430
133-166	625-650	$\pm 11$	625	18	15	450
133-167	650-675	$\pm 11$	650	18	15	470
133-168	675-700	$\pm 12$	675	18	15	480
133-169	700-725	$\pm 12$	700	18	15	500
133-170	725-750	$\pm 12$	725	18	15	510
133-171	750-775	$\pm 13$	750	18	15	520
133-172	775-800	$\pm 13$	775	18	15	540
133-173	800-825	$\pm 13$	800	18	15	555
133-174	825-850	$\pm 14$	825	18	15	570
133-175	850-875	$\pm 14$	850	18	15	590
133-176	875-900	$\pm 14$	875	18	15	600
133-177	900-925	$\pm 15$	900	18	15	620
133-178	925-950	$\pm 15$	925	18	15	630
133-179	950-975	$\pm 15$	950	18	15	650
133-180	975-1000	$\pm 16$	975	18	15	670

## Specifications

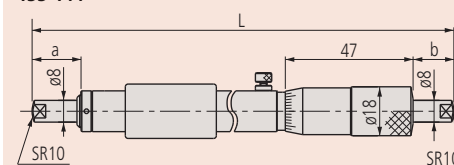
Graduation	0,01mm
Accuracy	Refer to the list of specifications
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Measuring surfaces	Carbide tipped, crown lapped
Measuring spindle	With spindle lock (except 50-75 mm), spindle pitch 0,5 mm
Delivered	Including box, insulation (from 100 mm), key



133-143



133-144



100-1000 mm

Specifications

Graduation	0,01mm
Scale	Thimble and sleeve satin chrome finish, Ø18 mm
Measuring surfaces	Carbide tipped, crown lapped
Measuring spindle	With spindle lock (except 50-75 mm), spindle pitch 0,5 mm
Delivered	Including box, insulation (from 100 mm), key



Tubular Inside Micrometer

Series 133

This is a standard single rod type inside micrometer, with the following features:

- Standard single rod.
- Carbide measuring faces.



133-902

Metric		Micrometer set	
No.	Range [mm]	Models included	Mass [g]
133-901	50-150	133-143, 133-144, 133-145, 133-146	415
		133-143, 133-144, 133-145,133-146	
133-902	50-300	133-147, 133-148, 133-149,133-150, 133-151, 133-152	1655





# Tubular Inside Micrometer with Extensions

## Specifications

Graduation	0,01 mm
Accuracy	$\pm(3+n+L/50) \mu\text{m}$ $\pm(6+L/50) \mu\text{m}$ (139-203, 139-204) n = number of extensions, L = Maximum measuring length (mm)
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18 \text{ mm}$ $\varnothing 13 \text{ mm}$ (139-203, 139-204)
Measuring surfaces	Carbide
Measuring spindle	Spindle pitch 0,5 mm
Measuring span	25 mm 10 mm(139-203), 25 mm (139-204)
Extension	$\varnothing 17 \text{ mm}$ $\varnothing 10 \text{ mm}$ (139-203, 139-204)
Delivered	Including box, key, extensions, micrometer head

## Standard accessories

No.	Description
139-001	Tubular Inside Micrometer, 100-125mm, for 139-173 to 139-177
139-003	Tubular Inside Micrometer 100-110mm, for 139-203
139-005	Tubular Inside Micrometer 100-125mm, for 139-204

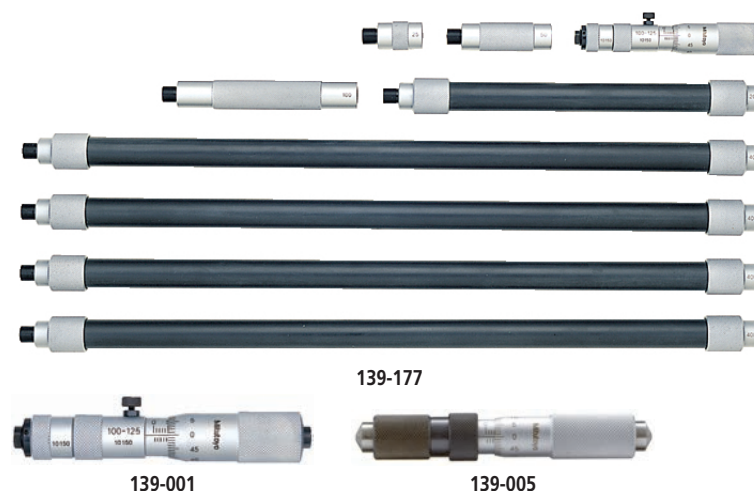
## Consumable spares

No.	Description
981003	Extension Rod for Series 139, 339, 25mm
981005	Extension Rod for Series 139, 339, 50mm
981007	Extension Rod for Series 139, 339, 100mm
981009	Extension Rod for Series 139, 339, 200mm
981011	Extension Rod for Series 139, 339, 400mm
981981	Extension Rod 10mm, for 139-203
981982	Extension Rod 20mm, for 139-203
981983	Extension Rod 30mm, for 139-203
981984	Extension Rod 60mm, for 139-203
981985	Extension Rod 90mm, for 139-203
981986	Extension Rod 110mm, for 139-203
981987	Extension Rod 120mm, for 139-203
981988	Extension Rod 130mm, for 139-203
981991	Extension Rod 25mm, for 139-204
981993	Extension Rod 75mm, for 139-204
981994	Extension Rod 150mm, for 139-204
981995	Extension Rod 225mm, for 139-204
981996	Extension Rod 300mm, for 139-204
981997	Extension Rod 350mm, for 139-204
981998	Extension Rod 400mm, for 139-204
981999	Extension Rod 425mm, for 139-204
982000	Extension Rod 450mm, for 139-204

## Series 139

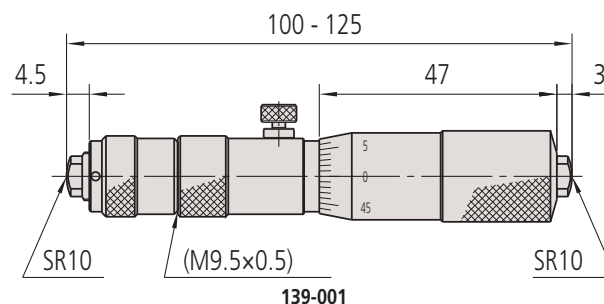
This is an extension pipe type inside micrometer that offers you the following benefits:

- Interchangeable extensions in a hollow pipe design.
- Carbide measuring faces are available.



## Metric

No.	Range [mm]	Extension rods	Mass [g]
139-173	100-500	4 (25, 50, 100, 200 mm)	490
139-174	100-900	5 (25, 50, 100, 200, 400 mm)	790
139-175	100-1300	6 (25, 50, 100, 200, 400 mm (2 pcs.))	1090
139-176	100-1700	7 (25, 50, 100, 200, 400 mm (3 pcs.))	1390
139-177	100-2100	8 (25, 50, 100, 200, 400 mm (4 pcs.))	1690
139-203	40-300	8 (10, 20, 30, 60, 90, 110, 120, 130 mm)	240
139-204	100-1000	10 (25, 50, 75, 150, 225, 300, 350, 400, 425, 450 mm)	770

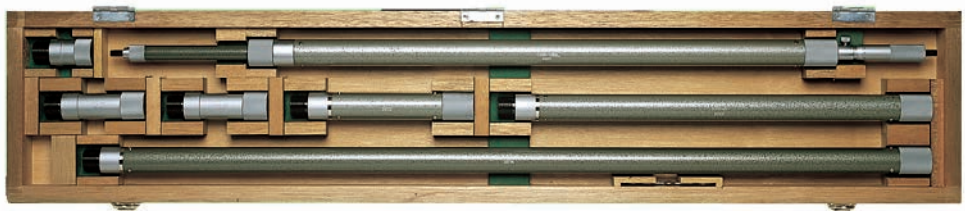


# Tubular Inside Micrometer with Extensions

## Series 140

This is a long range inside micrometer that offers you the following benefits:

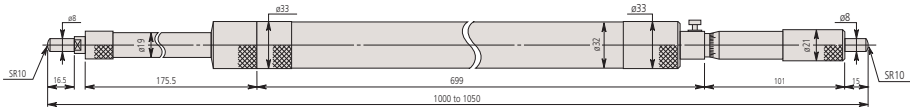
- It has a long measuring range of up to 5000 mm
- Extension tube type design.
- Measuring surfaces in carbide are available, micro-lap finish



140-158

### Metric

No.	Range [mm]	Extension rods	Mass [g]
140-157	1000-2000	5 (50, 100 (2 pcs.) 200, 500 mm)	3700
140-158	1000-3000	6 (50, 100 (2 pcs.), 200, 500, 1000 mm)	5200
140-159	1000-4000	7 (50, 100 (2 pcs.), 200, 500, 1000 mm (2 pcs.))	6700
140-160	1000-5000	8 (50, 100 (2 pcs.) 200, 500, 1000 mm (3 pcs.))	8260



Micrometer Head for series 140

### Specifications

Graduation	0,01 mm
Accuracy	$\pm(7+n+L/50) \mu\text{m}$ n = number of extensions, L = Maximum measuring length (mm)
Scale	Thimble and sleeve satin chrome finish, $\phi 21$ mm
Measuring spindle	Spindle pitch 0,5 mm
Measuring span	50 mm
Extension	$\phi 32$ mm
Delivered	Including box, key

### Consumable spares

No.	Description
04GZA394	Extension Rod 50mm, for Series 140
04GZA396	Extension Rod 100mm, for Series 140
04GZA398	Extension Rod 200mm, for Series 140
04GZA400	Extension Rod 500mm, for Series 140
04GZA402	Extension Rod 1000mm, for Series 140

# Digimatic Tubular Inside Micrometer with Extensions



Functions	Series 337
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Function lock	●
Data output	●

## Specifications

Accuracy	$\pm(3+n+L/50) \mu\text{m}$ n = Number of extensions, L = Maximum measuring length (mm) (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, $\phi 18$ mm
Measuring spindle	Spindle pitch 0,5 mm
Measuring span	25 mm
Extension	$\phi 12,5$ mm
Display	LCD, character height 7,5 mm
Delivered	Including box, key, 1 battery, extensions, micrometer head

## Standard accessories

No.	Description
337-101	Digital Tubular Inside Micrometer (Rod), 200-225mm, Digimatic, IP65

## Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

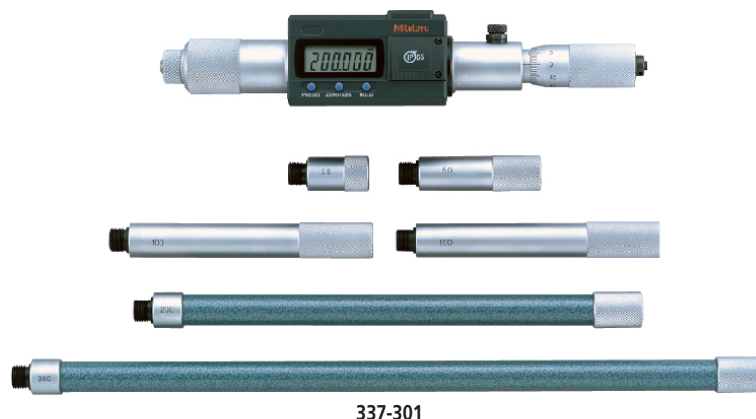
## Consumable spares

No.	Description
938882	Battery SR44 1.5V
980521	Extension Rod for Series 137, 337, 25mm, Carbide Tipped
980523	Extension Rod for Series 137, 337, 50mm, Carbide Tipped
980525	Extension Rod for Series 137, 337, 100mm, Carbide Tipped
980529	Extension Rod for Series 137, 337, 200mm, Carbide Tipped
980531	Extension Rod for Series 137, 337, 300mm, Carbide Tipped

## Series 337

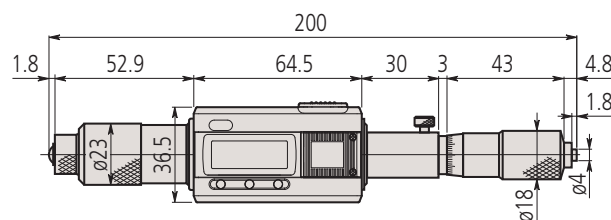
This is an extension rod type inside micrometer that offers you the following benefits:

- Interchangeable extensions with cylindrical gage rods are spring-mounted in protective sleeves so you can extend the measuring range.
- Carbide measuring faces.
- Digimatic type, with data output.
- It has excellent resistance against water and dust (IP65 protection level) enabling you to use it in machining situations that include splashing coolant fluid.



## Metric

No.	Range [mm]	Extension rods	Mass [g]
337-301	200-1000	6 (25, 50, 100 (2 pcs.), 200, 300 mm)	1040
337-302	200-1500	7 (25, 50, 100, 200, 300 (3 pcs.))	1410



Micrometer Head for series 337



# Digimatic Tubular Inside Micrometer with Extensions

## Series 339

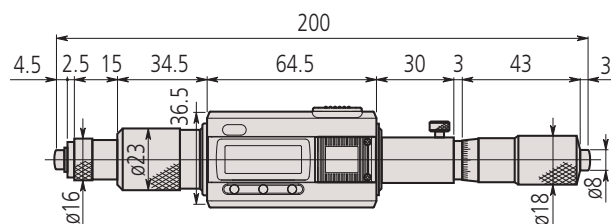
This is an extension pipe type inside micrometer that offers you the following benefits:

- Interchangeable extensions in a hollow pipe design.
- Carbide measuring faces.
- Digimatic type with data output.
- It has excellent resistance against water and dust (IP65 protection level) enabling you to use it in machining situations that include splashing coolant fluid.



### Metric

No.	Range [mm]	Extension rods	Mass [g]
339-301	200-1000	5 (25, 50, 100, 200, 400 mm)	1050
339-302	200-2000	8 (25, 50, 100, 200 (2 pcs.), 400 mm (3 pcs.))	1800



Micrometer Head for series 339



Functions	Series 339
ZERO/ABS	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Function lock	●
Data output	●

### Specifications

Accuracy	$\pm(3+n+L/50) \mu\text{m}$ n = number of extensions, L = Maximum measuring length (mm) (excluding quantizing error)
Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, $\phi 18$ mm
Measuring spindle	Spindle pitch 0,5 mm
Measuring span	25 mm
Extension	$\phi 17$ mm
Display	LCD, character height 7,5 mm
Delivered	Including box, key, 1 battery, extensions, micrometer head

### Standard accessories

No.	Description
339-101	Digital Tubular Inside Micrometer (Pipe), 200-225mm, Digimatic, IP65

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790B	U-WAVE-T Connection Cable B, with Data Button IP Micrometer Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
981003	Extension Rod for Series 139, 339, 25mm
981005	Extension Rod for Series 139, 339, 50mm
981007	Extension Rod for Series 139, 339, 100mm
981009	Extension Rod for Series 139, 339, 200mm
981011	Extension Rod for Series 139, 339, 400mm



# Inside Micrometer with Interchangeable Rod

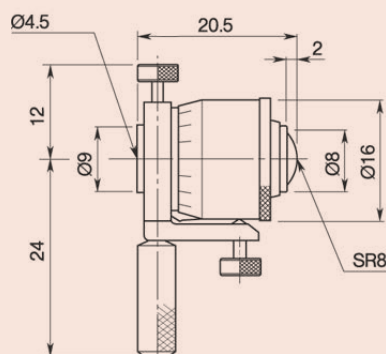
## Specifications

Graduation	0,01 mm
Accuracy	$\pm(6+L/50) \mu\text{m}$ , L = Maximum measuring length (mm)
Scale	Thimble and sleeve satin chrome finish
Measuring surfaces	Hardened
Measuring spindle	Spindle pitch 0,5 mm with spindle lock
Delivered	Including box, key

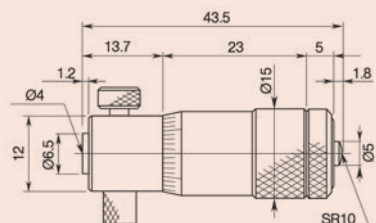


When using one of the extension rods supplied

141-101 with extension handle



141-001/003



141-025/027

## Series 141 - Interchangeable Rod Type

This an interchangeable rod type inside micrometer that offers you the following benefits:

- Interchangeable measuring rods allow you to take inside measurements of up to 1000 mm.
- Each interchangeable rod is marked with its measuring range.
- For models supplied with more than one interchangeable rod, you can achieve the full measuring range by combining spacing collars with the rods.
- A extension handle to help you measure deep bores is included in sets up to 300 mm range.



141-205

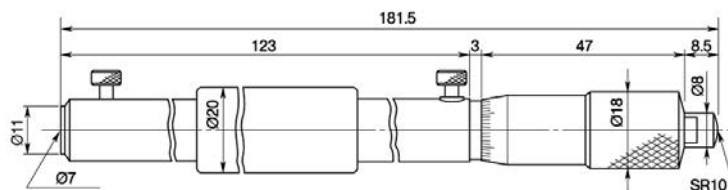
## Metric

No.	Range [mm]	Head adjustment range [mm]	Interchangeable rod	Extension collar	Accessories: inside micrometer (standard in the set) No.	Mass [g]
141-001	25-32	7	-	-	-	20
141-101	25-50	7	2 (38, 50 mm)	1 (6 mm)	141-001	60
141-025	50-63	13	-	-	-	40
141-205	50-200	13	3 (100, 150, 200 mm)	1 (12 mm)	141-025	125
141-206	50-300	13	5 (100, 150, 200, 250, 300 mm)	1 (12 mm)	141-025	275
141-009	200-225	25	-	-	-	220
141-117	200-500	25	3 (300, 400, 500 mm)	2 (25/50 mm)	141-009	520
141-118	200-1000	25	8 (300, 400, 500, 600, 700, 800, 900, 1000 mm)	2 (25/50 mm)	141-009	1940

## Metric

With carbide measuring surface

No.	Range [mm]	Head adjustment range [mm]	Interchangeable rod	Extension collar	Accessories: inside micrometer (standard in the set) No.	Mass [g]
141-003	25-32	7	-	-	-	20
141-103	25-50	7	2 (38, 50 mm)	1 (6 mm)	141-003	60
141-027	50-63	13	-	-	-	40
141-211	50-200	13	3 (100, 150, 200 mm)	1 (12 mm)	141-027	125
141-212	50-300	13	5 (100, 150, 200, 250, 300 mm)	1 (12 mm)	141-027	275
141-011	200-225	25	-	-	-	220



141-009

# Bore Gauge for Extra Small Holes

## Series 526 Bore Gauge

This is a two point split contact point ideally suited to smaller bore measurements. It offers you the following benefits:

- A precision bore gauge so you can make quick and accurate measurements of small hole diameters (0,95-18 mm).
- You can replace the analogue indicator fitted to this instrument with a customer-supplied Digital indicator if you need.
- The contact point is hard chrome finish



### Metric

No.	Range [mm]	Graduation	No. Dial Indicator	Measuring depth	Number of anvils
526-173-1	0,95-1,55	0,01 mm	2046SB	11,5 mm	5
526-163-1	1,5-4	0,01 mm	2046SB	17,5-22,5 mm <sup>(1)</sup>	9
526-153-1	3,7-7,3	0,01 mm	2046SB	32 mm	7
526-126	7-10	0,01 mm	2046SB	40-56 mm <sup>(2)</sup>	6
526-127	10-18	0,01 mm	2046SB	62 mm	8
526-172-1	0,95-1,55	0,001 mm	2109SB-10	11,5 mm	5
526-162-1	1,5-4	0,001 mm	2109SB-10	17,5-22,5 mm <sup>(1)</sup>	9
526-152-1	3,7-7,3	0,001 mm	2109SB-10	32 mm	7
526-124	7-10	0,001 mm	2109SB-10	40-56 mm <sup>(2)</sup>	6
526-125	10-18	0,001mm	2109SB-10	62 mm	8

<sup>(1)</sup> Holes  $\varnothing \leq 2,25$  mm : measuring depth 17,5 mm / holes  $\varnothing > 2,25$  mm : measuring depth 22,5 mm

<sup>(2)</sup> Holes  $\varnothing \leq 8$  mm : measuring depth 40 mm / holes  $\varnothing > 8$  mm : measuring depth 56 mm

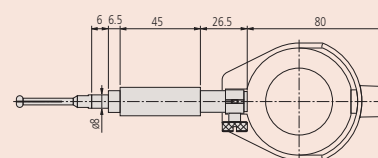
## Specifications

Accuracy	4 $\mu$ m 6 $\mu$ m for range 10-18 mm
Repeatability	2 $\mu$ m
Delivered	In box including plastic cover for Dial Indicator

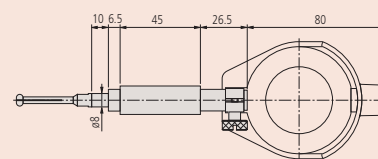
## Optional accessories

No.	Description
215-120-10	Stand for Bore Gauge Series 526
543-310B	Digital Indicator Bore Gauge ID-C, 12,7mm, 0,001mm, Flat Back

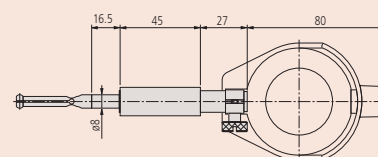
Setting rings are optional accessories. See Series 177 for details.



0,95 - 4 mm



3,7 - 7,3 mm



7 - 18 mm

For details on indicators suitable for use with this instrument, refer to Dial Gauges section.

# Bore Gauge for Extra Small Holes

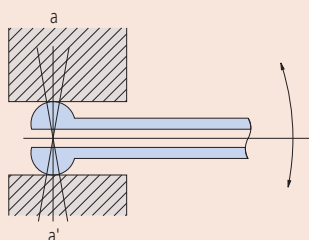
## Contact Point for Series 526

Replacement contact points

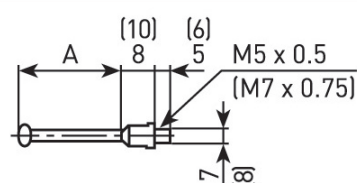
No.	Range [mm]	Marking on the measuring head (engraved)	A [mm]	B [mm]	C [mm]
21DAA601A	0,95-1,15	1	11,5		
21DAA601B	1,07-1,25	1,1	11,5		
21DAA601C	1,17-1,35	1,2	11,5		
21DAA601D	1,27-1,45	1,3	11,5		
21DAA601E	1,37-1,55	1,4	11,5		
21DAA602A	1,5-1,9	1,75	17,5		
21DAA602B	1,8-2,2	2	17,5		
21DAA602C	2,05-2,45	2,25	17,5		
21DAA602D	2,25-2,75	2,5	22,5		
21DAA602E	2,5-3	2,75	22,5		
21DAA602F	2,75-3,25	3	22,5		
21DAA602G	3-3,5	3,25	22,5		
21DAA602H	3,25-3,75	3,5	22,5		
21DAA602J	3,5-4	3,75	22,5		
21DAA603A	3,7-4,3	4	32		
21DAA603B	4,2-4,8	4,5	32		
21DAA603C	4,7-5,3	5	32		
21DAA603D	5,2-5,8	5,5	32		
21DAA603E	5,7-6,3	6	32		
21DAA603F	6,2-6,8	6,5	32		
21DAA603G	6,7-7,3	7	32		
102469	7-7,5	1	1,8	40	29,2
102470	7,5-8	2	1,8	40	29,2
102471	8-8,5	3	1,8	40	29,2
102472	8,5-9	4	1,8	40	29,2
102473	9-9,5	5	1,8	40	29,2
102474	9,5-10	6	1,8	40	29,2
102454	10-11	1	2,1	46	38
102455	11-12	2	2,7	46	38
102456	12-13	3	2,7	46	38
102457	13-14	4	2,7	46	38
102458	14-15	5	2,7	46	38
102459	15-16	6	2,7	46	38
102460	16-17	7	2,7	46	38
102461	17-18	8	2,7	46	38



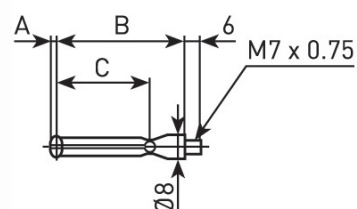
526-153-1



**Positioning of Bore Gauges**  
The contact points have a large curvature, simplifying positioning for bore diameter measurement (in the direction a-a')



526-162-1, 526-163-1, 526-172-1, 526-173-1  
( ) 526-152-1, 526-153-1



526-124, 526-125, 526-126, 526-127

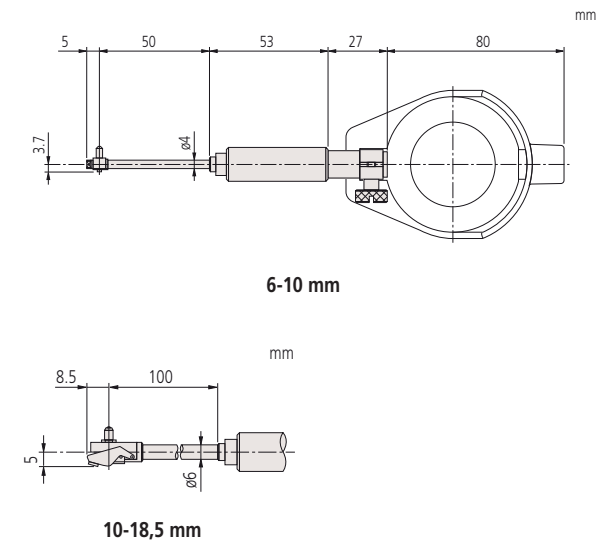
# Bore Gauge for Small Holes

## Series 511

- These are bore gauges that automatically self-centre via a centring bridge. They offer you the following benefits:
- A long plunger stroke gives you amazing accuracy.
  - Interchangeable washers 0,5mm thick are supplied as standard accessories, so you can enable setting in small steps.
  - Contact points are carbide (> 18 mm range), giving you high durability and wear resistance.
  - A large grip reduces heat transfer from the operator by 50%.



Metric							
No.	Range [mm]	Graduation	No. Dial Indicator	Measuring depth	Stroke of contact point [mm]	Number of anvils	Mass [g]
511-211	6-10	0,01 mm	2046SB	50 mm	0,5	9	255
511-204	10-18,5	0,01 mm	2046SB	100 mm	0,6	9	264
511-210	6-10	0,001 mm	2109SB-10	50 mm	0,5	9	255
511-203	10-18,5	0,001 mm	2109SB-10	100 mm	0,6	9	268



Specifications	
Accuracy	5 µm
Delivered	Including box, dial indicator, plastic cover for indicator

Optional accessories	
No.	Description
543-310B	Digital Indicator Bore Gauge ID-C, 12,7mm, 0,001mm, Flat Back



543-310B

For details on indicators suitable for use with this instrument, refer to the Dial Gauges section.

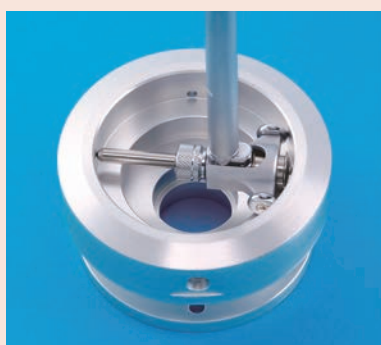
# Bore Gauge

## Specifications

Accuracy	2 µm
Stroke of contact point	18 - 60 mm: 1,2 mm 50 - 400 mm: 1,6 mm
Repeatability	0,5 µm
Delivered	Including box, dial indicator, plastic cover for indicator

## Optional accessories

No.	Description
953549	Extension Rod Series 511, 125mm, 9mm rod diameter
953550	Extension Rod Series 511, 250mm, 9mm rod diameter
953551	Extension Rod Series 511, 500mm, 9mm rod diameter
953552	Extension Rod Series 511, 125mm, 12mm rod diameter
953553	Extension Rod Series 511, 250mm, 12mm rod diameter
953554	Extension Rod Series 511, 500mm, 12mm rod diameter
953555	Extension Rod Series 511, 750mm, 12mm rod diameter
953556	Extension Rod Series 511, 1000mm, 12mm rod diameter
953557	Extension Rod Series 511, 125mm, 15mm rod diameter
953558	Extension Rod Series 511, 500mm, 15mm rod diameter
953559	Extension Rod Series 511, 750mm, 15mm rod diameter
953560	Extension Rod Series 511, 1000mm, 15mm rod diameter
953561	Extension Rod Series 511, 250mm, 15mm rod diameter
543-310B	Digital Indicator Bore Gauge ID-C, 12,7mm, 0,001mm, Flat Back



For details on indicators suitable for use with this instrument, refer to the Dial Gauges section.  
For a description of replacement contact points, see the Spare Parts section at end of catalogue.

## Series 511

This is a bore gauge that automatically self-centres via a centring bridge and offers you the following benefits:

- It reduces the influence of heat from the operator's hand by 50% by making the grip hollow structured, thereby retaining high accuracy measurement.
- Interchangeable washers (0,5 mm thick) are supplied as standard accessories, so you can enable setting in small steps.
- Contact points are carbide (> 18 mm range), giving you high durability and wear resistance.



511-712



511-713



Extensions for deep-hole measurement  
(optional accessory)

## Metric

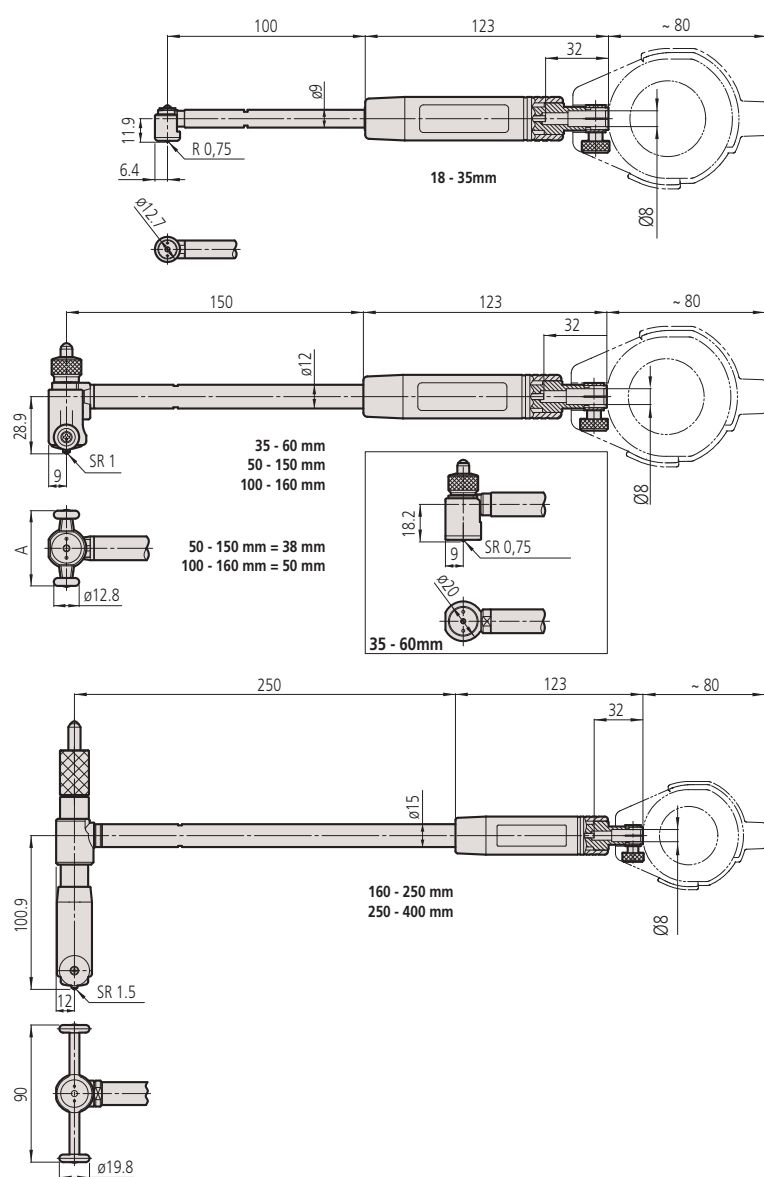
No.	Range [mm]	Graduation	No. Dial Indicator	Measuring depth	Number of anvils	Mass [g]
511-721	18-35	0,001 mm	2109SB-10	100 mm	9	330
511-722	35-60	0,001 mm	2109SB-10	150 mm	6	400
511-723	50-150	0,001 mm	2109SB-10	150 mm	11	420
511-724	100-160	0,001 mm	2109SB-10	150 mm	13	480
511-725	160-250	0,001 mm	2109SB-10	250 mm	6	850
511-726	250-400	0,001 mm	2109SB-10	250 mm	5	945
511-711	18-35	0,01 mm	2046SB	100 mm	9	330
511-712	35-60	0,01 mm	2046SB	150 mm	6	400
511-713	50-150	0,01 mm	2046SB	150 mm	11	420
511-714	100-160	0,01 mm	2046SB	150 mm	13	480
511-715	160-250	0,01 mm	2046SB	250 mm	6	850
511-716	250-400	0,01 mm	2046SB	250 mm	5	945



# Bore Gauge

## Series 511

Example of measuring heads with different capacity.



#### Specifications

Accuracy	2 µm
Repeatability	0,5 µm

#### Standard accessories

No.	Description
21DZA213A	Carbide Tipped Anvil Series 511, Range 18 mm
21DZA213B	Carbide Tipped Anvil Series 511, Range 20 mm
21DZA213C	Carbide Tipped Anvil Series 511, Range 22 mm
21DZA213D	Carbide Tipped Anvil Series 511, Range 24 mm
21DZA213E	Carbide Tipped Anvil Series 511, Range 26 mm
21DZA213F	Carbide Tipped Anvil Series 511, Range 28 mm
21DZA213G	Carbide Tipped Anvil Series 511, Range 30 mm
21DZA213H	Carbide Tipped Anvil Series 511, Range 32 mm
21DZA213J	Carbide Tipped Anvil Series 511, Range 34 mm
21DZA232A	Carbide Tipped Anvil Series 511, Range 50mm (100mm)
21DZA232B	Carbide Tipped Anvil Series 511, Range 40mm, 55mm (105mm)
21DZA232C	Carbide Tipped Anvil Series 511, Range 45mm, 60mm (110mm)
21DZA232D	Carbide Tipped Anvil Series 511, Range 50mm, 65mm (115mm)
21DZA232E	Carbide Tipped Anvil Series 511, Range 55mm, 70mm (120mm)
21DZA232F	Carbide Tipped Anvil Series 511, Range 60mm, 75mm (125mm)
21DZA232G	Carbide Tipped Anvil Series 511, Range 80mm (130mm)
21DZA232H	Carbide Tipped Anvil Series 511, Range 85mm (135mm)
21DZA232J	Carbide Tipped Anvil Series 511, Range 90mm (140mm)
21DZA232L	Carbide Tipped Anvil Series 511, Range 95mm (145mm)
21DZA232M	Carbide Tipped Anvil Series 511, Range 100mm (150mm)
205457	Washer Series 511, 0,5mm, Range 35-160mm
205458	Washer Series 511, 1 mm, Range 35-160mm
205459	Washer Series 511, 2 mm, Range 35-160mm
205460	Washer Series 511, 3 mm, Range 35-160mm
205623	Washer Series 511, 0,5mm, Range 18-35mm
205624	Washer Series 511, 1mm, Range 18-35mm
102178	Sub-Anvil Series 511, 50 mm

## Bore Gauge

### Series 511

This is a bore gauge that automatically self-centres via a centring bridge and offers you the following benefits:

- Carbide for the contact point ensuring high durability and wear resistance
- It reduces the influence of heat from the operator's hand by 50% by making the grip hollow structured, thereby retaining high accuracy measurement.



511-921



Indicator 2046SB included in the set 511-921



Indicator 2109SB-10 included in the set 511-922



Indicator 543-310B included in the set 511-925-10

#### Metric

No.	Range [mm]	Graduation	No. Dial Indicator	Measuring depth
511-921	18-150	0,01 mm	2046SB	100/150 mm
511-922	18-150	0,001 mm	2109SB-10	100/150 mm
511-925-10	18-150	0,001 mm	543-310B	100/150 mm

# Bore Gauge with Micrometer Head

## Series 511

This is a micrometer head that enables measurements without interchangeable anvils. It offers you the following benefits:

- A long plunger stroke gives you amazing accuracy.
- Contact points are carbide (> 18 mm range), giving you high durability and wear resistance.
- A large grip reduces heat transfer from the operator by 50%.
- Wide measuring range with sub-anvils.



511-814



Extensions for deep-hole measurement (optional accessory)

### Metric

No.	Range [mm]	Graduation	No. Dial Indicator	Micrometer Head stroke	Sub anvils	Measuring depth	Mass [g]
511-823	60-100	0,001 mm	2109SB-10	10 mm	10, 20 mm	150 mm	430
511-824	100-160	0,001 mm	2109SB-10	13 mm	10, 20, 20 mm	150 mm	480
511-825	150-250	0,001 mm	2109SB-10	13 mm	10, 20, 20, 50 mm	150 mm	850
511-826	250-400	0,001 mm	2109SB-10	25 mm	25, 50, 50 mm	150 mm	950
511-827	400-600	0,001 mm	2109SB-10	50 mm	50, 100 mm	250 mm	1.270
511-828	600-800	0,001 mm	2109SB-10	50 mm	50, 100 mm	250 mm	1.670
511-813	60-100	0,01 mm	2046SB	10 mm	10, 20 mm	150 mm	430
511-814	100-160	0,01 mm	2046SB	13 mm	10, 20, 20 mm	150 mm	480
511-815	150-250	0,01 mm	2046SB	13 mm	10, 20, 20, 50 mm	150 mm	850
511-816	250-400	0,01 mm	2046SB	25 mm	25, 50, 50 mm	150 mm	950
511-817	400-600	0,01 mm	2046SB	50 mm	50, 100 mm	250 mm	1.270
511-818	600-800	0,01 mm	2046SB	50 mm	50, 100 mm	250 mm	1.670

## Specifications

Accuracy	2 µm
Repeatability	0,5 µm
Delivered	Including box, dial indicator, plastic cover for indicator

## Optional accessories

No.	Description
953552	Extension Rod Series 511, 125mm, 12mm rod diameter
953553	Extension Rod Series 511, 250mm, 12mm rod diameter
953554	Extension Rod Series 511, 500mm, 12mm rod diameter
953555	Extension Rod Series 511, 750mm, 12mm rod diameter
953556	Extension Rod Series 511, 1000mm, 12mm rod diameter
953557	Extension Rod Series 511, 125mm, 15mm rod diameter
953561	Extension Rod Series 511, 250mm, 15mm rod diameter
953558	Extension Rod Series 511, 500mm, 15mm rod diameter
953559	Extension Rod Series 511, 750mm, 15mm rod diameter
953560	Extension Rod Series 511, 1000mm, 15mm rod diameter
543-310B	Digital Indicator Bore Gauge ID-C, 12,7mm, 0,001mm, Flat Back



543-310B

For details on indicators suitable for use with this instrument, refer to the Dial Gauges section. For a description of replacement contact points, see the Spare Parts section at end of catalogue.

# Bore Gauge with Micrometer Head

Series 511

Dimensions



60 - 100 mm



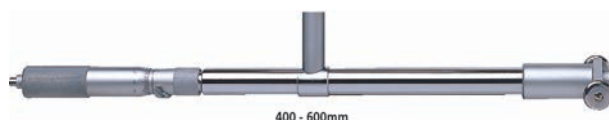
100 - 160 mm



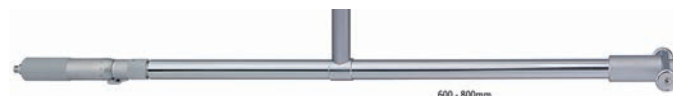
150 - 250 mm



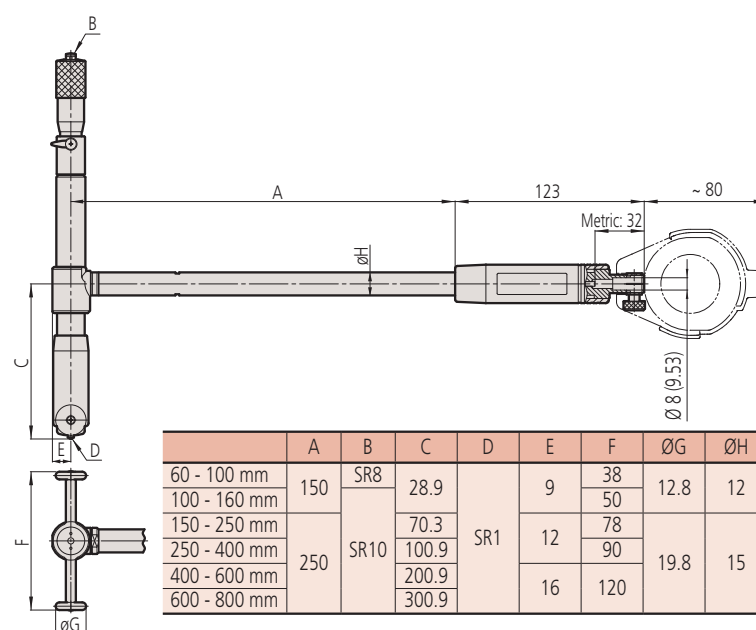
250 - 400 mm



400 - 600mm



600 - 800mm



	A	B	C	D	E	F	ØG	ØH
60 - 100 mm	150	SR8	28.9	SR1	9	38	12.8	12
100 - 160 mm	250	SR10	70.3		12	50	19.8	15
150 - 250 mm			100.9			78		
250 - 400 mm			200.9		16	90		
400 - 600 mm			300.9			120		
600 - 800 mm								

## Extension Rods

### Accessories for Bore Gauges

These extension rods help you with deep-hole measurement, and offer you the following benefits:

- Using a single, longer extension rod rather than several short ones reduces error. When several extension rods are joined together there is the possibility of small errors arising from the extra joints involved. Therefore it is good practice not to connect more than 2 rods to a bore gauge at any one time.
- You can use extension rods up to 1mm.
- If you are using an extension rod longer than 500mm, use the bore gauge in the vertical orientation.
- You can confirm accurate and satisfactory operation after connecting an extension rod.

Applicable Range	1. 125 mm No.	2. 250 mm No.	3. 500 mm No.	4. 750 mm No.	5. 1000 mm No.
A. 18-35 mm	953549	953550	953551	—	—
B. 35-160 mm	953552	953553	953554	953555	953556
C. 150-800 mm	953557	953561	953558	953559	953560

### Specifications

Extension rod diameter	ø9 mm (range 18-35 mm)
	ø12 mm (range 35-160 mm)
	ø15 mm (range 150-800 mm)



953549



953552



953557

# Bore Gauge Short Length Type

## Series 511

This is a compact and lightweight bore gauge due to the short length below the grip. It offers you the following benefits:

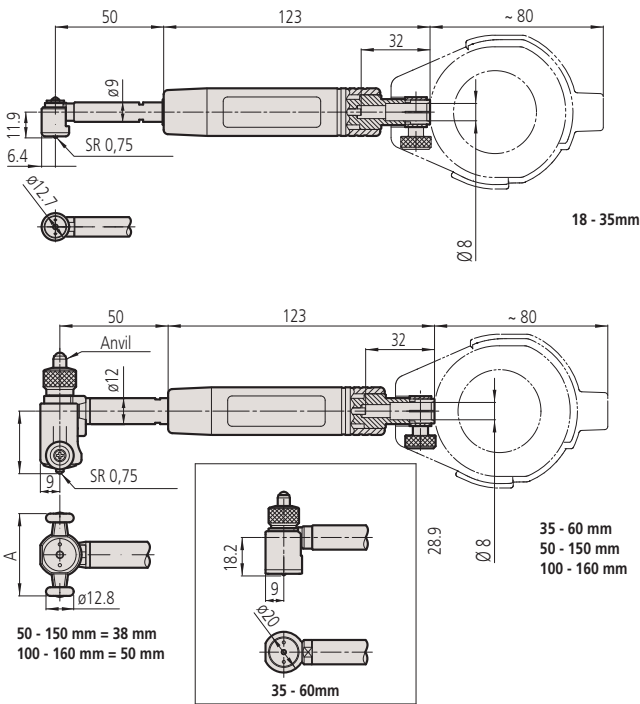
- A long plunger stroke gives you amazing accuracy.
- Contact points are carbide giving you high durability and wear resistance.
- A large grip reduces heat transfer from the operator by 50%.



511-766

### Metric

No.	Range [mm]	Graduation	No. Dial Indicator	Measuring depth	Number of anvils	Mass [g]
511-771	18-35	0,001 mm	2109SB-10	50 mm	9	320
511-772	35-60	0,001 mm	2109SB-10	50 mm	6	380
511-773	50-150	0,001 mm	2109SB-10	50 mm	11	400
511-774	100-160	0,001 mm	2109SB-10	50 mm	13	460
511-766	18-35	0,01 mm	2046SB	50 mm	9	320
511-767	35-60	0,01 mm	2046SB	50 mm	6	380
511-768	50-150	0,01 mm	2046SB	50 mm	11	400
511-769	100-160	0,01 mm	2046SB	50 mm	13	460



## Specifications

Accuracy	2 $\mu$ m
Repeatability	0,5 $\mu$ m
Stroke of contact point	18 - 60 mm: 1,2 mm 50 - 160 mm: 1,6 mm
Delivered	Including box, dial indicator, plastic cover for indicator

## Optional accessories

No.	Description
543-310B	Digital Indicator Bore Gauge ID-C, 12,7mm, 0,001mm, Flat Back



543-310B



For details of indicators suitable for use with this instrument, refer to the Dial Gauges section. For a description of replacement contact points, see the Spare Parts section at end of catalogue.



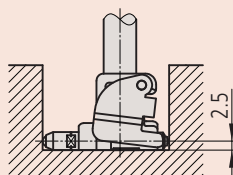
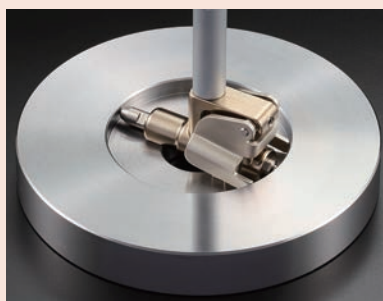
# Bore Gauge for Blind Holes

## Specifications

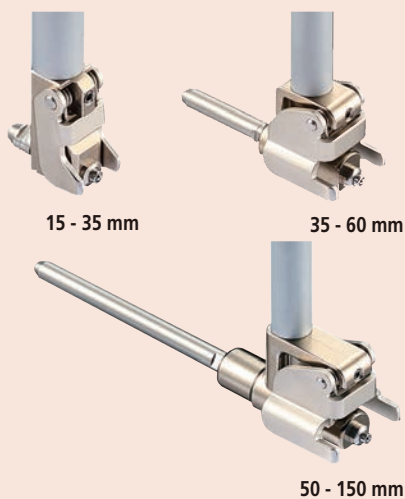
Accuracy	4 µm
Repeatability	1 µm
Stroke of contact point	1,2 mm
Delivered	Including box, dial indicator, plastic cover for indicator

## Optional accessories

No.	Description
543-310B	Digital Indicator Bore Gauge ID-C, 12,7mm, 0,001mm, Flat Back
953549	Extension Rod Series 511, 125mm, 9mm rod diameter
953550	Extension Rod Series 511, 250mm, 9mm rod diameter
953551	Extension Rod Series 511, 500mm, 9mm rod diameter



For blind holes with minimum depth 2,5 mm

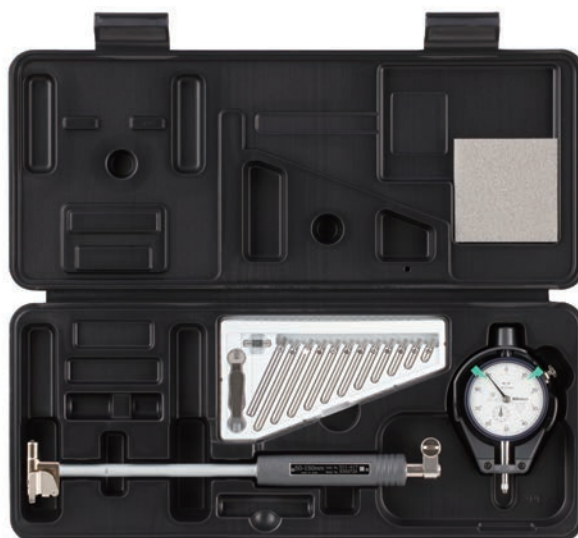


For details on indicators suitable for use with this instrument, refer to the Dial Gauges section.  
For a description of replacement contact points, see the Spare Parts section at end of catalogue.

## Series 511

This is a bore gauge for measuring blind holes that offers you the following benefits:

- You can measure the inside diameter close to the bottom of blind holes.
- Contact points are carbide giving you high durability and wear resistance.



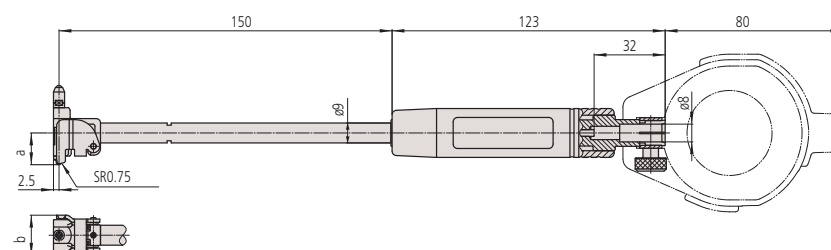
511-427



511-426

## Metric

No.	Range [mm]	Graduation	No. Dial Indicator	Measuring depth	a [mm]	b [mm]	Mass [g]
511-425	15-35	0,01 mm	2046SB	150 mm	9,9	10,6	350
511-426	35-60	0,01 mm	2046SB	150 mm	14,3	18	370
511-427	50-150	0,01 mm	2046SB	150 mm	22,7	22	380
511-435	15-35	0,001 mm	2109SB	150 mm	9,9	10,6	350
511-436	35-60	0,001 mm	2109SB	150 mm	14,3	18	370
511-437	50-150	0,001 mm	2109SB	150 mm	22,7	22	380



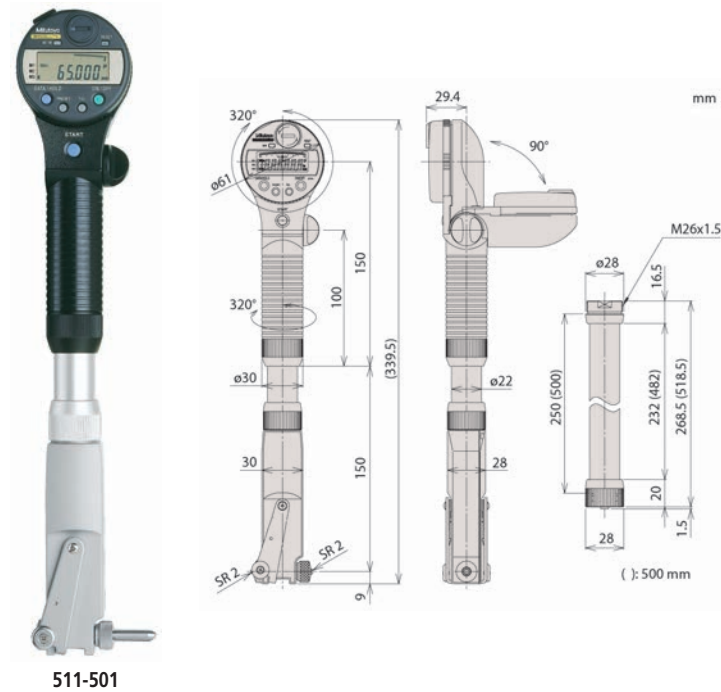
# ABSOLUTE Digimatic Bore Gauge

## Series 511

This is a Digimatic bore gauge that lets you take digital inside measurements with amazing accuracy even at the maximum 2m depth.

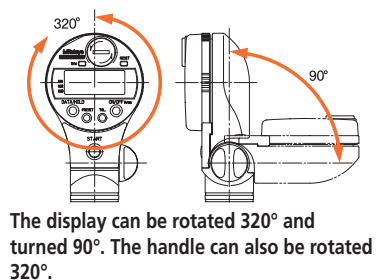
The ABSOLUTE Digimatic Bore Gauge offers you the following benefits:

- Precision bore gauge lets you easily measure the diameter of deep bores without loss of accuracy.
- You can store and recall up to 3 sets of master values and upper/lower tolerance values at the push of a button.
- GO/±NG judgement can be set.
- Up to max. four extension rods (250 or 500mm) can be used.

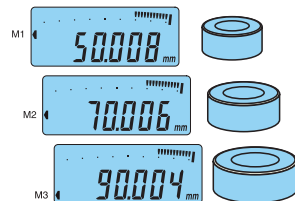


### Metric

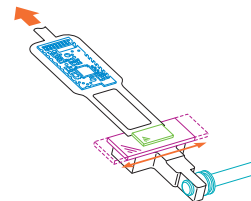
No.	Range [mm]	Number of anvils	Mass [g]
511-501	45-100	12	500
511-502	100-160	13	570



The display can be rotated 320° and turned 90°. The handle can also be rotated 320°.



Up to 3 sets of reference values can be preset, including top/bottom tolerance limits.



Even during measurement with a 2 m extension the accuracy is secured, as measured-value transmission is electronic.



Functions	Series 511
PRESET (x3)	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
MIN Value Hold	●

### Specifications

Accuracy	0,003 mm (excluding quantizing error)
Digital step	0,001 mm
Repeatability	±1 digit
Measuring force	≤5 N
Sampling Frequency	50 times/sec*
Power supply	2 batteries SR-44
Stroke of contact point	1,2 mm
Battery life	approx. 2000 hours
Display	LCD Character Height 7,5 mm

### Optional accessories

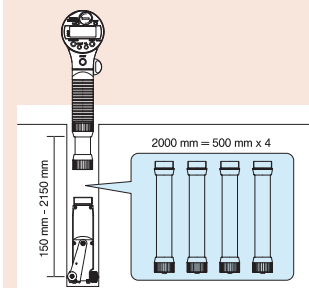
No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21DZA089	Extension Rod, Series 511, 250mm
21DZA081	Extension Rod, Series 511, 500mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



The ABSOLUTE Digimatic Bore Gauge detects the minimum value (true diameter) and holds it automatically.



Four extension rods (500 mm each) connected together provide a 2 m extension.

\*if the detecting speed is > 50 µm/s the peak value may not be displayed correctly

# Bore Gauge Checker

## Specifications

Delivered | Delivery as complete set in soft box

## Standard accessories

No.	Description
940088	Receiver for Bore Gauge Checker, 18-35mm/35-60mm
940089	Receiver for Bore Gauge Checker, 50-100mm/100-160mm
940090	Receiver for Bore Gauge Checker, 100-250mm/250-400mm
630030	Flat Jaws for Bore Gauge Checker, 2 pcs.

## Series 515

- For setting 2-point bore gauges series 511.
- The Bore Gauge Checker allows easy setting of dial bore gauges with ranges of 18 mm through 400 mm using gauge blocks.

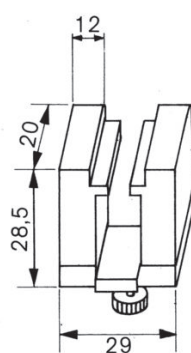


515-590  
+ gauge block (optional)

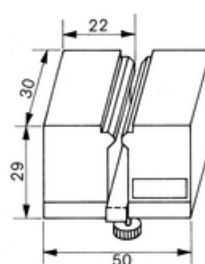


## Inch/Metric

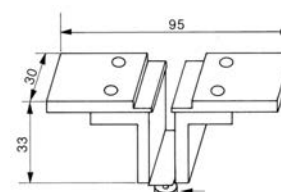
No.	Applicable Range	Mass [kg]
515-590	18-400 mm	4,51



940088



940089



940090

# Gauge Set

## Series 155 - Telescopic Gauge Set

- Self-centering and satin chrome finish.
- Constant spring force on to the measuring surface. Locked in position by knurled lockscrew.



155-905

### Metric

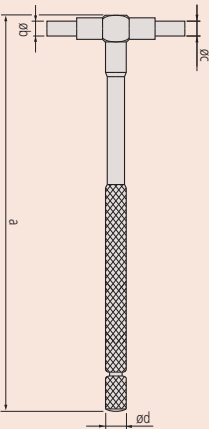
No.	Gauges included	Range	a [mm]	b [mm]	c [mm]	d [mm]	Mass
155-905	155-127	8-12,7 mm	110	4	3	5	15
	155-128	12,7-19 mm	110	5	3,5	5,5	25
	155-129	19-32 mm	110	5	3,5	5,5	35
	155-130	32-54 mm	150	7,5	6	8	75
	155-131	54-90 mm	150	7,5	6	8	80
	155-132	90-150 mm	150	7,5	6	8	100

### Specifications

Delivered	Including plastic wallet
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### Specifications

Delivered	Including plastic wallet
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# Setting Rings

## Series 177

### Specifications

#### Cylindricity

1 µm for ø1-60 mm  
1,5 µm for ø62-90 mm  
2 µm for ø100-150 mm  
2,5 µm for ø175-225 mm  
3 µm for ø250-300 mm



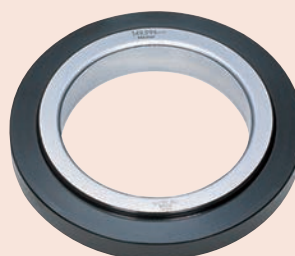
177-424



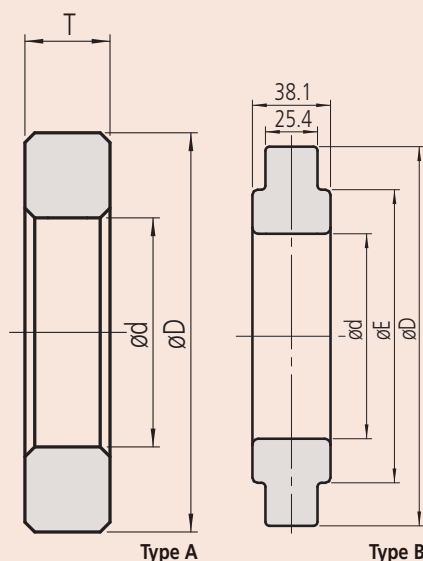
177-139



177-432



177-300



Tolerance from nominal diameter is  $\pm 0,01$  mm up to 45 mm, and  $\pm 0,02$  mm above. The calibrated diameter of each ring is marked on its upper face.

### Metric

No.	Material	Nominal size ød	Type	Ø D [mm]	Ø E [mm]	T [mm]
177-220	Steel	1 mm	A	20		4
177-222	Steel	1,1 mm	A	20		4
177-225	Steel	1,2 mm	A	20		4
177-227	Steel	1,3 mm	A	20		4
177-230	Steel	1,4 mm	A	20		4
177-236	Steel	1,75 mm	A	25		5
177-239	Steel	2 mm	A	25		5
177-242	Steel	2,25 mm	A	25		5
177-208	Steel	2,5 mm	A	25		7
177-246	Steel	2,75 mm	A	25		7
177-248	Steel	3 mm	A	25		7
177-250	Steel	3,25 mm	A	25		7
177-252	Steel	3,5 mm	A	25		7
177-255	Steel	3,75 mm	A	25		7
177-204	Steel	4 mm	A	25		7
177-418	Ceramic	4 mm	A	25		7
177-257	Steel	4,5 mm	A	25		7
177-205	Steel	5 mm	A	25		7
177-263	Steel	5,5 mm	A	25		7
177-267	Steel	6 mm	A	25		7
177-420	Ceramic	6 mm	A	25		7
177-271	Steel	6,5 mm	A	25		7
177-275	Steel	7 mm	A	25		7
177-125	Steel	8 mm	A	32		10
177-423	Ceramic	8 mm	A	32		10
177-279	Steel	9 mm	A	32		10
177-126	Steel	10 mm	A	32		10
177-424	Ceramic	10 mm	A	32		10
177-284	Steel	12 mm	A	32		10
177-425	Ceramic	12 mm	A	32		10
177-132	Steel	14 mm	A	38		10
177-177	Steel	16 mm	A	45		10
177-427	Ceramic	16 mm	A	45		10
177-133	Steel	17 mm	A	45		10
177-285	Steel	18 mm	A	45		10
177-286	Steel	20 mm	A	45		10
177-429	Ceramic	20 mm	A	45		10
177-139	Steel	25 mm	A	53		15
177-430	Ceramic	25 mm	A	53		15
177-288	Steel	30 mm	A	71		15
177-431	Ceramic	30 mm	A	71		15
177-140	Steel	35 mm	A	71		15
177-432	Ceramic	35 mm	A	71		15
177-290	Steel	40 mm	A	71		15
177-433	Ceramic	40 mm	A	71		15
177-178	Steel	45 mm	A	85		15
177-434	Ceramic	45 mm	A	85		15
177-146	Steel	50 mm	A	85		20
177-292	Steel	60 mm	A	112		20
177-314	Steel	62 mm	A	112		20
177-147	Steel	70 mm	A	112		20
177-316	Steel	75 mm	A	125		25
177-294	Steel	80 mm	A	125		25
177-318	Steel	87 mm	A	140		25
177-148	Steel	90 mm	A	140		25
177-296	Steel	100 mm	A	160		25
177-298	Steel	125 mm	B	210	168	38,1
177-300	Steel	150 mm	B	235	187	38,1
177-302	Steel	175 mm	B	260	215	38,1
177-304	Steel	200 mm	B	311	244	38,1
177-306	Steel	225 mm	B	337	264	38,1
177-308	Steel	250 mm	B	362	290	38,1
177-310	Steel	275 mm	B	413	321	38,1
177-312	Steel	300 mm	B	438	340	38,1

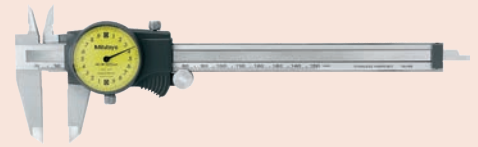


## Calipers

**Absolute Digimatic Caliper**  
**Page 167**

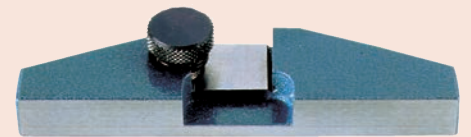


**Analog Caliper**  
**Page 181**



**Special Purpose Caliper**  
**Page 188**

**Caliper Accessories**  
**Page 204**



# ABSOLUTE Coolant Proof Caliper IP67

Functions	Series 500
ORIGIN (ABS-Zero)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●

## Specifications

Accuracy	≤ 200 mm : ±0,02 mm > 200 mm : ±0,03 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5 years under normal use
Display	LCD, Character Height 9 mm (150, 200 mm) 11 mm (300 mm)
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range

## Consumable spares

No.	Description
938882	Battery 5R44 1.5V



Beam 150 and 200 mm or 300 mm

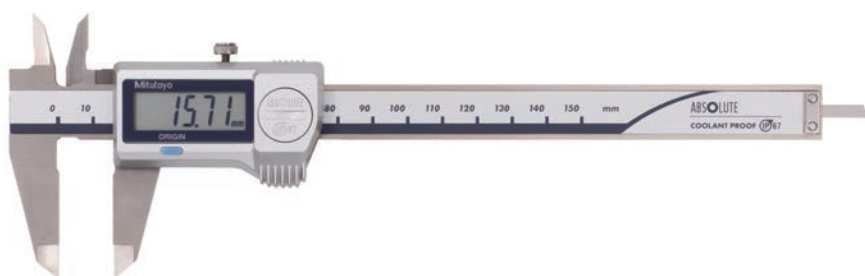


With Wireless System U-WAVE fit

## Series 500

This IP67 ABSOLUTE digimatic caliper allows reliable measurements in a wide range of situations and offers you the following benefits:

- Excellent resistance against water and dust (IP67 protection level) enabling use in machining situations that include splashing coolant fluid
- It is dustproof, complies with EN60529 and withstands temporary complete immersion in water without suffering any damage.
- Extraordinarily long battery life
- ABS (ABSOLUTE) scale requires no origin setting after power-on and has no limit to response speed.



500-706-20

## Metric

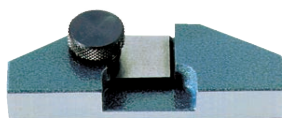
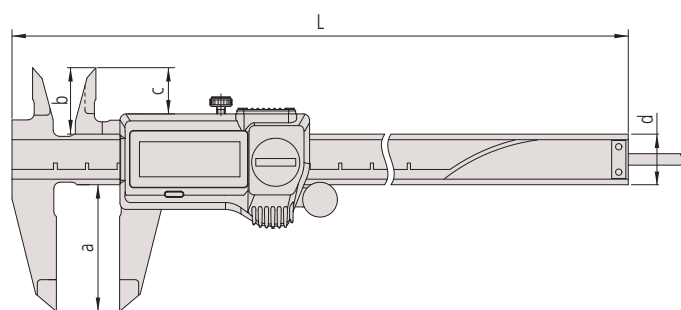
Without thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-706-20	0-150	flat		233	40	21	16,5	16	164
500-709-20	0-150	Ø 1,9 mm		233	40	21	16,5	16	164
500-716-20	0-150	flat	●	233	40	21	16,5	16	164
500-707-20	0-200	flat		290	50	24,5	20	16	194
500-717-20	0-200	flat	●	290	50	24,5	20	16	194
500-708-20	0-300	flat		404	64	27,5	21,8	20	345
500-718-20	0-300	flat	●	404	64	27,5	21,8	20	345

## Metric

With thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-702-20	0-150	flat		233	40	21	16,5	16	164
500-712-20	0-150	flat	●	233	40	21	16,5	16	164
500-719-20	0-150	Ø 1,9 mm	●	233	40	21	16,5	16	164
500-703-20	0-200	flat		290	50	24,5	20	16	194
500-713-20	0-200	flat	●	290	50	24,5	20	16	194
500-704-20	0-300	flat		404	64	27,5	21,8	20	345
500-714-20	0-300	flat	●	404	64	27,5	21,8	20	345



050083-10

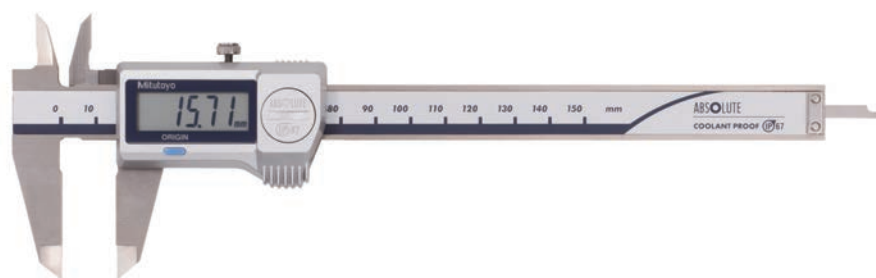
# ABSOLUTE Coolant Proof Caliper IP67 with Carbide Tipped Jaws

## Series 500

These robust calipers have carbide-tipped jaws and allow reliable measurements in a wide range of situations.

The ABSOLUTE Digimatic Carbide Caliper IP67 offers you the following benefits:

- Excellent resistance against water and dust (IP67 protection level) enabling use in machining situations that include splashing coolant fluid.
- Dustproof, complies with EN60529 withstands temporary complete immersion in water without suffering any damage
- Extraordinarily long battery life.



500-727-20

### Metric

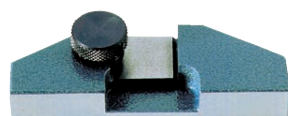
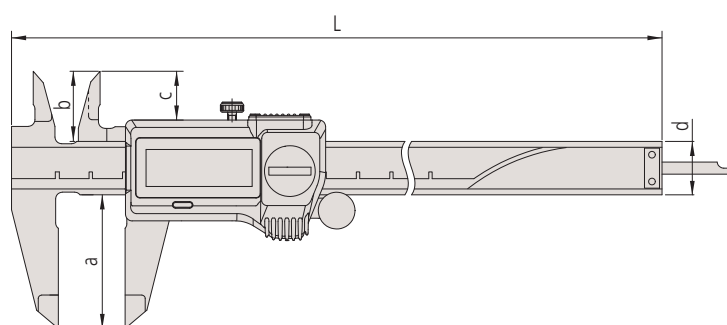
Carbide-tipped jaws for outside/inside measurement

No.	Range [mm]	Data output	Thumb roller	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-727-20	0-150	●	●	233	40	21	16,5	16	164
500-723-20	0-150	●	●	233	40	21	16,5	16	168
500-728-20	0-200	●	●	290	50	24,5	20	16	194
500-724-20	0-200	●	●	290	50	24,5	20	16	198

### Metric

Carbide-tipped jaws for outside measurement

No.	Range [mm]	Data output	Thumb roller	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-721-20	0-150	●	●	233	40	21	16,5	16	168
500-722-20	0-200	●	●	290	50	24,5	20	16	198



050083-10

Functions	Series 500
ORIGIN (ABS-Zero)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●

### Specifications

Accuracy	≤ 200 mm : ±0,02 mm > 200 mm : ±0,03 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Depth bar	Flat
Battery life	appr. 5 years under normal use
Display	LCD, Character height 9 mm
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



Carbide-tipped jaws

# ABSOLUTE AOS Digimatic Caliper

ABSOLUTE®



Functions	Series 500
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●

## Specifications

Accuracy	≤ 200 mm : ±0,02 mm / > 200 mm : ±0,03 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 18000 hours
Display	LCD, Character Height 9 mm (150, 200 mm) 11 mm (300 mm)
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF300	Connection Unit, U-WAVE fit, Standard Type
959143	Data Hold Unit
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



Round depth bar type



Caliper with Wireless System U-WAVE fit



Scan QR Code with your mobile device and watch our product videos on YouTube

## Series 500

This digimatic caliper allows you to take reliable measurements and offers you the following benefits:

- AOS (Advanced Onsite Sensor) induction type encoder used in top-of-the-line ABS coolant-proof calipers
- Thanks to the adoption of the electromagnetic induction type ABS encoder, this caliper can be used without concern for contamination on the scale face during measurement. Detection signal is not affected by dirt (water, oil, etc.) on surface of a scale.
- The slider provides smooth, stable and comfortable operation.
- Character height: 9 mm (150 and 200 mm), 11 mm (300 mm)
- ABS (ABSOLUTE) scale requires no origin setting after power-on and has no limit to response speed.



500-181-30

## Metric

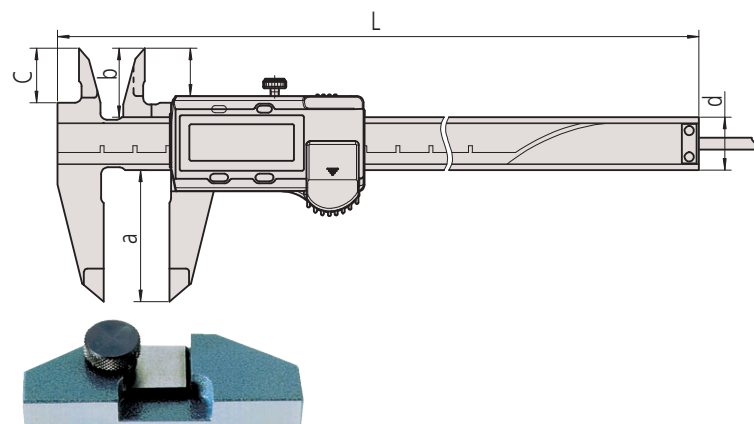
Without thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-180-30	0-100	Ø 1,9 mm		182	40	21	16,5	16	142
500-201-30	0-100	Ø 1,9 mm	●	182	40	21	16,5	16	143
500-184-30	0-150	Ø 1,9 mm		233	40	21	16,5	16	164
500-203-30	0-150	Ø 1,9 mm	●	233	40	21	16,5	16	168
500-181-30	0-150	flat		233	40	21	16,5	16	164
500-161-30	0-150	flat	●	233	40	21	16,5	16	164
500-182-30	0-200	flat		290	50	24,5	20	16	194
500-162-30	0-200	flat	●	290	50	24,5	20	16	194
500-205-30	0-300	flat	●	404	64	27,5	22	20	350

## Metric

With thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-150-30	0-100	Ø 1,9 mm	●	182	40	21	16,5	16	143
500-151-30	0-150	flat	●	233	40	21	16,5	16	164
500-158-30	0-150	Ø 1,9 mm	●	233	40	21	16,5	16	164
500-152-30	0-200	flat	●	290	50	24,5	20	16	194
500-153-30	0-300	flat	●	404	64	27,5	22	20	350



050083-10

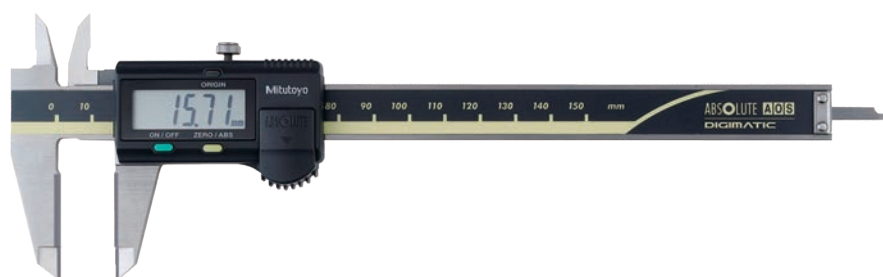
# ABSOLUTE AOS Digimatic Caliper with Carbide Tipped Jaws

## Series 500

These Digimatic calipers have carbide-tipped jaws and allow you to take reliable measurements and offer you the following benefits:

- Thanks to the adoption of the electromagnetic induction type ABS encoder, this caliper can be used without concern for contamination on the scale face during measurement. Detection signal is not affected by dirt (water, oil, etc.) on surface of a scale.
- The slider provides smooth, stable and comfortable operation.
- Character height: 9 mm (alleviation of fatigue with the high-contrast LCD)
- The ABS (ABSOLUTE) scale requires no origin setting after power-on and also has no limit to response speed.
- Extraordinary battery life

ABSOLUTE®



### Metric

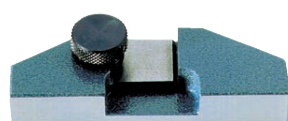
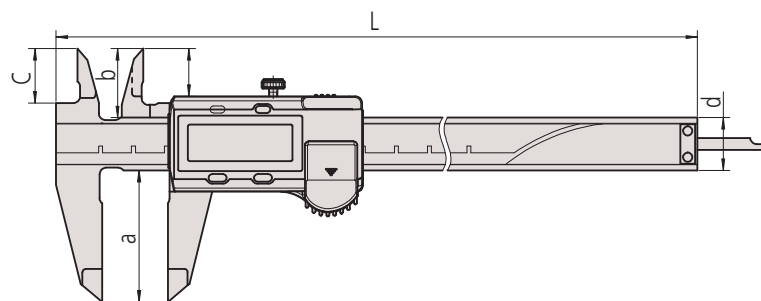
Carbide-tipped jaws for outside/inside measurement

No.	Range [mm]	Data output	Thumb roller	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-234-30	0-150	●		233	40	21	16,5	16	168
500-155-30	0-150	●	●	233	40	21	16,5	16	168
500-236-30	0-200	●		290	50	24,5	20	16	198
500-157-30	0-200	●	●	290	50	24,5	20	16	198

### Metric

Carbide-tipped jaws for outside measurement

No.	Range [mm]	Data output	Thumb roller	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-233-30	0-150	●		233	40	21	16,5	16	168
500-154-30	0-150	●	●	233	40	21	16,5	16	168
500-235-30	0-200	●		290	50	24,5	20	16	198
500-156-30	0-200	●	●	290	50	24,5	20	16	198



050083-10

Functions	Series 500
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Depth bar	

### Specifications

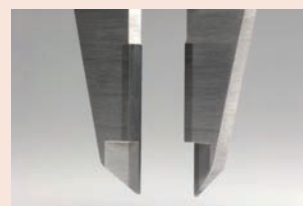
Accuracy	≤ 200 mm : ±0,02 mm > 200 mm : ±0,03 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 18000 hours
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF300	Connection Unit, U-WAVE fit, Standard Type
959143	Data Hold Unit
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



Carbide-tipped jaws



# ABSOLUTE Coolant Proof Solar Caliper IP67

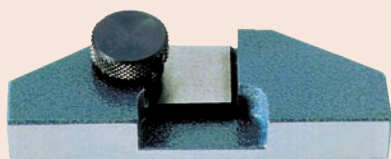
Functions	Series 500
ORIGIN (ABS-Zero)	

## Specifications

Accuracy	±0,02 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Power	Solar cell
Display	LCD, Character Height 7,5 mm
Delivered	In a case

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range



050083-10

## Series 500



This IP67 solar-powered digimatic SuperCaliper with ABSOLUTE system is a robust, high performance model and offers you the following benefits:

- Waterproof reliability
- Impact resistance of the display unit for improved usability in workshop conditions
- It operates in only 60 lux ambient lighting.
- Even if the illumination is temporarily less than 60 lux measuring can be performed by charging a super capacitor.
- Excellent resistance against water and dust (IP67 protection level) enabling you to use it in machining situations that include splashing coolant fluid





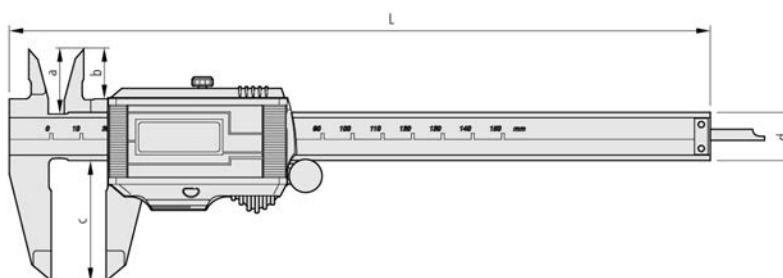
500-772

## Metric Without thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-772	0-150	flat		233	21	16,5	40	16	180
500-792	0-150	Ø 1,9 mm		233	21	16,5	40	16	180
500-778	0-150	flat		233	21	16,5	40	16	180
500-773	0-200	flat		290	24,5	20	50	16	210
500-779	0-200	flat		290	24,5	20	50	16	210

## Metric With thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-774	0-150	flat		233	21	16,5	40	16	180
500-776	0-150	flat		233	21	16,5	40	16	180
500-775	0-200	flat		290	24,5	20	50	16	210
500-777	0-200	flat		290	24,5	20	50	16	210



# ABSOLUTE Digimatic Solar Caliper

## Series 500

This ABSOLUTE digimatic solar caliper enables you to take reliable measurements and offers you the following benefits:

- You can operate it in just 60 lux ambient lighting.
- ABS (ABSOLUTE) scale requires no origin setting after power-on and has no limit to response speed.
- ABS (ABSOLUTE) scale requires no origin setting after power-on and has no limit to response speed.

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500-444



500-457

### Metric

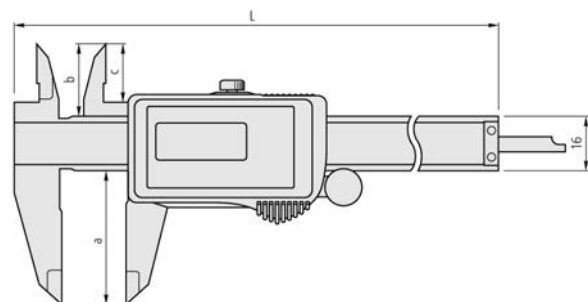
Without thumb roller

No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
500-457	0-150	flat		233	40	21	16,5	150
500-458	0-200	flat		290	50	24	20	180

### Metric

With thumb roller

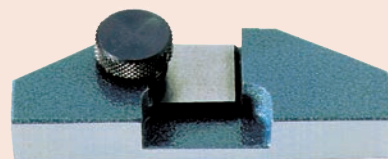
No.	Range [mm]	Depth bar	Data output	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
500-453	0-100	Ø 1,9 mm		182	40	21	16,5	125
500-443	0-100	Ø 1,9 mm		182	40	21	16,5	145
500-454	0-150	flat		233	40	21	16,5	150
500-444	0-150	flat		233	40	21	16,5	170
500-455	0-200	flat		290	50	24	20	180
500-445	0-200	flat		290	50	24	20	200



Functions	Series 500
ORIGIN (ABS-Zero)	
Specifications	
Accuracy	±0,02 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Power	Solar cell
Display	LCD, Character Height 7,5 mm
Delivered	In a case

### Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
959143	Data Hold Unit
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range



050083-10

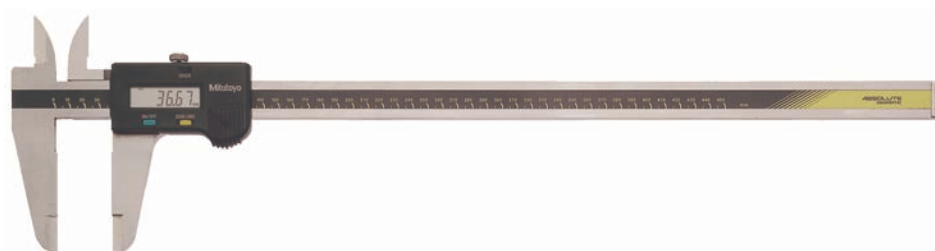
# ABSOLUTE Digimatic Caliper for Long Range

ABSOLUTE®

## Series 500

This digimatic caliper allows you to take reliable measurements and offers you the following benefits:

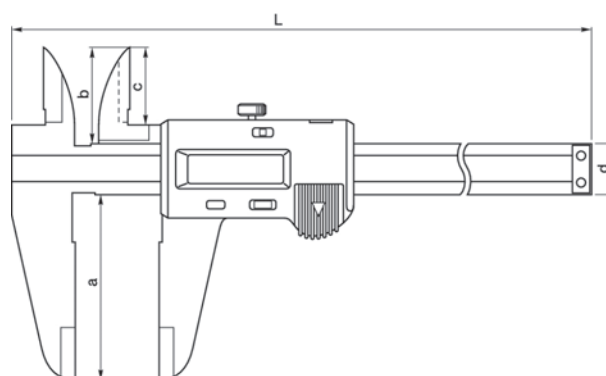
- It has a robust design (6 x 25 mm beam) for large measuring ranges.
- ABSOLUTE System delivers reliable measurements.
- The slider provides smooth, stable and comfortable operation.
- Character height: 10 mm



500-500-10

## Metric

No.	Range [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
500-500-10	0-450	630	90	47	38	25	1170
500-501-10	0-600	780	90	47	38	25	1350
500-502-10	0-1000	1240	130	61	50	32	3300



Functions	Series 500
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●

## Specifications

Accuracy	≤ 600 mm : ±0,05 mm ≤ 1000 mm : ±0,07 mm (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 20000 hours
Display	LCD, Character Height 10 mm
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button
959143	Data Hold Unit

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

# ABSOLUTE Digimatic Caliper with Nib Style Jaws

## Series 550

This is a Digimatic caliper with nib-style jaws that lets you measure inside dimensions.

It offers you the following benefits:

- Rounded measuring surfaces enable you to measure inside dimensions.
- ABSOLUTE System delivers reliable measurements.



200/300 mm

**ABSOLUTE<sup>®</sup>**  
**IP67**



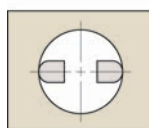
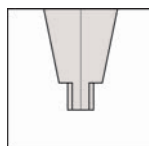
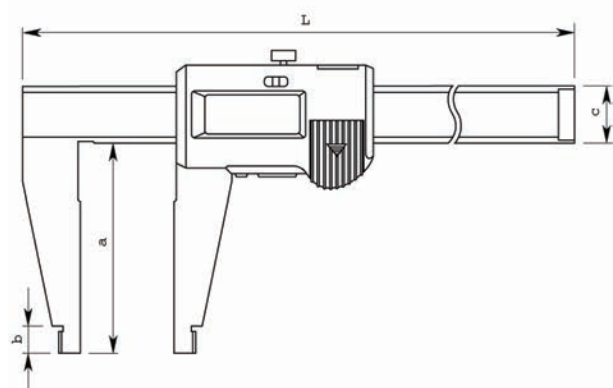
550-301-20

### Metric IP67 model

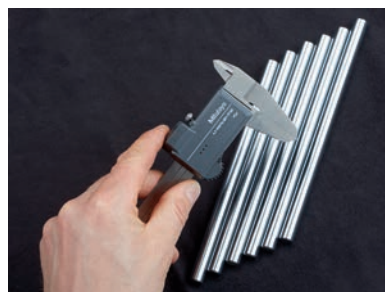
No.	Range [mm]	Remarks	Accuracy [mm]	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
550-301-20	0-200	IP67	±0,03	10,1 mm	290	60	8	16	180
550-331-10	0-300	IP67	±0,04	10,1 mm	403	75	12	20	380

### Metric Non IP67 model

No.	Range [mm]	Accuracy [mm]	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	Mass [g]
550-203-10	0-450	±0,05	20,1 mm	630	100	18	25	1110
550-205-10	0-600	±0,05	20,1 mm	780	100	18	25	1290
550-207-10	0-1000	±0,07	20,1 mm	1240	140	24	32	3350



Round surfaces of jaws for measuring inside dimensions



With Wireless System U-WAVE fit (0-200 mm and 0-300 mm only)

## Series 550

Functions	550-203-10 up to 550-207-10	550-301-20	550-331-10
ORIGIN (ABS-Zero)	●	●	●
OFFSET*	●	●	●
ON/OFF	●	●	●
Auto Power OFF after 20 min. non use	●	●	●
Low voltage alarm	●	●	●
Data output	●	●	●
PRESET	●	●	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5 years (200 mm), 1 year (300 mm), 3,5 years (>300 mm)
Display	LCD, Character Height 9 mm (200 mm) 10,2 mm (300 mm) 10 mm (>300 mm)
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button
959143	Data Hold Unit

## Optional accessories for IP67

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

\*10 mm

# ABSOLUTE Digimatic Caliper with Nib Style and Standard Jaws

## Series 551

This is a Digimatic caliper with nib-style and standard jaws. It offers you the following benefits:

- Knife-shaped measuring surfaces allow you to take outside measurements.
- Rounded measuring surfaces enable you to measure inside dimensions.
- ABSOLUTE System delivers reliable measurements.



200/300 mm

**ABSOLUTE®**  
**IP67**

	551-204-10	551-207-10	551-301-20	551-331-10
<b>Functions</b>				
ORIGIN (ABS-Zero)	●	●	●	●
OFFSET* ON/OFF	●	●	●	●
Auto Power OFF after 20 min. non use	●	●	●	●
Low voltage alarm	●	●	●	●
Data output PRESET	●	●	●	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5 years (200 mm), 1 years (300 mm), 3,5 year (>300 mm)
Display	LCD; Character Height 9 mm (200 mm) 10,2 mm (300 mm) 10 mm (>300 mm)
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button
959143	Data Hold Unit

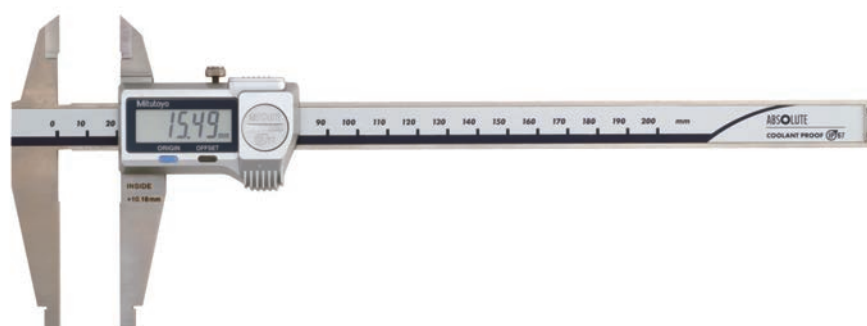
## Optional accessories for IP67

No.	Description
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

\*10 mm



551-301-20

## Metric

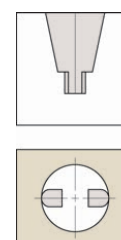
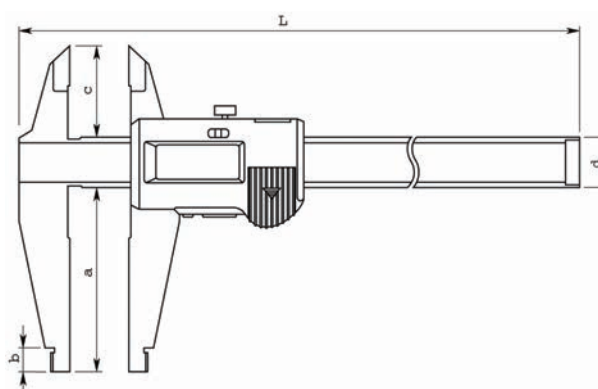
IP67 model

No.	Range [mm]	Inside measuring from	Remarks	Accuracy [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
551-301-20	0-200	10,1 mm	IP67	±0,03	290	60	8	30	16	190
551-331-10	0-300	10,1 mm	IP67	±0,04	403	90	10	40	20	420

## Metric

Non IP67 model

No.	Range [mm]	Inside measuring from	Accuracy [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
551-204-10	0-500	20,1 mm	±0,06	680	150	18	56	25	1060
551-206-10	0-750	20,1 mm	±0,06	963	150	18	56	25	1410
551-207-10	0-1000	20,1 mm	±0,07	1230	150	20	56	32	3430



Round surface of jaws for measuring inside dimensions



With Wireless System U-WAVE fit (0-200 mm and 0-300 mm only)



# ABSOLUTE Digimatic Carbon Fibre Caliper IP66

## Series 552

This is a lightweight standard model of Digimatic caliper with steel jaws.

It offers you the following benefits:

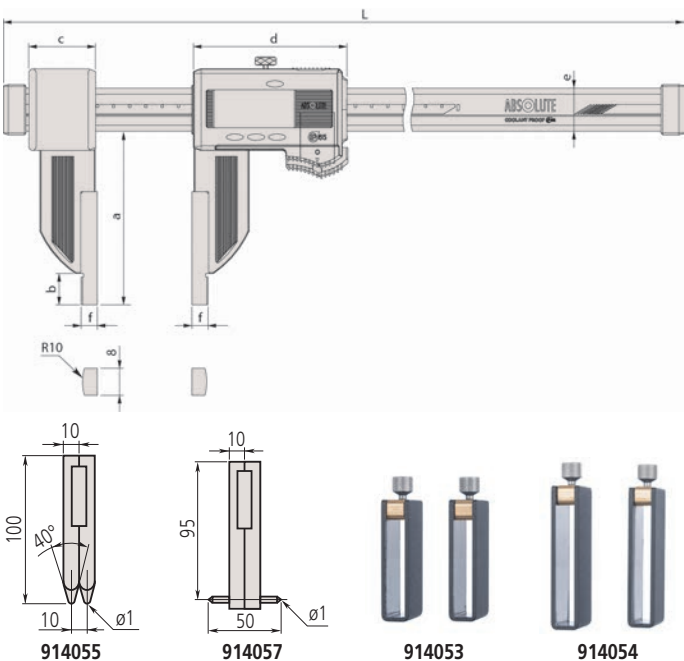
- Its ultra-lightweight design (with carbon fibre reinforced material) reduces total weight by up to 50%.
- It has excellent resistance against water and dust (IP66 protection level) enabling you to use it in machining situations that include splashing coolant fluid.
- Direct readout of inside measurements from the LCD (you can easily set the offset value by using the offset button).
- Preset function lets you set a desired starting point.



552-304-10

### Metric

No.	Range [mm]	Accuracy [mm]	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	Mass [g]
552-302-10	0-450	±0,04	20,1 mm	640	100	18	41,2	91,8	25	10	715
552-303-10	0-600	±0,04	20,1 mm	790	100	18	41,2	91,8	25	10	790
552-304-10	0-1000	±0,05	20,1 mm	1230	150	24	62,8	113,8	32	10	1760
552-305-10	0-1500	±0,09	20,1 mm	1740	150	24	62,8	113,8	32	10	2160
552-306-10	0-2000	±0,12	20,1 mm	2250	150	24	62,8	113,8	32	10	2560



Functions	Series 552
ORIGIN (ABS-Zero)	●
OFFSET*	●
DATA/HOLD	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●
PRESET	●

### Specifications

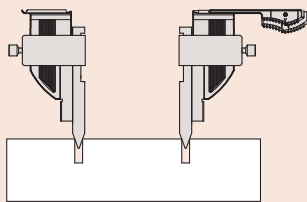
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5000 hours
Display	LCD, Character Height 10 mm
Delivered	In a case, including 1 battery

### Optional accessories

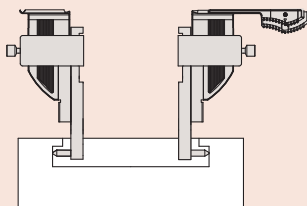
No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type
914055	Center to Center Jaws Series 552, 2 pcs., (≥10,1mm) Metric
914057	Inside Groove Jaws Series 552, 2 pcs., Metric
914053	Holders (Clamps) Series 552, 2 pcs., 450 and 600mm Range
914054	Holders (Clamps) Series 552, 2 pcs., >600mm Range

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



hole center to center



inside groove diameter  
\* 20mm

# ABSOLUTE Digimatic Carbon Fibre Caliper IP66 with Ceramic Jaws

Functions	Series 552
ORIGIN (ABS-Zero)	●
OFFSET*	●
DATA/HOLD	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output PRESET	●

## Specifications

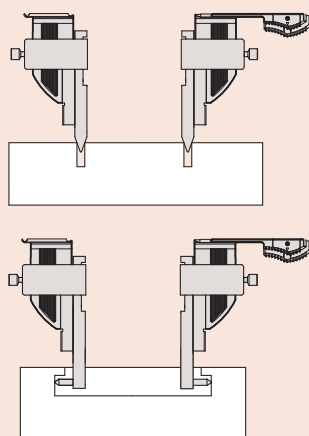
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5000 hours
Display	LCD, Character Height 10 mm
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type
914055	Center to Center Jaws Series 552, 2 pcs., (≥10,1mm) Metric
914057	Inside Groove Jaws Series 552, 2 pcs., Metric
914053	Holders (Clamps) Series 552, 2 pcs., 450 and 600mm Range

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



\* 20mm

## Series 552

This is a lightweight standard model of Digimatic caliper with ceramic jaws.

It offers you the following benefits:

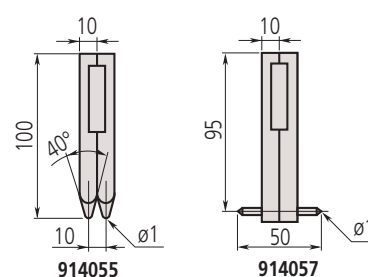
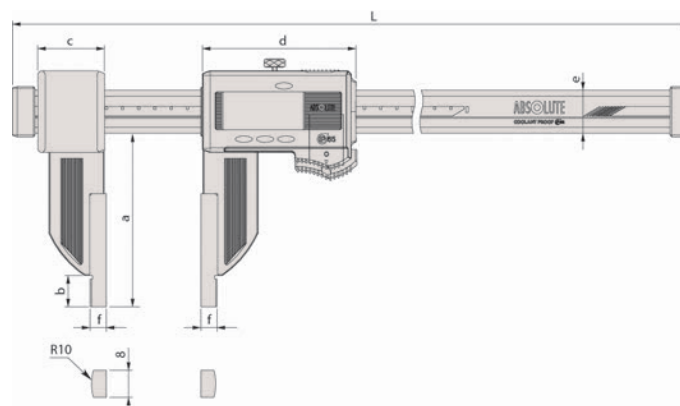
- Its ultra-lightweight design (with carbon fibre reinforced material) reduces total weight by up to 50%.
- It has excellent resistance against water and dust (IP66 protection level) enabling you to use it in machining situations that include splashing coolant fluid.
- Direct readout of inside measurements from the LCD (you can easily set the offset value by using the offset button).
- Preset function lets you set a desired starting point.



552-156-10

## Metric

No.	Range [mm]	Accuracy [mm]	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	Mass [g]
552-155-10	0-450	±0,04	20,1 mm	640	100	18	41,2	91,8	25	10	715
552-156-10	0-600	±0,04	20,1 mm	790	100	18	41,2	91,8	25	10	790



914053



# ABSOLUTE Digimatic Carbon Fibre Caliper IP66 with Extra Long Jaws

## Series 552

This is a lightweight standard model of Digimatic caliper with extra-long jaws.

It offers you the following benefits:

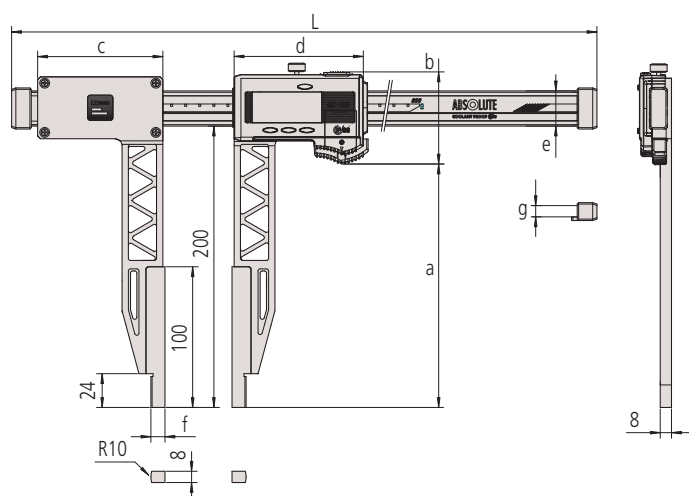
- Its ultra-lightweight design (with carbon fibre reinforced material) reduces total weight by up to 50%.
- It has excellent resistance against water and dust (IP66 protection level) enabling you to use it in machining situations that include splashing coolant fluid.
- Direct readout of inside measurements from the LCD (you can easily set the offset value by using the offset button).
- Preset function lets you set a desired starting point.



552-151-10

## Metric

No.	Range [mm]	Accuracy [mm]	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	Mass [g]
552-150-10	0-450	±0,06	20,1 mm	680	173	65,5	89	91,8	25	10	8	1215
552-151-10	0-600	±0,06	20,1 mm	830	173	65,5	89	91,8	25	10	8	1290
552-152-10	0-1000	±0,07	20,1 mm	1280	170,5	73	110	113,8	32	10	12	2090
552-153-10	0-1500	±0,11	20,1 mm	1790	170,5	73	110	113,8	32	10	12	2490
552-154-10	0-2000	±0,14	20,1 mm	2300	170,5	73	110	113,8	32	10	12	2890



Functions	Series 552
ORIGIN (ABS-Zero)	●
OFFSET*	●
DATA/HOLD	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●
PRESET	●

## Specifications

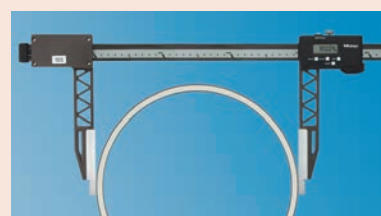
Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5000 hours
Display	LCD, Character Height 10 mm
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



*	metric
≤ 600mm	20mm
≤ 1000mm	20mm

# ABSOLUTE Digimatic Carbon Fibre Caliper IP66 for Interchangeable Jaws/ Scriber

Functions	Series 552
ORIGIN (ABS-Zero)	●
OFFSET	●
DATA/HOLD	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●
PRESET	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Max. response speed	Unlimited
Battery life	approx. 5000 hours
Display	LCD, Character Height 10 mm
Delivered	In a case, including 1 battery, scriber clamps (2pcs.)

## Standard accessories

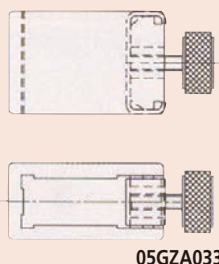
No.	Description
05GZA033	Scriber Clamp, 9x9mm

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



05GZA033

## Series 552

This is a lightweight standard model of Digimatic caliper with optional interchangeable jaws.

It offers you the following benefits:

- Its ultra-lightweight design (with carbon fibre reinforced material) reduces total weight by up to 50%.
- It has excellent resistance against water and dust (IP66 protection level) enabling you to use it in machining situations that include splashing coolant fluid.
- Direct readout of inside measurements from the LCD (you can easily set the offset value by using the offset button).
- Preset function lets you set a desired starting point.



552-182-10  
with optional accessories 07CZA056

## Metric

No.	Range [mm]	Accuracy [mm]	Mass [g]
552-181-10	0-450	±0,04	650
552-182-10	0-600	±0,04	725
552-183-10	0-1000	±0,05	1480
552-184-10	0-1500	±0,09	1880
552-185-10	0-2000	±0,12	2280

Accuracy: without jaws

Standard contact point	Measuring range	0-450 mm / 0-18"	0-600 mm / 0-24"	0-1000 mm / 0-40"	0-1500 mm / 0-60"	0-2500 mm / 0-80"
	Combination error	± 0,06 / ± 0.0025"	± 0,06 / ± 0.0025"	± 0,07 / ± 0.0030"	± 0,11 / ± 0.0045"	± 0,14 / ± 0.0055"
Inside Point type	Measuring range (mm)	IN 50-500 mm	50-650 mm	50-1050 mm	50-1550 mm	50-2550 mm
		OUT 0-450 mm	0-600 mm	0-1000 mm	0-1500 mm	0-2500 mm
	Measuring range (in)	IN 50,8-500,8 mm / 2-20"	50,8-650,8 mm / 2-26"	50,8-1050,8 mm / 2-42"	50,8-1550,8 mm / 2-62"	50,8-2550,8 mm / 2-82"
		OUT 0-450 mm / 0-18"	0-600 mm / 0-24"	0-1000 mm / 0-40"	0-1500 mm / 0-60"	0-2500 mm / 0-80"
	Combination error	± 0,09 mm / ± 0.0035"	± 0,09 mm / ± 0.0035"	± 0,10 mm / ± 0.0040"	± 0,14 mm / ± 0.0055"	± 0,17 mm / ± 0.0070"
Centerline type	Measuring range (mm)	30-480 mm	30-630 mm	30-1030 mm	30-1530 mm	30-2030 mm
	Measuring range (in)	30,48-480,8 mm / 1.2-19.2"	30,48-630,48 mm / 1.2-25.2"	30,48-1030,48 mm / 1.2-41.2"	30,48-1530,48 mm / 1.2-61.2"	30,48-2030,48 mm / 1.2-81.2"
	Combination error	± 0,08 mm / ± 0.0030"	± 0,08 mm / ± 0.0030"	± 0,09 mm / ± 0.0035"	± 0,13 mm / ± 0.0055"	± 0,16 mm / ± 0.0065"
Scriber type	Measuring range (mm)	30-480 mm	30-630 mm	30-1030 mm	30-1530 mm	30-2030 mm
	Measuring range (in)	30,48-480,8 mm / 1.2-19.2"	30,48-630,48 mm / 1.2-25.2"	30,48-1030,48 mm / 1.2-41.2"	30,48-1530,48 mm / 1.2-61.2"	30,48-2030,48 mm / 1.2-81.2"
	Combination error	± 0,10 / ± 0.0040"	± 0,10 / ± 0.0040"	± 0,11 / ± 0.0045"	± 0,15 / ± 0.0060"	± 0,18 / ± 0.0070"
Surface Plate type + Scriber	Measuring range	0-450 mm / 0-17"	0-600 mm / 0-23.7"	0-1000 mm / 0-39.4"	0-1500 mm / 0-59.4"	0-2500 mm / 0-79.6"
	Combination error	± 0,10 / ± 0.0040"	± 0,10 / ± 0.0040"	± 0,11 / ± 0.0045"	± 0,15 / ± 0.0060"	± 0,18 / ± 0.0070"
Surface Plate type + Inside Point type	Measuring range (mm)	25-475 mm	25-625 mm	25-1025 mm	25-1525 mm	25-2025 mm
		0-450 mm	0-600 mm	0-1000 mm	0-1500 mm	0-2000 mm
	Measuring range (in)	25,4-475,4 mm / 1-19"	25,4-625,4 mm / 1-24"	25,4-1025,4 mm / 1-41"	25,4-1525,4 mm / 1-62"	25,4-2025,4 mm / 1-81"
		0-450 mm / 0-18"	0-600 mm / 0-24"	0-1000 mm / 0-40"	0-1500 mm / 0-60"	0-2000 mm / 0-80"
	Combination error	± 0,12 mm / ± 0.0025"	± 0,12 mm / ± 0.0050"	± 0,13 mm / ± 0.0055"	± 0,17 mm / ± 0.0070"	± 0,20 mm / ± 0.0080"
Surface Plate type + Center Line type	Measuring range (mm)	15-465 mm	15-615 mm	15-1015 mm	15-1515 mm	15-2015 mm
		15,254-465,24 mm / 0,6-18.6"	15,24-615,24 mm / 0,6-24.6"	15,24-1015,24 mm / 0,6-40.6"	15,24-1515,24 mm / 0,6-60.6"	15,24-2015,24 mm / 0,6-80.6"
	Combination error	± 0,11 mm / ± 0.0045"	± 0,11 mm / ± 0.0045"	± 0,12 mm / ± 0.0050"	± 0,16 mm / ± 0.0066"	± 0,19 mm / ± 0.0075"

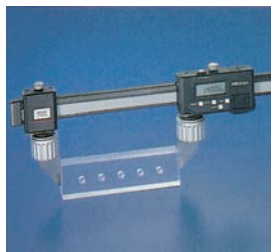
Accuracy with different Interchangeable Jaws



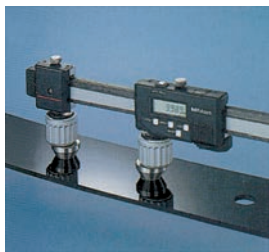
# ABSOLUTE Digimatic Carbon Fibre Caliper IP66 for Interchangeable Jaws/ Scriber

Series 552

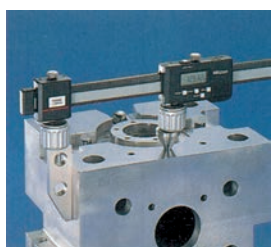
Interchangeable jaws (optional)



Standard type



Centreline type



Surface plate type



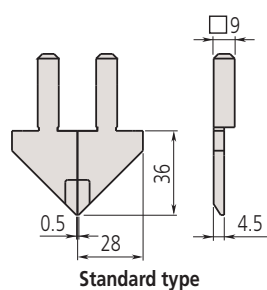
Inside point type



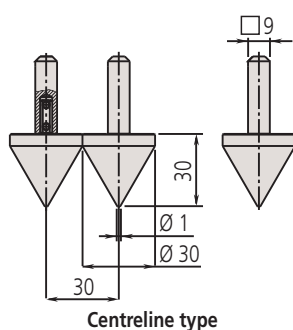
Scriber type

Metric

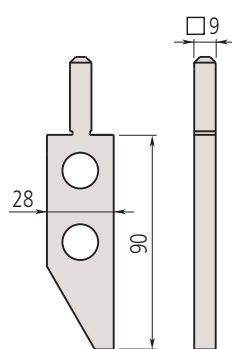
No.	Type	Mass [g]
07CZA056	Standard (pair)	90,6
07CZA057	Centreline (pair)	119,6
07CZA044	Surface plate (1 piece)	191,3
07CZA058	Inside point (pair)	98,8
07CZA055	Scriber (pair)	63,2
07GZA000.	Scriber for height gages	120



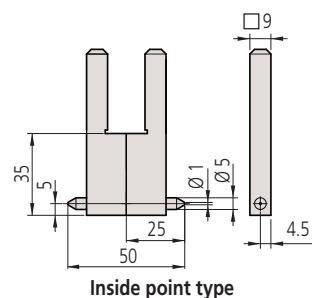
Standard type



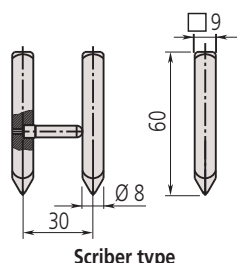
Centreline type



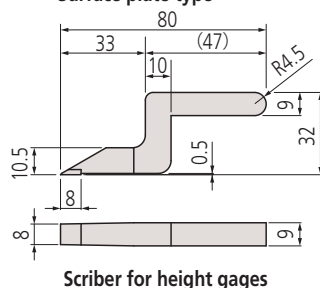
Surface plate type



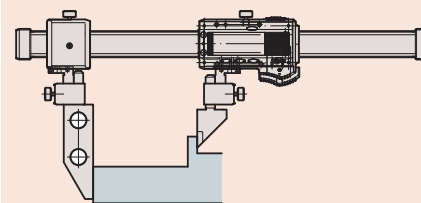
Inside point type



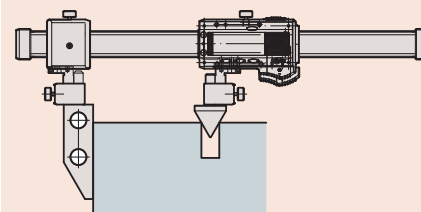
Scriber type



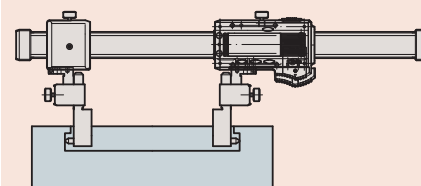
Scriber for height gages



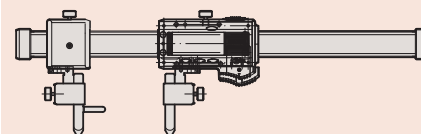
Surface plate type + Standard type



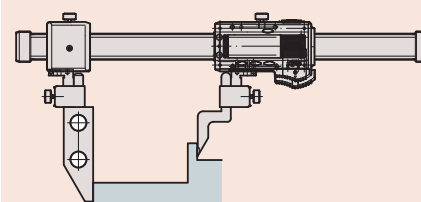
Surface plate type + Centreline type



Inside point type



Scriber type



Surface plate type + Scriber for height gages

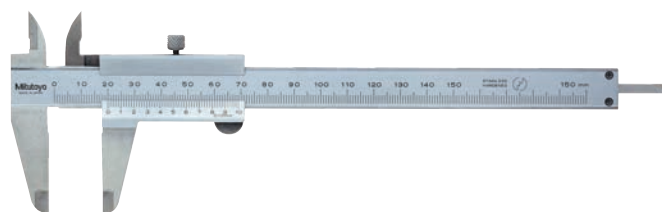


# Vernier Caliper

## Series 530

This is a standard type of vernier caliper that offers you the following benefits:

- Main scale and vernier scale satin chrome finish gives you high readability.
- Raised sliding surfaces



530-122

### Metric

Graduation 0,02 mm

No.	Range [mm]	Depth bar	Accuracy [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
530-122	0-150	flat	±0,03	229	40	21	17	16	143
530-123	0-200	flat	±0,03	288	50	24,5	20,5	16	180
530-124	0-300	flat	±0,04	404	64	27,5	22	20	355

### Metric

Graduation 0,05 mm

No.	Range [mm]	Depth bar	Accuracy [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
530-100	0-100	Ø 1,9 mm	±0,05	182	40	21,5	17	16	128
530-102	0-150	Ø 1,9 mm	±0,05	229	40	21	17	16	144
530-101	0-150	flat	±0,05	229	40	21	17	16	143
530-108	0-200	flat	±0,05	288	50	24,5	20,5	16	180
530-109	0-300	flat	±0,08	404	64	27,5	22	20	355
530-501	0-600	without	±0,1	780	90	47	38	25	1300
530-502	0-1000	without	±0,15	1240	130	60	50	32	3300

### Metric/Inch

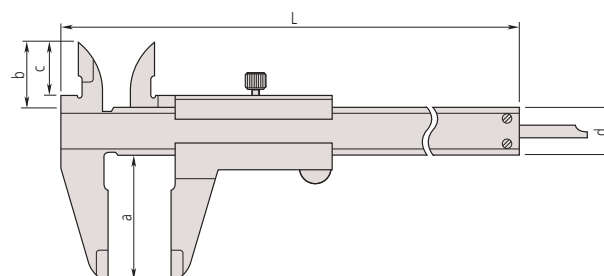
Graduation 0,02 mm-1/1000"

No.	Range [inch]	Range [mm]	Accuracy	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
530-312	0-6	0-150	±0,03 mm/ 0,0015"	flat	229	40	21	17	16	143
530-118	0-8	0-200	±0,03 mm/ 0,0015"	flat	288	50	24,5	20,5	16	180
530-119	0-12	0-300	±0,04 mm/ 0,002"	flat	404	64	27,5	22	20	355

### Metric/Inch

Graduation 0,05 mm-1/128"

No.	Range [inch]	Range [mm]	Accuracy	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
530-104	0-6	0-150	±0,05 mm/ 0,002"	flat	229	40	21	17	16	143
530-316	0-6	0-150	±0,05 mm/ 0,002"	flat	229	40	21	17	16	145
530-114	0-8	0-200	±0,05 mm/ 0,002"	flat	288	50	24,5	20,5	16	180
530-115	0-12	0-300	±0,08 mm/ 0,003"	flat	404	64	27,5	22	20	355



## Specifications

Accuracy	Refer to the list of specifications
Delivered	In a box

## Optional accessories

No.	Description
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range



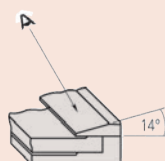
530-316

Clamping screw below the slider



530-104

with metric/inch graduation



Easy reading due to vernier scales inclined by 14 degrees

Metr.ISO-Gew			
Nenn est. extr. φ mm	Stg. Passo Pas mm	Kern fond int. nucleo φ mm	Bohr trap meche broca φ mm
3	0,5	2,46	2,5
4	0,7	3,24	3,3
5	0,8	4,13	4,2
6	1	4,92	5
8	1,25	6,65	6,8
10	1,5	8,38	8,5
12	1,75	10,11	10,2
16	2	13,84	14
20	2,5	17,29	17,5
Whitworth			
φ in.	Gg/in.	φ mm	φ mm
1/4	20	4,72	5,0
5/16	18	6,13	6,4
3/8	16	7,49	7,7
1/2	12	9,99	10,25
5/8	11	12,92	13,25
3/4	10	15,8	16,25
7/8	9	18,61	19
1	8	21,34	21,75
101995			

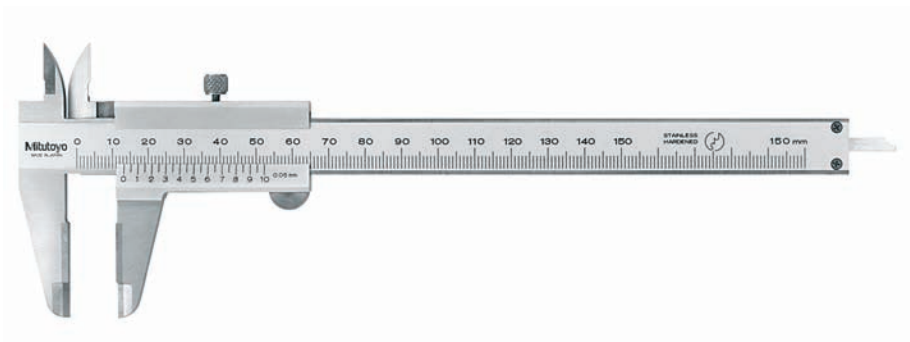
530-316 only

# Vernier Caliper with Carbide Tipped Jaws

## Series 530

This vernier caliper has carbide-tipped jaws and offers you the following benefits:

- Main scale and vernier scale satin chrome finish gives you high readability.
- Raised sliding surfaces.



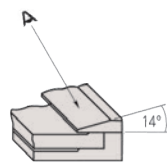
530-320

**Metric** Carbide-tipped jaws for outside/inside measurement

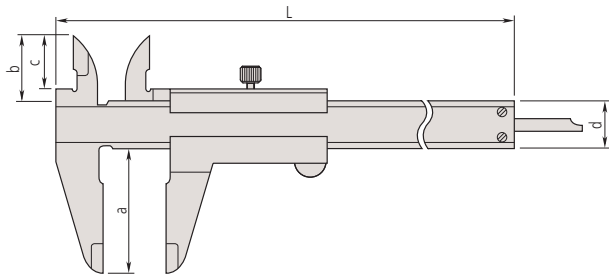
No.	Range [mm]	Accuracy	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
530-335	0-150	±0,05 mm	flat	229	40	21	17	16	145

**Metric** Carbide-tipped jaws for outside measurement

No.	Range [mm]	Accuracy	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
530-320	0-150	±0,05 mm	flat	229	40	21	17	16	145
530-321	0-200	±0,05 mm	flat	288	50	24,5	20,5	16	181
530-322	0-300	±0,08 mm	flat	404	64	27,5	22	20	355



Easy reading due to vernier scales inclined by 14 degrees

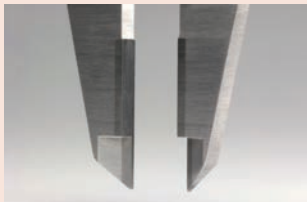


## Specifications

Graduation	0,05 mm
Accuracy	Refer to the list of specifications
Delivered	In a box

## Optional accessories

No.	Description
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range



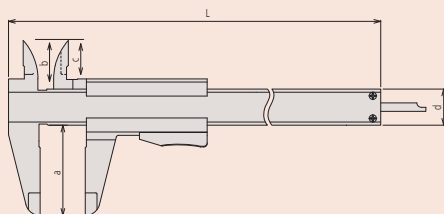
Carbide-tipped measuring surfaces

### Specifications

Accuracy	Refer to the list of specifications
Delivered	In a box

### Optional accessories

No.	Description
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range



## Vernier Caliper with Thumb Clamp

### Series 531

This vernier caliper with thumb clamp only moves when you depress the spring-loaded thumb grip.



531-122

### Metric

No.	Range [mm]	Accuracy	Graduation	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
531-101	0-150	±0,05 mm	0,05 mm	flat	229	40	21,5	17	16	142
531-102	0-200	±0,05 mm	0,05 mm	flat	288	50	25	20,5	16	175
531-103	0-300	±0,08 mm	0,05 mm	flat	403	64	27,5	22	20	360

### Metric/Inch

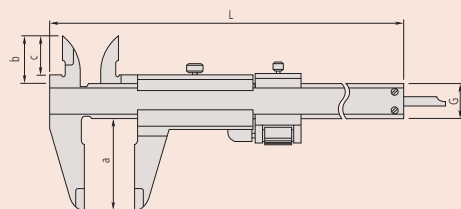
No.	Range [inch]	Range [mm]	Accuracy	Graduation	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
531-122	0-6	0-150	±0,05 mm/0,002"	0,05 mm-1/128"	flat	229	40	21,5	17	16	142
531-108	0-8	0-200	±0,05 mm/0,002"	0,05 mm-1/128"	flat	288	50	25	20,5	16	175
531-109	0-12	0-300	±0,08 mm/0,003"	0,05 mm-1/128"	flat	403	64	27,5	22	20	360

### Specifications

Graduation	0,02 mm
Accuracy	Refer to the list of specifications
Delivered	In a box

### Optional accessories

No.	Description
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range



## Vernier Caliper with Fine Adjustment

### Series 532

This is a vernier Caliper with fine-adjustment to help you with slider positioning.



532-101

### Metric

No.	Range [mm]	Accuracy	Depth bar	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
532-101	0-130	±0,03 mm	flat	229	40	21,5	17	16	165
532-102	0-180	±0,03 mm	flat	288	50	25	20,5	16	202
532-103	0-280	±0,04 mm	flat	403	64	27,5	22	20	395

# Dial Caliper

## Series 505

This dial caliper allows you to take reliable measurements and offers you the following benefits:

- Ultra-smooth sliding and high shock protection
- Easy to read yellow dial with large character height

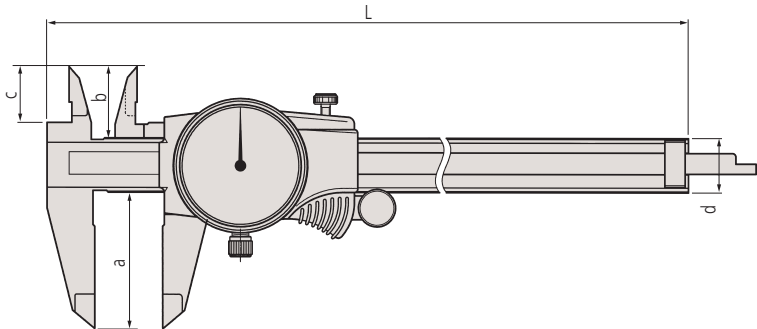


505-730



505-732

No.	Range [mm]	Graduation	Accuracy	Remarks	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
505-730	0-150	0,02 mm. 2 mm/rev	±0,03 mm		231	40	21	16,5	16	175
505-732	0-150	0,01 mm. 1 mm/rev	±0,02 mm		231	40	21	16,5	16	176
505-734	0-150	0,02 mm. 2 mm/rev	±0,03 mm	carbide tipped jaws for outside	231	40	21	16,5	16	175
505-735	0-150	0,02 mm. 2mm/rev	±0,03 mm	carbide tipped jaws for outside and inside	231	40	21	16,5	16	175
505-731	0-200	0,02 mm. 2 mm/rev	±0,03 mm		288	50	24,5	20	16	185
505-733	0-200	0,01 mm. 1 mm/rev	±0,03 mm		288	50	24,5	20	16	186
505-745	0-300	0,02 mm. 2 mm/rev	±0,04 mm		403	64	27,5	22	20	370

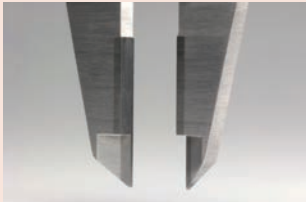


### Specifications

Accuracy	Refer to the list of specifications
Depth bar	flat
Delivered	In a case

### Optional accessories

No.	Description
050083-10	Depth Base Attachment for Caliper, 75mm width, for 100, 150, 200mm range
050084-10	Depth Base Attachment for Caliper, 100 mm width, for 100mm, 100, 150, 200mm range
050085-10	Depth Base Attachment for Caliper, 125mm width for 300mm Range



Carbide tipped jaws outside  
505-734

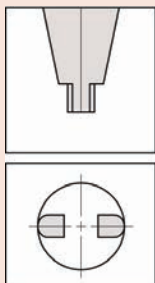


Carbide tipped jaws inside and outside  
505-735

# Vernier Caliper with Nib Style and Standard Jaws

## Specifications

Accuracy	Refer to the list of specifications
Delivered	In a box



Round surface of jaws for measuring inside dimensions

## Series 533

These vernier calipers with nib style and standard jaws let you take easy, metric measurements. They offer you the following benefits:

- You can read inside and outside measurements directly from the upper and lower vernier scales.
- Main scale and vernier scale satin chrome finish gives you high readability.



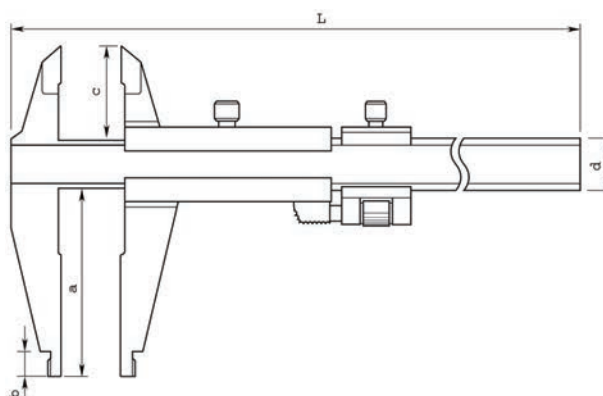
**533-404**  
Without fine adjustment

## Metric With fine adjustment

No.	Range [mm]	Accuracy	Graduation	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
533-504	0-500	±0,05 mm	0,02 mm	20,1 mm	680	150	15	56	25	1250
533-505	0-750	±0,07 mm	0,02 mm	20,1 mm	963	150	15	56	25	1550
533-506	0-1000	±0,08 mm	0,02 mm	20,1 mm	1230	150	20	56	32	3450

## Metric Without fine adjustment

No.	Range [mm]	Accuracy	Graduation	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
533-404	0-500	±0,1 mm	0,05 mm	20,1 mm	680	150	15	56	25	1200
533-405	0-750	±0,12 mm	0,05 mm	20,1 mm	963	150	15	56	25	1500
533-406	0-1000	±0,15 mm	0,05 mm	20,1 mm	1230	150	20	56	32	3300





# Vernier Caliper with Nib Style Jaws

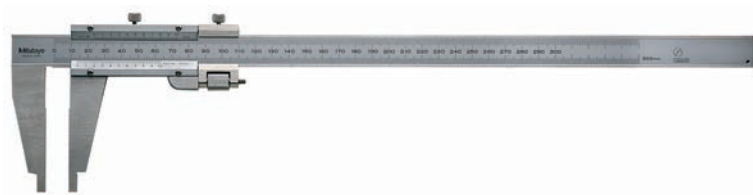
## Series 160

These vernier calipers with nib style jaws come with or without fine adjustment. They offer you the following benefits:

- The top offset vernier scale allows you to directly read the inside dimensions without having to add the jaw blade width.
- Main scale and vernier scale satin chrome finish gives you high readability.



160-101



160-127

### Metric With fine adjustment

No.	Range [mm]	Accuracy	Graduation	Inside measuring from
160-127	0-300	± 0,04 mm	0,02 mm	10,1 mm
160-128	0-450	±0,05 mm	0,02 mm	20,1 mm
160-101	0-600	±0,05 mm	0,02 mm	20,1 mm
160-104	0-1000	±0,07 mm	0,02 mm	20,1 mm
160-110	0-1500	±0,1 mm	0,02 mm	20,1 mm
160-113	0-2000	±0,12 mm	0,02 mm	20,1 mm

No.	L [mm]	R [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	Mass [g]
160-127	445	5	95	75	12	20	10	38	450
160-128	630	10	125	100	18	25	14,8	6	1200
160-101	780	10	125	100	18	25	14,8	6	1400
160-104	1240	10	172	140	24	32	17	10	3500
160-110	1800	10	212	180	30	32	19	10	4850
160-113	2300	10	220	180	30	40	23	12	10300

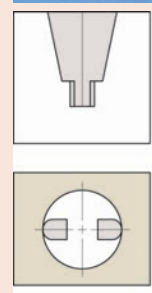
### Metric Without fine adjustment

No.	Range [mm]	Accuracy	Graduation	Inside measuring from
160-130	0-450	±0,1 mm	0,05 mm	20,1 mm
160-131	0-600	±0,1 mm	0,05 mm	20,1 mm
160-132	0-1000	±0,15 mm	0,05 mm	20,1 mm
160-133	0-1500	±0,22 mm	0,05 mm	20,1 mm
160-134	0-2000	±0,28 mm	0,05 mm	20,1 mm

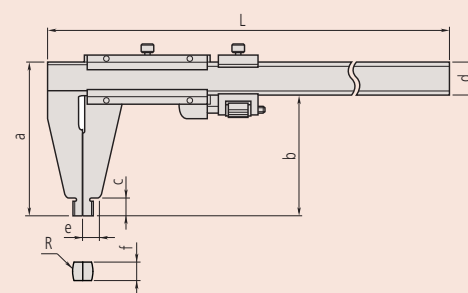
No.	L [mm]	R [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	Mass [g]
160-130	630	10	125	100	18	25	14,8	6	1100
160-131	780	10	125	100	18	25	14,8	6	1300
160-132	1240	10	172	140	24	32	17	10	3300
160-133	1800	10	212	180	30	32	19	10	4700
160-134	2300	10	220	180	30	40	23	12	9900

## Specifications

Accuracy	Refer to the list of specifications
Delivered	In a box

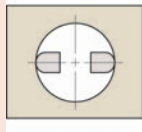
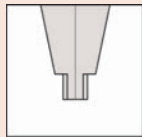
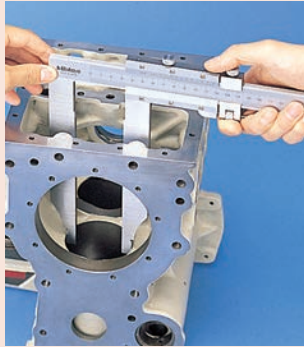


Rounded outside measuring surfaces for measuring inside dimensions



## Specifications

Accuracy	Refer to the list of specifications
Delivered	In a box



Rounded outside measuring surfaces for measuring inside dimensions

# Vernier Caliper with Long Jaws

## Series 534

These vernier calipers with long jaws come with or without fine adjustment and let you measure hard-to-reach features.

They offer you the following benefits:

- Long jaws enable you to measure hard-to-reach workpiece features.
- The top offset vernier scale allows you to directly read the inside dimensions without having to add the jaw blade width.



534-110

### Metric

With fine adjustment

No.	Range [mm]	Accuracy	Graduation	Inside measuring from
534-113	0-300	±0,04 mm	0,02 mm	10,1 mm
534-114	0-500	±0,06 mm	0,02 mm	20,1 mm
534-115	0-750	±0,08 mm	0,02 mm	20,1 mm
534-116	0-1000	±0,1 mm	0,02 mm	20,1 mm

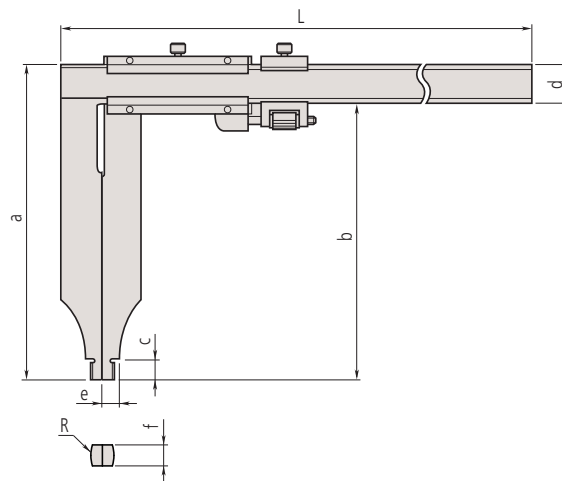
No.	L [mm]	R [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	Mass [g]
534-113	445	5	110	90	12	20	7	3,8	460
534-114	682	10	225	200	18,5	25	12	6	1500
534-115	995	10	232	200	18,5	32	12	8	2900
534-116	1230	10	232	200	18,5	32	12	8	3500

### Metric

Without fine adjustment

No.	Range [mm]	Accuracy	Graduation	Inside measuring from
534-109	0-300	±0,07 mm	0,05 mm	10,1 mm
534-110	0-500	±0,13 mm	0,05 mm	20,1 mm

No.	L [mm]	R [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	Mass [g]
534-109	445	5	110	90	12	20	7	3,8	400
534-110	682	10	225	200	18,5	25	12	6	1400



# ABSOLUTE Digimatic Caliper with Constant Measuring Force

## Series 573

These Digimatic calipers have a load cell and help you measure elastic workpieces. They offer you the following benefits:

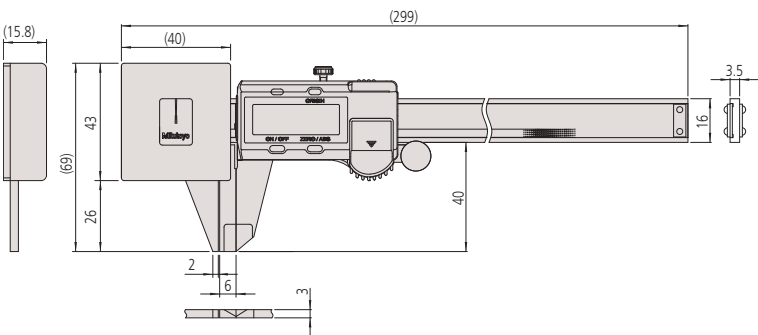
- Due to their low and constant measuring force these calipers are ideal for measuring elastic workpieces such as plastic and rubber parts that standard calipers cannot measure accurately.
- Now equipped with the same AOS (Advanced Onsite Sensor) induction type encoder used in top-of-the-line ABS coolant-proof calipers.
- Thanks to the adoption of the electromagnetic induction type ABS encoder, this caliper can be used without concern for contamination on the scale face during measurement. Detection signal is not affected by dirt (water, oil, etc.) on surface of a scale.
- Character height: 9 mm (alleviation of fatigue with the high-contrast LCD)
- The ABS (ABSOLUTE) scale requires no origin setting after power-on and also has no limit to response speed.
- Extraordinary battery life



573-191-30

### Metric

No.	Range [mm]	Accuracy	Mass [g]
573-191-30	0-180	±0,05 mm	253



## ABSOLUTE®

Functions	Series 573
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●

### Specifications

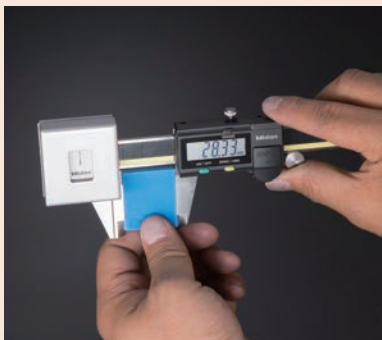
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Jaw retraction	0,3 mm
Max. response speed	Unlimited
Measuring force	0,5-1 N
Battery life	approx. 18000 hours
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF300	Connection Unit, U-WAVE fit, Standard Type
959143	Data Hold Unit

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



A consistently low measuring force can be guaranteed by only taking measurements when the pointer is between the two fiducial lines.

# ABSOLUTE Digimatic Caliper for Tolerance Measurement

ABSOLUTE®

Functions	Series 573
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●

## Specifications

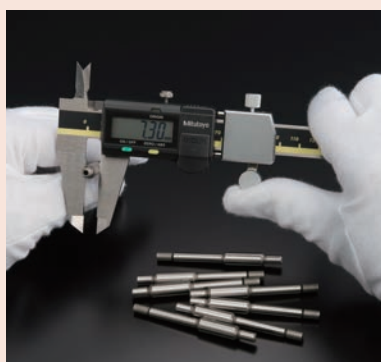
Digital step	0,01 mm
Accuracy	±0,02 mm (excluding quantizing error)
Jaw retraction	2 mm
Max. response speed	Unlimited
Measuring force	7-14 N
Battery life	approx. 18000 hours
Display	LCD, Character height 9 mm
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
959143	Data Hold Unit

## Consumable spares

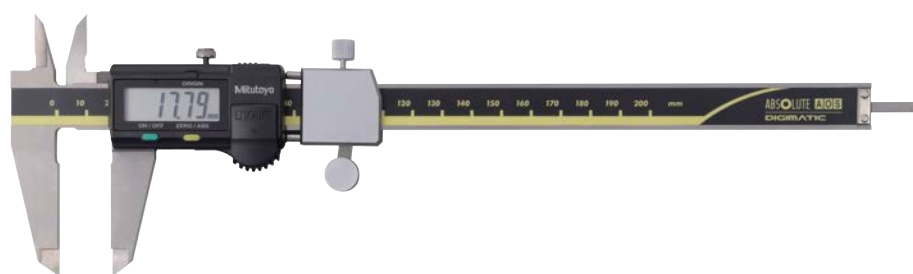
No.	Description
938882	Battery SR44 1.5V



## Series 573

The ABSOLUTE Digimatic snap caliper features a spring-loaded mechanism to allow quick and efficient GO/±NO-GO inspection for mass produced parts.

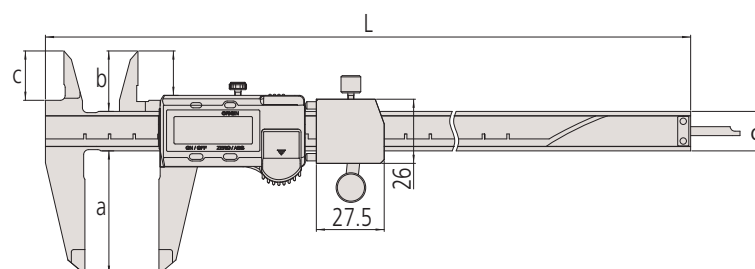
- Now equipped with the same AOS (Advanced Onsite Sensor) induction type encoder used in top-of-the-line ABS coolant-proof calipers.
- Thanks to the adoption of the electromagnetic induction type ABS encoder, this caliper can be used without concern for contamination on the scale face during measurement. Detection signal is not affected by dirt (water, oil, etc.) on surface of a scale.
- The slider provides smooth, stable and comfortable operation.
- Character height: 9 mm (alleviation of fatigue with the high-contrast LCD)
- The ABS (ABSOLUTE) scale requires no origin setting after power-on and also has no limit to response speed.
- Extraordinary battery life



573-182-30

## Metric

No.	Range [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
573-181-30	0-100	233	40	21	16,5	16	213
573-182-30	0-150	290	50	24,5	20	16	233



# Scribing Caliper with Carbide Tipped Jaws

## Series 573

These calipers are designed for scribing tasks. They offer you the following benefits:

- Carbide-tipped jaws facilitate fine scribing on workpiece.
- With depth bar.



Safety  
Dust- and  
Water-  
Protected  
www.tuv.com  
ID: 2011207400



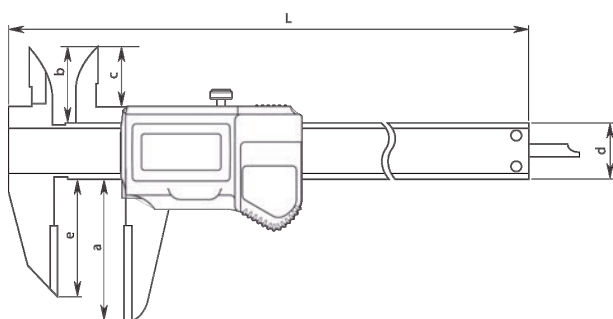
**ABSOLUTE®**  
**IP67**



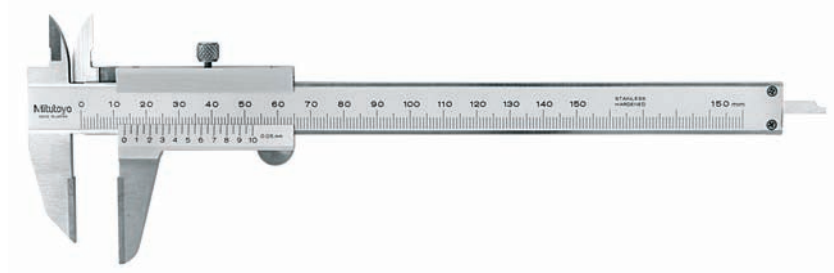
573-677-20

### Metric

No.	Range [mm]	Accuracy	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [g]
573-676-20	0-150	±0,02 mm	229	46	21,5	17	16	33	166
573-677-20	0-200	±0,02 mm	288	50	25	20,5	16	43	196
573-679	0-300	±0,03 mm	403	64	27,5	22	20	54	345



## Series 536



536-221

### Metric

No.	Range [mm]	Accuracy	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [g]
536-221	0-150	±0,05 mm	229	40	21,5	17	16	33	150
536-222	0-200	±0,05 mm	288	50	25	20,5	16	43	180
536-223	0-300	±0,08 mm	403	64	27,5	22	20	54	400

Functions	Series 573
ORIGIN (ABS-Zero)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●

### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years (150 mm, 200 mm) 5000 hours (300 mm)
Display	LCD, Character Height 9 mm (150, 200 mm) 10,2 mm (300 mm)
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

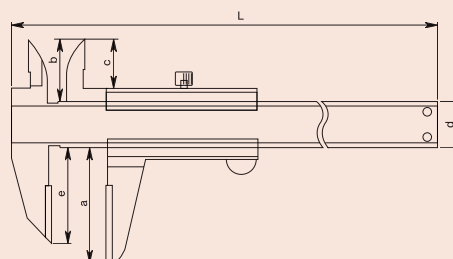
No.	Description
938882	Battery SR44 1.5V







### Sample application

### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,05mm
Delivered	In a case





Functions	Series 573
ORIGIN (ABS-Zero)	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

#### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years (150 mm, 200 mm) 5000 hours (300 mm)
Display	LCD, Character Height 9 mm (150 mm, 200 mm) 10,2 mm (300 mm)
Delivered	In a case, including 1 battery

#### Optional accessories

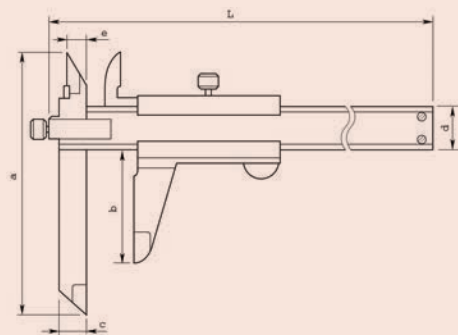
No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

#### Consumable spares

No.	Description
938882	Battery SR44 1.5V

#### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,05 mm
Delivered	In a case

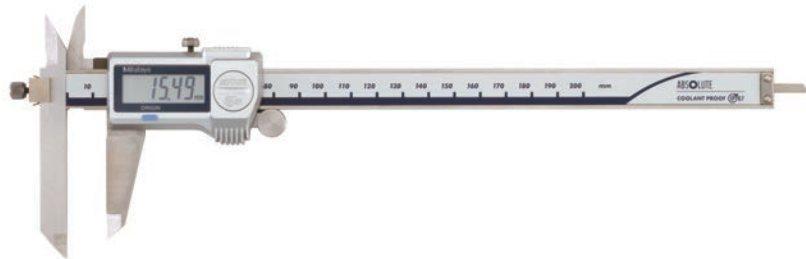


## Offset Caliper

### Series 573

These offset calipers enable you to measure stepped workpieces. They offer you the following benefits:

- You can adjust the beam-mounted jaw to facilitate measurement of stepped sections and hard-to-reach workpiece features.



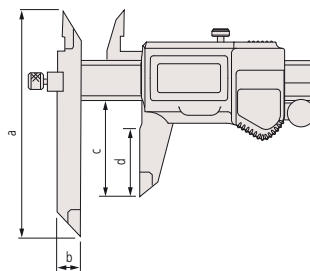
573-602-20

#### Metric Without thumb roller

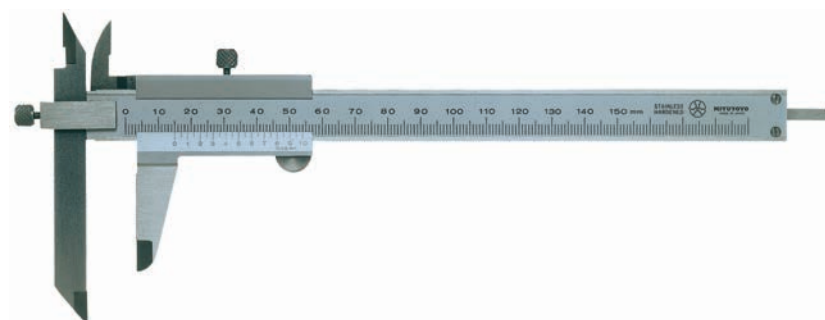
No.	Range [mm]	Accuracy	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
573-611-20	0-150	±0,02 mm	95	10	40	30	168
573-612-20	0-200	±0,02 mm	95	10	50	38,5	198
573-614	0-300	±0,03 mm	135	15	64	51	350

#### Metric With thumb roller

No.	Range [mm]	Accuracy	a [mm]	b [mm]	c [mm]	d [mm]	Mass [g]
573-601-20	0-150	±0,02 mm	95	10	40	30	168
573-602-20	0-200	±0,02 mm	95	10	50	38,5	198
573-604	0-300	±0,03 mm	135	15	64	51	350



### Series 536



536-101

#### Metric

No.	Range [mm]	Accuracy	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [g]
536-101	0-150	±0,05 mm	229	95	40	10	16	7,5	150
536-102	0-200	±0,05 mm	286	95	50	10	16	8,5	200
536-103	0-300	±0,08 mm	403	135	64	15	20	12	400

# Offset Centerline Caliper

## Series 573

These offset centreline calipers enable you to measure centre to centre distance.

They offer you the following benefits:

- Specially designed for hole centre-to-centre measurements in the same plane, or between offset planes.
- You can also measure from an edge to a hole centre.



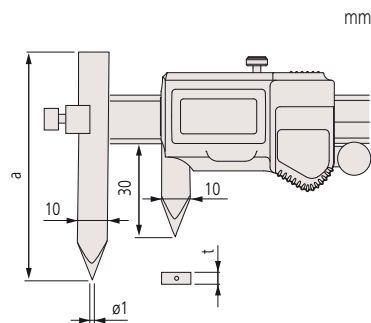
573-606-20

### Metric Without thumb roller

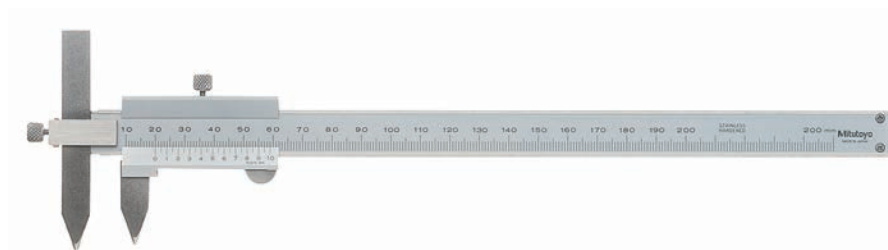
No.	Range [mm]	Accuracy	a [mm]	t [mm]	Mass [g]
573-615-20	10,1-160	±0,03 mm	75	3,5	157
573-616-20	10,1-210	±0,03 mm	75	3,5	177
573-618	10,1-310	±0,04 mm	100	3,8	320

### Metric With thumb roller

No.	Range [mm]	Accuracy	a [mm]	t [mm]	Mass [g]
573-605-20	10,1-160	±0,03 mm	75	3,5	157
573-606-20	10,1-210	±0,03 mm	75	3,5	177
573-608	10,1-310	±0,04 mm	100	3,8	320



## Series 536



536-106

### Metric

No.	Range [mm]	Accuracy	L [mm]	a [mm]	d [mm]	t [mm]	Mass [g]
536-105	10,1-150	±0,05 mm	229	75	16	3	140
536-106	10,1-200	±0,05 mm	282	75	16	3	160
536-107	10,1-300	±0,08 mm	383	100	20	3,8	320

Functions	Series 573
ORIGIN (ABS-Zero)	●
OFFSET*	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●
PRESET	●

### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years (150 mm , 200 mm) 5000 hours (300 mm)
Display	LCD, Character Height 9 mm (150 mm, 200 mm) 10,2 (300 mm)
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

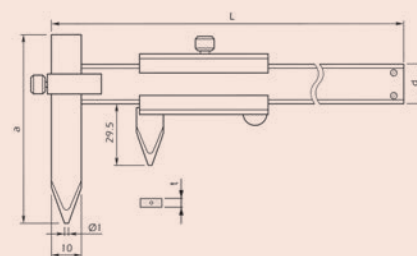
### Consumable spares

No.	Description
938882	Battery SR44 1.5V

\* 10 mm

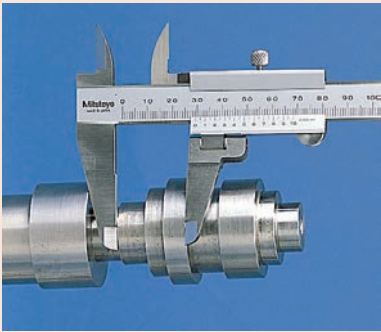
### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,05mm
Delivered	In a case



Specifications

Accuracy	±0,05 mm
Graduation	0,05mm
Delivered	In a case

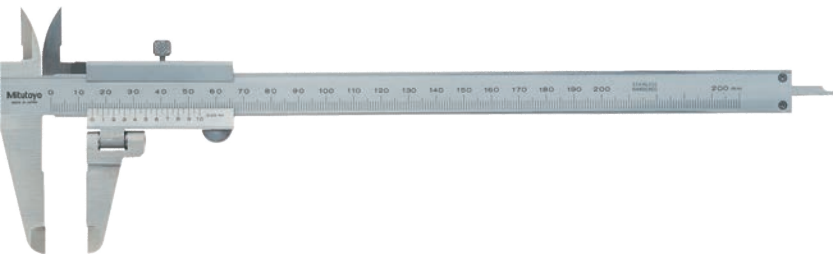


Swivel Caliper

Series 536

These vernier calipers have a swivelling jaw. They offer you the following benefits:

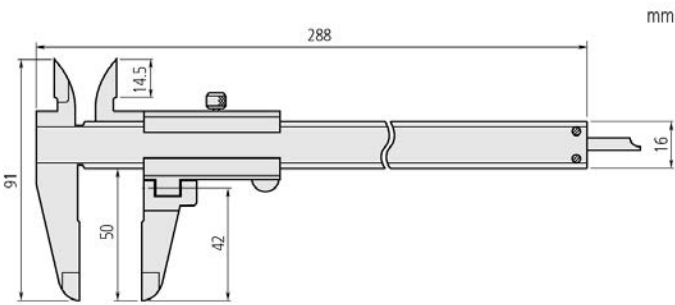
- You can rotate the moving jaw to measure sectioned shafts.
- With depth bar.



536-212

Metric

No.	Range [mm]	Remarks	Mass [g]
536-212	0-200	Swivel range ±90°	190



# ABSOLUTE Digimatic Back-Jaw Centreline Caliper

## Series 573

These Digimatic back-jaw centreline calipers offer you the following benefits:

- Specially designed to allow you to measure hole centre-to-centre or edge-to-centre distances.
- You can read measurements more easily from above, thanks to the jaws being on the back of the slide.
- Direct reading of pitch measurements is also available due to the offset value setting function.

ABSOLUTE\*



573-116-10  
Centre-to-centre type



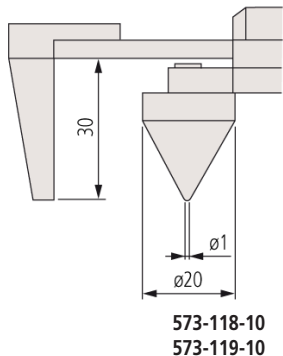
573-118-10  
Edge-to-centre type

### Metric Centre-to-centre type

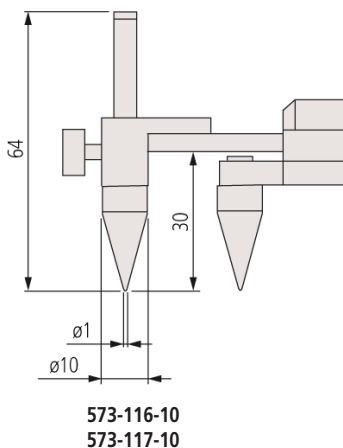
No.	Range [mm]	Accuracy	Mass [g]
573-116-10	10,1-200	±0,1 mm	485
573-117-10	10,1-300	±0,15 mm	580

### Metric Edge-to-centre type

No.	Range [mm]	Accuracy	Mass [g]
573-118-10	10,1-200	±0,1 mm	490
573-119-10	10,1-300	±0,15 mm	585



573-118-10  
573-119-10



573-116-10  
573-117-10

Functions	Series 573
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
OFFSET*	●
ON/OFF	●
Low voltage alarm	●
Data output	●
PRESET	●

### Specifications

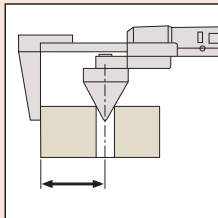
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5000 hours
Display	LCD, Character Height 7 mm
Delivered	In a case, including 1 battery

### Optional accessories

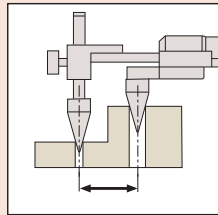
No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter

### Consumable spares

No.	Description
938882	Battery SR44 1.5V







Edge-to-center type



Centre-to-centre type



Functions	Series 573
ORIGIN (ABS-Zero)	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

#### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

#### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type
06ADV380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type

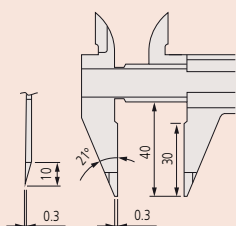
#### Consumable spares

No.	Description
938882	Battery SR44 1.5V



#### Specifications

Accuracy	±0,05 mm
Graduation	0,05 mm
Delivered	In a case



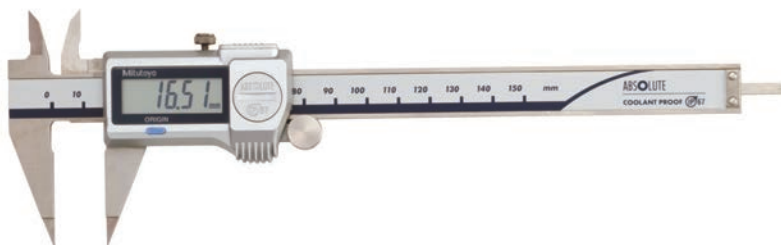
mm

## Point Caliper

### Series 573


These point calipers have extra fine ground measuring jaws. They offer you the following benefits:

- Narrow-tip jaws fit into very small grooves and tracks, making it much easier for you to obtain many previously difficult outside measurements.




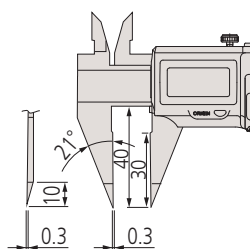
573-621-20  
Fine measuring jaws

#### Metric Fine measuring jaws

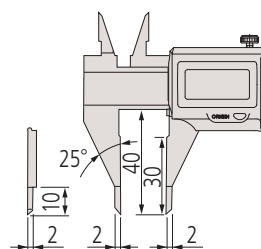
No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-621-20	0-150	± 0,02 mm		163
573-622-20	0-150	± 0,02 mm		163

#### Metric Pointed measuring jaws

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-625-20	0-150	± 0,02 mm		163
573-626-20	0-150	± 0,02 mm		163

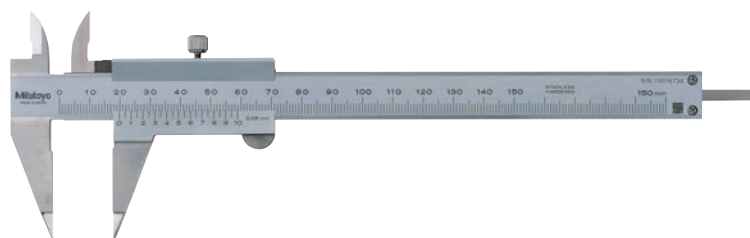


Fine measuring jaws



Pointed measuring jaws

### Series 536



536-121

#### Metric

No.	Range [mm]	Mass [g]
536-121	0-150	150

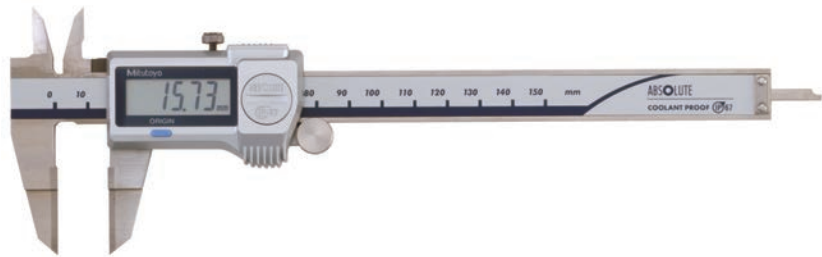


# Blade Caliper

## Series 573

These blade calipers have thin measuring jaws. They offer you the following benefits:

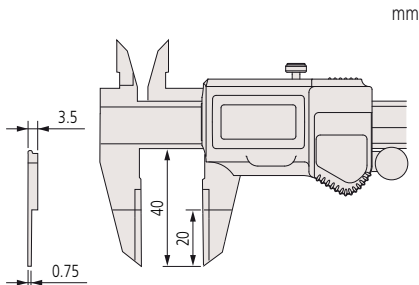
- The thin blade-type jaws fit into very small grooves making it much easier for you to obtain many previously difficult outside measurements.
- The outside measuring faces are carbide.



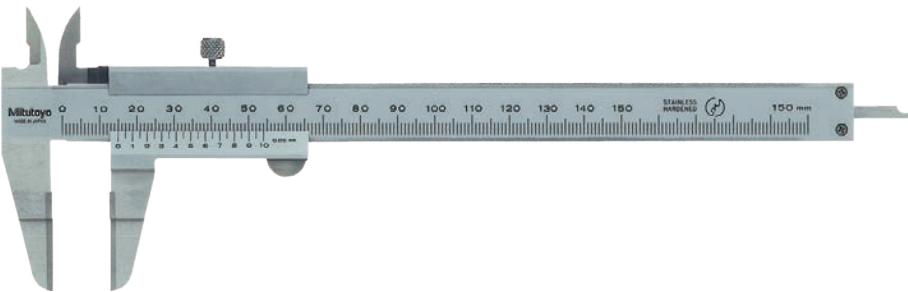
573-634-20

### Metric

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-634-20	0-150	±0,02 mm		168
573-635-20	0-150	±0,02 mm		168



## Series 536



536-134

### Metric

No.	Range [mm]	Accuracy	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [g]
536-134	0-150	±0,05 mm	229	20	40	0,75	16	3	140
536-135	0-200	±0,05 mm	286	25	50	0,75	16	3	180
536-136	0-300	±0,08 mm	403	30	64	1	16	3,8	420

Functions	Series 573
ORIGIN (ABS-Zero)	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

Specifications	
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

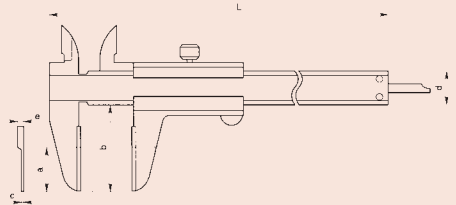
### Consumable spares

No.	Description
938882	Battery SR44 1.5V



### Specifications

Accuracy	Refer to the list of specifications
Graduation	0,05mm
Delivered	In a case



# ABSOLUTE Digimatic Neck Caliper

Functions	Series 573
ORIGIN (ABS-Zero)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●

## Specifications

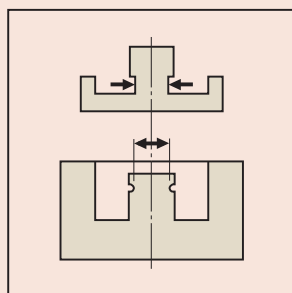
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	aprox. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



## Series 573

These neck calipers enable measurements in hard to reach places. They offer you the following benefits:

- You can measure wall thickness inside bores and recesses.



573-651-20



573-652-20  
Point jaw type

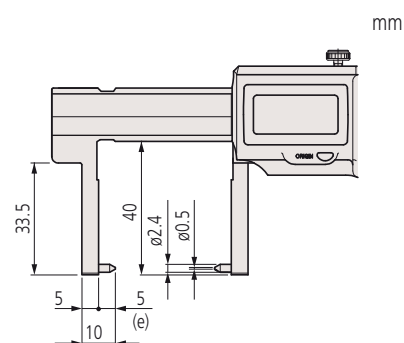
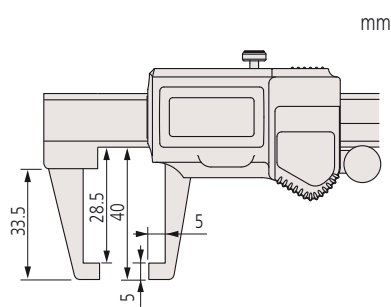
## Metric

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-651-20	0-150	±0,03 mm	●	157
573-653-20	0-150	±0,03 mm		157

## Metric

### Point jaw type

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-652-20	0-150	±0,03 mm	●	157
573-654-20	0-150	±0,03 mm		157



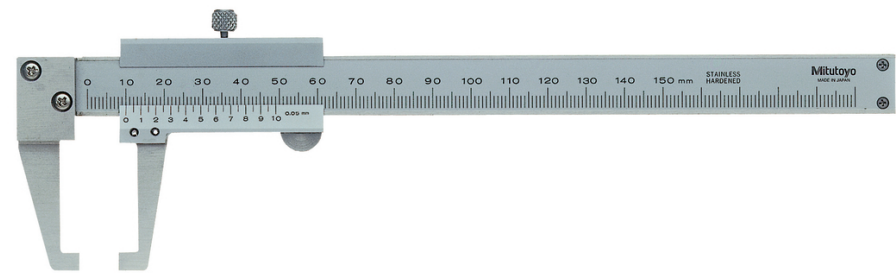
Point jaw type

# Neck Caliper

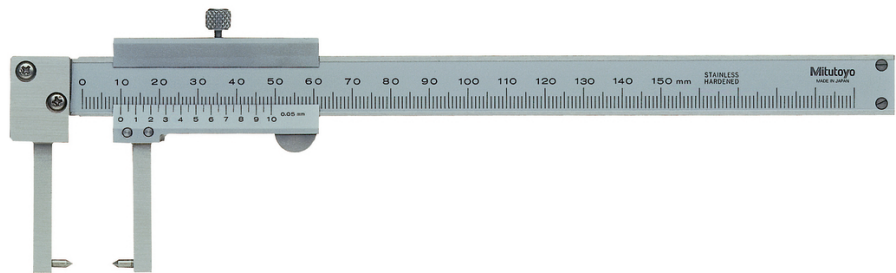
## Series 536

These neck calipers enable measurements in hard to reach places. They offer you the following benefits:

- You can measure wall thickness inside bores and recesses.



536-151



536-152  
Point jaw type

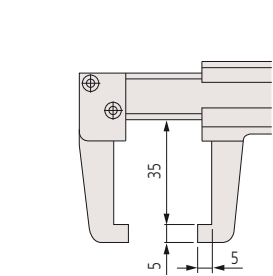
### Metric

No.	Range [mm]	Mass [g]
536-151	0-150	140

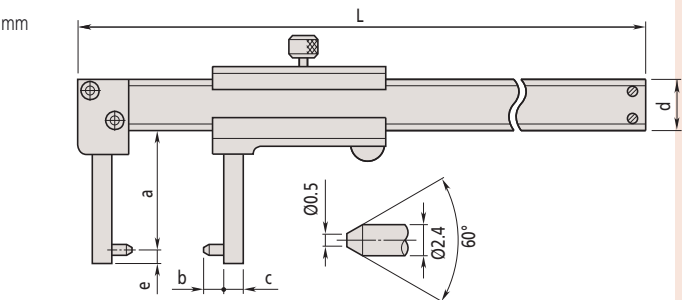
### Metric

#### Point jaw type

No.	Range [mm]	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [g]
536-152	0-150	229	38	5	5	16	2	140



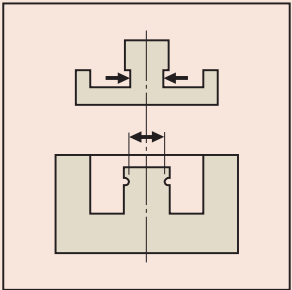
536-151







536-152  
Point jaw type

### Specifications

Accuracy	±0,05 mm
Graduation	0,05mm
Delivered	In a case



# Knife-Edge Caliper

Functions	Series 573
ORIGIN (ABS-Zero)	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

## Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

## Optional accessories

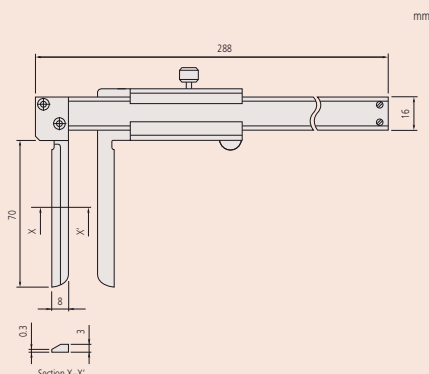
No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

## Specifications

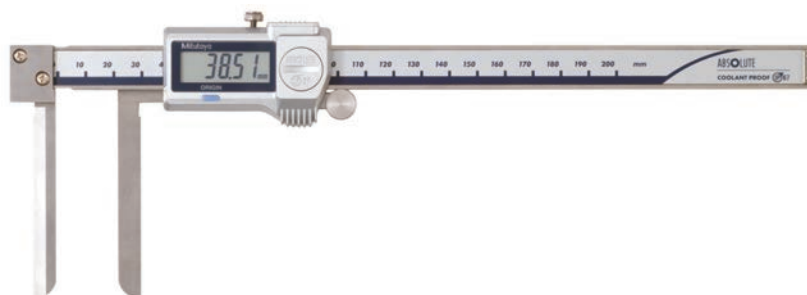
Accuracy	±0,12 mm
Graduation	0,05 mm
Delivered	In a case



## Series 573


These caliper are a knife-edge type and offer you the following benefits:

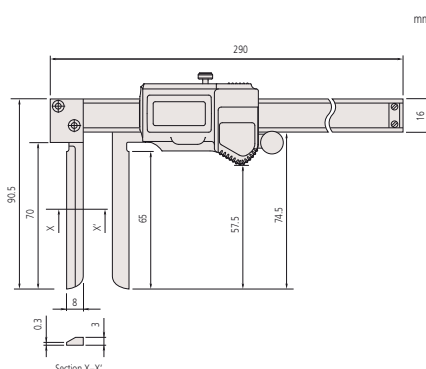
- Specially designed to let you take inside measurements in hard-to-reach places.
- With long narrow jaws.



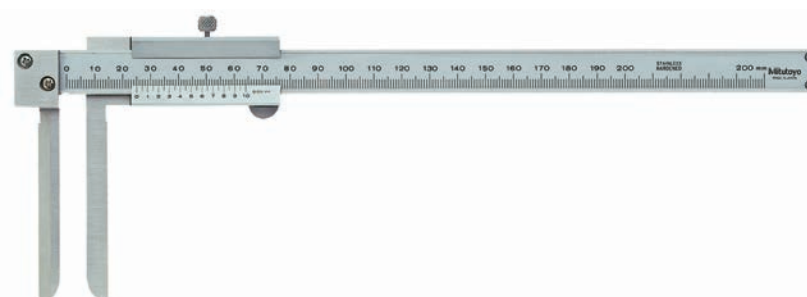
573-642-20

## Metric

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-642-20	10,1-200	±0,05 mm		227
573-643-20	10,1-200	±0,05 mm		227



## Series 536



536-142

## Metric

No.	Range [mm]	Mass [g]
536-142	10,1-200	210

# ABSOLUTE Digimatic Inside Caliper

## Series 573

- Specially designed for inside measurements in hard-to-reach places.



573-645-20



573-646-20  
Point jaw type

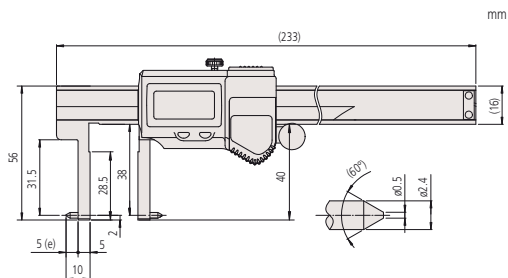
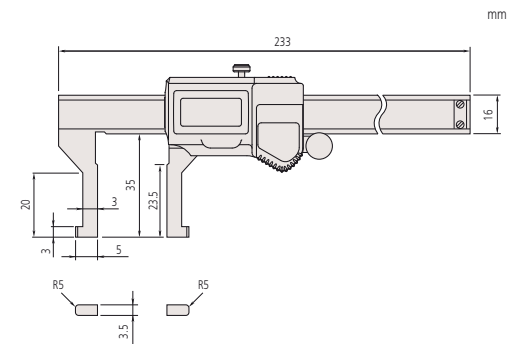
### Metric

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-645-20	10,1-160	±0,05 mm		147
573-647-20	10,1-160	±0,05 mm		147

### Metric

#### Point jaw type

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-646-20	20,1-170	±0,03 mm		157
573-648-20	20,1-170	±0,03 mm		157



Point jaw type

Mitutoyo

Functions	Series 573
ORIGIN (ABS-Zero)	
OFFSET*	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

### Specifications

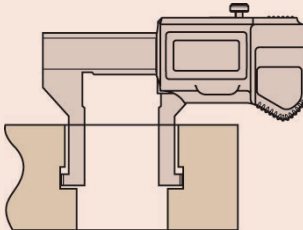
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

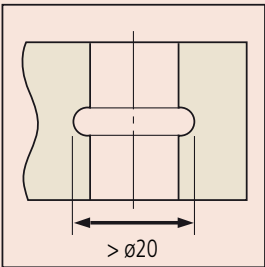
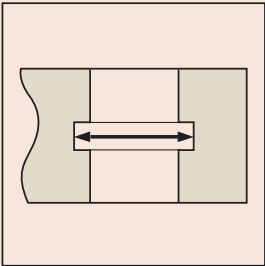


\* 20 mm



Specifications

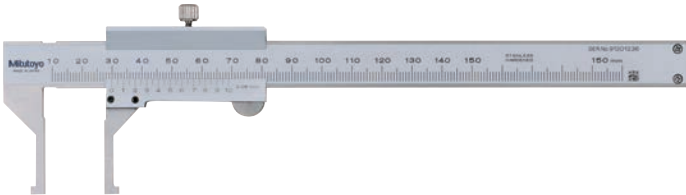
Accuracy	Refer to the list of specifications
Graduation	0,05 mm
Delivered	In a case



Inside Caliper

Series 536

- Specially designed for inside measurements in hard-to-reach places.



536-145



536-146  
Point jaw type

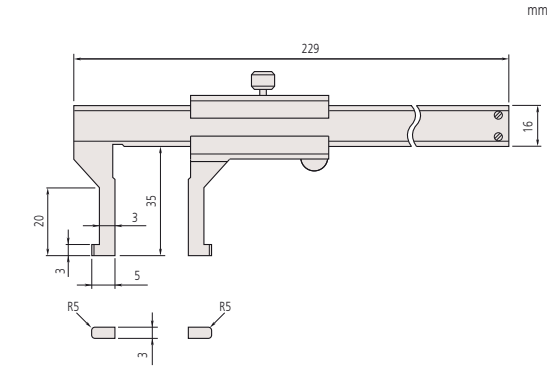
Metric

No.	Range [mm]	Accuracy	Mass [g]
536-145	10,1-150	±0,05 mm	130

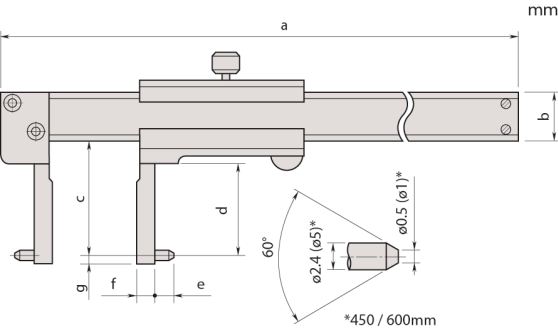
Metric

Point jaw type

No.	Range [mm]	Accuracy	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	Mass [g]
536-146	20,1-150	±0,05 mm	229	16	38	31	5	5	2	140
536-147	30,1-300	±0,08 mm	403	20	98	89	5	10	2	370
536-148	70,1-450	±0,1 mm	610	25	145	136	10	25	5	1250
536-149	70,1-600	±0,12 mm	750	25	145	136	10	25	5	1430



536-145



Point jaw type

# Tube Thickness Caliper

## Series 573

These tube thickness calipers are designed especially for round-shaped workpieces.

They offer you the following benefits:

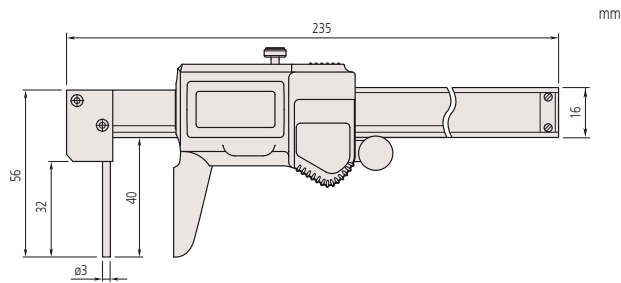
- The beam-mounted jaw is a round bar that lets you easily measure tube wall thickness.



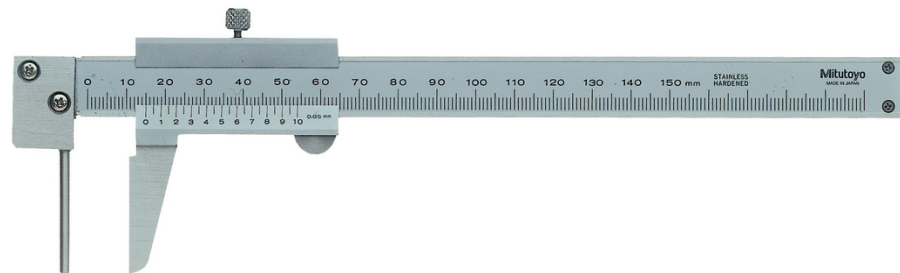
573-661-20

### Metric

No.	Range [mm]	Accuracy	Thumb roller	Mass [g]
573-661-20	0-150	±0,05 mm		167
573-662-20	0-150	±0,05 mm		167



## Series 536



536-161

### Metric

No.	Range [mm]	Mass [g]
536-161	0-150	150

Functions	Series 573
ORIGIN (ABS-Zero)	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

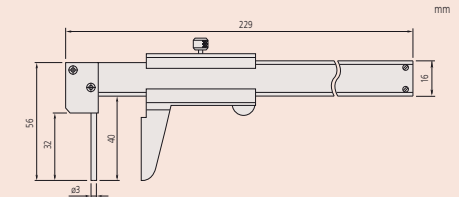
Specifications	
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Battery life	approx. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case, including 1 battery

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

No.	Description
938882	Battery SR44 1.5V

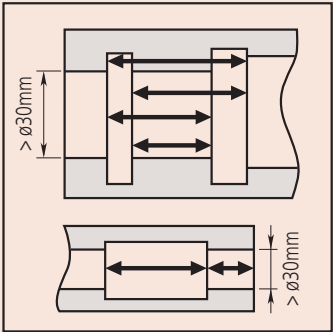
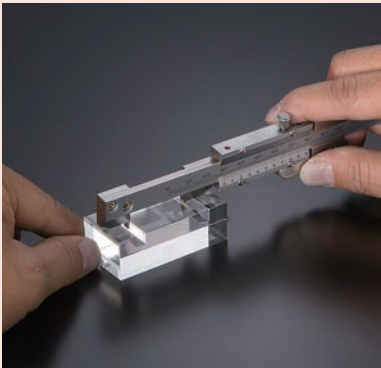


Specifications	
Accuracy	±0,05 mm
Graduation	0,05 mm
Delivered	In a case



Specifications

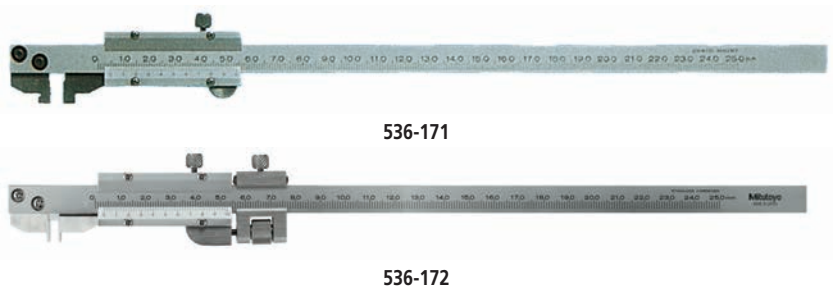
Accuracy	±0,03 mm
Graduation	0,02mm
Delivered	In a case



Vernier Hook Type Caliper

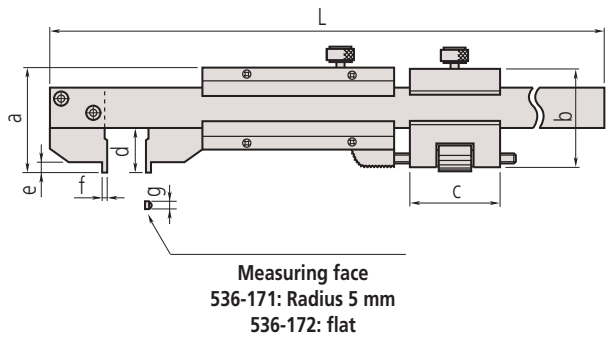
Series 536

These vernier hook type calipers enable you to measure the width of grooves and lands inside bores and recesses.



Metric

No.	Range [mm]	Inside measuring from	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	Mass [g]
536-171	0-200	10,1 mm	320	28			12	4	5	3,5	170
536-172	0-200	2,1 mm	320	28	28,5	20	12	4	1	3,5	200

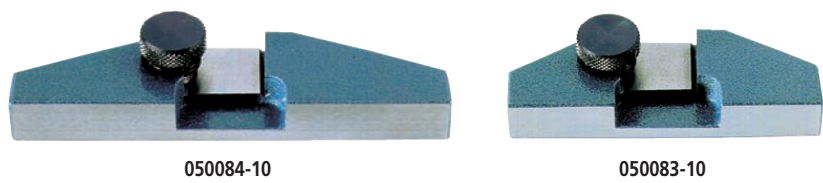


# Optional Accessory for Calipers

## Depth base attachment

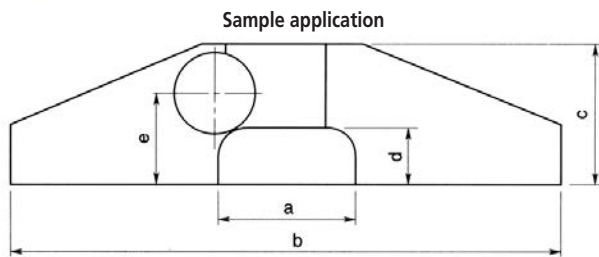
This is an optional depth base attachment for calipers. It offers you the following benefits:

- For digital, vernier and dial calipers which have a depth measuring bar.
- Finely ground base surface.
- Secure locking clamp.



## Metric

No.	Applicable measuring range of caliper	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [g]
050083-10	100, 150 and 200 mm	25	75	24,5	9	16	130
050084-10	100, 150 and 200 mm	25	100	24,5	9	16	160
050085-10	300 mm	30	125	28,5	11,5	20	270



## Depth Measuring Instruments



**Depth Micrometer**  
**Page 206**



**Depth Gauge**  
**Page 209**



**Depth Gauge Accessories**  
**Page 218**



# Depth Micrometer

## Series 128

This micrometer allows you to measure depth and offers you the following features:

- ø4mm measuring rod.
- Ratchet stop provides you with constant measuring force.
- Measuring rod lock.
- Carbide-tipped measuring rod model is available.



128-101

### Metric

No.	Range [mm]	Base (W x T)	Mass [g]
128-101	0-25	63,5 x 16 mm	200
128-102	0-25	101,6 x 16 mm	250

### Metric

Carbide-tipped measuring rod

No.	Range [mm]	Base (W x T)	Mass [g]
128-103	0-25	63,5 x 16 mm	200
128-104	0-25	101,6 x 16 mm	250

## Specifications

Graduation	0,01 mm
Measuring span	25 mm
Spindle pitch	0,5 mm with spindle lock
Micrometer Head Feed (0-25 mm)	±3 µm
Flatness of reference surface (base)	1,3 µm (63,5 mm) 2 µm (101,6 mm)
Flatness of measuring face (rod)	0,3 µm
Parallelism between measuring face (rod) and reference surface (base)	(4+L/50) µm L=max. measuring length (mm)
Measuring surfaces	Hardened, precision ground, micro-lap finish
Base	Hardened tool steel
Scale	thimble and sleeve satin chrome finish, ø 18 mm
Measuring force	5-10 N
Delivered	Including box and key



# Depth Micrometer with Interchangeable Rods

## Specifications

Graduation	0,01 mm
Measuring span	25 mm
Spindle pitch	0,5 mm, with spindle lock
Micrometer Head Feed (0-25 mm)	$\pm 3 \mu\text{m}$
Zero point errors of rods	$\pm 4 \mu\text{m}$ (0-150 mm) $\pm 6 \mu\text{m}$ (0-300 mm)
Flatness of reference surface (base)	1,3 $\mu\text{m}$ for 63,5 mm 2 $\mu\text{m}$ for 101,6 mm
Flatness of measuring face (rod)	0,3 $\mu\text{m}$
Parallelism between measuring face (rod) and reference surface (base)	$(4 + L/50) \mu\text{m}$ L=max. measuring length (mm)
Measuring surfaces	Hardened, precision ground, micro-lap finish
Base	Hardened tool steel
Scale	Thimble and sleeve satin chrome finish $\varnothing 18$ mm
Measuring force	5-10 N
Delivered	Including box and key



## Series 129

This interchangeable rod type micrometer can be used for wide range measurements. It offers you the following benefits:

- $\varnothing 4$ mm interchangeable rods, with lapped measuring surfaces, enable you to make wide-range measurement
- The ratchet stop provides constant measuring force.
- Measuring rod lock.



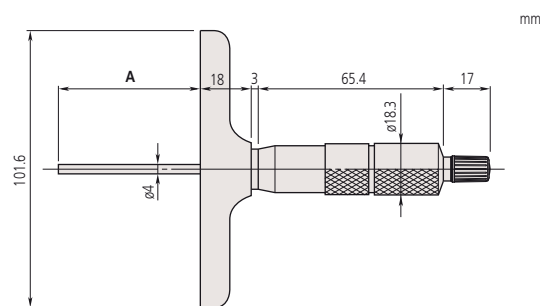
129-112

## Metric Base 101,6 x 16 mm

No.	Range [mm]	Number of rods	Mass [g]
129-155	0-25		290
129-113	0-50	2	310
129-114	0-75	3	330
129-115	0-100	4	355
129-116	0-150	6	410
129-153	0-300	12	640

## Metric Base 63,5 x 16 mm

No.	Range [mm]	Number of rods	Mass [g]
129-154	0-25		240
129-109	0-50	2	260
129-110	0-75	3	280
129-111	0-100	4	310
129-112	0-150	6	370
129-152	0-300	12	600



A = Range

# Digimatic Depth Micrometer with Interchangeable Rod

## Series 329

This interchangeable rod type micrometer can be used for wide range measurements. It offers you the following benefits:

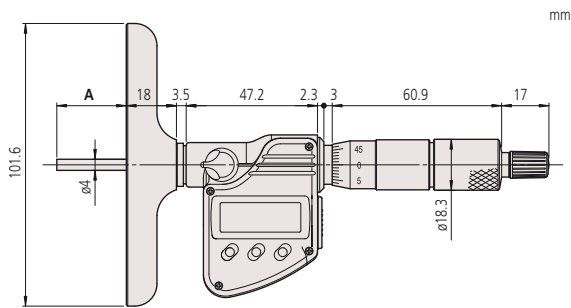
- $\varnothing 4$ mm interchangeable rods, with lapped measuring surfaces, enable you to make wide-range measurement
- The ratchet stop provides constant measuring force.
- Measuring rod lock.



329-250-30

### Metric

No.	Range [mm]	Base (W x T)	Number of rods	Mass [g]
329-250-30	0-150	101,6 x 16 mm	6	540
329-251-30	0-300	101,6 x 16 mm	12	790



A = Range

Functions	Series 329
ZERO/ABS	●
DATA/HOLD	●
Lock function	●
Auto Power OFF after 20 min. non use	●
2 x PRESET	●
Low voltage alarm	●
Data output	●

### Specifications

Digital step	0,001 mm
Scale	Thimble and sleeve satin chrome finish, $\varnothing 18$ mm
Measuring span	25 mm
Spindle pitch	0,5 mm with spindle lock
Zero point errors of rods	$\pm 4 \mu\text{m}$ (0-150 mm) $\pm 6 \mu\text{m}$ (0-300 mm)
Micrometer Head Feed (0-25 mm) (excluding quantizing error)	$\pm 3 \mu\text{m}$
Flatness of reference surface (base)	2 $\mu\text{m}$
Flatness of measuring face (rod)	0,3 $\mu\text{m}$
Parallelism between measuring face (rod) and reference surface (base)	$(4+L/50) \mu\text{m}$ L = max. measuring length (mm)
Measuring surfaces	Hardened, precision ground, micro-lap finish
Base	Hardened tool steel
Measuring force	5-10 N
Battery life	approx. 2,4 years
Delivered	Including box, key and 1 battery

### Optional accessories

No.	Description
05CZA662	Digimatic Cable with Data Button IP Type, 1m, Micrometer Type
05CZA663	Digimatic Cable with Data Button IP Type, 2m, Micrometer Type
06AFM380B	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Micrometer Type
264-622	U-WAVE fit, IP67 Type, Wireless Transmitter for Micrometer
264-623	U-WAVE fit, Buzzer Type, Wireless Transmitter for Micrometer
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

ABSOLUTE®

## Specifications

### Optional accessories

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
21AZB149	Lifting Lever, S-Type Series 2,3,4 (up to 10mm)
21JAA224	Contact Element Ball Point, 14mm Length, Carbide, Metric

This ABSOLUTE Digimatic Indicator Depth Gauge offers you the following benefits:

- 
- A Mitutoyo Absolute digital depth gauge is shown with its base and a long probe. To the left, five different probe tips of varying lengths and diameters are displayed. The gauge features a digital LCD screen showing '0.00 mm'. Below the screen are three buttons: 'MODE' (white), 'SET' (blue), and 'DATA ON/OFF' (green). The brand name 'Mitutoyo' and 'ABSOLUTE' are printed above the screen. A coiled cable is attached to the top of the gauge.

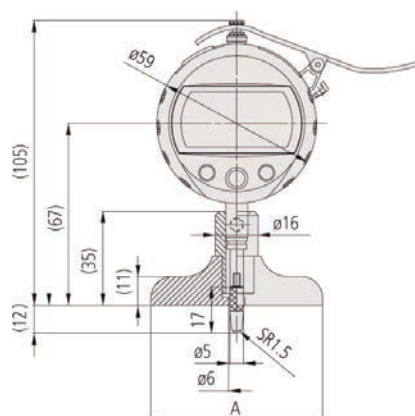
547-211

With indicator No. 543-390BD

Metric

With indicator No. 543-400BD

No.	Range [mm]	Accuracy	Base flatness	Base size [mm]	Mass [g]
<b>547-211</b>	0-200	± 20 µm	5 µm	63,5 x 16	290
<b>547-212</b>	0-200	± 20 µm	5 µm	101,6 x 16	340



547-211, 547-251 A=63.5 mm  
547-212, 547-252 A=101.6 mm

# Dial Indicator Depth Gauge

## Series 7

This rectangular base dial indicator depth gauge offers you the following benefits:

- Rectangular base.
- It has a hardened, precision ground and micro-lapped reference face on its base.



7211



7214



7231

Metric With horizontal indicator No. 1162

No.	Range [mm]	Accuracy	Stroke [mm]	Base flatness [μm]	Measuring force [N]	Base size [mm]	Probe tip	Extension rods	Mass [g]
7231	0-200	±15 μm	5	5	≤ 1,4	63,5 x 16	Ball R = 1,5 mm	10, 20, 30, 30, 100 mm	200

Metric With indicator No. 2902SB

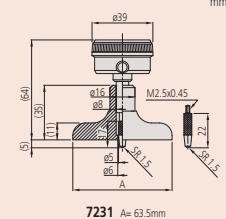
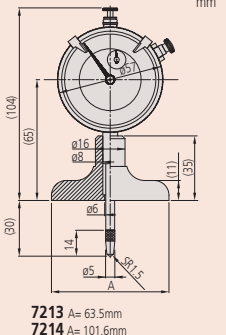
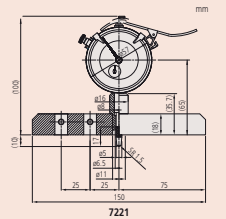
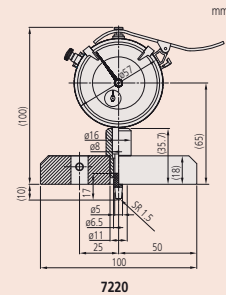
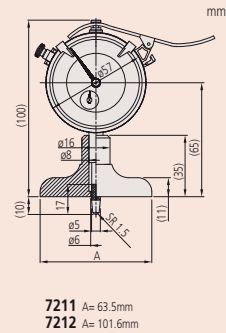
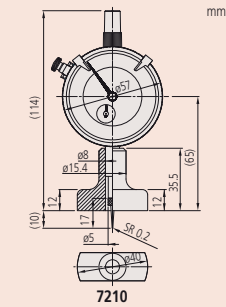
No.	Range [mm]	Accuracy	Stroke [mm]	Base flatness [μm]	Measuring force [N]	Base size [mm]	Probe tip	Extension rods	Mass [g]
7210	0-10	±15 μm	10	5	≤ 1,4	40 x 16	Needle R = 0,2 mm		200
7211	0-200	±15 μm	10	5	≤ 1,4	63,5 x 16	Ball R = 1,5 mm	10, 20, 30, 30, 100 mm	245
7212	0-200	±15 μm	10	5	≤ 1,4	101,6 x 16	Ball R = 1,5 mm	10, 20, 30, 30, 100 mm	295
7220	0-200	±15 μm	10	5	≤ 1,4	100 x 18	Ball R = 1,5 mm	10, 20, 30, 30, 100 mm	374
7221	0-200	±15 μm	10	5	≤ 1,4	150 x 18	Ball R = 1,5 mm	10, 20, 30, 30, 100 mm	820

Metric With indicator No. 2952SB

No.	Range [mm]	Accuracy	Stroke [mm]	Base flatness [μm]	Measuring force [N]	Base size [mm]	Probe tip	Extension rods	Mass [g]
7213	0-210	±30 μm	30	5	≤ 2,5	63,5 x 16	Ball R = 1,5 mm	30, 60, 90 mm	265
7214	0-210	±30 μm	30	5	≤ 2,5	101,6 x 16	Ball R = 1,5 mm	30, 60, 90 mm	315

## Specifications

Graduation 0,01 mm





# Dial Indicator Depth Gauge

## Specifications

Graduation 0,01 mm

## Consumable spares

No.	Description
137413	Contact Element Needle, R 0,2mm, 17mm Length, Steel, Metric
21JAA224	Contact Element Ball Point, 14mm Length, Carbide, Metric
21JAA226	Contact Element Ball Point, 22mm Length, Carbide, Metric

## Series 7

This round base type dial indicator depth gauge offers you the following benefits:

- Round base type
- It has a hardened, precision ground and micro-lapped reference face on its base.



7222

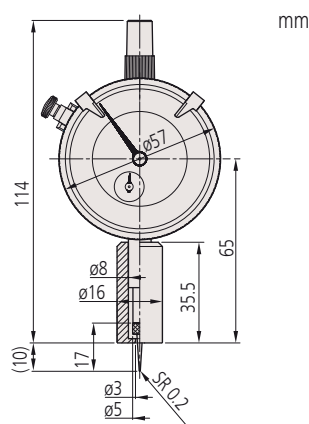


7224

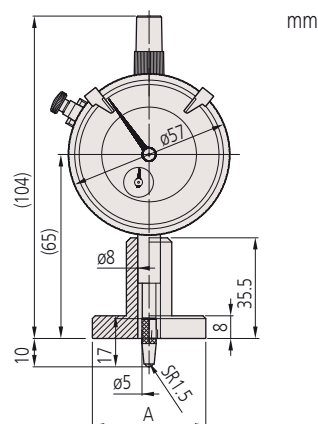
## Metric

Circular base with indicator No. 2902SB.

No.	Range [mm]	Accuracy	Stroke [mm]	Base flatness [μm]	Measuring force [N]	Base size [mm]	Probe tip	Mass [g]
7222	10	±15 μm	10	5	≤ 1,4	ø 16	Needle R = 0,2 mm	165
7223	10	±15 μm	10	5	≤ 1,4	ø 25	Ball R = 1,5 mm	180
7224	10	±15 μm	10	5	≤ 1,4	ø 40	Ball R = 1,5 mm	195



7222



7223 A= ø25mm

7224 A= ø40mm

# ABSOLUTE Digimatic Depth Gauge

## Series 571

This is a standard model depth gauge that lets you take accurate measurements. It offers you the following benefits:

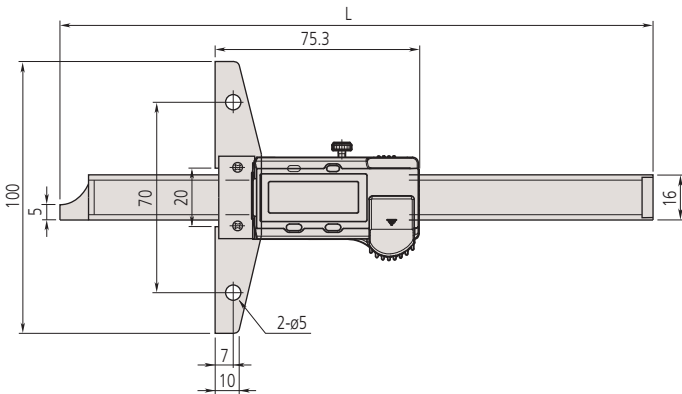
- ABSOLUTE System gives you reliable measurements.
- Its base and measuring faces are hardened and micro-lapped for robustness.
- Large character height of 9 mm makes measurements easy to read.
- Exceptional battery life.



571-201-30

### Metric

No.	Range [mm]	Accuracy	L [mm]	Base (W x T)	Mass [g]
571-201-30	0-150	±0,02 mm	239	100 x 6 mm	207
571-202-30	0-200	±0,02 mm	289	100 x 6 mm	227
571-203-20	0-300	±0,03 mm	403	100 x 6 mm	257
571-204-10	0-450	±0,05 mm	635	250 x 10 mm	1270
571-205-10	0-600	±0,05 mm	785	250 x 10 mm	1400
571-206-10	0-750	±0,06 mm	935	250 x 10 mm	1530
571-207-10	0-1000	±0,07 mm	1200	250 x 10 mm	1760



Up to 300 mm range

Functions	Series 571
ORIGIN (ABS-Zero)	●
ZERO/ABS	●
ON/OFF	●
Low voltage alarm	●
Data output	●

### Specifications

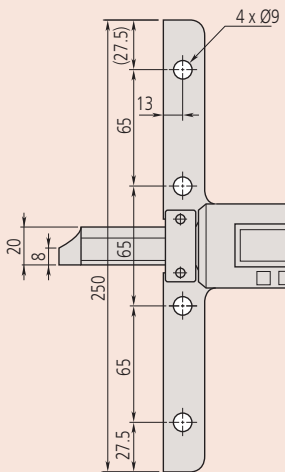
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Repeatability	0,01 mm
Battery life	approx. 18000 hours (150, 200 mm) approx. 20000 hours (>200 mm)
Display	LCD, character height 9 mm (150/200/300 mm), 10 mm (>300 mm)
Delivered	In a box including 1 battery

### Optional accessories

No.	Description
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF300	Connection Unit, U-WAVE fit, Standard Type
959143	Data Hold Unit
900370	Extension Base, Depth Gauge, 180mm width for up to 300mm range
900371	Extension Base, Depth Gauge, 260mm width for up to 300mm range
900372	Extension Base, Depth Gauge, 320mm width for up to 300mm range

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



> 300 mm range

# ABSOLUTE Digimatic Depth Gauge

Functions	Series 571
ORIGIN (ABS-Zero)	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●

## Specifications

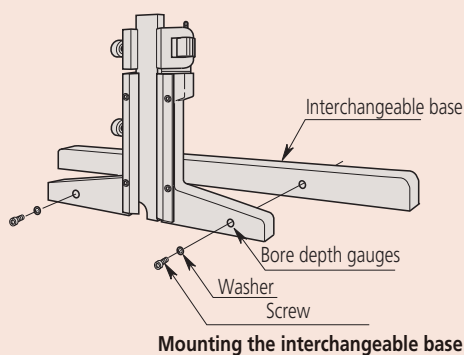
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Repeatability	0,01 mm
Battery life	approx. 5 years (150, 200 mm) 5000 hours (300 mm)
Display	LCD, Character Height 9 mm (150, 200 mm) 10,2 mm (300 mm)
Delivered	In a box including 1.0 battery

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
900370	Extension Base, Depth Gauge, 180mm width for up to 300mm range
900371	Extension Base, Depth Gauge, 260mm width for up to 300mm range
900372	Extension Base, Depth Gauge, 320mm width for up to 300mm range

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



## Series 571

This depth gauge is IP67 coolant proof and offers you the following benefits:

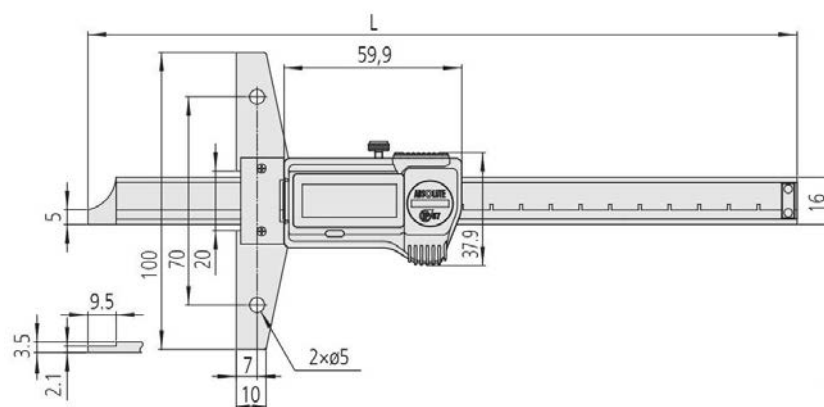
- ABSOLUTE System gives you reliable measurements.
- Its base and measuring faces are hardened and micro-lapped for robustness.
- It has excellent resistance against water and dust (IP67 protection level) enabling you to use it in machining situations that include splashing coolant fluid.
- Extremely resistant to both coolants and lubricants.



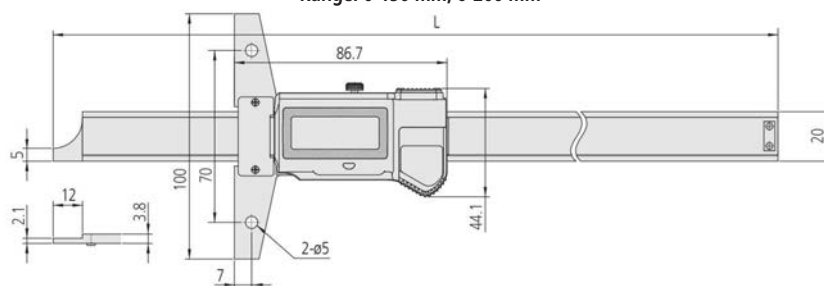
571-252-20

## Metric

No.	Range [mm]	Accuracy	L [mm]	Base (W x T)	Mass [g]
571-251-20	0-150	±0,02 mm	239	100x 6 mm	199
571-252-20	0-200	±0,02 mm	289	100 x 6 mm	219
571-253-10	0-300	±0,03 mm	404	100 x 6,3 mm	357



Range: 0-150 mm, 0-200 mm



Range: 0-300 mm

# ABSOLUTE Digimatic Depth Gauge IP67 Hook/Pin Type

## Series 571

- Direct reading for either measuring surface is obtained by pressing the OFFSET function, which compensates for the 10 mm width of the hook.



571-255-20



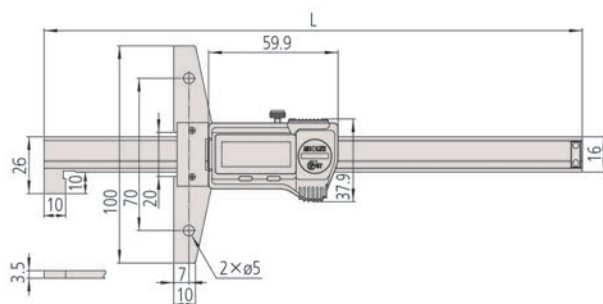
571-302-20

### Metric Hook Type

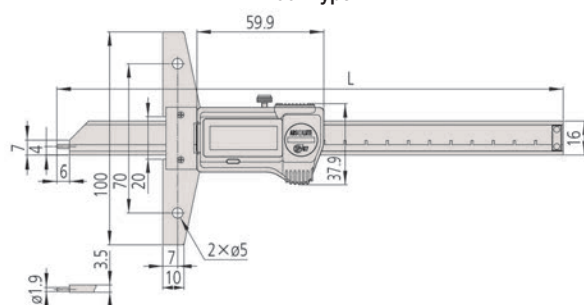
No.	Depth range	Hook range	Base (W x T)	L [mm]	Mass [g]
571-254-20	10,1-160 mm	0-150 mm	100 x 6 mm	249	216
571-255-20	10,1-210 mm	0-200 mm	100 x 6 mm	299	236

### Metric Pin Type

No.	Range [mm]	Base (W x T)	L [mm]	Mass [g]
571-301-20	0-150	100 x 6 mm	249	207
571-302-20	0-200	100 x 6 mm	299	227



Hook Type



Pin Type

Series 571			
	571-254-20	571-255-20	571-301-20 571-302-20
<b>Functions</b>			
ORIGIN (ABS-Zero)	●	●	●
OFFSET	●	●	●
Auto Power OFF after 20 min. non use	●	●	●
Low voltage alarm	●	●	●
Data output	●	●	●

### Specifications

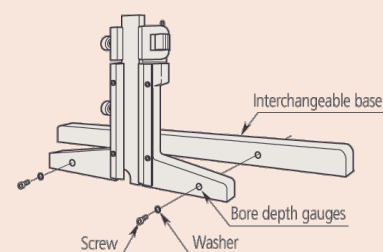
Digital step	0,01 mm
Accuracy	±0,03 mm (excluding quantizing error)
Max. response speed	Unlimited
Repeatability	0,01 mm
Battery life	approx. 5 years
Display	LCD, Character Height 9 mm
Delivered	In a case including 1 battery

### Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type
900370	Extension Base, Depth Gauge, 180mm width for up to 300mm range
900371	Extension Base, Depth Gauge, 260mm width for up to 300mm range
900372	Extension Base, Depth Gauge, 320mm width for up to 300mm range

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



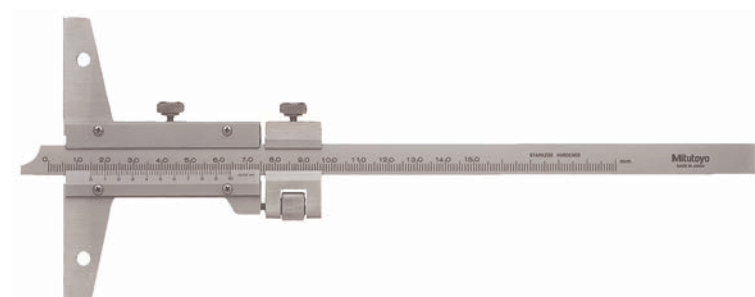
Mounting the interchangeable base

# Vernier Depth Gauge

## Series 527

This vernier depth gauge offers you the following benefits:

- Its base and measuring faces are hardened and micro-lapped for robustness.
- Fine adjustment models available



527-101

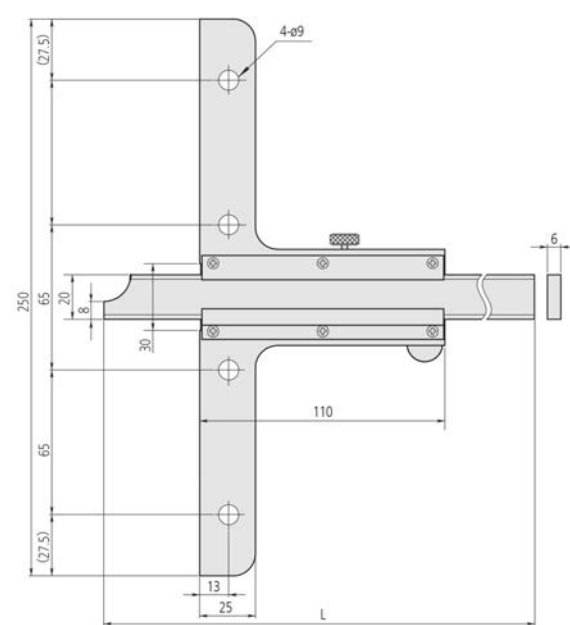
### Metric

No.	Range [mm]	Accuracy	Graduation	Base (W x T)	L [mm]	Mass [g]
527-201	0-150	±0,05 mm	0,05 mm	100 x 6,5 mm	260	240
527-121	0-150	±0,03 mm	0,02 mm	100 x 6,5 mm	260	215
527-202	0-200	±0,05 mm	0,05 mm	100 x 6,5mm	310	260
527-122	0-200	±0,03 mm	0,02 mm	100 x 6,5mm	310	230
527-203	0-300	±0,08 mm	0,05 mm	100 x 6,5 mm	410	300
527-123	0-300	±0,04 mm	0,02 mm	100 x 6,5mm	410	265
527-204	0-600	±0,1 mm	0,05 mm	250 x 10 mm	800	1510
527-205	0-1000	±0,15 mm	0,05 mm	250 x 10mm	1200	1880

### Metric

With fine adjustment

No.	Range [mm]	Accuracy	Graduation	Base (W x T)	L [mm]	Mass [g]
527-101	0-150	±0,03 mm	0,02 mm	100 x 6,5mm	260	280
527-102	0-200	±0,03 mm	0,02 mm	100 x 6,5mm	310	300
527-103	0-300	±0,04 mm	0,02 mm	100 x 6,5mm	410	350
527-104	0-600	±0,05 mm	0,02 mm	250 x 10mm	800	1510
527-105	0-1000	±0,07 mm	0,02 mm	250 x 10mm	1200	1880



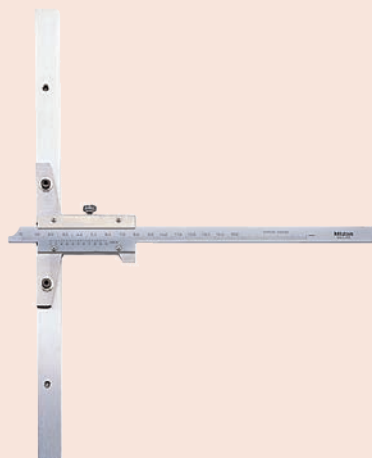
Range: 0-600 mm, 0-1000 mm

## Specifications

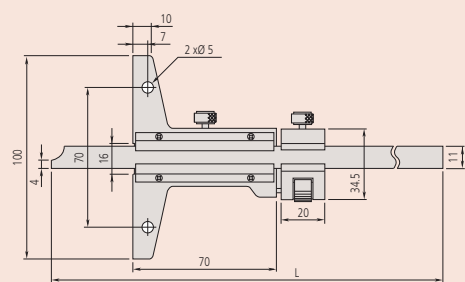
Accuracy Refer to the list of specifications

## Optional accessories

No.	Description
900370	Extension Base, Depth Gauge, 180mm width for up to 300mm range
900371	Extension Base, Depth Gauge, 260mm width for up to 300mm range
900372	Extension Base, Depth Gauge, 320mm width for up to 300mm range



527-201 with 900372



Range: 0-150 mm, 0-200 mm, 0-300 mm

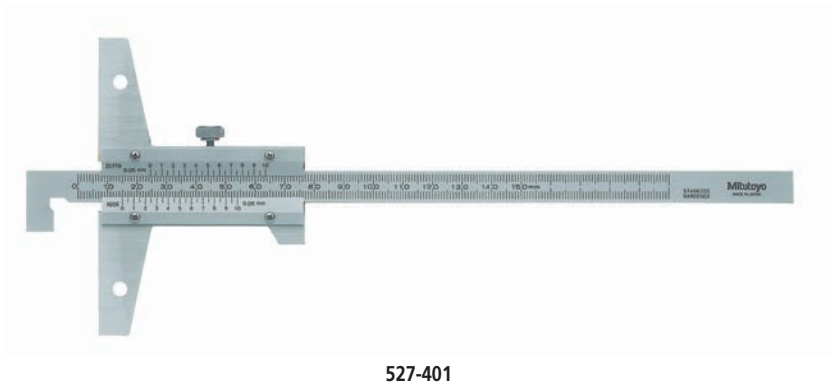


# Vernier Depth Gauge Hook Type

## Series 527

This hook type vernier depth gauge offers you the following benefits:

- The end of the beam is hook-shaped so you can take depth and thickness measurements of a projected portion or lip in a hole, as well as standard depth measurements.
- Fine adjustment models are available.



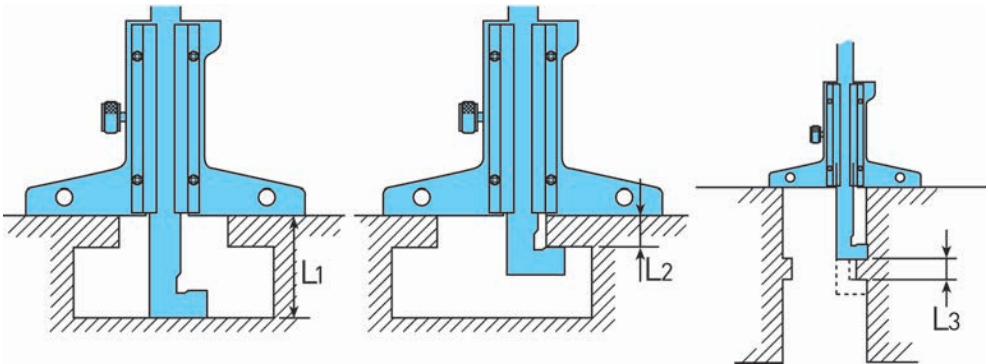
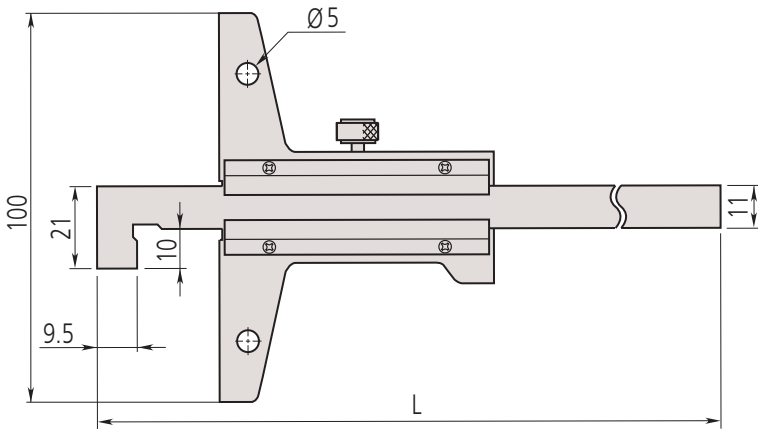
### Metric

No.	Accuracy	Depth range	Hook range	Graduation	L [mm]	Mass [g]
527-401	±0,05 mm	10,1-150 mm	0-150 mm	0,05 mm	260	240
527-402	±0,05 mm	10,1-200 mm	0-200 mm	0,05 mm	310	240
527-403	±0,08 mm	10,1-300 mm	0-300 mm	0,05 mm	410	270

### Metric

With fine adjustment

No.	Accuracy	Depth range	Hook range	Graduation	L [mm]	Mass [g]
527-411	±0,03 mm	10,1-150 mm	0-150 mm	0,02 mm	260	280
527-412	±0,03 mm	10,1-200 mm	0-200 mm	0,02 mm	310	300
527-413	±0,04 mm	10,1-300 mm	0-300 mm	0,02 mm	410	350



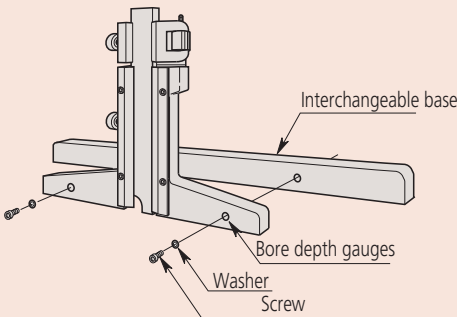
L1 = depth-vernier reading / L2 = hook-vernier reading / L3 = (depth-vernier reading) - (hook-vernier reading)

## Specifications

Accuracy	Refer to the list of specifications
----------	-------------------------------------

## Optional accessories

No.	Description
900370	Extension Base, Depth Gauge, 180mm width for up to 300mm range
900371	Extension Base, Depth Gauge, 260mm width for up to 300mm range
900372	Extension Base, Depth Gauge, 320mm width for up to 300mm range



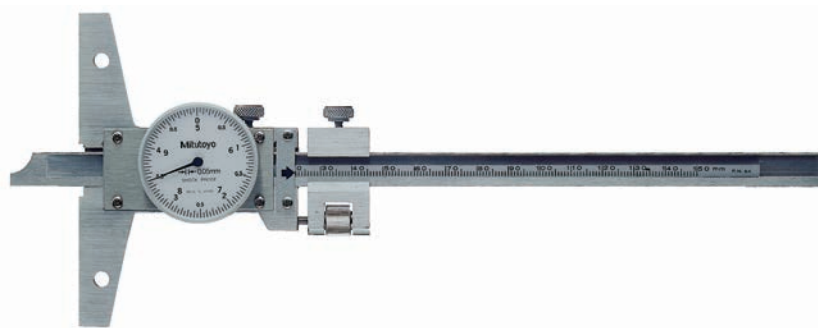
## Mounting the interchangeable base

# Dial Depth Gauge

## Series 527

This dial depth gauge offers you the following benefits:

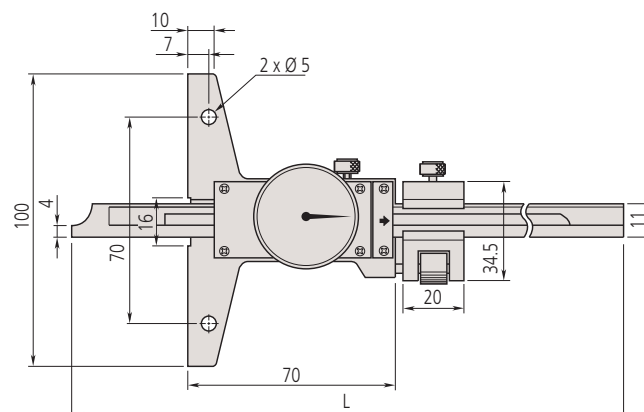
- The dial is very easy-to-read.
- Its base and measuring faces are hardened and micro-lapped for robustness.
- You can make fine adjustments.



527-301-50

### Metric

No.	Range [mm]	Accuracy	L [mm]	Mass [g]
527-301-50	0-150	±0,05 mm	260	280
527-302-50	0-200	±0,05 mm	310	300
527-303-50	0-300	±0,08 mm	410	340

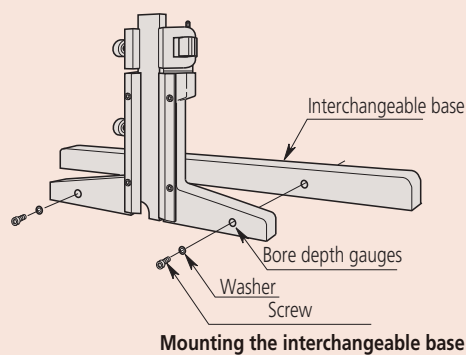
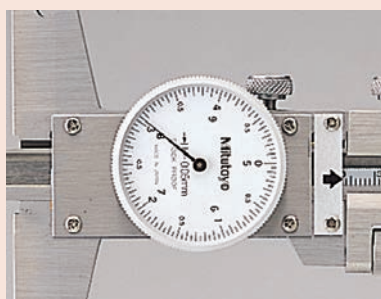


## Specifications

Accuracy	Refer to the list of specifications
Graduation	0,05 mm
Base size	100 x 6,5 mm (W x T) mm

## Optional accessories

No.	Description
900370	Extension Base, Depth Gauge, 180mm width for up to 300mm range
900371	Extension Base, Depth Gauge, 260mm width for up to 300mm range
900372	Extension Base, Depth Gauge, 320mm width for up to 300mm range



# Tyre Tread Depth Gauge

## Series 571

This is designed to measure tyre tread depth and offers you the following benefits:

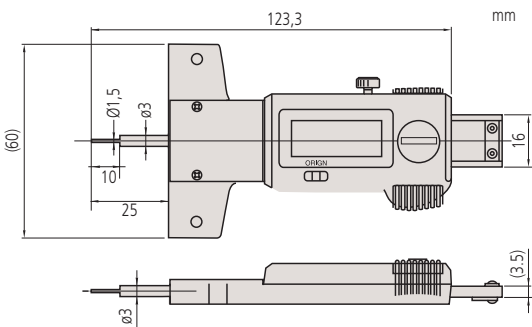
- The ABSOLUTE feature of this gauge keeps track of the origin point (once set) for the entire life of the battery.
- It gives you SPC data output.



571-100-20

### Metric

No.	Range [mm]	Accuracy	Mass [g]
571-100-20	0-25	±0,02 mm	160



## Optional Accessories for Depth Gauge

### Extension bases

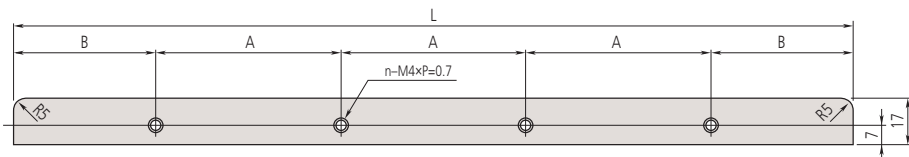
These optional extension bases can be fitted to depth gauge models up to 0-300 mm range. They cannot be attached to 0-600mm or 0-1000 mm range models.



900372

### Metric

No.	L [mm]	A [mm]	B [mm]	Number of holes	Mass [g]
900370	180	70	55	2	200
900371	260	35	60	5	270
900372	320	70	55	4	345

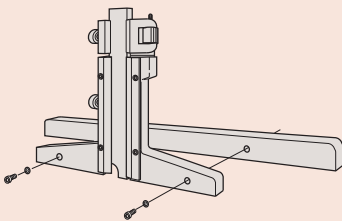


Functions	Series 571
ORIGIN (ABS-Zero)	
Auto Power OFF after 20 min. non use	
Low voltage alarm	
Data output	

Specifications	
Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	unlimited
Repeatability	0,01 mm
Battery life	approx. 5 years
Display	LCD, Character height 9 mm
Delivered	Including 1 battery

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type
264-620	U-WAVE fit, IP67 Type, Wireless Transmitter for Caliper
264-621	U-WAVE fit, Buzzer Type, Wireless Transmitter for Caliper
02AZF310	Connection Unit, U-WAVE fit, Waterproof Type

No.	Description
938882	Battery SR44 1.5V



Attaching the extension base

## Height Gauges



**Height Gauge**  
**Page 220**



**Height Gauge Accessories**  
**Page 227**



**Height Gauge with Data Processing Unit**  
**Page 229**

# Lightweight Vernier Height Gauge

## Series 506

This vernier height gauge offers you the following benefits:

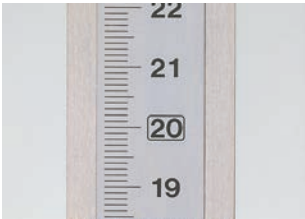
- You can take accurate and fast readings thanks to the satin chrome finished main and vernier scales.
- A carbide-tipped scribe is provided.



506-207



Fine adjustment



Large digit

### Metric

No.	Range [mm]	Accuracy	Mass [kg]
506-207	0-200	±0,03 mm	1,4

### Specifications

Graduation	0,02 mm
Accuracy	Refer to the list of specifications.
Delivered	Including scribe and scribe clamp

### Standard accessories

No.	Description
07GZA004	Scribe Clamp with Plastic Screw, for Height Gauge
900173	Carbide Tipped Scribe, 6,35x12,7mm, 47mm Length

### Optional accessories

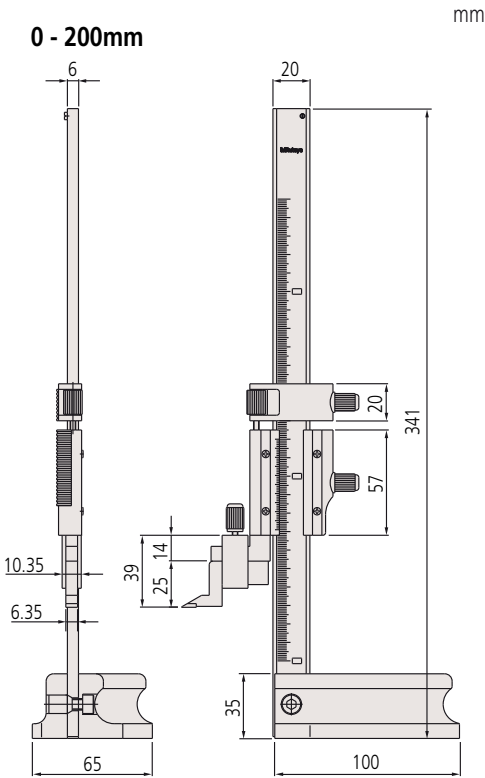
No.	Description
953639	Holding Bar for Swivel Clamp, 6,25x12,7mm, 50mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail



953639



900321



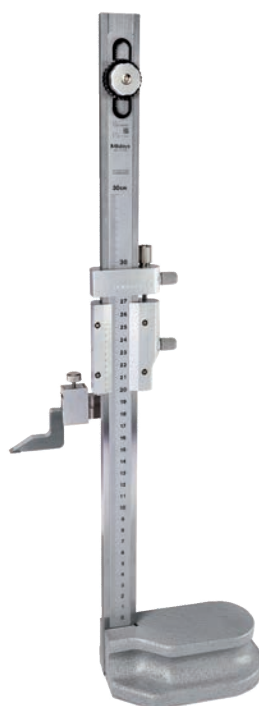


# Vernier Height Gauge

## Series 514

This vernier height gauge offers you the following benefits:

- You can take accurate and fast readings thanks to the satin chrome finished main and vernier scales.
- A carbide-tipped scriber is provided.



514-102

### Specifications

Graduation	0,02 mm
Accuracy	Refer to the list of specifications.
Scale adjustment	15 mm for models up to 600 mm 25 mm for models 1.000 and 1.500 mm
Delivered	Including scriber, scriber clamp and cover

### Standard accessories

No.	Description
05GZA033	Scriber Clamp, 9x9mm
07GZA000	Carbide Tipped Scriber, 9x9mm, 80mm Length
905200	Carbide-tipped Scriber, 9x9mm, 150mm Length
905008	Scriber Clamp, for 16x10mm
900390	Carbide Tipped Scriber, 10x16mm, 144mm Length

05GZA033: for all except 514-170

07GZA000: 514-102, 514-104, 514-106

905200: 514-108, 514-109

905008: 514-170, 514-103, 514-105, 514-107

900390: 514-170

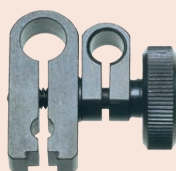
### Optional accessories

No.	Description
953638	Holding Bar for Swivel Clamp, 9x9mm, 50mm Length
900209	Holding Bar for Swivel Clamp, 9x9mm, 100mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail
07GZA003	Magnifier for Vernier Height Gauge, 300, 450, 600mm
07GZA015	Magnifier for Vernier Height Gauge, 1000mm

953638: except 514-170



953638

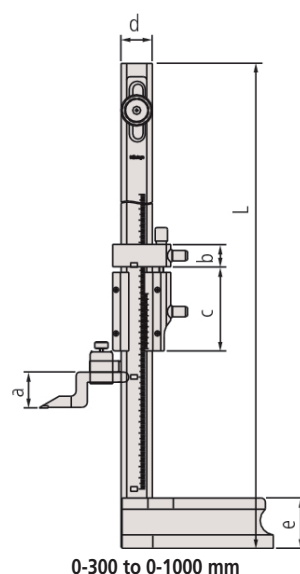


900321

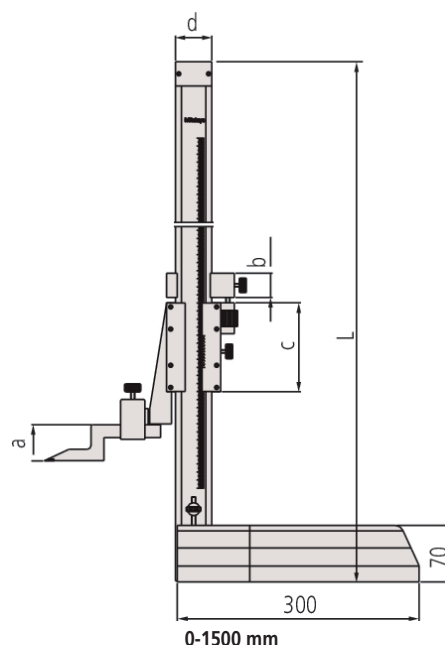


### Metric

No.	Range [mm]	Accuracy	Remarks	Fine adjustment	L [mm]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	Mass [kg]
514-102	0-300	±0,04 mm		4 mm	525	32	20	70	28	45	3,1
514-104	0-450	±0,05 mm		4 mm	675	32	20	70	28	45	3,4
514-106	0-600	±0,05 mm		7 mm	870	32	24	85	35	54	7,4
514-108	0-1000	±0,07 mm		6 mm	1340	42	30	110	45	65	20
514-170	0-1500	±0,18 mm	Delivered with magnifier	20 mm	1760	45	30	110,5	45	70	26



0-300 to 0-1000 mm



0-1500 mm

# Dial Height Gauge

## Series 192

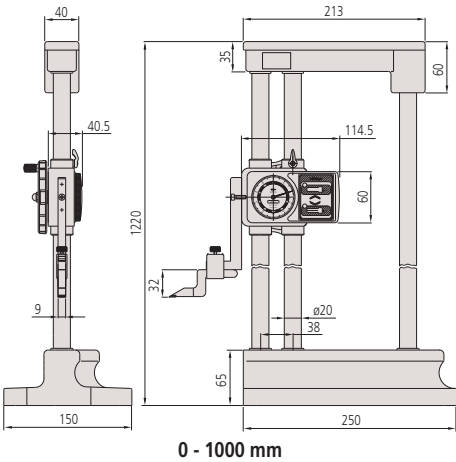
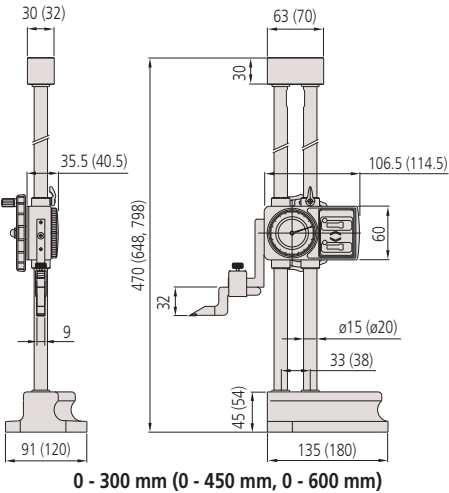
This dial height gauge offers you the following benefits:

- It allows you easy and error-free reading with both up and down digital counters as well as a dial.
- It comes with a hand wheel so you can easily make rough adjustments.
- A carbide-tipped scriber is provided.



### Metric

No.	Range [mm]	Accuracy	Mass [kg]
192-130	0-300	±0,03 mm	4,2
192-131	0-450	±0,05 mm	9,2
192-132	0-600	±0,05 mm	9,8
192-133	0-1000	±0,07 mm	17



### Specifications

Graduation	0,01 mm
Accuracy	Refer to the list of specifications
Delivered	Including scriber, scriber clamp and cover

### Standard accessories

No.	Description
05GZA033	Scriber Clamp, 9x9mm
07GZA000	Carbide Tipped Scriber, 9x9mm, 80mm Length

### Optional accessories

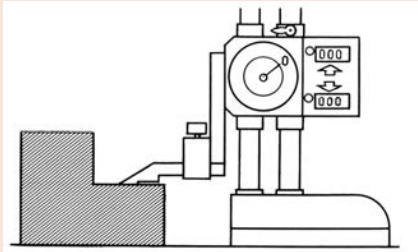
No.	Description
953638	Holding Bar for Swivel Clamp, 9x9mm, 50mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail



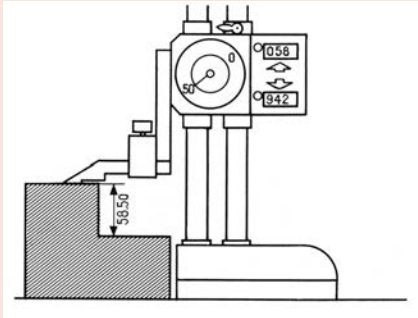
953638



900321



Reset



### Reading off

Counter : 58,00 mm  
Dial Gauge : 0,50 mm

Result : 58,50 mm

# ABSOLUTE Digimatic Height Gauge

ABSOLUTE®

Functions	Series 570
ORIGIN	●
ZERO/ABS	●
±SWITCHING	●
ON/OFF	●
DATA/HOLD	●
Low voltage alarm	●
Data output	●
PRESET	●

## Specifications

Accuracy	Refer to the list of specifications. (excluding quantizing error)
Digital step	0,01 mm
Scale	ABSOLUTE electrostatic linear encoder
Max. response speed	Unlimited
Battery life	approx. 5000 hours
Display	LCD, 6-digit
Delivered	Including 1 battery, scriber and scriber clamp

## Standard accessories

No.	Description
901338	Scriber Clamp, 6,35x12,7mm
900173	Carbide Tipped Scriber, 6,35x12,7mm, 47mm Length
05GZA033	Scriber Clamp, 9x9mm
905200	Carbide-tipped Scriber, 9x9mm, 150mm Length

901338, 900173: 570-227, 570-244  
05GZA033, 905200: 570-230

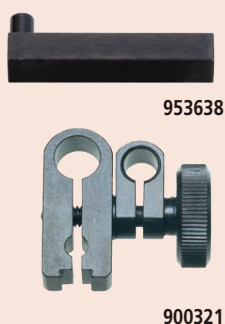
## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
953639	Holding Bar for Swivel Clamp, 6,25x12,7mm, 50mm Length
953638	Holding Bar for Swivel Clamp, 9x9mm, 50mm Length
900209	Holding Bar for Swivel Clamp, 9x9mm, 100mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail

953639: 570-227  
953638, 900209: 570-230

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



## Series 570

This Digimatic height gauge is very precise and reliable, and offers you the following benefits:

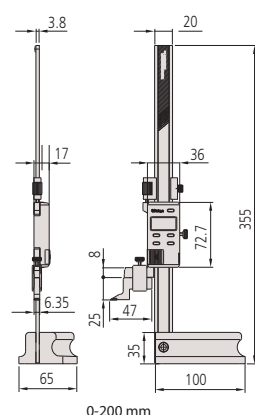
- Its built-in ABSOLUTE linear encoder means you don't have to set the reference point at every power-on, improving reliability as over-speed errors cannot occur.
- Fine-adjustment gives you precise positioning.
- It comes with large and smooth-acting slider hand wheel for coarse- and fine-adjustments (570-3xx only).
- A carbide-tipped scriber is provided.
- SPC data output.



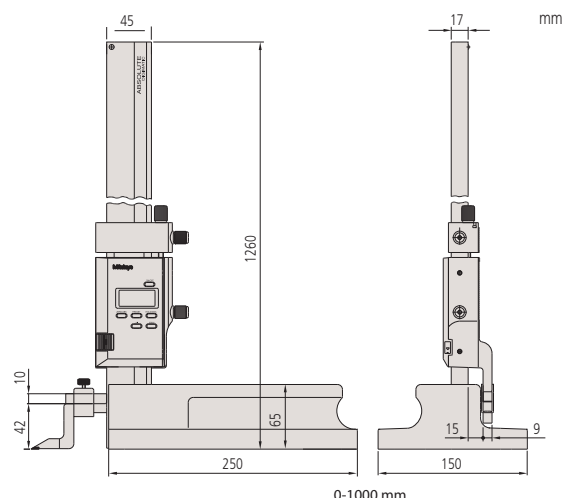
570-227

## Metric

No.	Range [mm]	Accuracy	Remarks	Mass [kg]
570-227	0-200	±0,03 mm	2 x PRESET	1,3
570-230	0-1000	±0,07 mm		16,8



0-200 mm



0-1000 mm

# ABSOLUTE Digimatic Height Gauge

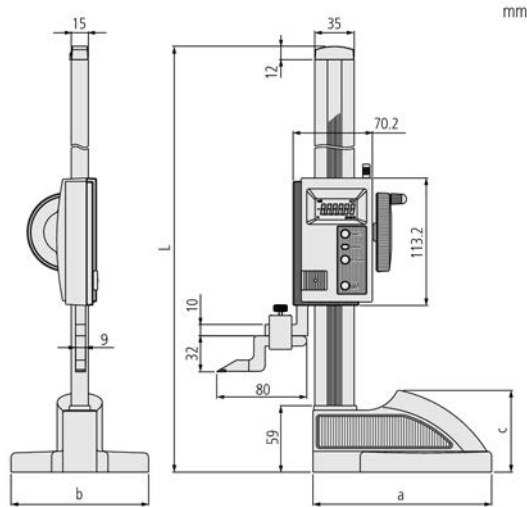
## Series 570

This Digimatic height gauge is very precise and reliable, and offers you the following benefits:

- Its built-in ABSOLUTE linear encoder means you don't have to set the reference point at every power-on, improving reliability as over-speed errors cannot occur.
- It comes with large and smooth-acting slider hand wheel
- A carbide-tipped scriber is provided.
- SPC data output.



570-302



### Metric

No.	Range [mm]	Accuracy	L [mm]	A [mm]	B [mm]	C [mm]	Mass [kg]
570-302	0-300	±0,03 mm	507	160	122	72,6	4,6
570-304	0-600	±0,05 mm	812	181	142	74,1	6,4



Large smooth slider handwheel



Fits the hand comfortably



Large clamp lever

ABSOLUTE<sup>®</sup>

Functions	Series 570
ORIGIN	●
ZERO/ABS	●
ON/OFF	●
DATA/HOLD	●
Low voltage alarm	●
Data output	●

### Specifications

Accuracy	Refer to the list of the specifications. (excluding quantizing error)
Digital step	0,01 mm
Scale	ABSOLUTE electrostatic linear encoder
Max. response speed	Unlimited
Battery life	approx. 20000 hours
Display	LCD, Character Height 10 mm
Delivered	Including 1 battery, scriber and scriber clamp

### Standard accessories

No.	Description
05GZA033	Scriber Clamp, 9x9mm
07GZA000	Carbide Tipped Scriber, 9x9mm, 80mm Length

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
953638	Holding Bar for Swivel Clamp, 9x9mm, 50mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



953638



900321





# Digimatic Height Gauge Double Column Type

Functions	Series 192
ZERO/ABS	●
PRESET (2 values)	●
±SWITCHING	●
ON/OFF	●
DATA/HOLD	●
Low voltage alarm	●
Data output	●

## Specifications

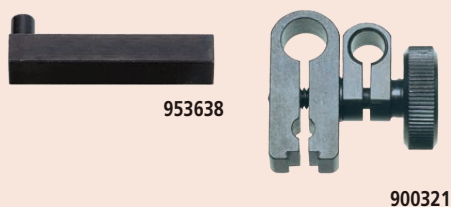
Accuracy	Refer to the list of specifications. (excluding quantizing error)
Digital step	0,01/0,005 mm
Max. response speed	500 mm/s
Battery life	approx. 3500 hours
Display	LCD, Character Height: 11 mm
Delivered	Including scriber, scriber holder, 1 battery and cover

## Standard accessories

No.	Description
05GZA033	Scriber Clamp, 9x9mm
07GZA000	Carbide Tipped Scriber, 9x9mm, 80mm Length
450291	Vinyl Cover Series 192, 300mm
450292	Vinyl Cover Series 192, 600mm
450290	Vinyl Cover Series 192, 1000mm

## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
953638	Holding Bar for Swivel Clamp, 9x9mm, 50mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail



## Series 192

This is a high accuracy height gauge which offers you the following benefits:

- Its double-column structure ensures high measuring accuracy.
- Carbide-tipped scriber provided
- Large character height of 11 mm provides good readability.
- SPC data output

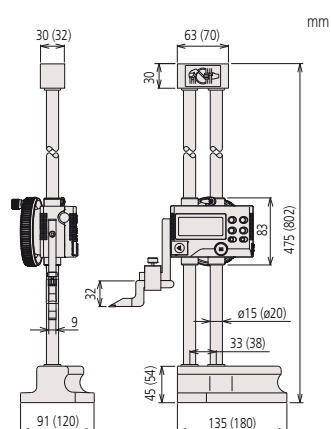


192-613-10

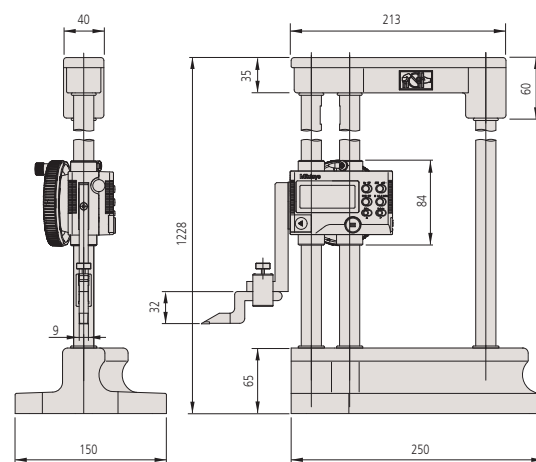


## Metric

No.	Range [mm]	Accuracy	Mass [kg]
192-613-10	0-300	±0,02 mm	4,7
192-614-10	0-600	±0,05 mm	8,3
192-615-10	0-1000	±0,07 mm	15,7



0-300 mm  
(0-600 mm)



0-1000 mm



# Digimatic Height Gauge Double Column Type with Touch Trigger Probe Connector

## Series 192

- Carbide-tipped long scriber is provided.
- Double-column structure ensures high measuring accuracy
- Bidirectional touch-trigger probe is an optional accessory. It can quickly and accurately measure steps as well as inside and outside dimensions.

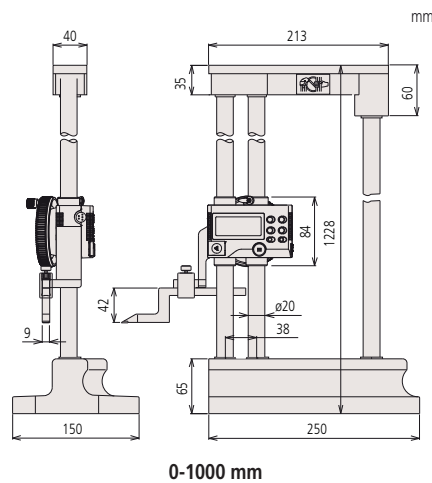
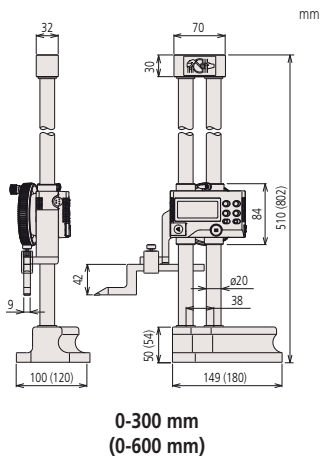


192-663-10



## Metric

No.	Range [mm]	Accuracy	Mass [kg]
192-663-10	0-300	±0,02 mm	5,7
192-664-10	0-600	±0,04 mm	8,3
192-665-10	0-1000	±0,06 mm	15,7



Functions	Series 192
ZERO/ABS	●
PRESET (2 values)	●
±SWITCHING	●
ON/OFF	●
DATA/HOLD	●
Stylus tip diameter compensation	●
Touch-trigger probe	●
Low voltage alarm	●
Data output	●

## Specifications

Accuracy	Refer to the list of specifications. (excluding quantizing error)
Digital step	0,01/0,005 mm
Max. response speed	500 mm/s
Repeatability	0,01 mm
Battery life	approx. 3500 hours
Display	LCD, Character Height: 11 mm
Delivered	Including scriber, scriber holder, 1 battery and cover

## Standard accessories

No.	Description
05GZA033	Scriber Clamp, 9x9mm
905200	Carbide-tipped Scriber, 9x9mm, 150mm Length
450291	Vinyl Cover Series 192, 300mm
450292	Vinyl Cover Series 192, 600mm
450290	Vinyl Cover Series 192, 1000mm

## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
192-007	Bi-Directional Touch Trigger Probe, for Series 192, Metric
953638	Holding Bar for Swivel Clamp, 9x9mm, 50mm Length
900209	Holding Bar for Swivel Clamp, 9x9mm, 100mm Length
900321	Swivel Clamp, for Ø4/8mm, Dovetail

## Consumable spares

No.	Description
938882	Battery SR44 1.5V



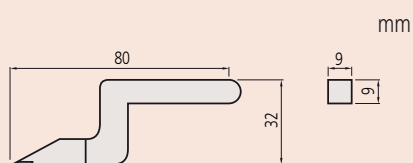
192-007

# Spare Parts for Height Gauges

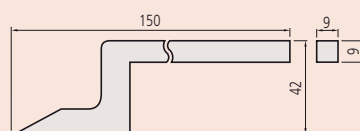
## Standard accessories for Height Gauges

These are optional accessories and spare parts for height gauges, that you can use for different tasks.

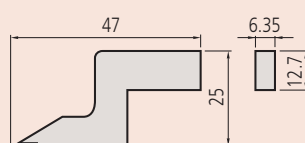
- Various accessories are available for using height gauges in different applications.
- Hard-wearing carbide-tipped scribes are available for all height gauges.



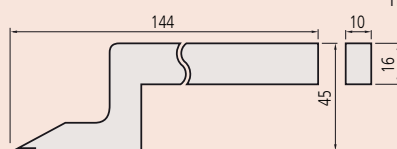
07GZA000



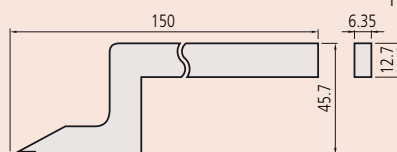
905200  
mm



900173  
mm



900390  
mm



905201



## Carbide-tipped scribes

No.	Applicable height gauges	Description
07GZA000	192-130, 192-131, 192-132, 192-133 192-613-10, 192-614-10, 192-615-10 514-102, 514-104, 514-106 570-302, 570-304	Carbide tipped scriber (9 x 9 mm) 80 mm length
905200	192-663-10, 192-664-10, 192-665-10 514-108 570-230	Carbide tipped scriber (9 x 9 mm) 150 mm length
900173	570-227 506-207	Carbide tipped scriber (12,7 x 6,35 mm) 47 mm length
900390	514-170	Carbide tipped scriber (16 x 10 mm) 144 mm length

## Scriber clamps

No.	Applicable height gauges	Description
905008	514-170	Scriber clamp (16 x 10 mm)
05GZA033	192-130, 192-131, 192-132, 192-133 192-613-10, 192-614-10, 192-615-10 192-663-10, 192-664-10, 192-665-10 514-102, 514-104, 514-106, 514-108 570-230 570-302, 570-304	Scriber clamp (9 x 9 mm)
07GZA004	570-227, 570-244, 506-207	Scriber clamp with plastic screw (12,7 x 6,35 mm)

# Optional Accessories for Height Gauges

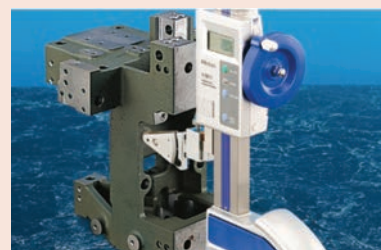
## Optional accessories for Height Gauges

These are optional accessories and spare parts for height gauges, that you can use for different tasks.

- Various accessories are available for using height gauges in different applications.
- Hard-wearing carbide-tipped scribers are available for all height gauges.

### Center master

No.	Remarks	Applicable height gauges
900581	Center master (12,7 x 6,35 mm)	570-227, 570-244 506-207
		192-630-10, 192-631-10, 192-632-10, 192-633-10 570-248
951144	Center master (9 x 9 mm)	192-130, 192-131, 192-132, 192-133 192-613-10, 192-614-10, 192-632-10, 192-633-10 570-312, 570-313, 570-314
		192-670-10, 192-671-10, 192-672-10, 192-673-10 514-108, 514-109



Center master



Depth Gage Attachment



Electrical contact sensor  
900872

### Depth measurement attachment

No.	Remarks	Applicable height gauges
900764	Depth measurement attachment	192-130, 192-131, 192-132, 192-133 192-613-10, 192-614-10, 192-615-10 514-102, 514-103, 514-104, 514-105, 514-106, 514-107 570-302, 570-304
		192-663-10, 192-664-10, 192-665-10 514-108, 514-109
900878	Depth measurement attachment (12,7 mm x 6,35 mm)	570-227, 570-244 506-207
		192-630-10, 192-631-10, 192-632-10, 192-633-10 570-248

### Electrical contact sensor

No.	Applicable height gauges
900872	For all height gauges on a granite surface plate. For electroconductive parts with a sufficient contact surface.

# QM-Height

ABSOLUTE®

## Specifications

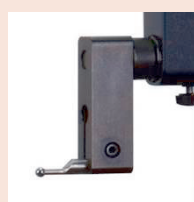
Digital step	0,001 mm/0,005 mm
Accuracy	$\pm(2,4+2,1L/600) \mu\text{m}$ L = Measuring length (mm)
Repeatability ( $\pm 2\sigma$ )	1,8 $\mu\text{m}$
Scale	ABSOLUTE electromagnetic inductive
Measuring force	1,5 $\pm$ 0,5 N
Drive method	Manual
Guiding method	Roller bearing
Power supply	Alkaline battery size AA LR6 (4pcs.), rechargeable battery size AA Ni-MH (4pcs.), AC-Adapter (optional)
Battery life	Approx. 1200 h (without air floating) Approx. 90 h (with air floating)
Display	TN monochrome LCD
Measuring function	1D measurement: height, diameter, pitch, Max/Min/TIR (Max-Min), tolerance, preset, data memory

## Standard accessories

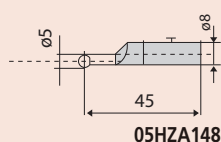
No.	Description
011037	Battery LR6 (AA) 4x
12AAA715	Setting Block Linear Height/QM-Height, Probe Calibration
05HZA148	Ball Offset Probe QM-Height, Ø5mm, Standard Accessory

## Optional accessories

No.	Description
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type
02AZE990	U-WAVE-T Mounting Plate
06AEG180D	AC-Adapter, 6V 2A, CEE Type



05HZA148



05HZA148



02AZE990 for U-WAVE (wireless system)

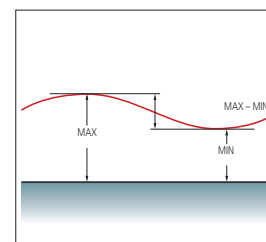
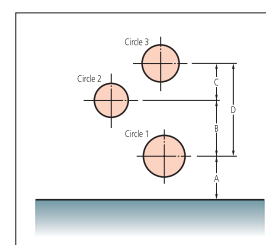


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## Series 518

This is a high precision ABSOLUTE digital height gauge that offers you the following benefits:

- It has a high accuracy, high resolution ABSOLUTE linear encoder for position detection.
- Types with and without pneumatic drive mechanism
- Automatic running of prelearned part programs
- You can easily implement frequently used measurements, such as inside/outside diameter and pitch calculations, by icon-based commands that also support easy one-key operation.
- Extraordinary battery life
- GO/±NG judgement is performed by setting the upper and lower tolerances.
- Display is mounted fixed to the housing for more comfortable usage. Probe moves independently during measurements.



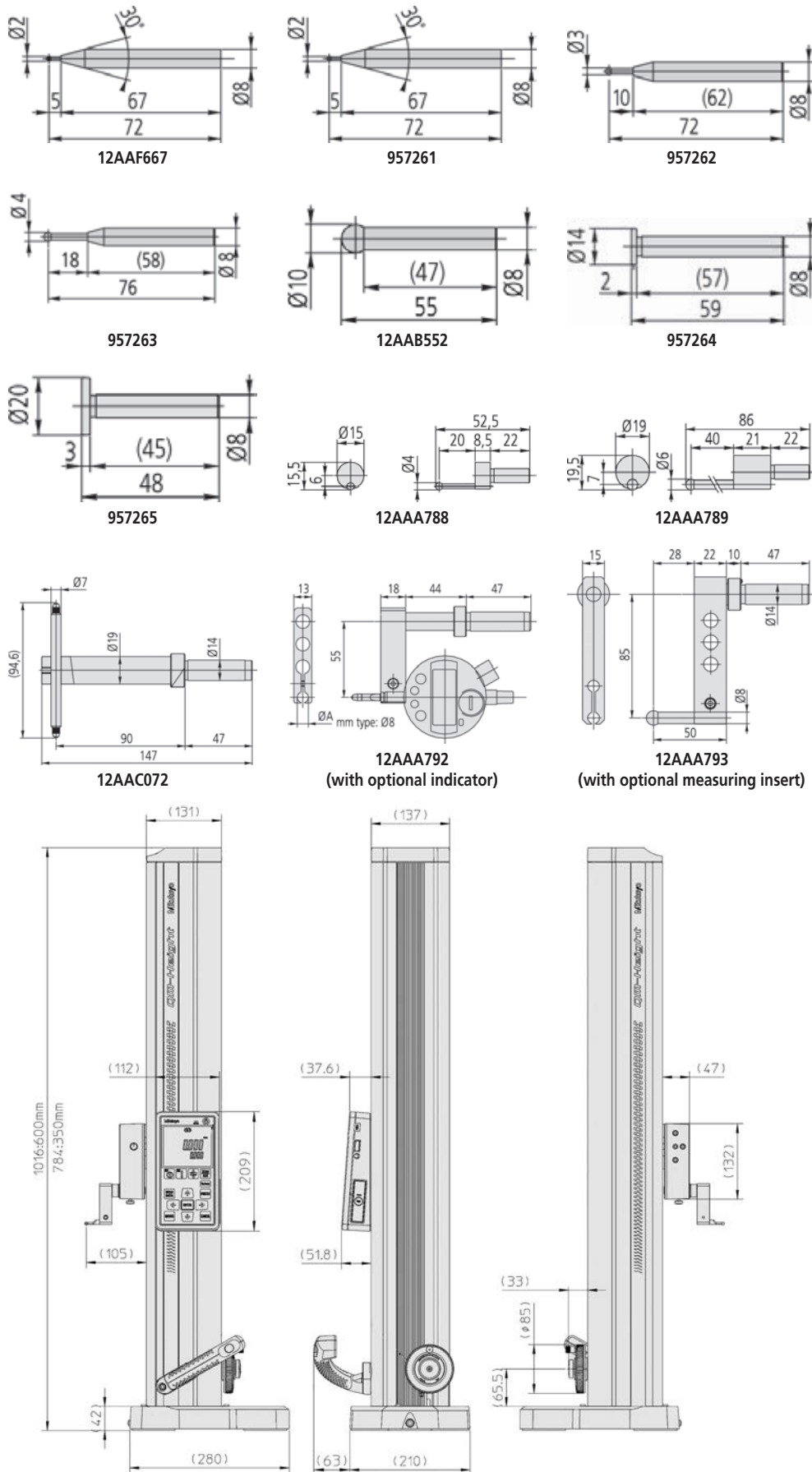
No.	Range	Perpendicularity	Air floating	Mass [kg]
518-240	0-350/0-465*	7 $\mu\text{m}$	no	25
518-242	0-600/0-715*	12 $\mu\text{m}$	no	26
518-244	0-350/0-465*	7 $\mu\text{m}$	yes	29
518-246	0-600/0-715*	12 $\mu\text{m}$	yes	30

\*Range with probe turned to upward position



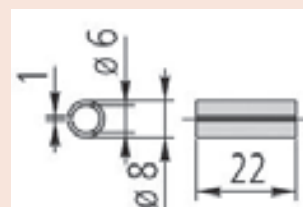
# Optional Accessories for QM-Height

## Series 518 - Optional Accessories for QM-Height



## Optional accessories

No.	Description
12AAF667	Ball Probe Coaxial Type, Ø2mm, Ruby, 72mm Length
957261	Ball Probe Coaxial Type, Ø2mm, 72mm Length
957262	Ball Probe Coaxial Type, Ø3mm, 72mm Length
957263	Ball Probe Coaxial Type, Ø4mm, 76mm Length
12AAB552	Ball Probe, Coaxial Type, Ø10mm, 50mm Length
957264	Disk Probe Coaxial Type, Ø14mm, 59mm Length
957265	Disk Probe Coaxial Type, Ø20mm, 48mm Length
12AAA788	Ball Probe Eccentric Type Ø4mm
12AAA789	Ball Probe Eccentric Type Ø6mm
12AAC072	Depth Probe
12AAA792	Indicator Holder LH-600, QM-Height, for 8mm Stem
12AAA793	Probe Extension Holder LH-600, QM-Height, 85mm
226116	Collar 6mm to 8mm



226116



Inside diameter



Outside diameter

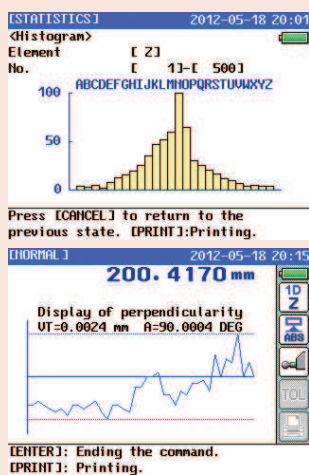


## Specifications

Slider stroke	600 mm
Digital step	0,0001/0,001/0,01/0,1 mm
Accuracy	(1,1 + 0,6L/600) $\mu$ m L = length (mm)
Perpendicularity	5 $\mu$ m (after compensation)
Straightness	4 $\mu$ m (mechanical)
Language for display	English/German/French/Spanish/ Italian/Dutch/Portuguese/ Swedish/Turkish/Czech/ Hungarian/Slovenian/Polish/ Traditional Chinese (optional)/ Japanese
Drive method	Manual/motor (5-40 mm/s, 7 steps)
Suspension method	Full/semi-floating with built-in air compressor
Balancing method	Counter balance
Number of stored programs	50 programs (max.)
Number of stored data	60.000 (max.)
Battery operation time	approx. 5 hours
Probes	See specific chapter on Probes
Measuring force	1 N
Display	Graphic LCD 320x240 dots (with back light)

## Standard accessories

No.	Description
12AAA715	Setting Block Linear Height/QM-Height, Probe Calibration
12AAF634	Eccentric Probe LH-600, Standard Accessory, Ø5mm
12AAF712	Battery Pack, LH-600, Standard Accessory
223587	Dust Cover LH-600
357651	AC adapter 12V, for SJ-210/SJ-310/LH-600



Linear Height LH-600 brochure on request



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# Linear Height LH-600E/EG

## Series 518

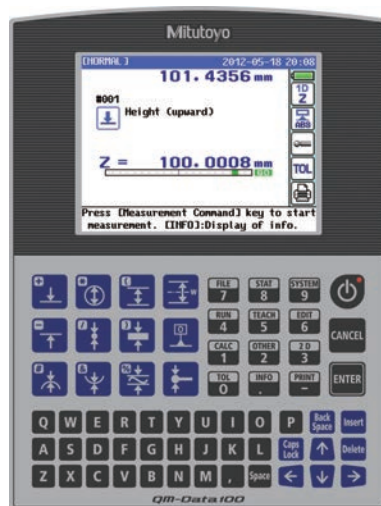
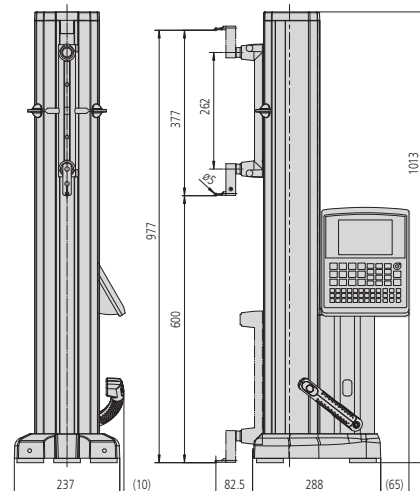
This is a high performance 2D measurement system.

The Linear Height Gauge LH-600E/EG offers you a huge range of features, including:

- Excellent accuracy.
- Pneumatic drive mechanism.
- Self-explanatory control pad with menu control in display.
- Easy-to-read LCD display.
- Automatic running of pre-learned part programs.
- GO/± NG display at each measurement.
- Mains-independent operation with rechargeable battery.
- Easy handling with low weight.
- RS-232C data output port.
- USB Data output (for storing data only).
- DIGIMATIC data input for when using a digital indicator (e.g. when testing perpendicularity).
- Statistic processing.



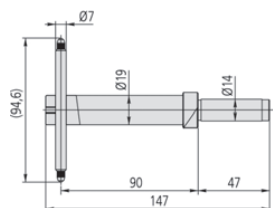
518-351D-21 518-352D-21



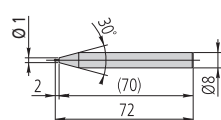
No.	Range [mm]	Remarks	Mass [kg]
518-351D-21	0-972		24
518-352D-21	0-972	Power grip pre-installed	24

# Optional Accessories for Linear Height

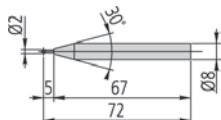
## Series 518



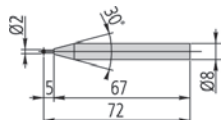
12AAC072



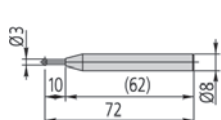
12AAF666



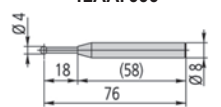
957261



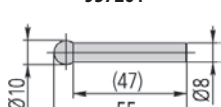
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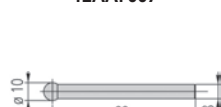
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957263



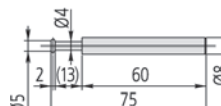
12AAB552



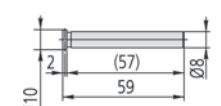
12AAF668



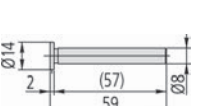
12AAF669



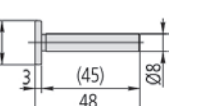
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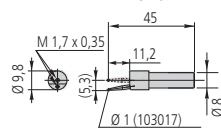
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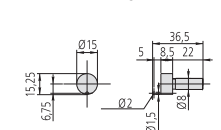
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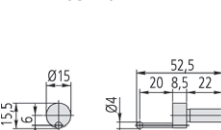
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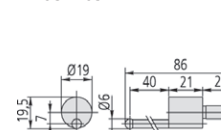
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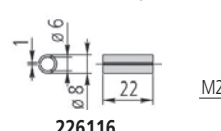
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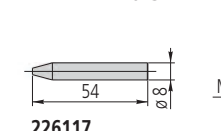
12AAA788



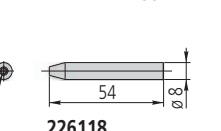
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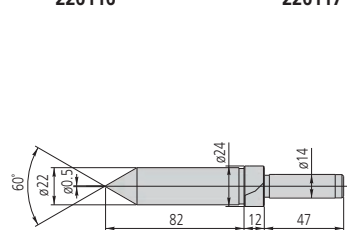
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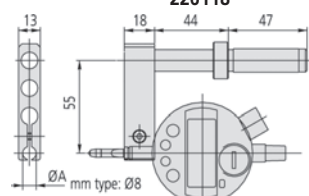
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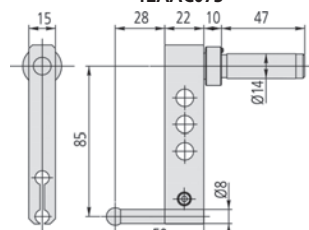
226118



12AAC073

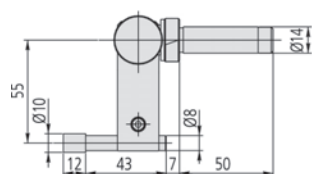


12AAA792  
(with optional indicator)



12AAA793

(with optional measuring insert)



12AAB136



K650986



12AAN050

## Optional accessories

No.	Description
<b>1. Probe diameter calibration block</b>	
12AAA787	Setting Block Linear Height/QM-Height, Probe Calibration, Taper Probe also
<b>2. Depth measurement</b>	
12AAC072	Depth Probe
<b>3. Interchangeable measuring insert (or stylus) for eccentric probe (standard accessory)</b>	
12AAF666	Ball Probe Coaxial Type, Ø1mm, 72mm Length
957261	Ball Probe Coaxial Type, Ø2mm, 72mm Length
12AAF667	Ball Probe Coaxial Type, Ø2mm, Ruby, 72mm Length
957262	Ball Probe Coaxial Type, Ø3mm, 72mm Length
957263	Ball Probe Coaxial Type, Ø4mm, 76mm Length
12AAB552	Ball Probe, Coaxial Type, Ø10mm, 50mm Length
12AAF668	Ball Probe Coaxial Type, Ø10mm, 82mm Length
12AAF669	Ball Probe Coaxial Type, Ø10mm, 120mm Length
12AAF670	Disk Probe Coaxial Type, Ø5mm, 75mm Length
12AAF671	Disk Probe Coaxial Type, Ø10mm, 59mm Length
957264	Disk Probe Coaxial Type, Ø14mm, 59mm Length
957265	Disk Probe Coaxial Type, Ø20mm, 48mm Length
12AAF672	Ball Probe Eccentric Type Ø1mm
12AAF673	Ball Probe Eccentric Type Ø2mm
12AAA788	Ball Probe Eccentric Type Ø4mm
12AAA789	Ball Probe Eccentric Type Ø6mm
226116	Collar 6mm to 8mm
226117	CMM Stylus Adapter M2
226118	CMM Stylus Adapter M3
<b>4. Special holder, special probe</b>	
12AAC073	Tapered Measuring Insert, Ø22mm
12AAA792	Indicator Holder LH-600, QM-Height, for 8mm Stem
12AAA793	Probe Extension Holder LH-600, QM-Height, 85mm
12AAB136	Cylindrical Probe, Ø10mm
<b>5. Others</b>	
12AAF674	Auxiliary Weight, LH-600, 1 pcs.
K650986	Stylus Kit M3 "Linear Height"
<b>6. Printer and interface</b>	
12AAN052	Printer Paper for 12AAN050, 10 pcs.
12AAA804	Printer Cable 2m, for Page Printer
12AAA807D	Cable RS-232C 2m
12AAN050	Receipt Printer for LH-600E/EG, CEE Type
<b>7. Battery</b>	
12AAF712	Battery Pack, LH-600, Standard Accessory

Recommended model for A4 printer: EPSON LQ-590  
K650986: holder M3/disk probe Ø 12 mm/  
ruby ball probe Ø 1, 2, 3, 4 mm/extension 10, 20 mm



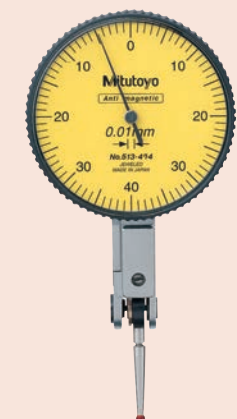
**ABSOLUTE Digimatic Indicator**  
**Page 234**



**Dial Indicator**  
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**Accessories for Indicator**  
**Page 266**



**Dial Test Indicator**  
**Page 275**



**Accessories for Dial Test Indicators**  
**Page 286**



**Thickness Gauge, Caliper Gauge**  
**Page 288**

# ABSOLUTE Digimatic Solar Indicator ID-SS

## Series 543

This solar-powered, standard model is environmentally friendly and very easy to use.

The ABSOLUTE Digimatic Solar Indicator ID-SS offers you the following benefits:

- The ABSOLUTE sensor means you don't have to carry out origin setting every time you power it on, saving you time and hassle.
- There's no battery to change.
- The solar cell operates from just 40 Lux.
- Super-capacitor charge storage enables you to work in low-level lighting conditions of less than 40 Lux.
- You can access all functions by using the large, user-friendly buttons on the front of the indicator.
- Large character height of 9 mm provides good readability.



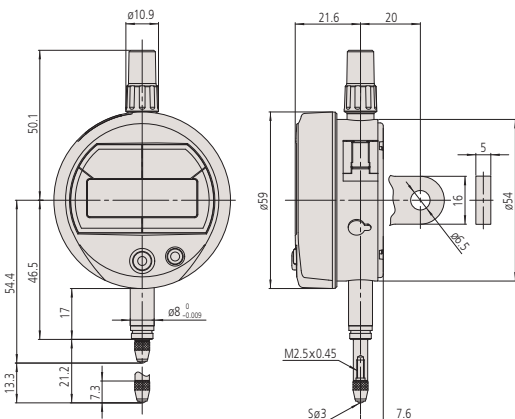
543-500B

543-505B

### Metric

No.	No. Lug back plate	Range	Digital step	Max. permissible error of indication	Hysteresis	Repeatability	Measuring force [N]	Mass lug/plain [g]
543-500B	543-500	12,7 mm	0,001 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,5	150/140
543-505B	543-505	12,7 mm	0,01 mm	0,02 mm	0,02 mm	0,01 mm	≤ 1,5	150/140

No. with "B": Flat back plate



Functions	Series 543
ORIGIN (ABS-Zero)	●
Digimatic data output	●
Counting direction switchable	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Capacitance type, absolute linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Counting value composition error
Power supply	Solar cell usable from 40 Lux illumination
Display	LCD character height 9 mm

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21EZA198	Spindle Lifting Lever, for 12,7mm Range
540774	Spindle Lifting Cable, 500mm
21EZA105	Spindle Lifting Knob, for 12,5mm, Metric

For USB Input Tool Direct cable: a footswitch (no. 937179T), a USB- footswitch adapter (no. 06ADV384) and USB-ITPAK Software (no. 06AEN846) are required.

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

### Illuminance

2000 Lux	engraving invisible mending
1500 Lux	clockmaker electronic workshop
750-1000 Lux	technical drawing precision mechanic work
500 Lux	bureau
200-300 Lux	working with manufacturing machines
150 Lux	passages with vehicles loading zone
100 Lux	lunch room, passages
50 Lux	warehouse storage room



# ABSOLUTE Digimatic Indicator ID-S

## Series 543

This is a standard model of indicator that is reliable and easy to use. The ABSOLUTE Digimatic Indicator ID-S offers you the following benefits:

- The ABSOLUTE sensor means you don't have to carry out origin setting every time you power it on, saving you time and hassle.
- You can access all functions by using the large, user-friendly buttons on the front of the indicator.
- Large character height of 9 mm provides good readability.
- Exceptional battery life.

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IP42

IP53



Functions	Series 543
ORIGIN (ABS-Zero)	
Digimatic data output	
ON/OFF	
Counting direction switchable	

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Capacitance type, ABSOLUTE linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, counting value composition error
Power supply	1 battery SR-44
Battery life	approx. 18000 hours (0.001 mm type) approx. 20000 hours (0.01 mm type)
Display	LCD, character height 9 mm

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21EZA198	Spindle Lifting Lever, for 12,7mm Range
540774	Spindle Lifting Cable, 500mm
21EZA105	Spindle Lifting Knob, for 12,5mm, Metric
238774	Silicon rubber boot for ID-C, ID-N, ID-S

For USB Input Tool Direct cable: a footswitch (no. 937179T), a USB- footswitch adapter (no. 06ADV384) and USB-ITPAK Software (no. 06ADV386) are required. 238774 only for 543-794B

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
938882	Battery SR44 1.5V
02ACA376	NBR Rubber Boot, for ID-C, ID-N, ID-S

02ACA376 only for 543-794B



21EZA198



540774



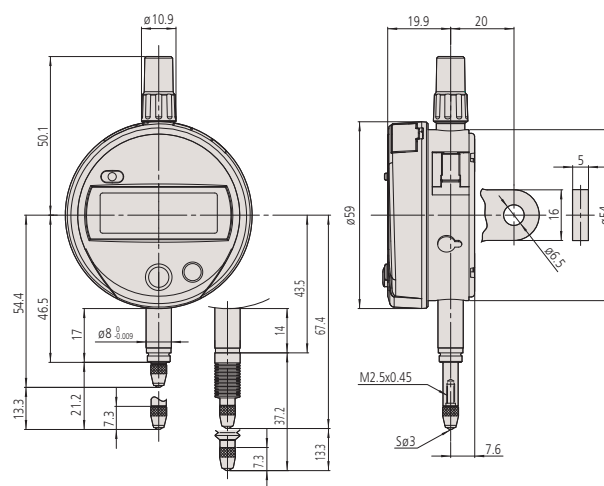
21EZA105



### Metric

No.	No. Lug back plate	Range	Digital step	Max. permissible error of indication	Hysteresis	Repeatability	Measuring force [N]	Remarks	Mass Lug/flat [g]
543-781B	543-781	12,7 mm	0,01 mm	0,02 mm	0,02 mm	0,01 mm	≤ 1,5	IP42	140/150
543-790B	543-790	12,7 mm	0,001 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,5	IP42	140/150
543-794B	543-794	12,7 mm	0,001 mm	0,003 mm	0,002 mm	0,002 mm	≤ 2,5	IP53	140/150

No. with "B": Flat back plate





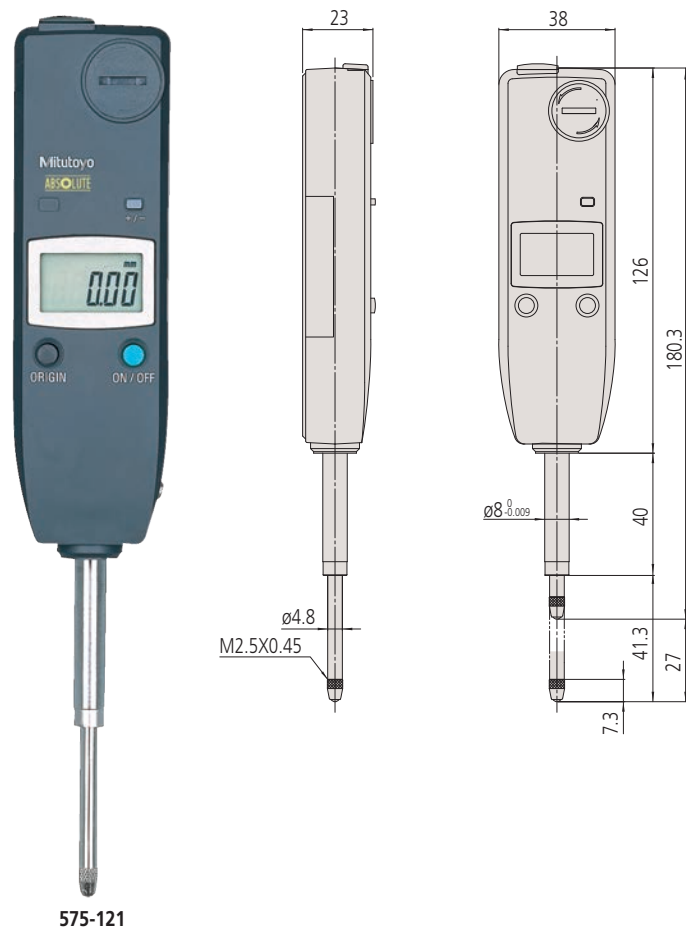
# ABSOLUTE Digimatic Indicator ID-U

## Series 575

This is a slim type of digital indicator with a 25 mm range.

The ABSOLUTE Digimatic Indicator ID-U offers you the following benefits:

- The ABSOLUTE sensor means you don't have to carry out origin setting every time you power it on, saving you time and hassle.
- Its compact design makes it ideal for installing into measuring fixtures.
- Exceptional battery life.



### Metric

No.	Range	Max. permissible error of indication	Measuring force [N]	Mass [g]
575-121	25,4 mm	0,02 mm	≤ 1,8	140



Functions	Series 575
ORIGIN (ABS-Zero)	●
Digimatic data output	●
ON/OFF	●
Counting direction switchable	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,01 mm
Scale	Capacitance type, ABSOLUTE linear encoder
Stem Ø	8 mm
Max. response speed	Unlimited
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, counting value composition error
Power supply	1 battery SR-44
Battery life	approx. 20000 hours
Display	LCD, character height 8,5 mm

### Standard accessories

No.	Description
137693	Spindle Lifting Handle

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
540774	Spindle Lifting Cable, 500mm

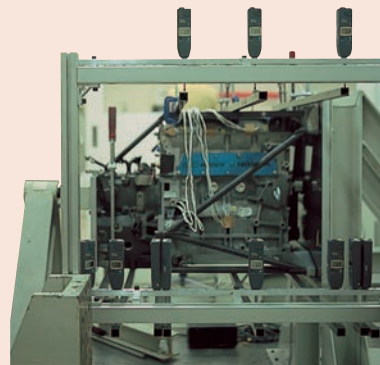
540774: moving measuring range max. 12mm

For USB Input Tool Direct cable:

a footswitch (no. 937179T), a USB- footswitch adapter (no. 06ADV384) and USB-ITPAK Software (no. 06ADV386) are required.

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



# ABSOLUTE Digimatic Indicator ID-C

## Series 543

This is a multifunction indicator that is reliable and easy to use.

The ABSOLUTE Digimatic Indicator ID-C offers you the following benefits:

- The ABSOLUTE sensor means you don't have to carry out origin setting every time you power it on, saving you time and hassle.
- GO/±NG judgement is performed by setting the upper and lower tolerances.
- You can make simple calculations by a user-definable factor using the formula  $Ax$  ( $x$  is spindle displacement).
- Large character height of 11mm provides good readability.
- Display 330° rotatable.
- A function lock protects the display against unauthorised use.



Calculation :  $f(x) = Ax$

Mounting the ID-C on a measuring fixture and setting the multiplying factor "A" (between 0,0001 and 99,9999) allows direct measurement without using a conversion table and improves measurement efficiency



330° rotary display

The display can be rotated 330°, allowing use at a position where you can easily read the measurement value



Function locking

Ensures reliability of measurement by locking the settings to prevent preset function settings from being changed by mistake



Large LCD

The large LCD incorporates 11 mm characters making measurement values much easier to read



Tolerance function

2 kinds of tolerance visualisation



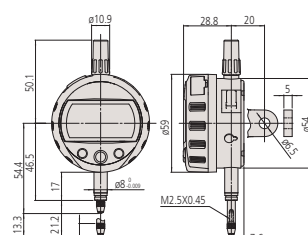
12,7 mm range model



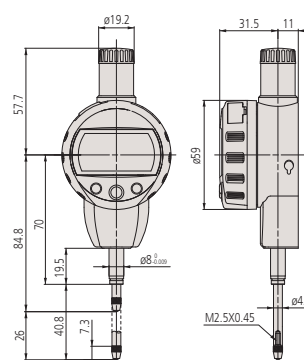
25,4 mm range model



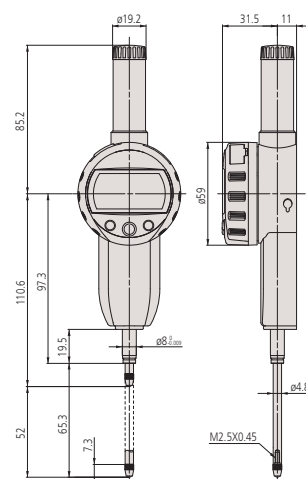
50,8 mm range model



12,7 mm range models



25,4 mm range models



50,8 mm range models

# ABSOLUTE Digimatic Indicator ID-C

## Series 543

### Metric

No.	No. Lug back plate	Range	Digital step	Max. permissible error of indication	Hysteresis	Repeatability	Measuring force [N]	Remarks	Mass [g]
543-390B	543-390	12,7	0,001 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,5		170
543-394B	543-394	12,7	0,001 mm	0,003 mm	0,002 mm	0,002 mm	0,4 - 0,7	Low force	170
543-400B	543-400	12,7	0,01 mm	0,02 mm	0,02 mm	0,01 mm	≤ 0,9		170
543-404B	543-404	12,7	0,01 mm	0,02 mm	0,02 mm	0,01 mm	0,2 - 0,5	Low force	170
543-470B		25,4	0,001 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,8		190
543-474B		25,4	0,01 mm	0,02 mm	0,02 mm	0,01 mm	≤ 1,8		190
543-490B		50,8	0,001 mm	0,005 mm	0,002 mm	0,002 mm	≤ 2,3		260
543-494B		50,8	0,01 mm	0,04 mm	0,02 mm	0,01 mm	≤ 2,3		260

No. with "B": Flat back plate

Specification low measuring force models : see below



Spindle lifting handle



Spindle lifting lever



Spindle lifting lever



Spindle lift knob



Spindle lifting cable 500 mm



Spindle lifting cable 300 mm

## Setting measuring force on low measuring force models

### •543-404/404B

Spindle orientation	Spring	Weight (approximately 0.1N)	Maximum measuring force
Pointing vertically downward	Yes	Yes	0.5N
	Yes	No	0.4N
	No	Yes	0.3N
	No	No	0.2N
Horizontal	Yes	No	0.2N

### •543-394/394B

Spindle orientation	Spring	Weight (approximately 0.1N)	Maximum measuring force
Pointing vertically downward	Yes	Yes	0.7N
	Yes	No	0.6N
	No	Yes	0.4N
	No	No	Not defined
Horizontal	Not defined		

Functions	Series 543
ZERO/ABS	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
Lock function	●
PRESET	●
Calculation function	●
Counting direction switchable	●
Selectable resolution*	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Capacitance type, ABSOLUTE linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, counting value composition error, overflow error, tolerance limit setting error
Power supply	1 battery SR-44
Battery life	approx. 7000 hours
Display	LCD character height 11 mm Rotatable 330°

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21EZA198	Spindle Lifting Lever, for 12,7mm Range
540774	Spindle Lifting Cable, 500mm
901975	Spindle Lifting Cable Auto-Stop, 300mm
21EZA105	Spindle Lifting Knob, for 12,5mm, Metric
21EZA197	Spindle Lifting Knob, for 25,4mm Range
21EZA200	Spindle Lifting Knob, for 50,8mm Range
137693	Spindle Lifting Handle
02ACA571	Auxiliary Spindle Spring, for 25,4mm Range
02ACA773	Auxiliary Spindle Spring, for 50mm Range

02ACA571 and 02ACA773 : required when orienting the indicator upside down

21EZA105 : not available for low measuring force models

540774 : moving measuring range max. 28 mm

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

\*0,001 mm type

# ABSOLUTE Digimatic Indicator Max/Min/RANGE ID-C

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Functions	Series 543
PRESET (x3)	●
ZERO/ABS	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
Analogue measuring range switchable	●
MAX/MIN/RANGE	●
Lock function	●
Fast measurement mode	●
Calculation function	●
Counting direction switchable	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Measuring force	≤ 1,5 N
Scale	Capacitance ABSOLUTE linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Measurement frequency	Standard mode: 10 times/s "Fast" mode: 50 times/s*
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, ABS composition error, overflow error, tolerance limit setting error
Power supply	1 battery CR-2032
Battery life	Standard mode: approx. 1 year "Fast" mode: approx. 4.5 month
Display	LCD, character height: 8 mm Rotatable 330°

## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21EZA198	Spindle Lifting Lever, for 12,7mm Range
540774	Spindle Lifting Cable, 500mm
21EZA313	USB Interface for PC Setup, ID-C Indicator

## Consumable spares

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



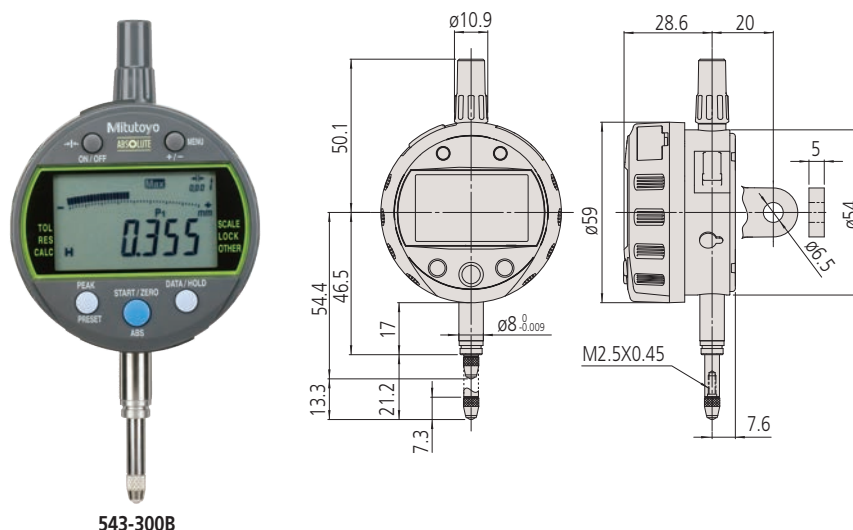
Scan QR Code with your mobile device and watch our product videos on YouTube

\*if the plunger speed is > 50 µm/s the peak value may not be displayed correctly

## Series 543

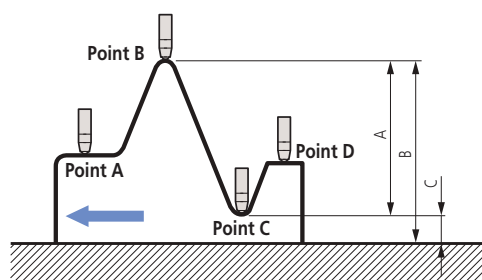
This indicator is the MAX/MIN/RANGE value holding function model. It offers the following benefits:

- The MAX/MIN/RANGE (run-out value) can be measured
- A fast measurement frequency mode (detection cycle 20 ms or 50 times/s) is selectable to measure in the peak detection mode (MAX/MIN/RANGE) more reliably
- Easy indicator setup via a setup menu
- Analogue bar graph in the display (12 different scales switchable)
- GO/±NG tolerance judgement function
- This indicator enables the use of a calculation function for the measured value Ax
- Coefficient A is freely definable and x = displacement of the plunger
- A USB interface box can be used to set up the indicator from PC via dedicated software



## Metric

No.	No. Lug back plate	Range	Digital step	Max. permissible error of indication	Hysteresis	Repeatability	Mass [g]
543-300B	543-300	12,7 mm	0,001 mm	0,003 mm	0,002 mm	0,002 mm	170



## Difference/Runout measurement

Example : Indicator travel from points A to D : Difference (or Total Runout) is displayed as A. Dimensions B (maximum value) and C (minimum value) can be measured with a simple key sequence.



543-300B  
7001-10

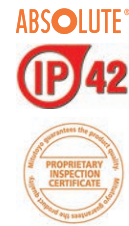


# ABSOLUTE Digimatic Indicator Calculator ID-C

## Series 543

This indicator allows you to use a calculation function for the measured value  $Ax+B+Cx^{-1}$

- The integrated calculation formula is useful in a variety of applications (e.g. roll diameter measurement)
- Coefficients A,B and C are freely definable. X = displacement of the plunger
- Analogue bar graph in the display (14 different scales switchable)
- GO/±NG tolerance judgement function
- MAX/MIN/RANGE function to measure peak values
- A fast measurement frequency mode(detection cycle 20 ms or 50 times/s) is selectable to measure in the peak detection mode (MAX/MIN/RANGE) more reliably
- Easy indicator setup via a setup menu
- A USB interface box can be used to set up the indicator from PC via dedicated software



543-340B



543-590B



543-595B

### Metric

No.	Range	Max. permissible error of indication	Hysteresis	Repeatability	Measuring force [N]	Mass [g]
543-340B	12,7 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,5	170
543-590B	25,5 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,8	190
543-595B	50,8 mm	0,006 mm	0,002 mm	0,002 mm	≤ 2,3	260

No.	R [μm]
21FAJ394	25 - 70 mm
K541281	50 - 100 mm
K541282	100 - 200 mm
21FAJ395	outside : 45-140 mm / inside : 65-100 mm

The accuracy of a radial measurement using the measuring bridges depends on the size of the radius to be measured and the form error of the workpiece.

Functions	Series 543
PRESET (x3)	●
ZERO/ABS	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
Analogue measuring range switchable	●
MAX/MIN/RANGE	●
Lock function	●
Selectable resolution	●
Fast measurement mode	●
Calculation function	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,0002/ 0,0005/ 0,001/ 0,002/ 0,005/ 0,01/ 0,02/ 0,05/ 0,1/ 0,2/ 0,5/ 1 mm or non-unit (scale resolution is 0,001 mm)
Scale	Capacitance type, ABSOLUTE linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Measurement frequency	Standard mode: 10 times/s "Fast" mode: 50 times/s
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, ABS composition error, overflow error, tolerance limit setting error
Power supply	1 battery CR-2032
Battery life	Standard mode: approx. 1 year "Fast" mode: approx. 4.5 month
Display	LCD, character height 8 mm Rotatable 330°

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21EZA198	Spindle Lifting Lever, for 12,7mm Range
540774	Spindle Lifting Cable, 500mm
21EZA313	USB Interface for PC Setup, ID-C Indicator
21FAJ394	Angle Plate for Calc. ID-C, Radius: 25-70mm
K541281	Angle Plate for Calc. ID-C, Radius: 50-100mm
K541282	Angle Plate for Calc. ID-C, Radius: 100-200mm
21FAJ395	Roll Type Base, Outside: 45-140mm, Inside:65-100mm

### Consumable spares

No.	Description
055AA217D	Lithium battery CR-2032, 1 pcs.
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



# ABSOLUTE Digimatic Indicator Calculator ID-C



21FAJ394



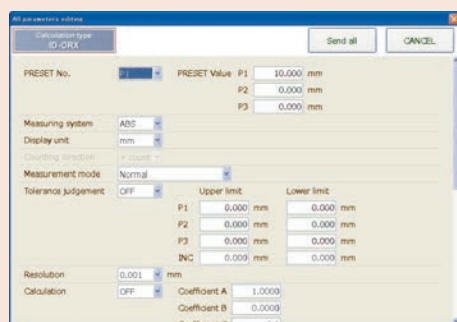
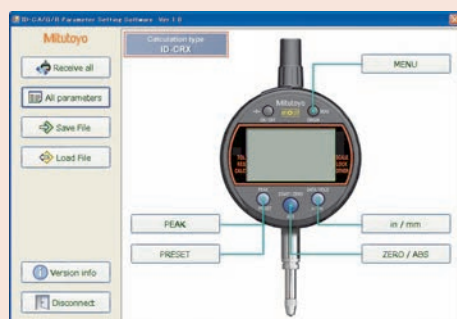
K541281



K541282



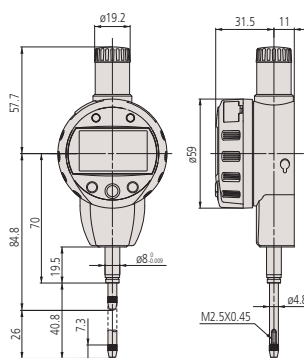
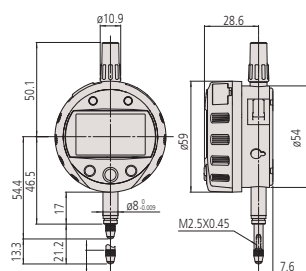
21FAJ395



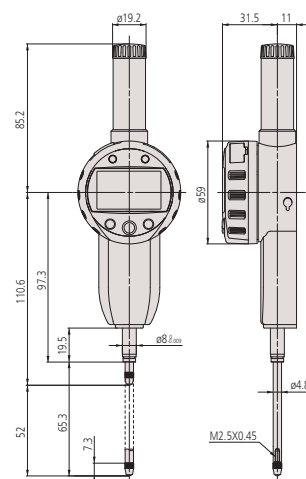
Setup software available for download at [www.mitutoyo.eu](http://www.mitutoyo.eu) (Registration is required)  
(optional USB Interface 21EZA313 is necessary)



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25,4 mm range models



50,8 mm range models



K541282



Custom-made solution



Custom-made solution



21FAJ395 (similar)



21FAJ395 (similar)

# ABSOLUTE Digimatic Indicator Bore Gauge ID-C

## Series 543

This indicator is designed for inside diameter measurement applications on bore gauges

It offers the following benefits:

- Minimum value holding function that allows you to easily detect a hole diameter
- Analogue bar graph in the display (12 different scales switchable)
- The analogue bar graph enhances usability by adding a dial gauge "feel" to digital measurement
- GO/±NG tolerance judgement function
- A fast measurement frequency mode (detection cycle 20ms or 50times/s) is selectable to measure in the peak detection mode more reliably
- Easy indicator setup via a setup menu
- A USB interface box can be used to set up the indicator from PC via dedicated software

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IP42



Functions	Series 543
PRESET (x3)	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
Analogue measuring range switchable	●
MIN Value Hold	●
Lock function	●
Fast measurement mode	●

### Specifications

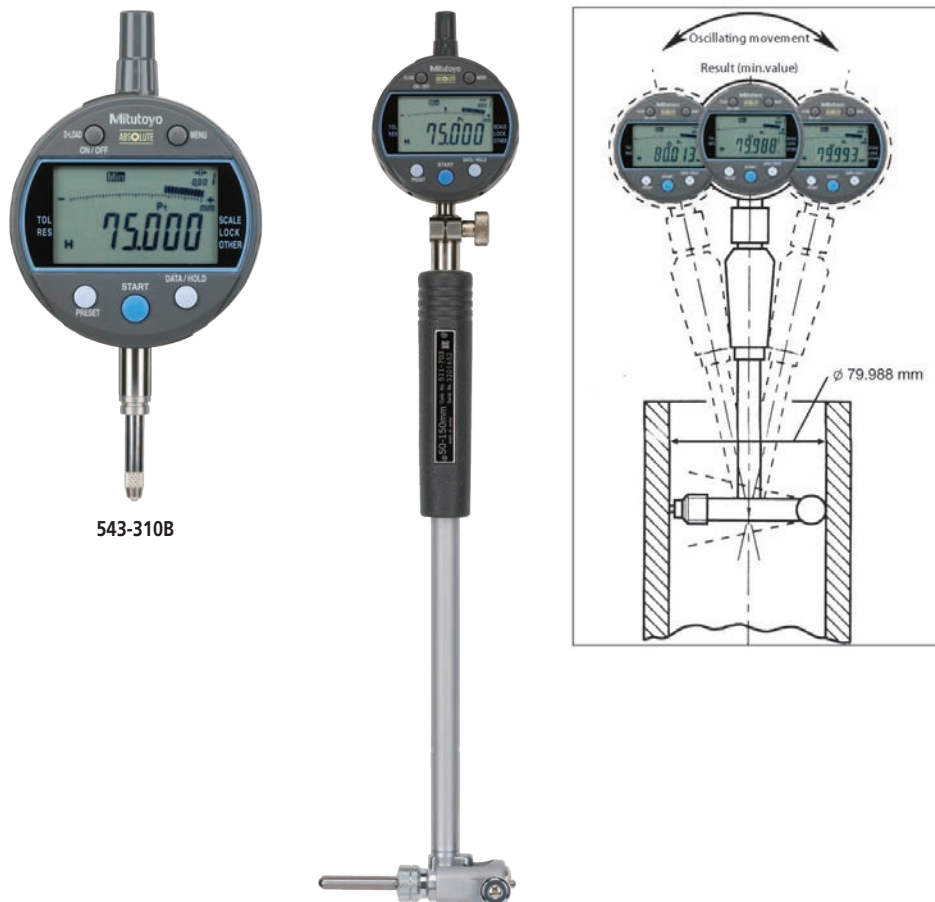
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Measurement frequency	Standard mode: 10 times/s "Fast" mode: 50 times/s*
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, composition error, overflow error, tolerance limit setting error
Scale	Capacitance ABSOLUTE linear encoder
Power supply	1 Battery CR-2032
Stem Ø	8 mm
Battery life	Standard mode: approx. 1 year "Fast" mode: approx. 4.5 month
Display	LCD character height: 8 mm Rotatable 330°

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
21EZA313	USB Interface for PC Setup, ID-C Indicator

### Consumable spares

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



543-310B

### Metric

No.	Range	Digital step	Max. permissible error of indication	Hysteresis	Repeatability	Measuring force [N]	Mass [g]
543-310B	12,7 mm	0,001/0,01 mm	0,003 mm	0,002 mm	0,002 mm	≤ 1,5	170



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\* if the detecting speed is > 50 µm/s the peak value may not be displayed correctly.

# ABSOLUTE Digimatic Indicator Signal ID-C



Functions	Series 543
Signal output: (+NG, OK, -NG)	●
Signal input: No-voltage input, (PRESET_RECALL/ZERO, HOLD_RESET)	●
PRESET (x3)	●
ZERO/ABS	●
GO/±NG judgement	●
ON/OFF	●
Analogue measuring range switchable	●
GO/±NG judgement via LED	●
Function lock	●
Calculation function	●
GO/±NG judgement on LCD	●
Counting direction switchable	●
MAX/MIN/RANGE	●

## Specifications

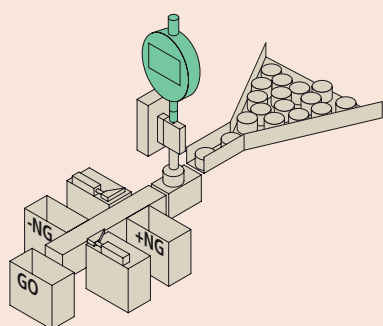
Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Capacitance type, ABSOLUTE linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Measurement frequency	100 times/s (If the plunger speed >0,1 mm/s the peak value could not be displayed correctly.)
Contact point	Carbide ball, thread M 2,4 x 0,45 mm
Alarm	Counting value composition error, overflow error, tolerance limit setting error
Power supply	DC 5 - 24 V
Display	LCD, character height 8 mm
Delivered	With signal cable 4 m. One end is fixed to the main unit. no connector is supplied for the other end.

## Optional accessories

No.	Description
21EZA198	Spindle Lifting Lever, for 12,7mm Range
540774	Spindle Lifting Cable, 500mm
21EZA105	Spindle Lifting Knob, for 12,5mm, Metric
238774	Silicon rubber boot for ID-C, ID-N, ID-S

## Consumable spares

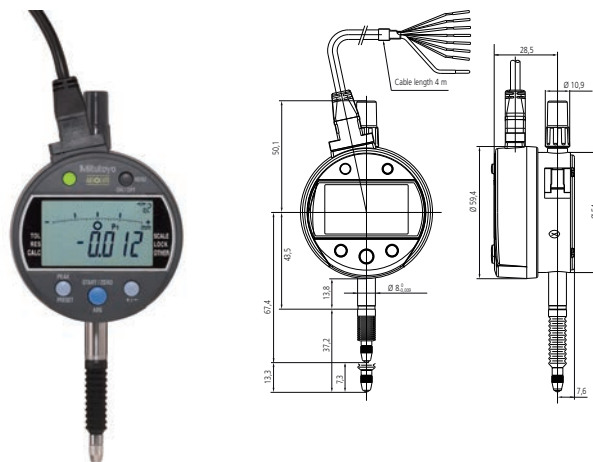
No.	Description
02ACA376	NBR Rubber Boot, for ID-C, ID-N, ID-S
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



## Series 543

This is an externally-powered Digimatic Indicator with a N-ch open drain -NG, OK, +NG output.

- Dust-protected and protected against splashing water, complying with IEC 60529 (equivalent to IP54)
- Measures MAX/MIN/RANGE (run-out value).
- Saves three different Preset and Tolerance settings.
- Fast measurement frequency mode (detection cycle 50 times/s) for reliable measurement in the peak detection mode (MAX/MIN/RANGE)
- Calculation function Ax. Coefficient A freely definable, x = displacement of the plunger
- Analogue bar graph in the display (12 different scales switchable)
- GO/±NG tolerance judgment function



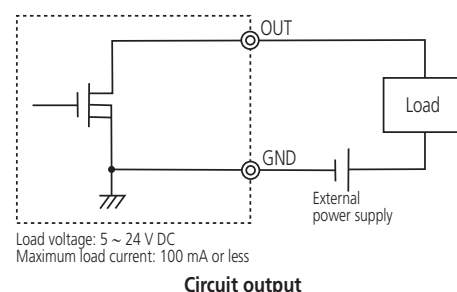
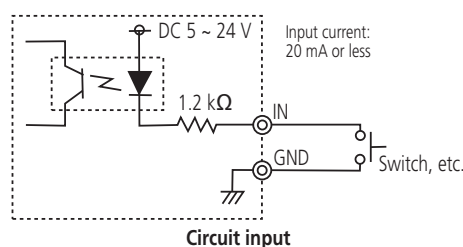
543-350B

## Metric

No.	No. Lug back plate	Range	Digital step	Max. permissible error of indication	Hysteresis	Repeatability	Measuring force	Mass [g]
543-350B	543-350	12,7 mm	0,001 mm	0,003 mm	0,002 mm	0,002 mm	≤2.5N	285

Logic of output signal	Signal name	Tolerance judgment results			Sensor signal synthesizing error Overflow error of display value
		-NG	OK	+NG	
Negative logic	-NG (Orange)	Low	High	High	High
	OK (Green)	High	Low	High	High
	+NG (Brown)	High	High	Low	High
Positive logic	-NG (Orange)	High	Low	Low	Low
	OK (Green)	Low	High	Low	Low
	+NG (Brown)	Low	Low	High	Low

## Normal mode, Maximum value detection mode, Minimum value detection mode



# ABSOLUTE Digimatic Indicator ID-N

## Series 543

This is a slim back-plunger model that is highly resilient and robust. The ABSOLUTE Digimatic Indicator ID-N offers you the following benefits:

- It slim body design is ideal for multi-point measurements.
- The ABSOLUTE sensor means you don't have to carry out origin setting every time you power it on, saving you time and hassle.
- It has excellent resistance against water and dust (IP66 protection level) allowing you to use it in machining situations that include splashing coolant fluid.
- Switchable display orientation gives you more mounting options.
- You can perform GO/±NG judgement by setting the upper and lower tolerances.



543-575

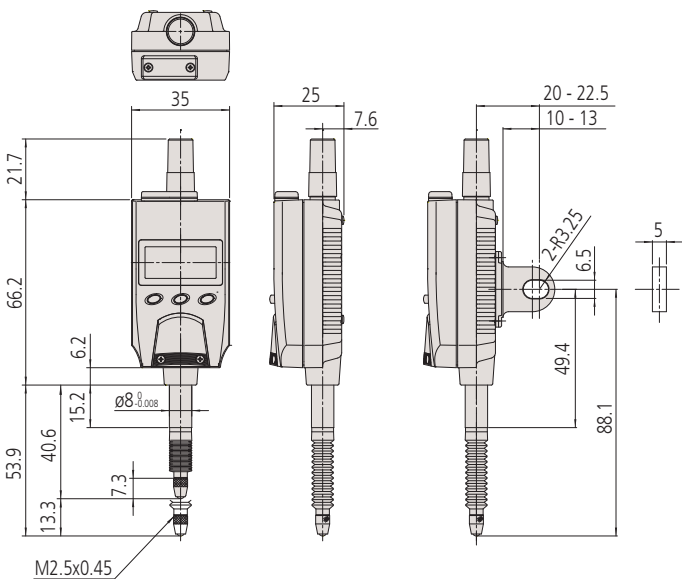
Flexible installation options switchable display orientation (overhead use)



Width of 35 mm instead of 60 as standard Digimatic indicators

### Metric

No.	Range	Digital step	Max. permissible error of indication	Measuring force [N]	Mass [g]
543-570	12,7 mm	0,01 mm	0,02 mm	≤ 2,5	130
543-575	12,7 mm	0,001 mm	0,003 mm	≤ 2,5	130



Functions	Series 543
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
External PRESET/ZERO	●
PRESET	●
Counting direction switchable	●
Selectable resolution*	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Capacitance type, ABSOLUTE linear encoder
Max. response speed	Unlimited
Stem Ø	8 mm
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Low voltage, counting value composition error, overflow error, tolerance limit setting error
Power supply	1 battery SR-44
Battery life	approx. 7000 hours
Display	LCD, character height: 6,2 mm

### Optional accessories

No.	Description
21EAA194	Digimatic Cable for ID-N/ ID-B 1m
21EAA190	Digimatic Cable for ID-N/ ID-B 2m
06AFM380G	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight IP Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790G	U-WAVE-T Connection Cable G, Flat Straight IP Type
21EAA210	Digital Cable for External Preset Series, Zero, 1 m
21EAA211	Digital Cable for External Preset Series, Zero, 2 m
238774	Silicon rubber boot for ID-C, ID-N, ID-S
21EZA145	Back Plate with Centre Lug, for ID-N/ID-B Indicator, Metric
21EZA105	Spindle Lifting Knob, for 12,5mm, Metric

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
02ACA376	NBR Rubber Boot, for ID-C, ID-N, ID-S



21EAA194



194EAA210

\* 0,001 mm type



# ABSOLUTE Digimatic Indicator ID-B



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Functions	Series 543
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
External PRESET/ZERO	●
PRESET	●
Counting direction switchable	●
Selectable resolution*	●

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Scale	Capacitance type, ABSOLUTE linear encoder
Stem Ø	8 mm
Max. response speed	Unlimited
Alarm	Low voltage, counting value composition error, overflow error, tolerance limit setting error
Power supply	1 battery SR-44
Battery life	approx. 7000 hours
Display	LCD, character height: 6,2 mm

## Optional accessories

No.	Description
21EAA194	Digimatic Cable for ID-N/ ID-B 1m
21EAA190	Digimatic Cable for ID-N/ ID-B 2m
06AFM380G	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight IP Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790G	U-WAVE-T Connection Cable G, Flat Straight IP Type
21EAA210	Digital Cable for External Preset Series, Zero, 1 m
21EAA211	Digital Cable for External Preset Series, Zero, 2 m
21EAA212	Silicon Rubber Boot, for ID-B, Series 1/2
21EZA145	Back Plate with Centre Lug, for ID-N/ID-B Indicator, Metric

## Consumable spares

No.	Description
938882	Battery SR44 1.5V
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
125317	NBR Rubber Boot, for ID-B, IP64 Series 2



21EAA194



21EAA210

\*0,001 mm type

## Series 543

This is a slim back-plunger model that is highly resilient and robust. The ABSOLUTE Digimatic Indicator ID-B offers you the following features:

- It is a back plunger type, with the display viewed from above.
- Its slim body design is ideal for multi-point measurements.
- The ABSOLUTE sensor means you don't have to carry out origin setting every time you power it on, saving you time and hassle.
- It has excellent resistance against water and dust (IP66 protection level) allowing you to use it in machining situations that include splashing coolant fluid.
- Switchable display orientation gives you more mounting options.
- You can perform GO/±NG judgement.



543-580



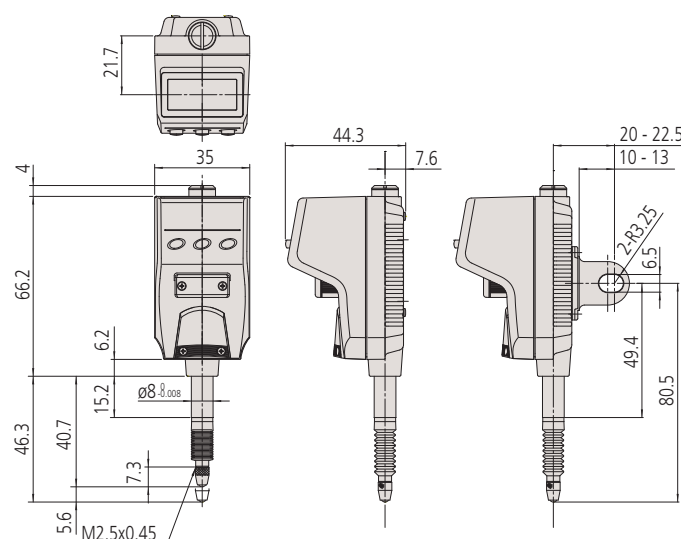
Flexible installation options with switchable display orientation (overhead use)



IP66

## Metric

No.	Range	Digital step	Max. permissible error of indication	Measuring force [N]	Mass [g]
543-580	5,08 mm	0,01 mm	0,02 mm	≤ 2	130
543-585	5,08 mm	0,001 mm	0,003 mm	≤ 2	130





# Digimatic Indicator ID-H

## Series 543

This is a superior multi-function indicator that gives you high accuracy and high resolution of 0,0005mm.

The Digimatic Indicator ID-H offers you the following benefits:

- 2-colour LCD backlight (green and red) provides you with visual GO/±NG tolerance judgement and analogue bar-graph display.
- You can display the maximum, minimum or range (runout value).
- Lifting mechanism over 30mm with cable release (optional).
- You can carry out zero-setting and presetting with the optional remote controller, without having to touch the indicator.
- The remote control system can be implemented in advance with the built-in RS-232 interface and a PC.
- External power supply via AC-Adapter.



543-561D

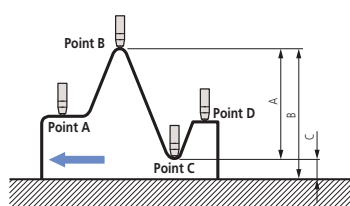
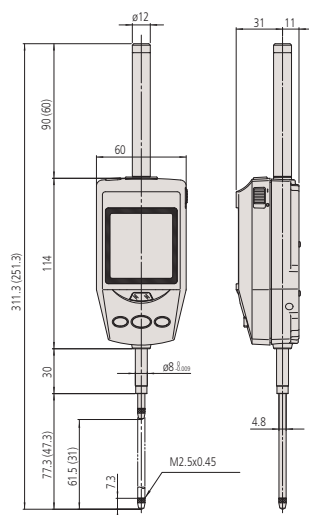
21EZA099:  
Data export  
Reset Max/Min/TIR  
Max/Min/TIR switchover  
Call PRESET value



The display switches from green to red backlight if the upper or lower tolerance limit is exceeded

### Metric

No.	Range	Max. permissible error of indication	Measuring force [N]	Mass [g]
543-561D	30,4 mm	0,0015 mm	≤ 2	290
543-563D	60,9 mm	0,0025 mm	≤ 2,5	305



### Difference/Runout measurement

Example : indicator travel from points A to D.

Difference (or Total Runout) is displayed as A. Dimensions B (maximum value) and C (minimum value) can be recalled from memory with a simple key sequence.



Functions	Series 543
ZERO	●
GO/±NG judgement	●
Digimatic data output	●
Digimatic data input	●
ON/OFF	●
DATA/HOLD	●
RS-232C Output*	●
Analogue measuring range switchable	●
Max/Min/Runout value	●
RS-232C Input*	●
Lock function	●
Selectable resolution	●
PRESET	●
Counting direction switchable	●

### Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm/0,0005 mm
Scale	Photoelectric linear encoder
Stem Ø	8 mm
Max. response speed	1000 mm/s
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Counting value composition error, overflow error, tolerance setting error
Power supply	AC adapter 6 V DC, 2A
Display	LCD, character height: 9,5 mm

### Standard accessories

No.	Description
06AEG180D	AC-Adapter, 6V 2A, CEE Type
137693	Spindle Lifting Handle

### Optional accessories

No.	Description
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type
21EAA130	Cable RS-232C for ID-H Indicator 1m
21EAA131	Cable RS-232C for ID-H Indicator 2m
21EZA099	Remote Controller, for ID-H Indicator
540774	Spindle Lifting Cable, 500mm
21EZA101	Spindle Lifting Knob, for ID-H Indicator

540774 : moving measuring range max. 30 mm

### Consumable spares













No.	Description
011511-1	Battery LR03 (AAA), 4x
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

### \* RS-232 Input/Output

Connect this instrument with an external device such as a PC using the RS-232 dedicated cable (optional accessory). With this connection it is possible to perform initial setup of the instrument, control of switching a measurement mode, etc., and processing such as measurement data transfer.



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Functions	Series 543
ZERO/ABS	
GO/±NG judgement	
Digimatic data output	
Digimatic data input	
ON/OFF	
Analogue measuring range switchable	
Max/Min/Runout value	
Lock function	
Function lock	
Selectable resolution	
PRESET	
Counting direction switchable	

## Specifications

Accuracy	Refer to the list of specifications (excluding quantizing error)
Digital step	0,001 mm/0,01 mm
Scale	Capacitance type, ABSOLUTE linear encoder
Stem Ø	8 mm
Max. response speed	Unlimited
Contact point	Carbide ball, thread M 2,5 x 0,45 mm
Alarm	Counting value composition error, overflow error, tolerance limit setting error
Power supply	AC adapter 9V DC, 500mA
Display	LCD character height 8,5 mm

### Standard accessories

No.	Description
06AEG302D	AC-Adapter, 9V 500mA, CEE Type
137693	Spindle Lifting Handle

### Optional accessories

No.	Description
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790D	U-WAVE-T Connection Cable D, Flat 10- Pin Type
540774	Spindle Lifting Cable, 500mm
02ACA571	Auxiliary Spindle Spring, for 25,4mm Range
02ACA773	Auxiliary Spindle Spring, for 50mm Range

540774 : moving measuring range max.12mm

02ACA571 and 02ACA773 : required when orienting the indicator upside down

For USB Input Tool Direct cable:

a footswitch (no. 937179T), a footswitch adapter (no. 06ADV384) and USB-ITPAK Software (no. 06AEN846) are required.

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

## Series 543

This is a superior multifunction indicator.

The ABSOLUTE Digimatic Indicator ID-F offers you the following benefits:

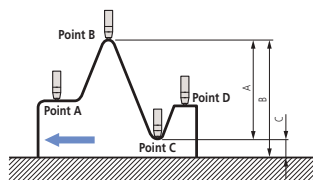
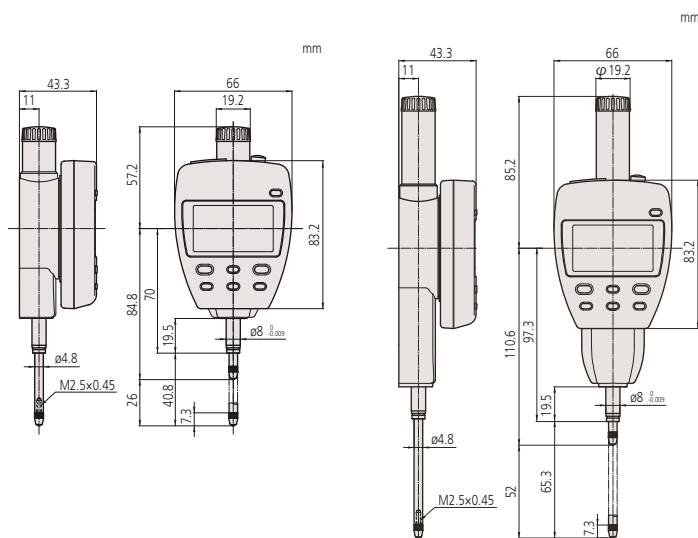
- 2-colour LCD backlight (green and red) provides you with visual GO/±NG tolerance judgement and analogue bar-graph display.
- You can display the maximum, minimum or range (runout value) during measurement.
- External power supply via AC-Adapter.



### Visual tolerance-monitoring

## Metric

No.	Range	Max. permissible error of indication	Measuring force [N]	Mass [g]
543-551D	25,4 mm	0,003 mm	≤ 1,8	240
543-557D	50,8 mm	0,003 mm	≤ 2,3	330
543-553D	50,8 mm	0,006 mm	≤ 2,3	330



### Difference/Runout measurement

**Example :** indicator travel from points A to D.

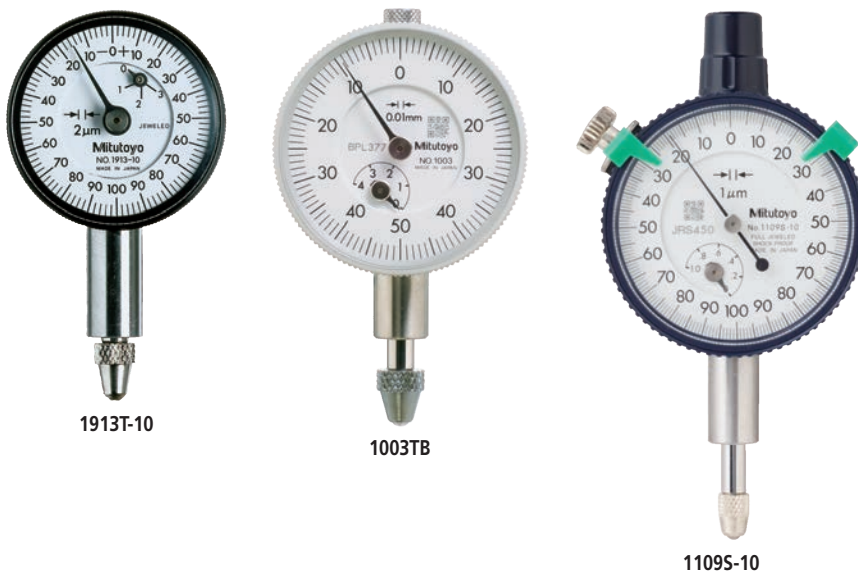
Difference (or Total Runout) is displayed as A. Dimensions B (maximum value) and C (minimum value) can be measured with a simple key sequence.

# Dial Indicator Series 1

## Series 1

This is a compact, metric dial indicator. It offers you the following benefits:

- It is ideal for use in applications where space is limited.
- Balanced dial



1913T-10

1003TB

1109S-10

## Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
1913TB-10	1913T-10	0,5	0,2 mm	0,002 mm	0-100-0	0,3 - 1,8
1109SB-10	1109S-10	1	0,2 mm	0,001 mm	0-100-0	0,4 - 1,5
1013SB-10	1013S-10	1	0,2 mm	0,002 mm	0-100-0	0,4 - 1,5
1911TB-10	1911T-10	2,5	1 mm	0,01 mm	0-50-0	0,3 - 1,8
1124SB	1124S	3,5	0,5 mm	0,005 mm	0-50 (50-0)	0,4 - 1,4
1003TB	1003T	4	1 mm	0,01 mm	0-50-0	0,3 - 1,4

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]
1913TB-10	50/46	15,5	39,4	31	12,5	19,4	15,2	8,9	30	6
1109SB-10	95/75	32,5	49	40	14,5	20	13,8	15,2	38	6,6
1013SB-10	95/75	32,5	49	40	14,5	20	13,8	15,2	38	6,6
1911TB-10	50/46	15,5	42	31	12,5	19,4	15,1	11,5	30	6
1124SB	90/70	32,5	46	40	14,5	20	13,8	12,2	38	6,6
1003TB	51/48	18	40,3	36	13	15	9,5	12,8	32	6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution μm	Any 1/2 revolution μm	Any 1 revolution μm	Range μm		
1913TB-10	2,5	4,5	5	6	1	2,5
1109SB-10	2,5	4	4,5	5	1	2
1013SB-10	2,5	4	4,5	6	1	2
1911TB-10	6,5	10	11	13	3	3,5
1124SB	5	8	9	12	3	3
1003TB	6	9	10	14	3	3,5

## Series 1

	1003TB	1911TB-10	1913TB-10	1013SB-10	1109SB-10	1124SB
<b>Functions</b>						
Balanced dial	●	●	●	●	●	●
Continuous dial						●
Shockproof				●	●	
Jeweled bearing		●	●	●	●	

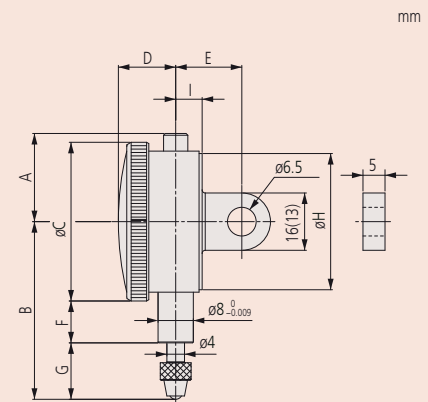
## Consumable spares

No.	Description
21AZA319	Contact Element Ball Point, 8,3mm Length, Metric
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

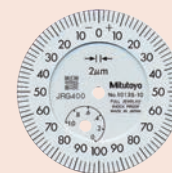
901312 : for 1109S-10 / 1013S-10 / 1124S

21AZA319 : for 1913T-10 / 1911T-10 / 1003T-10

For accessories and contact points, see end of dial indicators section



1911T-10



1013S-10



1124S

# Dial Indicator Series 1

## Series 1

This is a compact, metric dial indicator with 0,01 mm scale graduation, bezel Ø 40 mm and 5 mm range. It offers you the following benefits:

- It is ideal for use in applications where space is limited.
- Green limit markers are a standard accessory.



**IP63**  
10445(B)-60

	1040SB	1041SB	1044SB-60	1044SB-15	1041SB	1045SB
<b>Functions</b>						
Balanced dial						
Continuous dial						
Jeweled bearing						
IP63						
Double scale spacing						

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
136838	NBR Rubber Boot, IP63 Series 1
902119	Contact Element Ball Point, 8,3mm Length, Waterproof Type, Metric

136838 and 902119 : for 10445-60 (IP model)

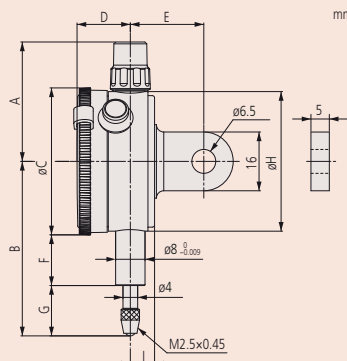
For accessories and contact points, see end of dial indicators section



10445-60  
IP63



10445-15



10445



10455



10405

### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
1040SB	10405	3,5	0,5 mm	0,01 mm	0-50 (50-0)	0,4 - 1,4
1041SB	10415	3,5	0,5 mm	0,01 mm	0-25-0	0,4 - 1,4
1044SB	10445	5	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
1044SB-15	10445-15	5	1 mm	0,01 mm	0-100 (100-0)	0,1 - 0,4
1044SB-60	10445-60	5	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2
1045SB	10455	5	1 mm	0,01 mm	0-50-0	0,4 - 1,4

1044SB-15: Low measuring force model. Use in vertical position only (contact point downward)

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]
1040SB	90/70	32,5	46	40	14,5	20	13,8	12,2	38	6,6
1041SB	90/70	32,5	46	40	14,5	20	13,8	12,2	38	6,6
1044SB	90/70	32,5	47,5	40	14,5	20	13,8	13,7	38	6,6
1044SB-15	90/70	32,5	47,5	40	14,5	20	13,8	13,7	38	6,6
1044SB-60	90/70	32,5	57	40	14,5	20	12,2	24,8	38	6,6
1045SB	90/70	32,5	47,5	40	14,5	20	13,8	13,7	38	6,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution	Any 1/2 revolution	Any 1 revolution	Range		
1040SB	5	8	9	12	3	3
1041SB	5	8	9	12	3	3
1044SB	5	9	10	12	3	3
1044SB-15	5	9	10	12	3	3
1044SB-60	5	9	10	12	3	3
1045SB	5	9	10	12	3	3



All products to be sold to commercial customers. Product illustrations are without obligation. Product descriptions, in particular any and all technical specifications, are only binding when explicitly agreed upon. For suggested retail prices, please refer to the separate price list.



## Dial Indicator Series 2

### Series 2

This is a standard, metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.



**IP64**  
2044S(B)-60

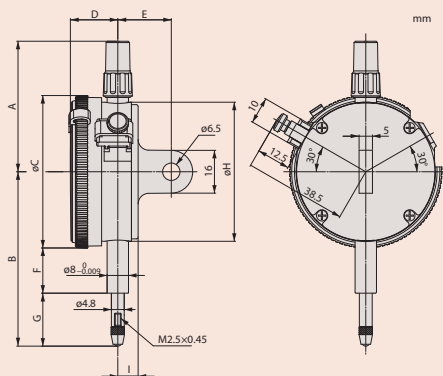
Series 2				
	2044SB	2044SB-60	2044SB-09	2045SB
<b>Functions</b>				
Balanced dial				
Continuous dial				
Shockproof				
IP64				

#### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
902119	Contact Element Ball Point, 8,3mm Length, Waterproof Type, Metric
125317	NBR Rubber Boot, for ID-B, IP64 Series 2

902119 and 125317 : for 2044S-60 (IP model)

For accessories and contact points, see end of dial indicators section



#### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
2044SB	2044S	5	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
2044SB-09	2044S-09	5	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
2044SB-60	2044S-60	5	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2,5
2045SB	2045S	5	1 mm	0,01 mm	0-50-0	0,4 - 1,4

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	G [mm]	I [mm]
2044SB	145/136	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6
2044SB-09	147/138	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6
2044SB-60	147/138	48,8	70	57	17,7	20	12,3	52	29,2	7,6
2045SB	145/136	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability μm	Hysteresis error μm
	Any 1/10 revolution μm	Any 1/2 revolution μm	Any 1 revolution μm	Range μm		
2044SB	5	9	10	12	3	3
2044SB-09	5	9	10	12	3	3
2044SB-60	5	9	10	12	3	3
2045SB	5	9	10	12	3	3

# Dial Indicator Series 2

## Series 2

This is a standard, metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.



**IP64**  
2046S(B)-60



## Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
2046SB	2046S	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
2046SB-09	2046S-09	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
2046SB-60	2046S-60	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2,5
2310SB-10	2310S-10	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
2902SB	2902S	10	1 mm	0,01 mm	100-0	0,4 - 1,4
2047SB	2047S	10	1 mm	0,01 mm	0-50-0	0,4 - 1,4

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	G [mm]	I [mm]
2046SB	144/135	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6
2046SB-09	146/137	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6
2046SB-60	146/137	48,8	70	57	17,7	20	12,3	52	29,2	7,6
2310SB-10	146/137	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6
2902SB	144/135	48,8	65,2	57	17,7	20	16,9	52	19,8	7,6
2047SB	144/135	48,8	65,2	57	17,7	20	16,9	52	19,5	7,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution µm	Any 1/2 revolution µm	Any 1 revolution µm	Range µm		
2046SB	5	9	10	13	3	3
2046SB-09	5	9	10	15	3	3
2046SB-60	5	9	10	13	3	3
2310SB-10	5	9	10	15	3	3
2902SB	5	9	10	13	3	3
2047SB	5	9	10	13	3	3

Series 2					
	2046SB	2046SB-60	2310SB-10	2046SB-09	2902SB
<b>Functions</b>					
Balanced dial					
Continuous dial					
Reverse reading					
Shockproof					
Jeweled bearing					
IP64					
Coaxial revolution counter					

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
902119	Contact Element Ball Point, 8,3mm Length, Waterproof Type, Metric
125317	NBR Rubber Boot, for ID-B, IP64 Series 2

902119 and 125317 : for 2046S-60 (IP model)

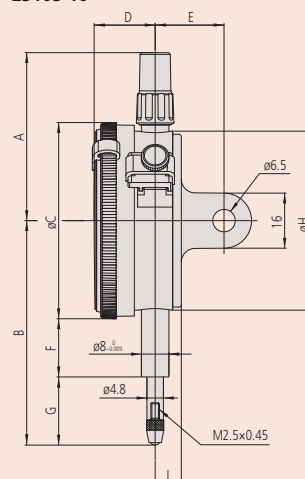
For accessories and contact points, see end of dial indicators section



2046S-60



2310S-10



## Dial Indicator Series 2

### Series 2

This is a standard, metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.



2109S-70  
2110S-70

Series 2				
	2109SB-10	2109SB-70	2110SB-10	2110SB-70
<b>Functions</b>				
Balanced dial	●	●		
Continuous dial			●	●
Shockproof	●	●	●	●
Jeweled bearing	●	●	●	●
IP64		●		●
Double scale spacing			●	●

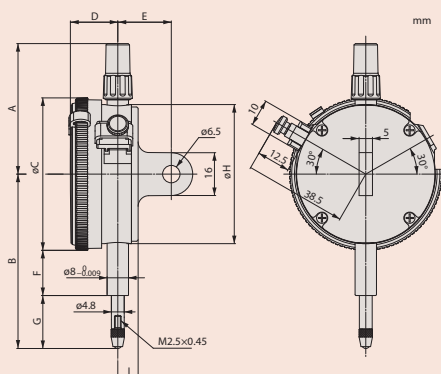
### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
21AZA320	Contact Element Ball Point, 12,1mm Length, Waterproof Type, Metric
902119	Contact Element Ball Point, 8,3mm Length, Waterproof Type, Metric
125317	NBR Rubber Boot, for ID-B, IP64 Series 2

902119 : for 2110S-70

21AZA320 and 136838 : for 2109S-70

For accessories and contact points, see end of dial indicators section.



2110S-10



2110S-70



2109S-10

### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
2110SB-10	2110S-10	1	0,1 mm	0,001 mm	0-100 (100-0)	0,9 - 1,5
2110SB-70	2110S-70	1	0,1 mm	0,001 mm	0-100 (100-0)	0,9 - 2
2109SB-10	2109S-10	1	0,2 mm	0,001 mm	0-100-0	0,9 - 1,5
2109SB-70	2109S-70	1	0,2 mm	0,001 mm	0-100-0	0,9 - 2

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	G [mm]	I [mm]
2110SB-10	149/140	48,8	66,5	57	17,7	20	16,9	52	21,2	7,6
2110SB-70	150/141	48,8	67,5	57	17,7	20	12,3	52	26,7	7,6
2109SB-10	148/139	48,8	60,5	57	17,7	20	16,9	52	15,1	7,6
2109SB-70	149/140	48,8	65,5	57	17,7	20	12,3	52	24,5	7,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability μm	Hysteresis error μm
	Any 1/10 revolution μm	Any 1/2 revolution μm	Any 1 revolution μm	Range μm		
2110SB-10	2,5	4	4,5	5	1	2
2110SB-70	2,5	4	4,5	5	1	2
2109SB-10	2,5	4	4,5	5	1	2
2109SB-70	2,5	4	4,5	5	1	2

# Dial Indicator Series 2

## Series 2

This is a standard, metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.



2113S-10



2118S-10



2119S-10

### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
2113SB-10	2113S-10	2	0,2 mm	0,001 mm	0-100-0	0,4 - 1,5
2118SB-10	2118S-10	5	0,2 mm	0,001 mm	0-100-100	0,4 - 1,5
2119SB-10	2119S-10	5	0,2 mm	0,001 mm	0-100-0	0,4 - 1,5
2124SB-10	2124S-10	5	0,5 mm	0,005 mm	0-50 (50-0)	0,4 - 1,5

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	G [mm]	I [mm]	Mass [g]
2113SB-10	148/139	48,8	61	57	17,7	20	16,9	52	15,6	7,6	139
2118SB-10	146/137	48,8	60,3	57	17,7	20	16,9	52	14,9	7,6	137
2119SB-10	146/137	48,8	60,3	57	17,7	20	16,9	52	14,9	7,6	137
2124SB-10	146/137	48,8	60,3	57	17,7	20	16,9	52	14,9	7,6	137

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution	Any 1/2 revolution	Any 1 revolution	Range		
	μm	μm	μm	μm	μm	μm
2113SB-10	2,5	4	4,5	7	1	2
2118SB-10	4	6	6,5	10	1,5	2,5
2119SB-10	4	6	6,5	10	1,5	2,5
2124SB-10	5	9	10	11	2	3

Series 2				
	2113SB-10	2119SB-10	2118SB-10	2124SB-10
Functions				
Balanced dial	●	●		
Continuous dial				●
Shockproof	●			
Jeweled bearing	●	●	●	●

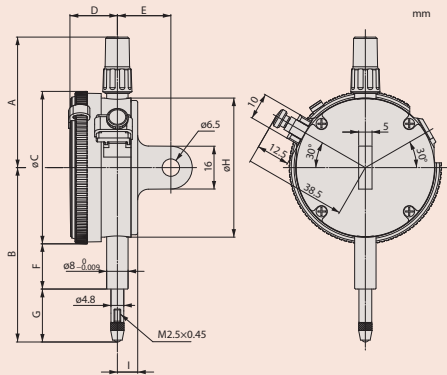
### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

For accessories and contact points, see end of dial indicators section.



2124S



# Dial Indicator with 20 mm Stroke Series 2

## Series 2

This is a standard, metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.



**IP64**  
2050S(B)-60

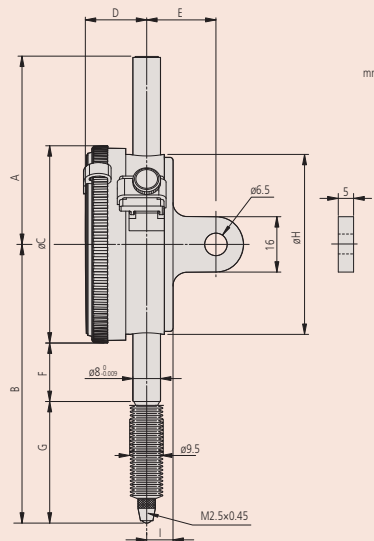
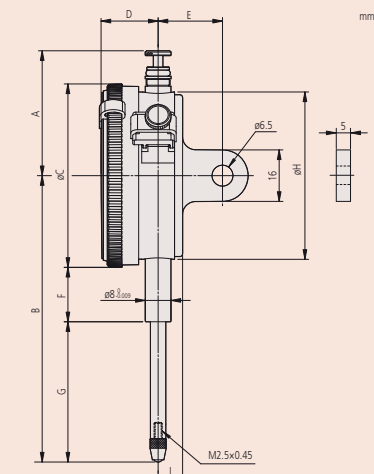
	2050SB	2320SB-10	2050SB-60	2050SB-19
<b>Functions</b>				
Continuous dial	●	●	●	●
Shockproof	●	●	●	●
Jeweled bearing	●	●	●	●
IP64	●	●	●	●
Cushioned end point	●	●	●	●
Coaxial revolution counter	●	●	●	●

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
21AZA321	Contact Element Ball Point, 19,3mm Length, Waterproof Type, Metric
136071	NBR Rubber Boot, IP64 Series 2

21AZA321 and 136071 : for 2050S-60 (IP model)

For accessories and contact points, see end of dial indicators section.



2050SB-60



2050S



2320S-10

### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
2050SB	2050S	20	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2
2050SB-60	2050S-60	20	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2,5
2050SB-19	2050S-19	20	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2
2320SB-10	2320S-10	20	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	G [mm]	I [mm]
2050SB	149/140	38,8	75,2	57	17,7	20	16,9	52	29,8	7,6
2050SB-60	155/146	38,8	75,2	57	17,7	20	12,3	52	29,8	7,6
2050SB-19	149/140	38,8	75,2	57	17,7	20	16,9	52	29,8	7,6
2320SB-10	150/141	38,8	75,2	57	17,7	20	16,9	52	29,8	7,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability μm	Hysteresis error μm
	Any 1/10 revolution μm	Any 1/2 revolution μm	Any 1 revolution μm	Range μm		
2050SB	6	10	11	20	3	4
2050SB-60	6	10	11	20	3	4
2050SB-19	6	10	11	20	3	4
2320SB-10	6	10	11	20	3	4



# Dial Indicator with 30 mm Stroke Series 2

## Series 2

This is a standard, metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.



### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
2052SB	2052S	30	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2,5
2052SB-19	2052S-19	30	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2,5
2330SB-10	2330S-10	30	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2,5
2952SB	2952S	30	1 mm	0,01 mm	100-0	0,4 - 2,5

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	G [mm]	I [mm]
2052SB	152/143	38,8	88,7	57	17,7	20	16,9	52	43,3	7,6
2052SB-19	152/143	38,8	88,7	57	17,7	20	16,9	52	43,3	7,6
2330SB-10	150/141	38,8	88,7	57	17,7	20	16,9	52	43,3	7,6
2952SB	152/143	38,8	88,7	57	17,7	20	16,9	52	43,3	7,6

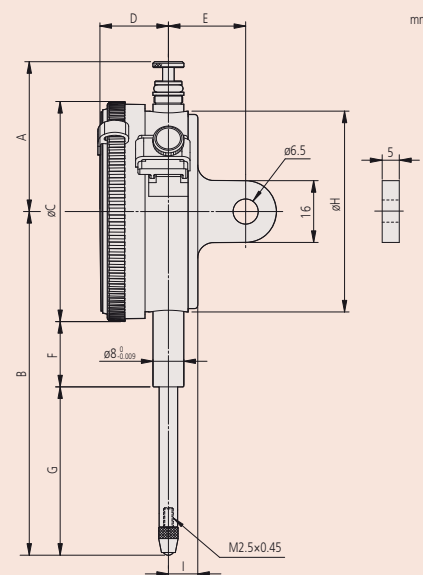
No.	EN ISO 463					
	Errors of indication over a range of				Repeatability $\mu\text{m}$	Hysteresis error $\mu\text{m}$
	Any 1/10 revolution $\mu\text{m}$	Any 1/2 revolution $\mu\text{m}$	Any 1 revolution $\mu\text{m}$	Range $\mu\text{m}$		
2052SB	7	11	12	25	3	5
2052SB-19	7	11	12	25	3	5
2330SB-10	7	11	12	25	3	5
2952SB	7	11	12	25	3	5

	Series 2			
	2052SB	2330SB-10	2052SB-19	2952SB
<b>Functions</b>				
Continuous dial				
Reverse reading				
Shockproof				
Jeweled bearing				
Cushioned end point				
Coaxial revolution counter				

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

For accessories and contact points, see end of dial indicators section.



# Special Dial Indicator Series 2

## Series 2

This is a dial indicator with a special design that offers you the following benefits:

- Standard size
- Bezel Ø 57mm, Graduation 0,01



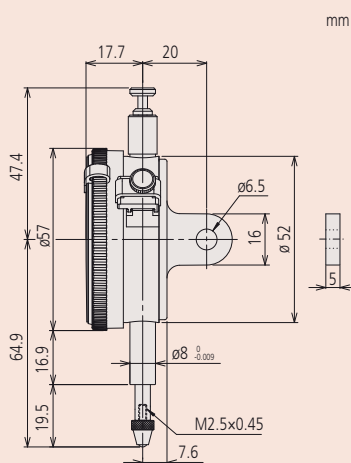
Series 2	
2046SB-80	2048SB-10
<b>Functions</b>	
Balanced dial	●
Continuous dial	●
Jeweled bearing	●
Peak retaining	●
Coaxial revolution counter	●
Adjustable pointer	●

### Consumable spares

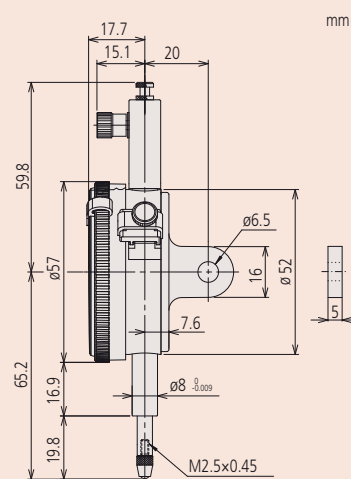
No.	Description
21AZA319	Contact Element Ball Point, 8,3mm Length, Metric
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

901312 : for 2046S-80  
21AZA319 : for 2048S-10

For accessories and contact points, see end of dial indicators section.



2048S-10



2046S-80



2048S-10



2046S-80

### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]	Mass lug/plain [g]
2048SB-10	2048S-10	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4	144/135
2046SB-80	2046S-80	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 5	158/149

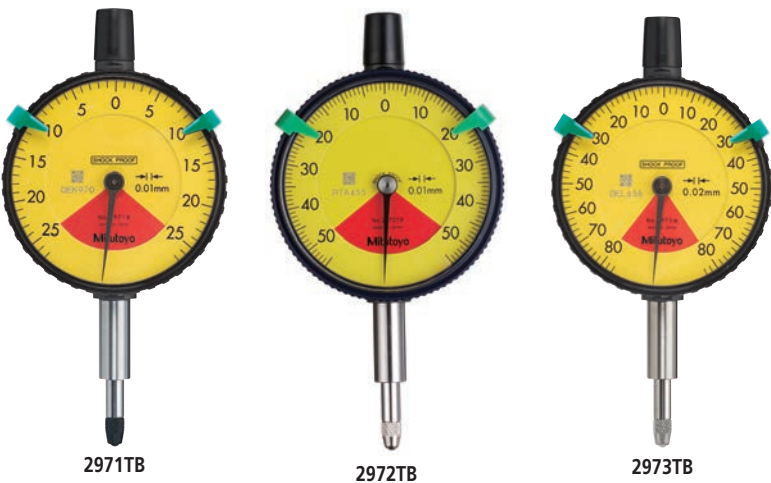
No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution µm	Any 1/2 revolution µm	Any 1 revolution µm	Range µm		
2048SB-10	5	9	10	15	3	3
2046SB-80	5	9	10	15		

# One Revolution Dial Indicator Series 2

## Series 2

This is a one revolution metric dial indicator. It offers you the following benefits:

- Excellent water and drip-proof characteristics
- Lightweight type
- It eliminates the possibility of reading errors due to miscounting multiple revolutions.



### Metric

No.	Range	Range per rev.	Graduation	Scale	Measuring force [N]
2971TB	0,5 (plunger stroke: 3,5)	0,7 mm	0,01 mm	25-0-25	0,4 - 1,4
2972TB	1 (plunger stroke: 3,5)	1,4 mm	0,01 mm	50-0-50	0,4 - 1,4
2973TB	1.6 (plunger stroke: 3.5)	2 mm	0,02 mm	80-0-80	0,4 - 1,4

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	F [mm]	G [mm]	H [mm]	I [mm]
2971TB	75	43,2	65,6	57	16,5	20,3	16,8	55	7,6
2972TB	75	43,2	66	57	16,5	20,3	17,2	55	7,6
2973TB	75	43,2	66,3	57	16,5	20,3	17,5	55	7,6

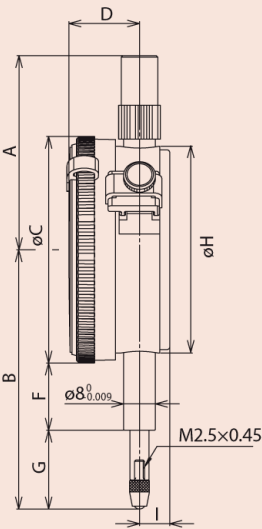
No.	EN ISO 463					
	Errors of indication over a range of				Repeatability µm	Hysteresis error µm
	Any 1/10 revolution µm	Any 1/2 revolution µm	Any 1 revolution µm	Range µm		
2971TB	5			7	3	3
2972TB	5			7	3	3
2973TB	8			16	5	4

Series 2		
Functions		
	One revolution	
	Cushioned end point	
	IP52	

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

For accessories and contact points, see end of dial indicators section.



# One Revolution Dial Indicator Series 2

## Series 2

This is a one revolution metric dial indicator. It offers you the following benefits:

- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.
- It eliminates the possibility of reading errors due to miscounting multiple revolutions.



**IP64**  
2929S(B)-60

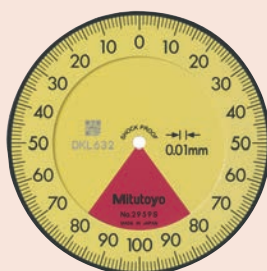
Series 2			
	2928SB up to 2959SB	2929SB-62	2929SB-60
<b>Functions</b>			
One revolution	●	●	●
Shockproof	●	●	●
IP64			●
IP52		●	

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
902119	Contact Element Ball Point, 8,3mm Length, Waterproof Type, Metric
125317	NBR Rubber Boot, for ID-B, IP64 Series 2

902119 and 125317 : for 2929S-60 (IP model)

For accessories and contact points, see end of dial indicators section.

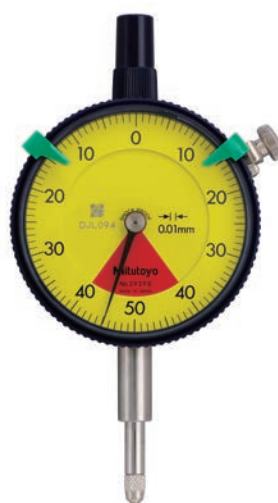
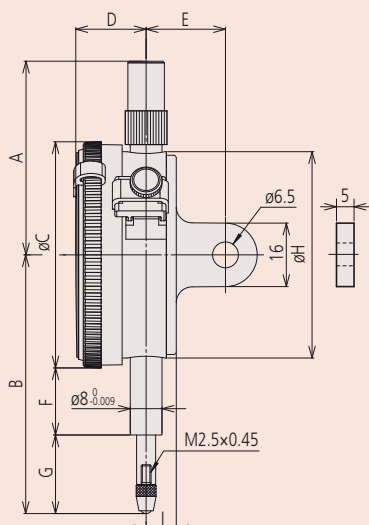


2959S



2928S

mm



2929S



2929S-60

### Metric

No.	No. with Lug back plate	Range	Range per rev.	Graduation	Scale	Measuring force [N]
2929SB	2929S	0,8 (plunger stroke: 5)	1 mm	0,01 mm	40-0-40	0,4 - 1,4
2929SB-60	2929S-60	0,8 (plunger stroke: 5)	1 mm	0,01 mm	40-0-40	0,4 - 2
2929SB-62	2929S-62	0,8 (plunger stroke: 5)	1 mm	0,01 mm	40-0-40	0,4 - 2
2959SB	2959S	1,6 (plunger stroke: 5)	2 mm	0,01 mm	80-0-80	0,4 - 1,4
2928SB	2928S	4 (plunger stroke: 10)	5 mm	0,1 mm	2-0-2	0,4 - 1,4

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]
2929SB	145/136	48,8	65,2	57	17,7	20	16,9	19,8	52	7,6
2929SB-60	146/137	48,8	70	57	17,7	20	12,3	29,2	52	7,6
2929SB-62	145/136	48,8	65,2	57	17,7	20	16,9	19,8	52	7,6
2959SB	145/136	48,8	65,2	57	17,7	20	16,9	19,8	52	7,6
2928SB	145/136	48,8	65,2	57	17,7	20	16,9	19,8	52	7,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution	Any 1/2 revolution	Any 1 revolution	Range		
2929SB	5			7	3	3
2929SB-60	5			7	3	3
2929SB-62	5			7	3	3
2959SB	5			9	3	4
2928SB	15			25	20	12

# One Revolution Dial Indicator Series 2

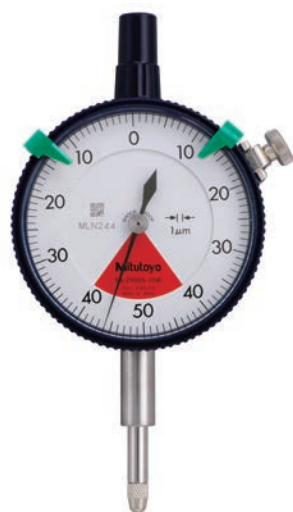
## Series 2

This is a one revolution metric dial indicator. It offers you the following benefits:

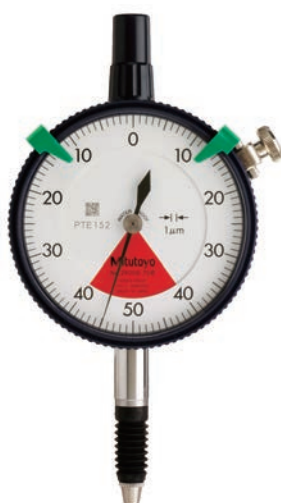
- Bezel clamp and lifting lever (optional) can be attached to either right or left side. They can be easily installed and removed without tools.
- No through screw holes on the frame and secure adhesion between the bezel and the crystal as well as the use of an O-ring prevents water or oil penetration.
- It eliminates the possibility of reading errors due to miscounting multiple revolutions.



**IP64**  
2900S(B)-70



2900S-10



2900S-70



2901S-10

## Metric

No.	No. with Lug back plate	Range	Range per rev.	Graduation	Scale	Measuring force [N]
2900SB-10	2900S-10	0,08 (plunger stroke: 4,5)	0,1 mm	0,001 mm	40-0-40	0,4 - 1,4
2900SB-70	2900S-70	0,08 (plunger stroke: 4,5)	0,1 mm	0,001 mm	40-0-40	0,4 - 2
2900SB-72	2900S-72	0,08 (plunger stroke: 4,5)	0,1 mm	0,001 mm	40-0-40	0,4 - 2
2901SB-10	2901S-10	0,16 (plunger stroke: 4,5)	0,2 mm	0,001 mm	80-0-80	0,4 - 1,4

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]
2900SB-10	149/140	48,8	66	57	17,7	20	16,9	20,6	52	7,6
2900SB-70	150/141	48,8	67	57	17,7	20	12,3	26,2	52	7,6
2900SB-72	149/140	48,8	66	57	17,7	20	16,9	20,6	52	7,6
2901SB-10	149/140	48,8	66,1	57	17,7	20	16,9	20,7	52	7,6

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution	Any 1/2 revolution	Any 1 revolution	Range		
2900SB-10	2			3	1	2
2900SB-70	2			3	1	2
2900SB-72	2			3	1	2
2901SB-10	2			4	1	2

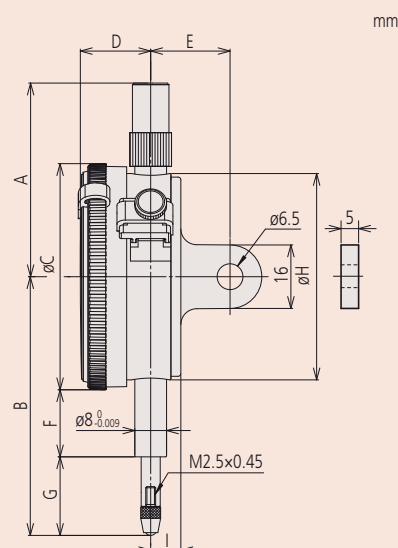
Functions	Series 2			
	2900SB-10	2901SB-10	2900SB-72	2900SB-70
One revolution				
Shockproof				
Jeweled bearing				
IP64				
IP52				

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
902119	Contact Element Ball Point, 8,3mm Length, Waterproof Type, Metric
125317	NBR Rubber Boot, for ID-B, IP64 Series 2

902119 and 125317 : for 2900S-70 (IP model)

For accessories and contact points, see end of dial indicators section.





# Dial Indicator Series 3

## Series 3

This is a metric dial indicator that offers you the following benefits:

- Bezel ø 78mm.
- 10mm range with graduation 0,01mm and 1mm range with graduation 0,001mm.

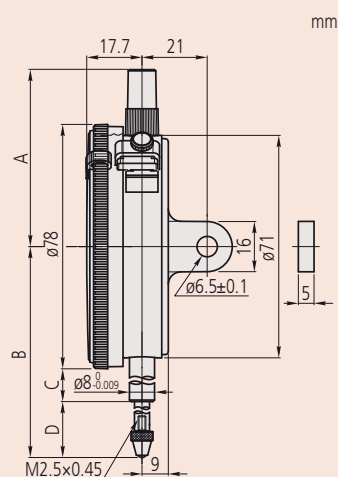


Series 3			
	3046SB	3047SB	3109SB-10
<b>Functions</b>			
Balanced dial			
Continuous dial			
Shockproof			
Jeweled bearing			

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

For accessories and contact points, see end of dial indicators section.



## Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
3046SB	3046S	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4
3047SB	3047S	10	1 mm	0,01 mm	0-50-0	0,4 - 1,4
3109SB-10	3109S-10	1	0,2 mm	0,001 mm	0-100-0	0,4 - 1,5

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]
3046SB	252/237	61,2	75,5	15,9	20,6
3047SB	252/237	61,2	75,5	15,9	20,6
3109SB-10	270/255	61,2	75,5	25,9	14,1

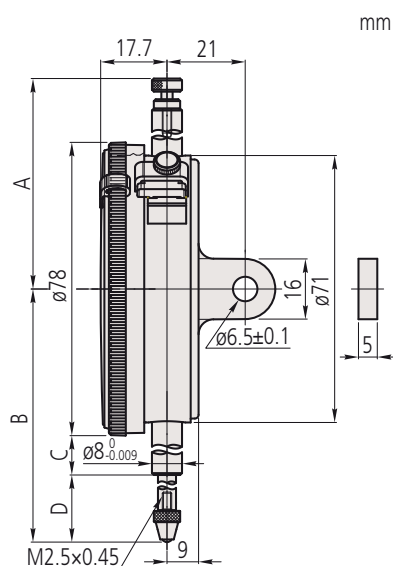
No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution	Any 1/2 revolution	Any 1 revolution	Range		
3046SB	5	9	10	15	3	3
3047SB	5	9	10	15	3	3
3109SB-10	2,5	4	4,5	5	1	2

# Dial Indicator with Large Diameter Scale Series 3

## Series 3

This is a standard, metric dial indicator. It offers you the following benefits:

- Large-diameter dial face for easy reading
- Supplied with limit markers and a bezel clamp as standard



3050S

## Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]
3050SB	3050S	20	1 mm	0,01 mm	0-100 (100-0)	0,4 - 2
3052SB-19	3052S-19	30	1 mm	0,01 mm	0-100 (0-100)	0,4 - 2,5
3058SB-19	3058S-19	50	1 mm	0,01 mm	0-100 (100-0)	0,4 - 3
3060SB-19	3060S-19	80	1 mm*	0,01 mm	0-100 (0-100)	0,4 - 3
3062SB-19	3062S-19	100	1 mm*	0,01 mm	0-100 (100-0)	0,4 - 3,2

\*3060S-19 and 3062S-19 : use in a vertical position only.

No.	Mass lug/plain [g]	A [mm]	B [mm]	C [mm]	D [mm]
3050SB	272/257	52,6	94	25,9	29,1
3052SB-19	285/270	72,9	104,3	25,9	39,4
3058SB-19	298/283	81,9	142,3	43,9	59,4
3060SB-19	314/299	120,9	202,3	73,9	89,4
3062SB-19	332/317	141,9	243,3	94,9	109,4

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution	Any 1/2 revolution	Any 1 revolution	Range		
3050SB	8	10	11	20	3	4
3052SB-19	10	11	12	25	3	5
3058SB-19	10	12	13	30	3	6
3060SB-19	10	14	15	45	3	9
3062SB-19	12	17	20	50	3	9

Series 3			
	3050SB	3052SB-19 up to 3062SB-19	
Functions			
Continuous dial	●	●	
Shockproof	●	●	
Jeweled bearing	●	●	
Cushioned end point	●	●	
Coaxial revolution counter		●	

## Consumable spares

No.	Description
21AZA319	Contact Element Ball Point, 8,3mm Length, Metric
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

901312 : for 3050S

21AZA319 : for 3052S-19 / 3058S-19 / 3060S-19 / 3062S-19

For accessories and contact points, end of dial indicators section.



3058S-19

# Dial Indicator Series 4

## Series 4

- Bezel ø 92 mm



Series 4	
Functions	
Continuous dial	

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric

For accessories and contact points, see end of dial indicators section.

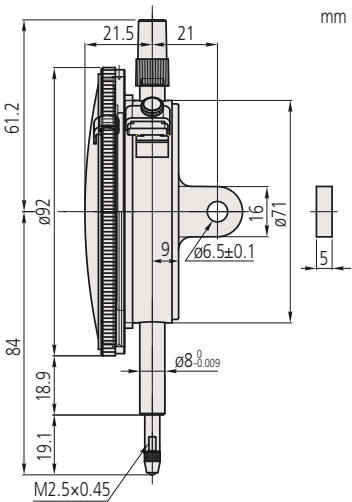


4046S

### Metric

No.	No. with Lug back plate	Range [mm]	Range per rev.	Graduation	Scale	Measuring force [N]	Mass lug/plain [g]
4046SB	4046S	10	1 mm	0,01 mm	0-100 (100-0)	0,4 - 1,4	345/330

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability µm	Hysteresis error µm
	Any 1/10 revolution µm	Any 1/2 revolution µm	Any 1 revolution µm	Range µm		
4046SB	5	9	10	15	3	3



# Dial Indicator Back Plunger Type Series 1

## Series 1

This is a back plunger dial indicator with bezel  $\varnothing$  39 mm. It offers you the following benefits:

- It is ideal for use in applications where space is limited.
- Green limit markers are a standard accessory.



1960T



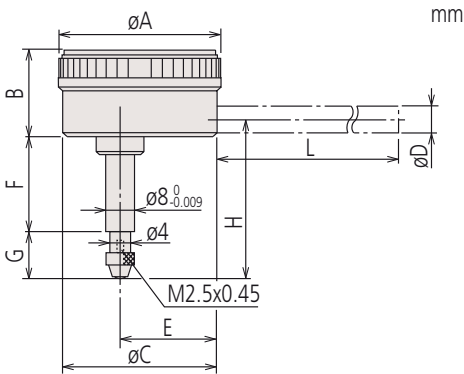
1160T

### Metric

No.	Range	Range per rev.	Graduation	Scale	Measuring force [N]
1960T	1 (plunger stroke: 4,5)	1,27 mm	0,01 mm	50-0-50	0,4 - 1,4
1160T	5	1 mm	0,01 mm	0-100	0,4 - 1,4
1162T	5	1 mm	0,01 mm	100-0	0,4 - 1,4

No.	A [mm]	B [mm]	C [mm]	E [mm]	F [mm]	G [mm]	H [mm]	Mass [g]
1960T	40	22,1	35	22	28,7	12,8	46	80
1160T	40	22,1	35	22	25	13,8	43,3	80
1162T	40	22,1	35	22	25	13,8	43,3	80

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability	Hysteresis error
	Any 1/10 revolution $\mu$ m	Any 1/2 revolution $\mu$ m	Any 1 revolution $\mu$ m	Range $\mu$ m		
1960T	7				3	3,5
1160T	7	11	12	18	3	4
1162T	7	11	12	18	3	4



Series 1			
Functions	1160T	1162T	1960T
Balanced dial			
Continuous dial			
Reverse reading			
One revolution			
Shockproof			

### Specifications

Delivered Delivered with factory certificate

### Optional accessories

No.	Description
136568	Holding Bar for Back Plunger Indicator, $\varnothing$ 8mm, 81mm Length
21AAA168	Holding Bar for Back Plunger Indicator, $\varnothing$ 8mm, 42mm Length
136567	Holding Bar for Back Plunger Indicator, $\varnothing$ 6mm, 81mm Length
21AAA166	Holding Bar for Back Plunger Indicator, $\varnothing$ 6mm, 42mm Length

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
21AZA319	Contact Element Ball Point, 8,3mm Length, Metric

901312 : for 1960  
21AZA319 : for 1160 and 1162

For accessories and contact points, see end of dial indicators section.



With optional holding bar

# Dial Indicator Back Plunger Type Series 2

## Series 2

This is a back plunger type dial indicator with bezel  $\varnothing$  55 - 58mm



Series 2		
	2960T	2990T-10
<b>Functions</b>		
One revolution	●	●
Shockproof	●	●
Jeweled bearing		●

### Specifications

Delivered Delivered with factory certificate

### Optional accessories

No.	Description
136568	Holding Bar for Back Plunger Indicator, $\varnothing$ 8mm, 81mm Length
21AAA168	Holding Bar for Back Plunger Indicator, $\varnothing$ 8mm, 42mm Length
136567	Holding Bar for Back Plunger Indicator, $\varnothing$ 6mm, 81mm Length
21AAA166	Holding Bar for Back Plunger Indicator, $\varnothing$ 6mm, 42mm Length

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
21AZA319	Contact Element Ball Point, 8,3mm Length, Metric

901312 : for 2990T-10  
21AZA319 : for 2960T

For accessories and contact points, see end of dial indicators section.



With optional holding bar



2990T-10

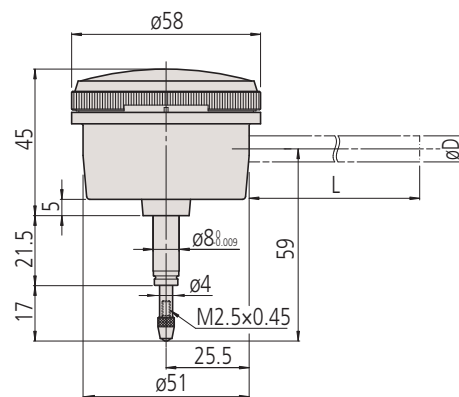


2960T

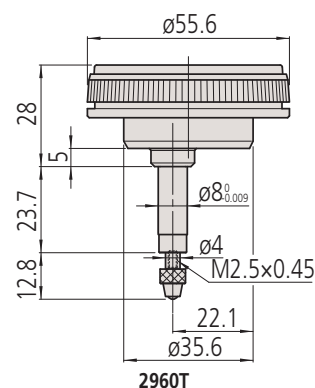
### Metric

No.	Range	Range per rev.	Graduation	Scale	Measuring force [N]	Mass [g]
2990T-10	0,1 (plunger stroke: 4)	0,14 mm	0,001 mm	50-0-50	0,4 - 1,5	220
2960T	1 (plunger stroke: 4,5)	1,27 mm	0,01 mm	50-0-50	0,4 - 1,4	215

No.	EN ISO 463					
	Errors of indication over a range of				Repeatability $\mu$ m	Hysteresis error $\mu$ m
	Any 1/10 revolution $\mu$ m	Any 1/2 revolution $\mu$ m	Any 1 revolution $\mu$ m	Range $\mu$ m		
2990T-10	2			4	1	2
2960T	7			15	3	3,5



2990T-10



2960T



# Contact Points

## Ball Point



902119

Metric					
A: M2,5 x 0,45					
L [mm]	Carbide No.	Carbide waterproof type No.	Plastic No.	Ruby No.	Sapphire No.
12,1	—	21AZA320	—	—	—
14	21JAA225	—	—	—	—
15	120049	—	—	120051	120050
17	21JAA224	—	—	—	—
19,3	—	21AZA321	—	—	—
20	137391	—	—	137392	—
22	21JAA226	—	—	—	—
25	120053	—	—	120055	120054
30	21AAA252	—	—	21AAA253	—
7,3	901312	—	901994	120047	—
8	120045	—	—	—	120046
8,3	21AZA319	902119	—	—	—

## Ball Point



101122

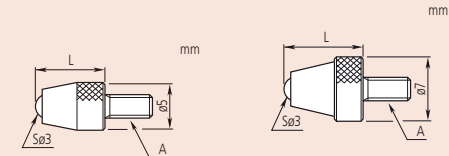
Metric		
A: M2,5 x 0,45		
No.	Material	D Ø [mm]
21AAA349	Carbide	1
21AAA350	Carbide	1,5
101122	Steel	1,8
21AAA351	Carbide	2,5
21AAA352	Carbide	4

## Shell Type Point - Steel

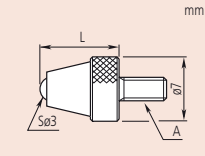


101118

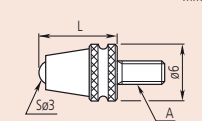
Metric	
A: M2,5 x 0,45	
No.	L [mm]
101386	5
101118	10
137393	15
101387	20
101388	25
21AAA254	30



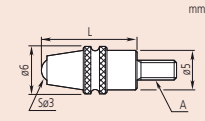
901312



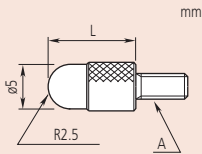
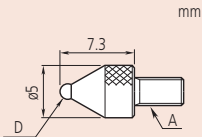
21AZA319



902119



21AZA320



For all drawings  
A = M 2,5 x 0,45 mm (metric)

# Contact Points

## Conical Point



101385

Metric			
A: M2,5 x 0,45			
No.	Material	Tip angle	L [mm]
101385	Steel	90°	5
101120	Steel	60°	10
120057	Carbide	90°	9
120068	Carbide	90°	15

## Needle Point - Steel



101121

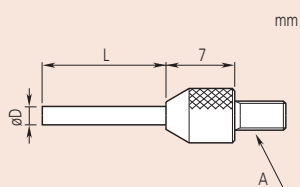
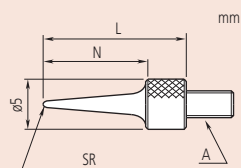
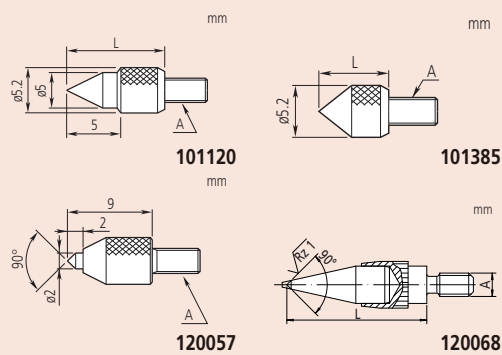
Metric			
A: M2,5 x 0,45			
No.	N [mm]	SR [mm]	L [mm]
101121	11	0,4	15
137413	13	0,2	17
21AAA255	21	0,4	25
21AAA256	31	0,4	35

## Cylinder Point - Carbide



137257

Metric		
A: M2,5 x 0,45		
No.	L [mm]	D Ø [mm]
120066	3	0,45
21AAA329	5	0,45
120065	3	1
21AAA330	5	1
21AAA331	8	1
21AAA332	10	1
21AAA333	20	1
21AAA334	40	1
21AAA335	5	1,5
21AAA336	10	1,5
120064	13	1,5
21AAA337	20	1,5
21AAA338	40	1,5
137257	8	2
21AAA257	18	2
21AAA258	28	2
21AAA339	40	2



For all drawings  
A = M 2,5 x 0,45 mm (metric)

# Contact Points

## Spherical Point



120059

Metric				
A: M2,5 x 0,45				
No.	Material	SR [mm]	L [mm]	D Ø [mm]
111460	Steel	5	3	5,5
120059	Carbide	7	10	7,5
125258	Steel	5	5	7,9
101119	Steel	7	5	10
120060	Carbide	10	10	10,5

## Flat Point - Steel



131365

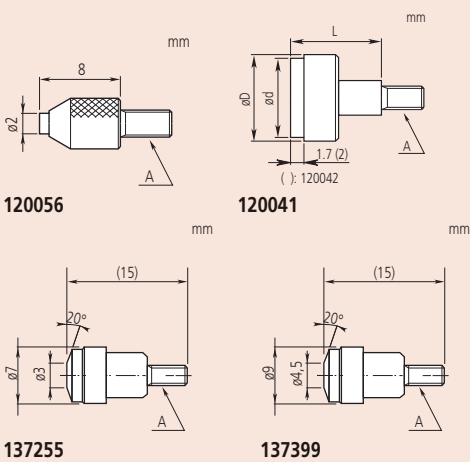
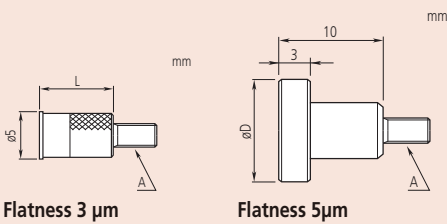
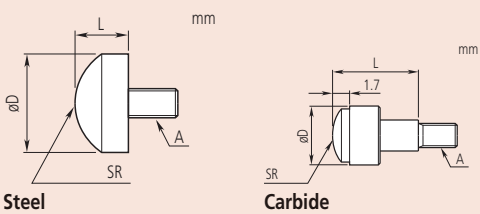
Metric			
A: M2,5 x 0,45			
No.	Flatness [µm]	L [mm]	D Ø [mm]
131365	3	8	5
21AAA340	3	10	5
101117	5	10	10
21AAA341	5	10	15
21AAA342	5	10	20
21AAA343	5	10	25
21AAA344	5		30

## Flat Point - Carbide

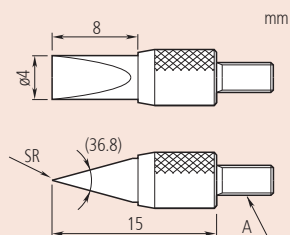


120056

Metric				
A: M2,5 x 0,45				
No.	Flatness [µm]	L [mm]	D Ø [mm]	Ø d [mm]
120056	3	8	5	2
120041	3	5	5,2	4,3
120042	3	10	7	6,5
120043	3	10	10,5	9,5
21AAA345	5	10	17	15
21AAA346	5	10	22	20
21AAA347	5	10	27	25
21AAA348	5	10	32	30
137255		10	7	6,4
137399		10	9	8



For all drawings  
A = M 2,5 x 0,45 mm (metric)



## Contact Points

### Knife Edge Point - Carbide

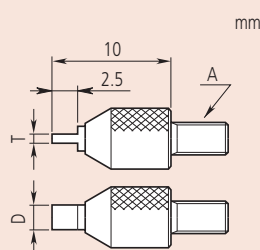


120067

Metric

A: M2,5 x 0,45

No.	SR [mm]
120067	0,2



### Blade Point - Carbide

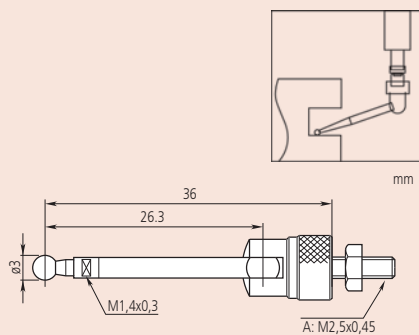


120062

Metric

A: M2,5 x 0,45

No.	D [mm]	T [mm]
120061	2	0,4
120062	2	0,6
120063	4	1



### Lever Point - Steel

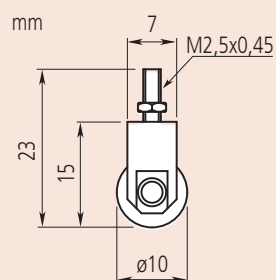


900391

Metric

A: M2,5 x 0,45

No.
900391



### Roller Point - Steel



901954

Metric

A: M2,5 x 0,45

No.
901954

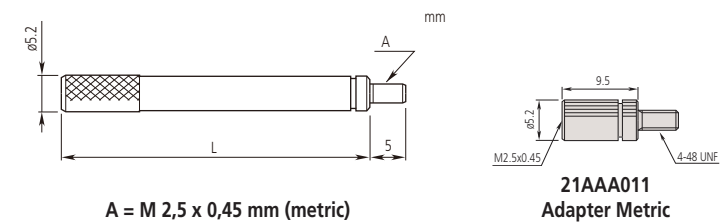
For all drawings  
A = M 2,5 x 0,45 mm (metric)

# Contact Points



Metric	
A: M2,5 x 0,45	
No.	Remarks
7822	Set with 6 contact points included

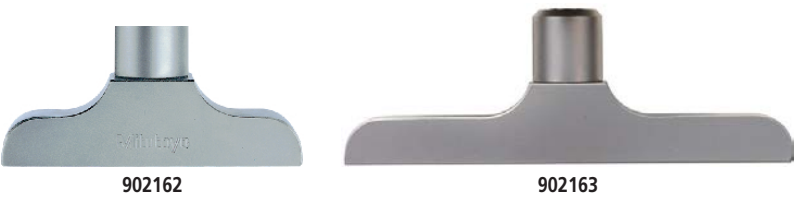
# Extension Rods



Metric	
No.	L [mm]
303611	10
21AAA259A	15
303612	20
21AAA259B	25
303613	30
21AAA259C	35
21AAA259D	40
21AAA259E	45
21AAA259F	50
21AAA259G	55
304146	60
21AAA259H	65
21AAA259L	75
21AAA259J	70
21AAA259M	80
304147	90
303614	100

No.	Remarks	L
21AAA011	Adapter Inch/Metric	9,5 mm

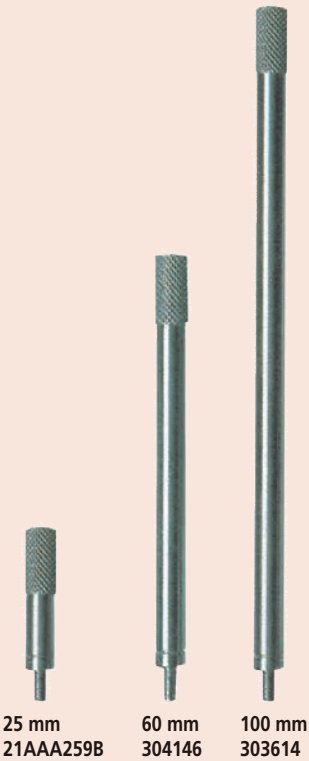
# Bases for Indicators



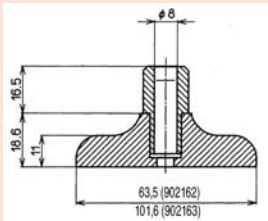
No.	Remarks	Length [mm]
902162	Delivered without fixing screw	63,5
902163	Delivered without fixing screw	101,6



Standard accessories	
No.	Description
131365	Contact Element Flat, 5mm, Steel, Metric
101117	Contact Element Flat, 10mm, Steel, Metric
101121	Contact Element Needle, R 0,4mm, Steel, Metric
101119	Contact Element Spherical, R 7mm, Steel, Metric
101118	Contact Element Shell, R 2,5mm, Steel, Metric
101387	Contact Element Shell, R 2,5mm, Steel, Metric



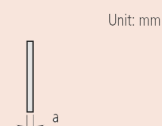
Optional accessories	
No.	Description
21JAA269	Set Screw for Base (Indicator)



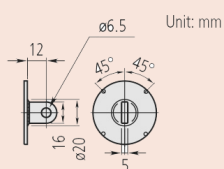
Thickness : 16 mm



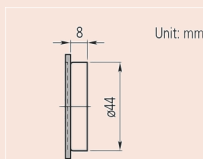
# Interchangeable Backs



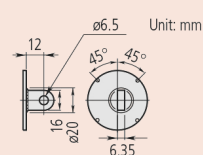
Flat back plate



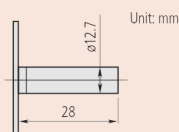
With centre lug



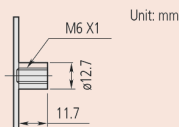
With magnet



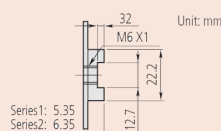
With laterally offset back lug



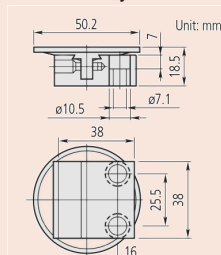
With post



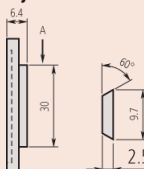
With screw mount



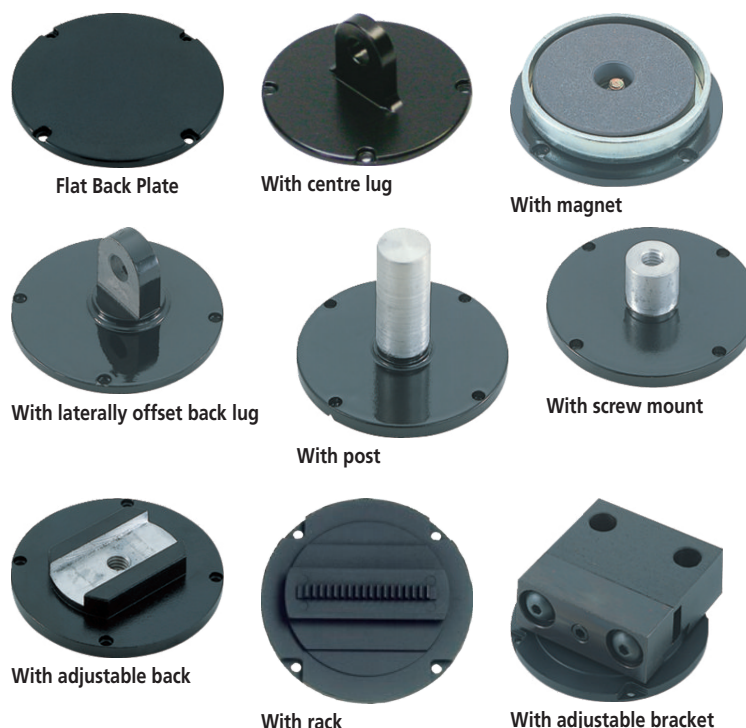
With adjustable stem



With adjustable bracket



With dovetail



No.	Description	For Series	Dimensions [mm]
191559	Flat Back Plate	1 <sup>(1)</sup>	a = 1 mm
101211	Flat Back Plate	1	a = 2,2 mm
136872	Flat Back Plate	1 (waterproof)	a = 1,5 mm
137906	Flat Back Plate	1.003	a = 1 mm
101039	Flat Back Plate	2/ ID-C/ ID-S/ ID-SS	a = 2,5 mm
21AZB231	Flat Back Plate	2 (waterproof S type)	a = 2,5 mm
100836	Flat Back Plate	3/ 4	a = 3 mm
190561	Back Plate with centre lug	1 <sup>(1)</sup>	a = 5 mm
101210	Back Plate with centre lug	1	a = 5 mm
137905	Back Plate with centre lug	for 1.003	a = 5 mm
101040	Back Plate with centre lug	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	a = 5 mm
21AZB230	Back Plate with centre lug	2 (waterproof S type)	a = 5 mm
100691	Back Plate with centre lug	3/ 4	a = 5 mm
21EZA145	Back Plate with centre lug	ID-N, ID-B, LGS <sup>(2)</sup>	5 mm
900928	Back Plate with magnet	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	
900929	Back Plate with magnet	3/ 4	
101167	Back Plate with laterally offset back lug	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	
100837	Back Plate with laterally offset back lug	3/ 4	
193172	Back Plate with post	1	
101169	Back Plate with post	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	
100839	Back Plate with post	3/ 4	
193173	Back Plate with screw mount	1	M 6 x 1
136023	Back Plate with screw mount	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	M 6 x 1
136024	Back Plate with screw mount	3/ 4	M 6 x 1
136025	Back Plate with adjustable back	1	M 6 x 1
136026	Back Plate with adjustable back	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	M 6 x 1
136027	Back Plate with adjustable back	3/ 4	M 6 x 1
129902	Back Plate with rack	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	
901963	Back Plate with adjustable bracket	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	
900008	Back Plate with dovetail	2/ ID-C/ ID-F/ ID-H/ ID-S/ ID-SS	

<sup>(1)</sup> for 1911, 1913-10, 1921, 1923, 1925-10, 1927-10

<sup>(2)</sup> for LGS 575-303, 575-304, 575-313

For old indicator models, please contact Mitutoyo

# Spindle Lifting Accessories

- The spindle lifting lever is attached to the top end of the spindle for improved inspection efficiency when using a dial indicator mounted on a stand.



### Spindle lifting cable

No.	Description
901975	With auto-stop function 300 mm length
540774	Without auto-stop function 500 mm length

No high grade IP-Protection (e.g. IP-64)

### Spindle lifting handle

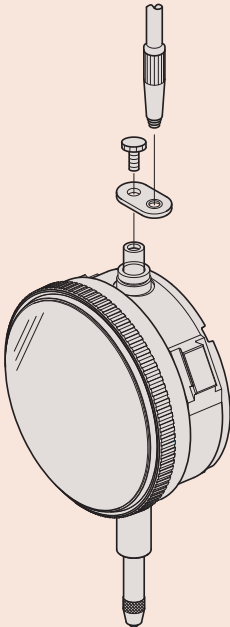
No.	Description
137693	Suitable for 4,8 mm spindle diameter

No high grade IP-Protection (e.g. IP-64)

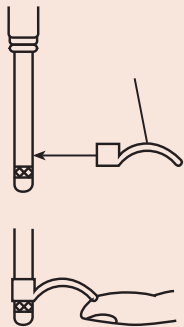
### Spindle lifting lever

No.	Use for
902100	S type Series 1 F type Series 2 (former model) (up to 5 mm range)
21AZB149	S type Series 2, 3 and 4 (up to 10 mm range)
21AZB150	S type Series 2 and 3 (from 10 mm up to 20 mm range)
21AZB151	S type No. 7322 / 7323
902011	ID-C: 543-280(B), 543-281(B), 543-282, 543-283(B)
21EZA198	Indicators ID-C (up to 12 mm range) ID-S, ID-SS

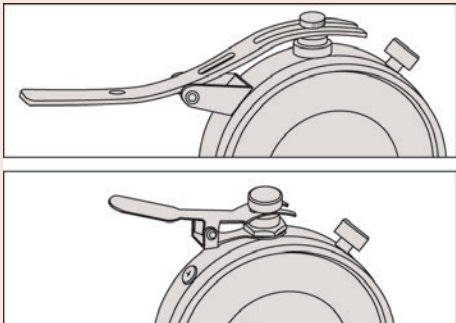
No high grade IP-Protection (e.g. IP-64)



Application 901975



Application 137693



Application spindle lifting lever

## Other Accessories for Dial Indicator

### Colour-coded Spindle Caps

- 9 colour-coded spindle caps are available for dial indicators with a range of 10 mm or less.
- With the exception of 2971 / 2972 / 2973 / 2976 / 2977 / 2978.

Colour	Standard	Water-resistant
	No.	No.
Black	193051	193595
Blue	193051B	193595B
Dark blue	193051S	193595S
Green	193051G	193595G
Orange	193051D	193595D
Pink	193051P	193595P
Red	193051R	193595R
White	193051W	193595W
Yellow	193051Y	193595Y



### Limit Stickers

- Tolerance markings.
- For dial indicators, Series 2 Ø 55,6 mm or 57 mm.
- 10 pieces per set.



136420



136421



136422

No.	Colour
136420	Red
136421	Green
136422	Yellow



# Other Accessories for Dial Indicator

## Crystal setter and assorted thrust pads

These crystal setters and thrust pads are used to make it easy to insert round dial glasses, and offer you the following benefits:

- You can use them to insert round dial glasses.
- Assorted thrust pads for diameters: 19,5/22,5/25,5/28,5/32,5/35/38/50mm.



7000

No.
7000

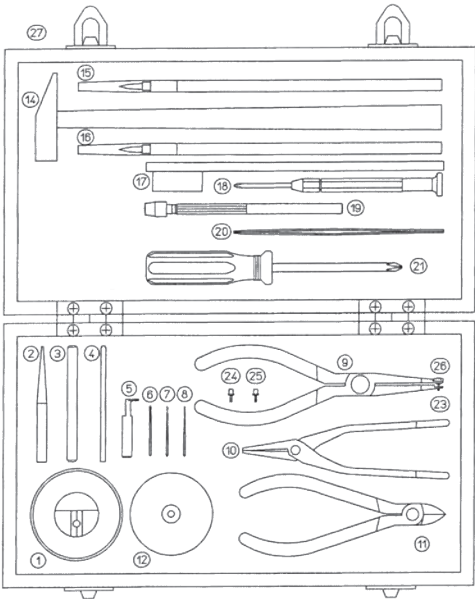
## Tool set

- For repairing analogue dial indicators.



7823EU

No.	Remarks
7823EU	Set with different tools included



## Specifications

Delivered	In a wooden case
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## Standard accessories

No.	Description
129730	Spindle-Rest (V-Anvil)/7823
129732	Pin Remover/7823
129733	Punch/7823
129734	Metal Bearing Adjuster/7823
129735	Pinion Set/7823
129736	Reamer Ø1mm/7823
193702	Reamer Ø0,6mm/7823
21JAA273	Reamer Ø0,5mm, 1/20 taper/7823
126628	Pointer removing tool/7823
901180	Pliers/7823
901179	Nippers/7823
129731	Pin rest/7823
901178	Hammer/7823
21JAA314	Stick/7823
901177	Brush/7823
901176	Brush/7823
901174	Phillips & Plain Screwdrivers
901175	Pin-vise/7823
129729	Tweezers/7823
901173	Phillips Screwdriver
126630	Pointer removing tip Ø0,8mm/7823
126630B	Hand Remover Pin 0,5mm 7823
126630C	Pointer removing tip Ø1,6mm/7823
100699	Adjustable Nut/7823

# Dial Test Indicator Lever Type

## Lever Indicator Overview



### Choices of dial position

Our product lineup offers four models, each with a different dial orientation on the frame to allow best readability in any situation.

- Horizontal type: standard model - with dial on the top of the frame
- Vertical type: dial on the end of the frame
- Horizontal (20° tilted face) type: dial on top of the frame, tilted backward by 20°
- Parallel type: dial on the side of the frame



### Stylus length is on the dial face

The length of the applied stylus affects the indicator's scale factor.

The appropriate length is indicated on the dial face to assist a customer when ordering the correct replacement stylus.



### ø8 stem to fit dovetails is a standard accessory

A ø8mm plain stem (21CAB104) for the Metric models that attaches to any dovetail on the frame is supplied as a standard accessory. Other sizes of stem to fit the dovetails are available as optional accessories:

- ø4mm stem: 21CAB106
- ø6mm stem: 21CAB103



### Attachable limit hands

Limit hands (optional) can be attached to the bezel as for dial indicators, allowing easy identification of the upper and lower limits of tolerance.



### Improved stylus bearing

The conventional method of mounting the stylus pivot bearing screw in the frame is prone to allowing looseness to develop with prolonged use.

A unique sub-plate structure to house this screw has now been incorporated in all models and eliminates this drawback.



# Lever Indicator Horizontal Type - 0,01 mm

## Series 513

This is a dial test indicator (lever type) which offers you the following benefits:

- Drastically enhanced durability, sensitivity and visibility
- Glare-free flat crystal face allows easy reading of graduations.
- O-ring seal on the bezel has the effect of providing smooth rotation and prevents dust and oil from penetrating through to the dial face.
- Multi-layer coatings on the crystal



513-466-10E



513-424-10E



513-414-10E



513-464-10E



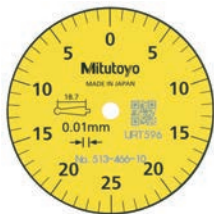
513-404-10E



513-415-10E



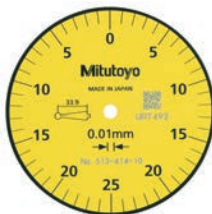
513-426-10E



513-466-10E



513-424-10E



513-414-10E



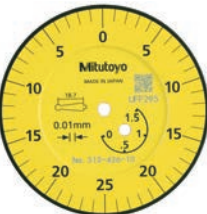
513-464-10E



513-404-10E



513-415-10E



513-426-10E

Series 513								
	513-404-10E	513-474-10E	513-415-10E	513-477-10E	513-464-10E	513-414-10E	513-424-10E	513-466-10E
Functions	up to							
Double scale spacing								
Coaxial revolution counter								
Compact type								
Long stylus								
Anti-magnet								

### Specifications

Contact point	Thread M 1,7 x 0,35
---------------	---------------------

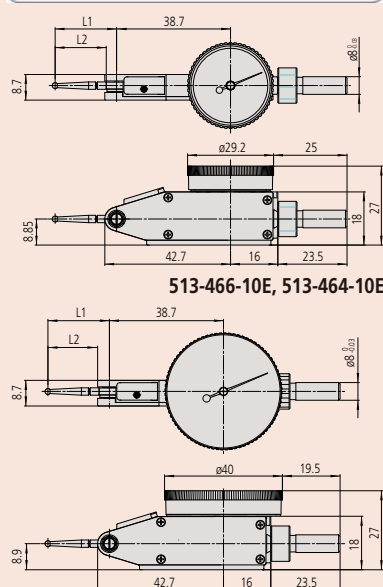
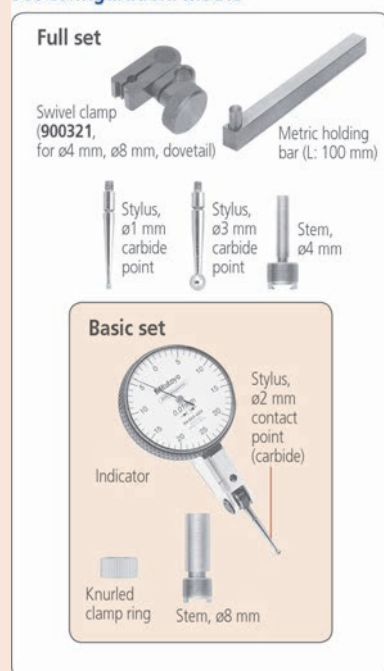
For optional accessories, see end of lever indicators section.

### Optional accessories

No.	Description
21AAB363	Limit Hands (Green) 2 pcs., Dial Indicator Series 1, Test Indicator

# Lever Indicator Horizontal Type - 0,01 mm

## Set Configuration: Metric



513-466-10E, 513-464-10E

513-404-10E, 513-404-10T, 513-414-10E, 513-414-10T, 513-415-10E, 513-415-10T, 513-424-10E, 513-424-10T, 513-426-10E, 513-474-10E, 513-477-10E, 513-478-10E

## Metric Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	Ø D [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-466-10E	0,5	0,01 mm	0-25-0	0,01-0,3	137557	29,2	22,2	18,7	41
513-424-10E	0,5	0,01 mm	0-25-0	0,01-0,3	137557	40	22,2	18,7	45
513-414-10E	0,5	0,01 mm	0-25-0	0,01-0,2	131324	40	37,4	33,9	45
513-464-10E	0,8	0,01 mm	0-40-0	0,01-0,3	103006	29,2	20,9	17,4	41
513-404-10E	0,8	0,01 mm	0-40-0	0,01-0,3	103006	40	20,9	17,4	45
513-415-10E	1	0,01 mm	0-50-0	0,01-0,2	136013	40	44,5	41	45
513-426-10E	1,5	0,01 mm	0-25-0	0,01-0,4	137557	40	22,2	18,7	45

## Metric Basic set - Ruby contact point

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Ruby stylus tip ø2 mm No.	Ø D [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-478-10E	0,5	0,01 mm	0-25-0	0,01-0,3	21CZA210	40	22,2	18,7	45
513-474-10E	0,8	0,01 mm	0-40-0	0,01-0,3	21CZA201	40	20,9	17,4	45
513-477-10E	1	0,01 mm	0-50-0	0,01-0,3	21CZA211	40	44,5	41	45

## Metric Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	Ø D [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-424-10T	0,5	0,01 mm	0-25-0	0,01-0,3	137557	40	22,2	18,7	45
513-414-10T	0,5	0,01 mm	0-25-0	0,01-0,2	131324	40	37,4	33,9	45
513-404-10T	0,8	0,01 mm	0-40-0	0,01-0,3	103006	40	20,9	17,4	45
513-415-10T	1	0,01 mm	0-50-0	0,01-0,2	136013	40	44,5	41	45

No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-466-10E	5	5	3	3	5			5	3	3
513-424-10E	5	5	3	3	5			5	3	3
513-414-10E	5	10	4	3	5			10	4	3
513-464-10E	5	8	3	3	5	6		8	3	3
513-404-10E	5	8	3	3	5	6		8	3	3
513-415-10E					5	8		10	4	3
513-426-10E					5		10	16	4	3
513-478-10E	5	5	3	3	5			5	3	3
513-474-10E	5	8	3	3	5	6		8	3	3
513-477-10E					5	8		10	4	3
513-424-10T	5	5	3	3	5			5	3	3
513-414-10T	5	10	4	3	5			10	4	3
513-404-10T	5	8	3	3	5	6		8	3	3
513-415-10T					5	8		10	4	3

# Lever Indicator - Horizontal Type - 0,001/0,002 mm

## Series 513

This is a dial test indicator (lever type) which offers you the following benefits:

- Drastically enhanced durability, sensitivity and visibility
- Glare-free flat crystal face allows easy reading of graduations.
- O-ring seal on the bezel has the effect of providing smooth rotation and prevents dust and oil from penetrating through to the dial face.
- Multi-layer coatings on the crystal

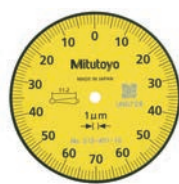


513-401-10E

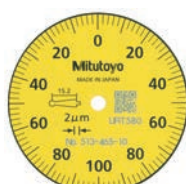
513-465-10E

513-405-10E

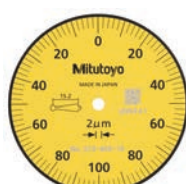
513-425-10E



513-401-10E



513-465-10E



513-405-10E



513-425-10E

### Metric Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	Ø D [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-401-10E	0,14	0,001 mm	0-70-0	0,01-0,3	103010	40	14,7	11,2	45
513-465-10E	0,2	0,002 mm	0-100-0	0,01-0,3	103011	29,2	18,7	15,2	41
513-405-10E	0,2	0,002 mm	0-100-0	0,01-0,3	103011	40	18,7	15,2	45
513-425-10E	0,6	0,002 mm	0-100-0	0,01-0,4	103011	40	18,7	15,2	45

### Metric Basic set - Ruby contact point

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Ruby stylus tip ø2 mm No.	Ø D [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-475-10E	0,2	0,002 mm	0-100-0	0,01-0,3	21CZB68	40	18,7	15,2	45

### Metric Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	Ø D [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-405-10T	0,2	0,002 mm	0-100-0	0,01-0,3	103011	40	18,7	15,2	45

No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-401-10E					2	3		3	2	1
513-465-10E	2	3	2	1	2	3		3	2	1
513-405-10E	2	3	2	1	2	3		3	2	1
513-425-10E					2	3	5	7	4	1
513-475-10E	2	3	2	1	2	3		3	2	1
513-405-10T	2	3	2	1	2	3		3	2	1

## Series 513

### Functions

	513-401-10E	up to 513-475-10E	513-465-10E	513-425-10E
Coaxial revolution counter				●
Compact type			●	●
Anti-magnet	●	●	●	●

### Specifications

Contact point Thread M 1,7 x 0,35

For optional accessories, see end of lever indicators section.

### Optional accessories

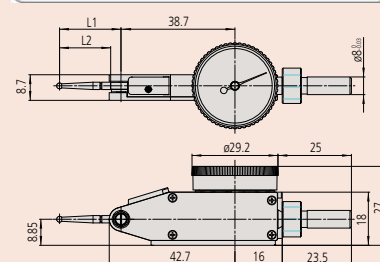
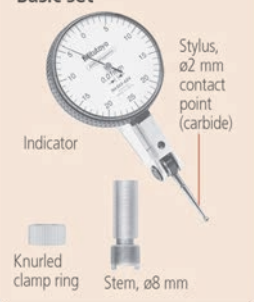
No.	Description
21AAB363	Limit Hands (Green) 2 pcs., Dial Indicator Series 1, Test Indicator

### Set Configuration: Metric

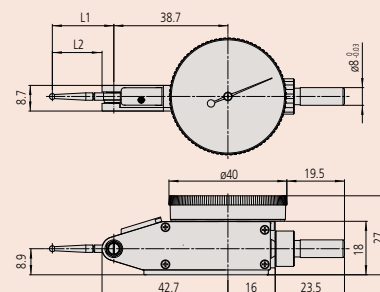
#### Full set



#### Basic set



513-465-10E



513-401-10E, 513-405-10E, 513-425-10E, 513-475-10E

# Lever Indicator and Magnet Stand

## Series 513

This is a dial test indicator (lever type) including mini magnet stand. It offers you the following benefits:

- It contains various accessories including a mini magnet stand, a swivel clamp and a stem with a knurled clamp ring.
- Easy to use



513-908-10E

### Indicator

Centered, bi-directional action for automatic reversal of measuring direction.

Jewelled bearings and precision gears and pinions for smooth, accurate movement and quick response.

### Stand

Magnetic force : 150 N.

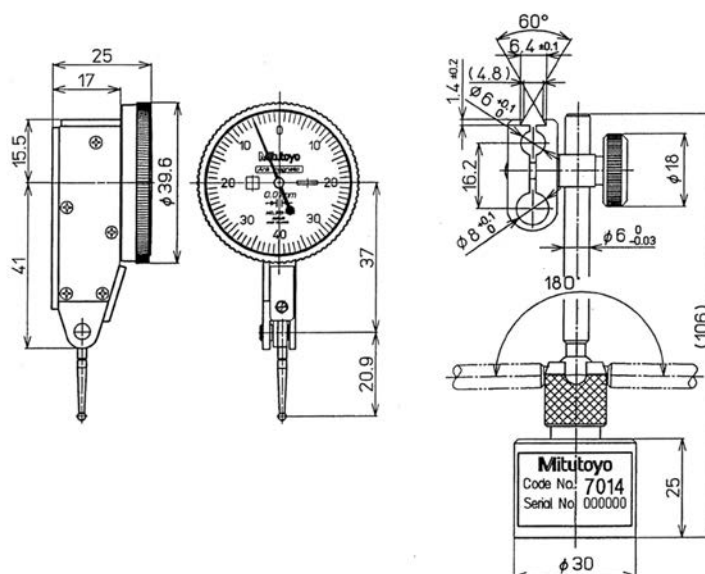
Mass : 180 g.



513-908-10E

## Metric

No.	Contents include	Mass [g]
513-908-10E	513-404-10E : Lever Indicator 7014-10 : Mini Magnetic Stand 902804 : Stem with knurled clamp ring	222





# Lever Indicator Horizontal (20° Tilted Face) Type

## Series 513

This is a dial test indicator (lever type) which offers you the following benefits:

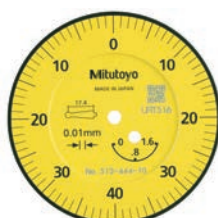
- Drastically enhanced durability, sensitivity and visibility
- Glare-free flat crystal face allows easy reading of graduations.
- O-ring seal on the bezel has the effect of providing smooth rotation and prevents dust and oil from penetrating through to the dial face.
- Multi-layer coatings on the crystal



513-445-10E



513-444-10E



513-444-10E

### Metric Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L1 [mm]	L2 [mm]	Mass [g]
513-445-10E	0,4	0,002 mm	0-100-0	0,01-0,3	103011	18,7	15,2	48
513-444-10E	1,6	0,01 mm	0-40-0	0,01-0,3	103006	20,9	17,4	48

### Metric Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L1 [mm]	L2 [mm]	Mass [g]
513-445-10T	0,4	0,002 mm	0-100-0	0,01-0,3	103011	18,7	15,2	48
513-444-10T	1,6	0,01 mm	0-40-0	0,01-0,3	103006	20,9	17,4	48

No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-445-10E					2	3	5	6	4	1
513-444-10E	5	16	4	3	5	8	10	16	4	3
513-445-10T					2	3	5	6	4	1
513-444-10T	5	16	4	3	5	8	10	16	4	3

Series 513		
<b>Functions</b>		
Coaxial revolution counter		
Anti-magnet		

### Specifications

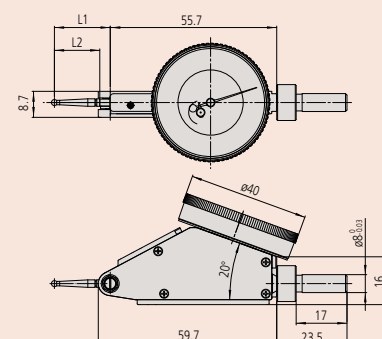
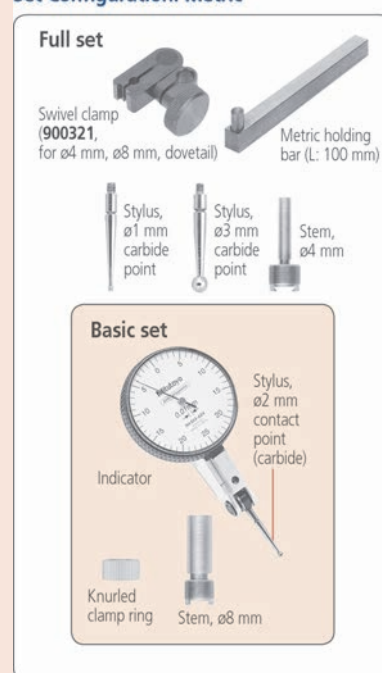
Contact point Thread M 1,7 x 0,35

For optional accessories, see end of lever indicators section.

### Optional accessories

No.	Description
21AAB363	Limit Hands (Green) 2 pcs., Dial Indicator Series 1, Test Indicator

### Set Configuration: Metric





# Lever Indicator Vertical Type

## Series 513

### Functions

Anti-magnet

### Specifications

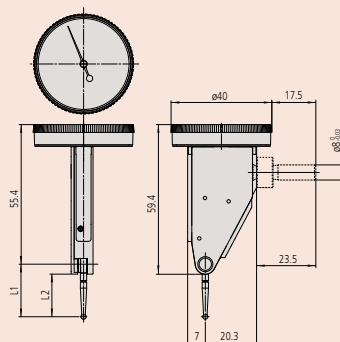
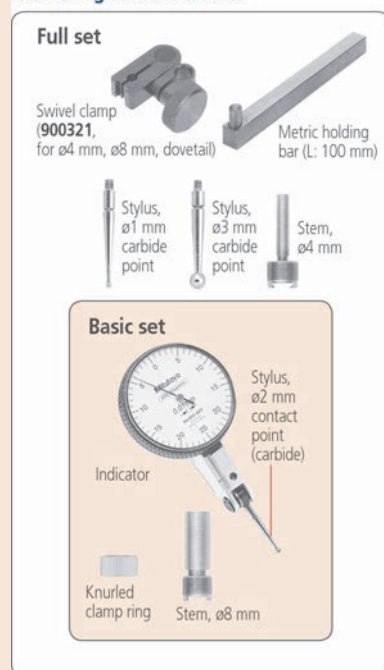
Contact point Thread M 1,7 x 0,35

For optional accessories, see end of lever indicators section.

### Optional accessories

No.	Description
21AAB363	Limit Hands (Green) 2 pcs., Dial Indicator Series 1, Test Indicator

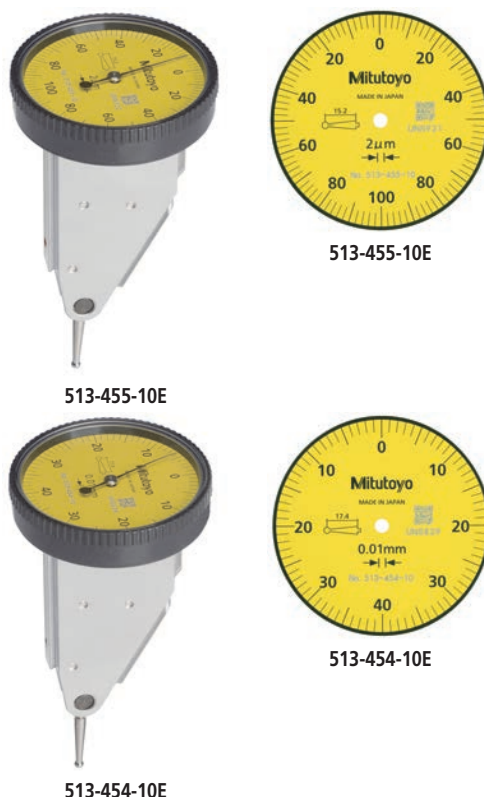
### Set Configuration: Metric



## Series 513

This is a dial test indicator (lever type) which offers you the following benefits:

- Drastically enhanced durability, sensitivity and visibility
- Glare-free flat crystal face allows easy reading of graduations.
- O-ring seal on the bezel has the effect of providing smooth rotation and prevents dust and oil from penetrating through to the dial face.
- Multi-layer coatings on the crystal



### Metric Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L1 [mm]	L2 [mm]	Mass [g]
513-455-10E	0,2	0,002 mm	0-100-0	0,01-0,3	103011	18,7	15,2	46
513-454-10E	0,8	0,01 mm	0-40-0	0,01-0,3	103006	20,9	17,4	46

### Metric Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L1 [mm]	L2 [mm]	Mass [g]
513-455-10T	0,2	0,002 mm	0-100-0	0,01-0,3	103011	18,7	15,2	46
513-454-10T	0,8	0,01 mm	0-40-0	0,01-0,3	103006	20,9	17,4	46

No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-455-10E	2	3	2	1	2	3		3	2	1
513-454-10E	5	8	3	3	5	6		8	3	3
513-455-10T	2	3	2	1	2	3		3	2	1
513-454-10T	5	8	3	3	5	6		8	3	3

# Lever Indicator Parallel Type

## Series 513

- Drastically enhanced durability, sensitivity and visibility.
- Glare-free flat crystal face allows easy reading of graduations.



513-484-10E

### Metric

#### Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L1 [mm]	L2 [mm]	Mass [g]
513-484-10E	0,8	0,01 mm	0-40-0	0,01-0,3	103006	20,9	17,4	53

### Metric

#### Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L1 [mm]	L2 [mm]	Mass [g]
513-484-10T	0,8	0,01 mm	0-40-0	0,01-0,3	103006	20,9	17,4	53

No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-484-10E	5	8	3	3	5	6		8	3	3
513-484-10T	5	8	3	3	5	6		8	3	3

## Series 513

### Functions

Anti-magnet

### Specifications

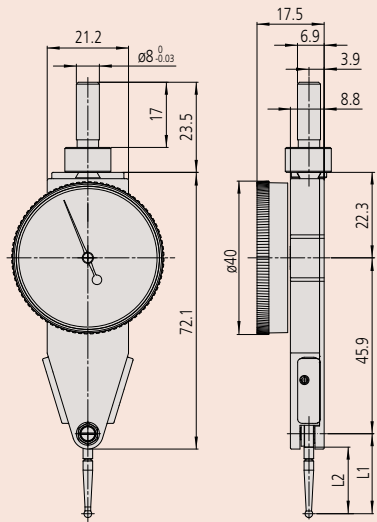
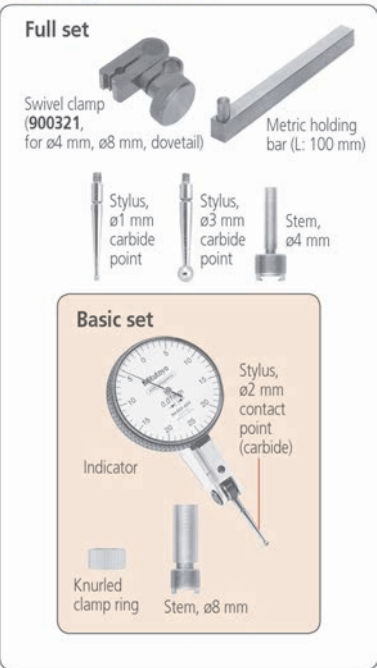
Contact point Thread M 1,7 x 0,35

For optional accessories, see end of lever indicators section.

### Optional accessories

No.	Description
21AAB363	Limit Hands (Green) 2 pcs., Dial Indicator Series 1, Test Indicator

### Set Configuration: Metric



# Lever Indicator Universal Type

## Series 513

### Functions

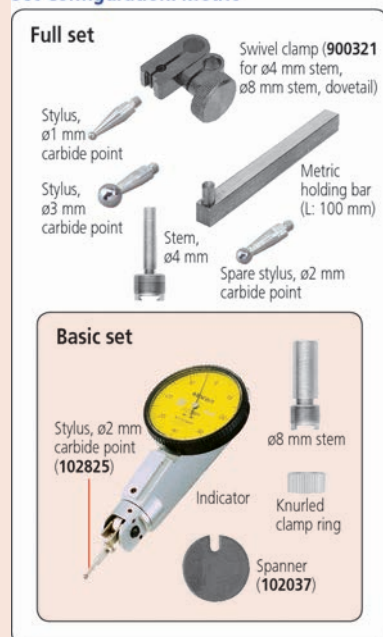
- Jeweled bearing

### Specifications

Contact point Thread M 1,4 x 0,3

For optional accessories, see end of lever indicators section.

### Set Configuration: Metric



## Series 513

This level indicator makes reading much easier as you can rotate its measuring head through 360°.

- Centered, bi-directional action for automatic reversal of measuring direction.
- Jewelled bearings and precision gears and pinions for smooth, accurate movement and quick response.



513-304-10E

### Metric

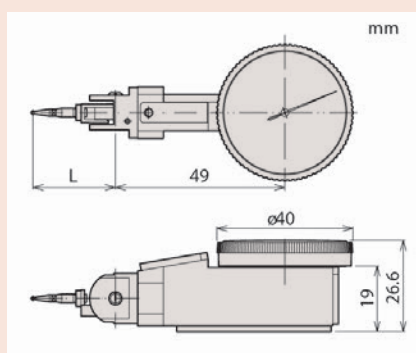
#### Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L [mm]	Mass [g]
513-304-10E	0,8	0,01 mm	0-40-0	≤ 0,3	102825	24	80

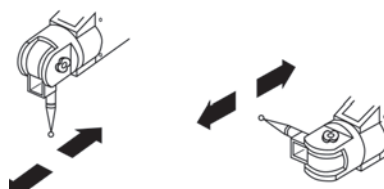
### Metric

#### Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	L [mm]	Mass [kg]
513-304-10T	0,8	0,01 mm	0-40-0	≤ 0,3	102825	24	80



No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-304-10E	5	8	3	3	5	6		8	3	3
513-304-10T	5	8	3	3	5	6		8	3	3



Stylus can be set at any angle while keeping the dial stationary

# Lever Indicator Small Type

## Series 513

This is a small type dial test indicator (lever type) which offers you the following benefits:

- Reversible measuring direction (clutch type)
- Jeweled bearings assure higher sensitivity and accuracy.



### Metric

#### Basic set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	C [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-501E	0,14	0,001 mm	0-70-0	≤ 0,4	136104	41,1	12,1	8,6	41
513-503E	0,2	0,002 mm	0-100-0	≤ 0,4	103010	43,7	14,7	11,2	41
513-514E	0,5	0,01 mm	0-25-0	≤ 0,3	131324	66,8	36,8		41
513-517E	0,8	0,01 mm	0-40-0	≤ 0,3	103006	49,9	20,9	17,4	41
513-517WE	0,8	0,01 mm	0-40-0	≤ 0,3	21CZA097	49,9	20,9	17,4	41
513-527E	0,8	0,01 mm	0-40-0	≤ 0,3	103010		14,7	11,2	36

### Metric

#### Full set

No.	Range [mm]	Graduation	Scale	Measuring force [N]	Carbide stylus tip ø2 mm No.	C [mm]	L1 [mm]	L2 [mm]	Mass [g]
513-501T	0,14	0,001 mm	0-70-0	≤ 0,4	136104	41,1	12,1	8,6	41
513-503T	0,2	0,002 mm	0-100-0	≤ 0,4	103010	43,7	14,7	11,2	41
513-514T	0,5	0,01 mm	0-25-0	≤ 0,3	131324	66,8	36,8		41
513-517T	0,8	0,01 mm	0-40-0	≤ 0,3	103006	49,9	20,9	17,4	41
513-517WT	0,8	0,01 mm	0-40-0	≤ 0,3	21CZA097	49,9	20,9	17,4	41
513-527T	0,8	0,01 mm	0-40-0	≤ 0,3	103010		14,7	11,2	36
513-515T	1	0,01 mm	0-50-0	≤ 0,3	136013	73,5	44,5	41	41

Series 513					
	513-517WE	513-517WT	513-514E up to 513-515T	513-527T	513-527E
<b>Functions</b>					
Jeweled bearing					
Compact type					
Long stylus					
Dustproof					

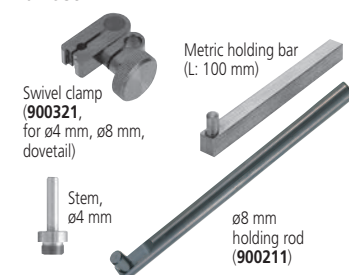
### Specifications

Contact point Thread M 1,7 x 0,35

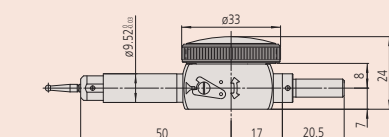
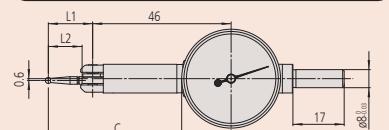
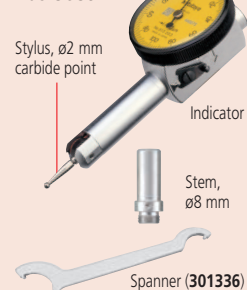
For optional accessories, see end of lever indicators section.

### Set Configuration: Metric

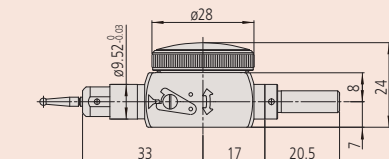
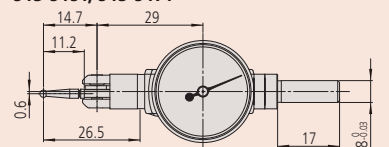
#### Full set



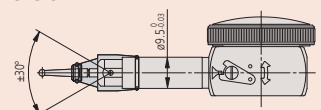
#### Basic set



513-501E, 513-501T, 513-503T, 513-514E, 513-514T, 513-515T, 513-517T



513-527



The stylus angle should be restricted within the range ±30° (as shown above) for dustproof models 513-517WE/T.

## Lever Indicator Small Type

No.	DIN 2270 (2016)				EN ISO 9493 (2010)					
	Error of indication over a range of		Hysteresis	Repeatability	Error of indication over a range of				Hysteresis	Repeatability
	MPE any 10 scale divisions	MPE measuring range			MPE any 10 scale divisions	MPE any half revolution	MPE any one revolution	MPE measuring range		
513-501E					2	3		3	2	1
513-503E	2	3	2	1	2	3		3	2	1
513-514E	5	10	4	3	5			10	4	3
513-517E	5	8	3	3	5	6		8	3	3
513-517WE	5	8	3	3	5	6		8	3	3
513-527E	5	8	3	3	5	6		8	3	3
513-501T	2	3	2	1	2	3		3	2	1
513-503T	2	3	2	1	2	3		3	2	1
513-514T	5	10	4	3	5			10	4	3
513-517T	5	8	3	3	5	6		8	3	3
513-517WT	5	8	3	3	5	6		8	3	3
513-527T	5	8	3	3	5	6		8	3	3
513-515T	5	10	4	3	5	8		10	4	3



# Styli, Stems and Holders

Stylus length affects the scale factor of an indicator, and the styli provided to you as standard give a scale factor of unity.



ø 0,5 mm ball-point



ø 0,7 mm ball-point



ø 1 mm ball-point Carbide



ø 2 mm ball-point Carbide



ø 2 mm ball-point Ruby



ø 3 mm ball-point Carbide

## Styli (for Metric Models)

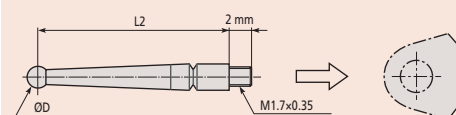
No.	Standard models	Small type models	L2 [mm]	Ø ball point
190547	●	●	11,2	0,5 mm steel
190549	●	●	17,4	0,5 mm steel
190654	●	●	18,7	0,5 mm steel
190656	●	●	41	0,5 mm steel
190548	●	●	11,2	0,7 mm steel
190550	●	●	17,4	0,7 mm steel
190653	●	●	18,7	0,7 mm steel
190655	●	●	41	0,7 mm steel
136756	●	●	8,6	1 mm carbide
21CZA044	●	●	9,4	1 mm carbide
103017	●	●	11,2	1 mm carbide
131314	●	●	15,2	1 mm carbide
103013	●	●	17,4	1 mm carbide
21CZA098	●	●	17,4	1 mm carbide*3
137558	●	●	18,7	1 mm carbide
102824	●	●	6,5	1 mm carbide*2
131316	●	●	33,9	1 mm carbide
136235	●	●	41	1 mm carbide
136104	●	●	8,6	2 mm carbide
21CZA036	●	●	9,4	2 mm carbide
103010	●	●	11,2	2 mm carbide
103011	●	●	15,2	2 mm carbide
103006	●	●	17,4	2 mm carbide
21CZA097	●	●	17,4	2 mm carbide*3
137557	●	●	18,7	2 mm carbide
102825	●	●	6,5	2 mm carbide*2
131324	●	●	33,9	2 mm carbide
136013	●	●	41	2 mm carbide
21CZA212	●	●	9,4	2 mm ruby
21CZA209	●	●	11,2	2 mm ruby
21CZB068	●	●	15,2	2 mm ruby
21CZA201	●	●	17,4	2 mm ruby
21CZA210	●	●	18,7	2 mm ruby
21CZA211	●	●	41	2 mm ruby
136758	●	●	8,6	3 mm carbide
21CZA045	●	●	9,4	3 mm carbide
103018	●	●	11,7	3 mm carbide
131315	●	●	15,2	3 mm carbide
103014	●	●	17,4	3 mm carbide
21CZA099	●	●	17,4	3 mm carbide*3
137559	●	●	18,7	3 mm carbide
102826	●	●	6,5	3 mm carbide*2
131317	●	●	33,9	3 mm carbide
136236	●	●	41	3 mm carbide

\*2 : Used extension 209829 for 513-304-10E, 513-304-10T

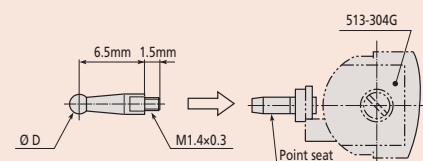
\*3 : For 513-517W models

## Optional accessories

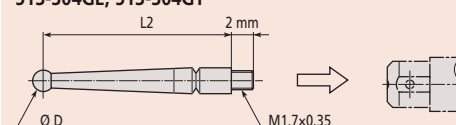
No.	Description
209829	Stylus Extension for Universal Type, Series 513



Styli for standard models



## Syli for universal type 513-304GE, 513-304GT




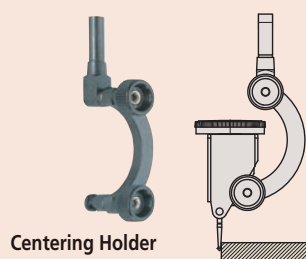
Styli for small type models

# Styli, Stems and Holders

## Styli, Stems and Holders







### Centering Holder

No.	Standard models	Stem
901959		ø 8 mm



Centering Holder  
901959

### Holding Bars

No.	Standard models	Small type models	L	Description
953638.			50 mm	9 x 9 mm
900209.			100 mm	9 x 9 mm
900211			115 mm	ø 8 mm





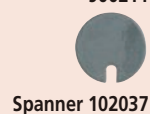
900209



900211

### Spanner

No.	Standard models	Small type models
102037		
301336		
















Spanner 102037



Spanner 301336

### Stems

No.	Standard models	Small type models	Diameter	Description
21CZB131			4 mm	Stem with knurled clamp ring
21CZB128			6 mm	Stem with knurled clamp ring
21CZB129			8 mm	Stem with knurled clamp ring
21CZB130			9,5 mm	Stem with knurled clamp ring
21CZB132			4 mm, 8 mm	2 stems with knurled clamp ring
21CZB133			4 mm, 9,5 mm	2 stems with knurled clamp ring
190322				Knurled clamp ring
21CAB106			4 mm	Stem
21CAB103			6 mm	Stem
21CAB104			8 mm	Stem
102036			4 mm	Stem
102389			6 mm	Stem
102822			8 mm	Stem



190322



902802



902804



102822





102389







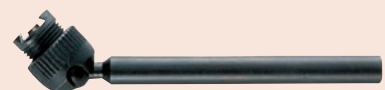
900321

### Swivel Clamps

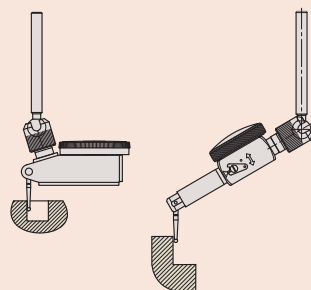
No.	Standard models	Small type models	Description
900321			For ø 4, 8 mm stems and dovetail

### Universal Holder

No.	Standard models	Small type models	Stem
21CZA229			ø 6 mm
21CZA233			ø 8 mm
21CZA230			
21CZA234			ø 8 mm



Universal Holder



Universal holder with standard type (left)  
Universal holder with small type (right)

# ABSOLUTE Digimatic Thickness Gauge

## Series 547

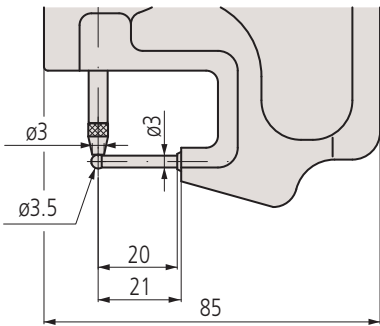
This ABSOLUTE Digimatic Thickness Gauge enables you to measure tube wall thickness.



547-360

Metric With indicator ID-C No. 543-400BS

No.	Range [mm]	Digital step	Indicator No.	Max. measuring depth [mm]	Mass [g]
547-360	0-10	0,01 mm	543-400BS (ID-C)	20	240



Functions	Series 547
ZERO/ABS	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
Lock function	●
PRESET	●
Calculation function	●
Counting direction switchable	●

### Specifications

Accuracy	±10 µm (excluding quantizing error)
Measuring force	≤ 1,5 N
Scale	Capacitance type ABSOLUTE linear encoder
Max. response speed	Unlimited
Contact point	Carbide ball M 2,5 x 0,45 mm
Alarm	Low voltage, counting value composition error, overflow error, tolerance limit setting error (only ID-C)
Power supply	1 battery SR-44
Battery life	approx. 7000 hours

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
21EZA198	Spindle Lifting Lever, for 12,7mm Range

# ABSOLUTE Digimatic Thickness Gauge

## Series 547

ABSOLUTE®  
IP42

Functions	Series 547
ZERO/ABS	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
Lock function	●
PRESET	●
Calculation function	●
Counting direction switchable	●

### Specifications

Accuracy	±10 μm (excluding quantizing error)
Measuring force	≤ 1,5 N
Scale	Capacitance type ABSOLUTE linear encoder
Parallelism	10 μm
Max. response speed	Unlimited
Contact point	M 2,5 x 0,45 mm (ISO/JIS type)
Alarm	Low voltage, counting value composition error, overflow error, tolerance limit setting error (ID-C only)
Power supply	1 battery SR-44
Battery life	approx. 7000 hours

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
21EZA198	Spindle Lifting Lever, for 12,7mm Range



547-321



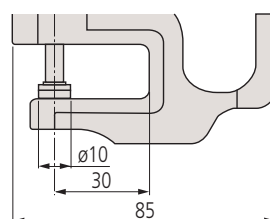
547-301

547-313

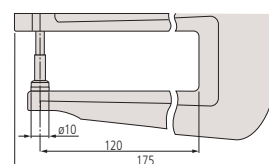
547-315

Metric With indicator ID-C No. 543-400BS

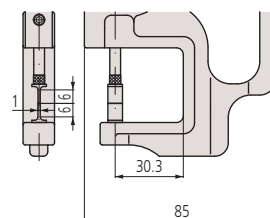
No.	Range [mm]	Digital step	Max. measuring depth [mm]	Type	Mass [g]
547-301	0-10	0,01 mm	30	Ceramic disc contact points	255
547-321	0-10	0,01 mm	120	Ceramic disc contact points and large jaw capacity	425
547-313	0-10	0,01 mm	30	Adjustable anvil	275
547-315	0-10	0,01 mm	30	Blade steel contact point	270



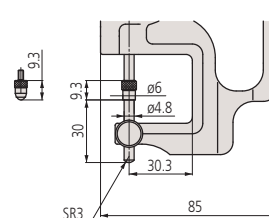
547-301



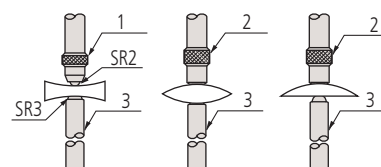
547-321



547-315



547-313



Concave lens      Convex lens      Plano-convex lens  
1: Ballpoint; 2: Flatpoint; 3: Anvil

(only for 547-313)

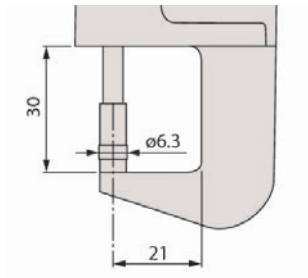
# ABSOLUTE Digimatic Thickness Gauge

## Series 547

For measuring film, paper, etc., with a resolution of 0,001 mm.



547-401



### Metric

No.	Range [mm]	Digital step	Indicator No.	Max. measuring depth [mm]	Mass [g]
547-401	0-12	0,01 mm/0,001 mm	543-390BS (ID-C)	21	290

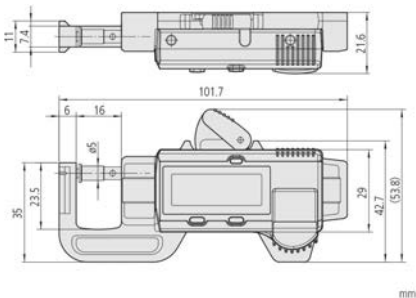
# Quick Mini Thickness Gauge

## Series 700

This is a lightweight, palm-sized thickness gauge.



700-119-30



No.	Range [mm]	Digital step	Mass [g]
700-119-30	0-12	0,01 mm	70



Functions	Series 547
ZERO/ABS	●
GO/±NG judgement	●
Digimatic data output	●
ON/OFF	●
DATA/HOLD	●
Lock function	●
PRESET	●
Calculation function	●
Counting direction switchable	●

### Specifications

Accuracy	±3 µm (excluding quantizing error)
Measuring force	≤ 3,5 N
Scale	Capacitance type ABSOLUTE linear encoder
Parallelism	3 µm
Max. response speed	Unlimited
Contact point	M 2,5 x 0,45 mm (ISO/JIS type) carbide tip
Alarm	Low voltage, counting value composition error, overflow error, tolerance limit setting error
Power supply	1 battery SR-44
Battery life	approx. 7000 hours

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type

### Consumable spares

No.	Description
938882	Battery SR44 1.5V
21AZB149	Lifting Lever, S-Type Series 2,3,4 (up to 10mm)

Functions	Series 700
ORIGIN	●
ZERO/ABS	●
ON/OFF	●

### Specifications

Accuracy	±0,02 mm (excluding quantizing error)
Power supply	Battery SR-44
Measuring force	2 N
Battery life	approx. 5 years
Display	LCD, character height 9 mm
Delivered	In case

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



# Dial Indicator Thickness Gauge

## Series 7

This metric dial indicator thickness gauge 7331S has a lightweight design.

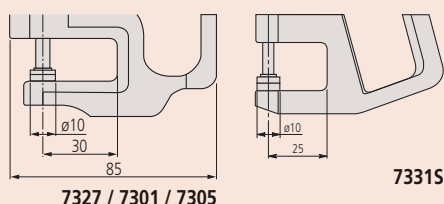
### Specifications

Accuracy	Refer to the list of specifications
Parallelism	5 µm

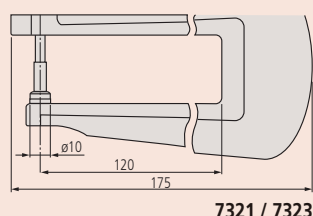
### Consumable spares

No.	Description
21AZB149	Lifting Lever, S-Type Series 2,3,4 (up to 10mm)
21AZB150	Lifting Lever, S-Type Series 2,3 (10-20mm)

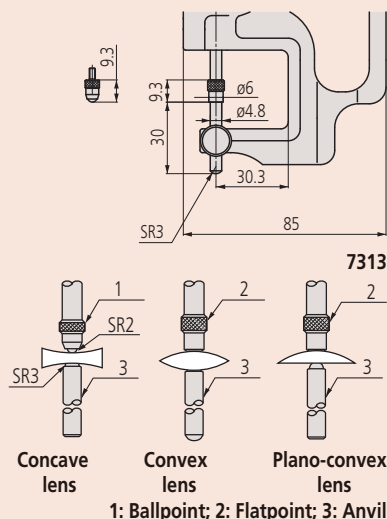
21AZB149 : for 7301/7327/7321/7313/7315/7360  
21AZB150 : for 7305/7323



7331S

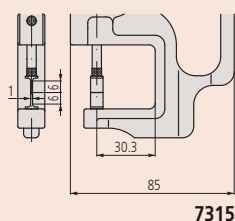


7321 / 7323

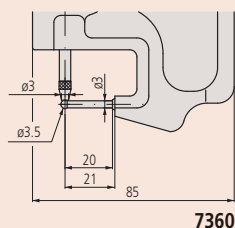


7313

Concave lens  
Convex lens  
Plano-convex lens  
1: Ballpoint; 2: Flatpoint; 3: Anvil



7315



7360



7327



7331S



7321



7313



7315



7360

### Metric Adjustable anvil

No.	Range [mm]	Graduation	Accuracy	Measuring force [N]	Indicator No.	Max. measuring depth	Mass [g]
7313	0-10	0,01 mm	±0,015 mm	≤ 1,4	2046SB	30 mm	215

### Metric Ceramic disc contact points

No.	Range [mm]	Graduation	Accuracy	Measuring force [N]	Indicator No.	Max. measuring depth	Mass [g]
7327	0-1	0,001 mm	±0,005 mm	≤ 1,5	2109SB-10	30 mm	225
7301	0-10	0,01 mm	±0,015 mm	≤ 1,4	2046SB	30 mm	205
7331S	0-10	0,01 mm	±0,02 mm	≤ 1,4		25 mm	140
7305	0-20	0,01 mm	±0,02 mm	≤ 2	2050SB	30 mm	220

### Metric Knife-edge contact point

No.	Range [mm]	Graduation	Accuracy	Measuring force [N]	Indicator No.	Max. measuring depth	Mass [g]
7315	0-10	0,01 mm	±0,015 mm	≤ 1,4	2046SB	30 mm	220

### Metric Large jaw capacity and ceramic disc contact points

No.	Range [mm]	Graduation	Accuracy	Measuring force [N]	Indicator No.	Max. measuring depth	Mass [g]
7321	0-10	0,01 mm	±0,015 mm	≤ 1,4	2046SB	120 mm	355
7323	0-20	0,01 mm	±0,022 mm	≤ 2	2050SB	120 mm	355

### Metric Tube thicknesses - Minimum inside diameter 3,5 mm

No.	Range [mm]	Graduation	Accuracy	Measuring force [N]	Indicator No.	Max. measuring depth	Mass [g]
7360	0-10	0,01 mm	±0,015 mm	≤ 1,4	2046SB	20 mm	200

# Internal Dial Caliper Gauge

Series 209



209-901

**Metric** Measuring contacts : Carbide ball  $\varnothing 0,6$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A <sup>(2)</sup> [mm]	B <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-301	5-15	0,015 mm	0,8-1,2 N	0,005	2,3	0,8	35	Fig. 4	160

**Metric** Measuring contacts : Carbide ball  $\varnothing 1,0$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A <sup>(2)</sup> [mm]	B <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-302	10-30	0,03 mm	1,1-1,6 N	0,01	5,2	1,2	85	Fig. 4	180
209-303	20-40	0,03 mm	1,1-1,6 N	0,01	7	1,2	85	Fig. 2	180
209-304	30-50	0,03 mm	1,1-1,6 N	0,01	7	1,2	85	Fig. 2	185
209-305	40-60	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	195
209-306	50-70	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	195
209-307	60-80	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	200
209-308	70-90	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	200
209-309	80-100	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	200

**Metric** Measuring contacts : Carbide ball  $\varnothing 1,5$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A <sup>(2)</sup> [mm]	B <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-901	15-65	0,05 mm	0,9-1,9 N	0,05	5,5	1,9	188	Fig. 4	355

**Metric** Measuring contacts : Carbide ball  $\varnothing 2,0$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A <sup>(2)</sup> [mm]	B <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-902	40-90	0,05 mm	0,9-1,9 N	0,05	8,3	2,4	192	Fig. 3	370
209-903	70-120	0,05 mm	0,9-1,9 N	0,05	8,3	2,4	192	Fig. 3	380

**Metric** Measuring contacts : Carbide bevel (radius 0,1 mm)

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A <sup>(2)</sup> [mm]	B <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-300	2,5-12,5	0,015 mm	0,8-1,2 N	0,005	0,7	0,4	12	Fig. 1	155

**Metric** Measuring contacts : Interchangeable, carbide ball  $\varnothing 1,0$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A <sup>(2)</sup> [mm]	B <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-310	50-100	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 5	220
209-311	90-140	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 5	230
209-312	130-180	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 5	230

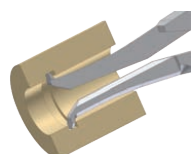


Figure 1

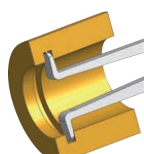


Figure 2

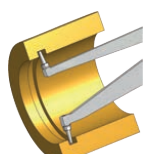


Figure 3

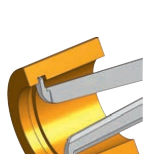


Figure 4



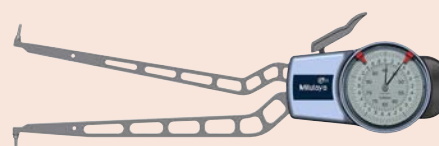
Figure 5



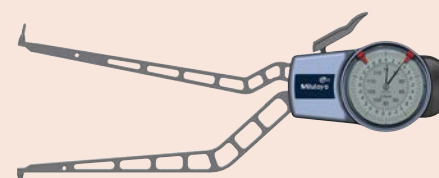
209-300



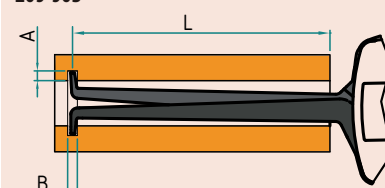
209-305



209-902



209-903



- (1) Maximum reach of contact arms over workpiece
- (2) Maximum groove depth
- (3) Minimum groove width

# Internal Digimatic Caliper Gauge

## Series 209



209-905

Functions	Series 209
SET key	●
DATA key	●
Max. reading	●
Min. reading	●
ABS/INC switchable	●
HOLD function	●
Data output	●
Tolerance LED (green/red)	●
Tolerance judgement	●
Counting direction switchable	●

### Specifications

Power supply	2 batteries AAA
Delivered	Including battery and inspection certificate

### Optional accessories

No.	Description
011551	Digimatic Data Output Series 209, For series 209
937387	Digimatic Cable, Round 6-Pin Type, 1m
965013	Digimatic Cable, Round 6-Pin Type, 2m
06AFM380E	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Round 6-Pin Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790E	U-WAVE-T Connection Cable E, Round 6-Pin Type
011530	Holder for Digital Caliper Gauge, 8mm stem for gauge stand

### Consumable spares

No.	Description
011511-1	Battery LR03 (AAA), 4x

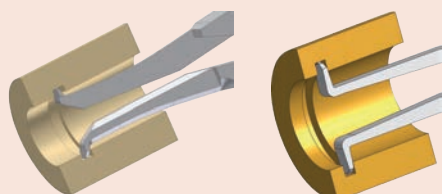


Figure 1

Figure 2

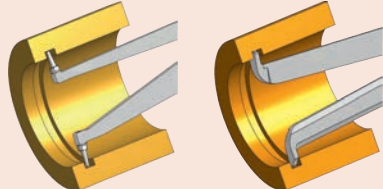
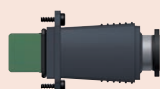


Figure 3

Figure 4



011551



011530

- (1) Maximum reach of contact arms over workpiece  
(2) Maximum groove depth  
(3) Minimum groove width

Metric/Inch Measuring contacts : Carbide ball  $\phi 0,6$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-551	5-15	0,015 mm	0,8-1,2 N	0,005	2,3	0,8	35	Fig. 4	230

Metric/Inch Measuring contacts : Carbide ball  $\phi 1,0$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-552	10-30	0,03 mm	1,1-1,6 N	0,01	5,2	1,2	85	Fig. 4	250
209-553	20-40	0,03 mm	1,1-1,6 N	0,01	7	1,2	85	Fig. 2	250
209-554	30-50	0,03 mm	1,1-1,6 N	0,01	7	1,2	85	Fig. 2	255
209-555	40-60	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	265
209-556	50-70	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	265
209-557	60-80	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	270
209-558	70-90	0,03 mm	1,1-1,6 N	0,01	8,3	1,2	85	Fig. 3	270

Metric/Inch Measuring contacts : Carbide ball  $\phi 1,3$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-904	13-43	0,04 mm	1,2-1,7 N	0,02	5,7	1,5	127	Fig. 2	360

Metric/Inch Measuring contacts : Carbide ball  $\phi 1,5$  mm

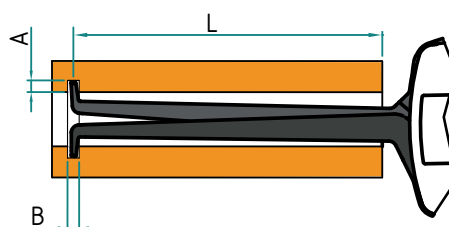
No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-905	15-65	0,06 mm	1-1,8 N	0,02	5,5	1,9	188	Fig. 2	415
209-906	30-60	0,04 mm	1,2-1,7 N	0,02	6,2	1,8	132	Fig. 3	370

Metric/Inch Measuring contacts : Carbide ball  $\phi 2,0$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-907	50-80	0,04 mm	1,2-1,7 N	0,02	8,3	2,4	132	Fig. 3	370
209-908	70-100	0,04 mm	1,2-1,7 N	0,02	8,3	2,4	132	Fig. 3	375
209-909	90-120	0,04 mm	1,2-1,7 N	0,02	8,3	2,4	132	Fig. 3	380
209-910	40-90	0,06 mm	1-1,8 N	0,02	8,3	2,4	192	Fig. 3	420

Metric/Inch Measuring contacts : Carbide bevel (radius 0,1 mm)

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-550	2,5-12,5	0,015 mm	0,8-1,2 N	0,005	0,7	0,4	12	Fig. 1	225



# External Dial Caliper Gauge

Series 209



**Metric** Measuring contacts: bevel radius: 0,4 mm (209-405), 0,75 (209-921)

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	Hf <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-405	0-20	0,03 mm	1,1-1,6 N	0,01	24,6	24,6	85	Fig. 1	210
209-921	0-50	0,05 mm	0,8-1,7 N	0,05	30	30	167	Fig. 2	430

**Metric** Measuring contacts: Carbide ball Ø 1,5 mm, Ø 3 mm (209-911)

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	Hf <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-911	0-50	0,05 mm	0,8-1,7 N	0,05	30	30	167	Fig. 2	430
209-402	0-10	0,015 mm	0,8-1,2 N	0,005	19,1	18,6	35	Fig. 2	170
209-404	0-20	0,03 mm	1,1-1,6 N	0,01	24,7	24,6	85	Fig. 2	210
209-407	0-20	0,03 mm	1,1-1,6 N	0,01	24,7	2,5	85	Fig. 4	200

**Metric** Measuring contacts : Carbide ball ø 1,5 mm / bevel radius 0,4 mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-401	0-10	0,015 mm	0,8-1,2 N	0,005	18,8	35	Fig. 8	165
209-406	0-20	0,03 mm	1,1-1,6 N	0,01	24,7	80	Fig. 3	200

**Metric** Measuring contacts : Carbide ball ø2 mm / hardened steel radius 0,5 mm

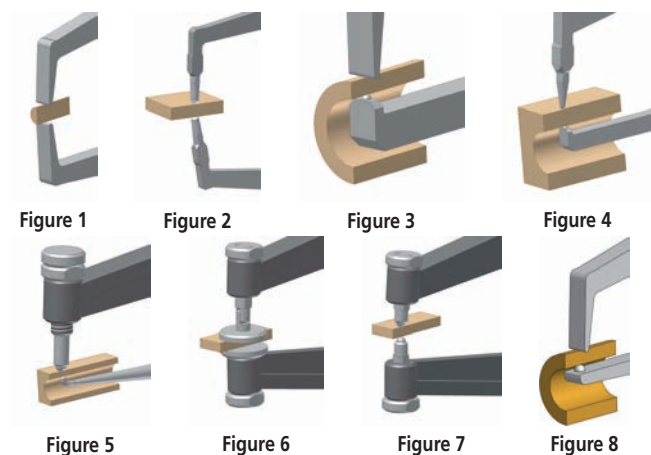
No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-603	0-10	0,1 mm	0,3-1,3 N	0,1	5	36	Fig. 5	40

**Metric** Measuring contacts : Carbide ball ø3 mm (209-912), ø2 mm (209-843)

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	Hf <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-912	0-50	0,05 mm	0,8-1,7 N	0,05	30	4,3	169	Fig. 4	400
209-843	0-10	0,1 mm	0,3-1,3 N	0,1	5	5	36	Fig. 7	40

**Metric** Measuring contacts : Disc measuring faces ø6 mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	Hf <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-403	0-10	0,02 mm	0,8-1,2 N	0,005	21,7	14,8	36	Fig. 6	175



## Optional accessories

No.	Description
011530	Holder for Digital Caliper Gauge, 8mm stem for gauge stand

Except 209-603, 209-843



209-402



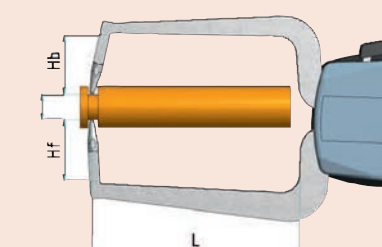
209-405



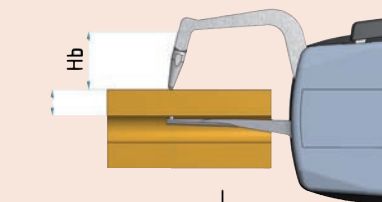
209-406



209-843



Figures 1/2/6/7



Figures 3/4/5/8

- (<sup>1</sup>) Maximum reach of contact arms over workpiece  
 (<sup>2</sup>) Maximum penetration depth of upper contact  
 (<sup>3</sup>) Maximum penetration depth of lower contact



# External Digimatic Caliper Gauge

## Series 209



Functions	Series 209
SET key	●
DATA key	●
Max. reading	●
Min. reading	●
ABS/INC switchable	●
HOLD function	●
Data output	●
Tolerance LED (green/red)	●
Tolerance judgement	●
Counting direction switchable	●

### Specifications

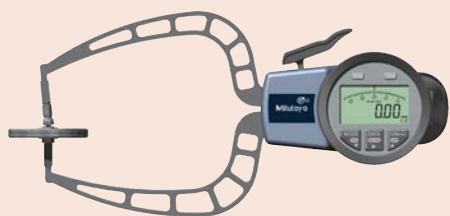
Power supply	2 batteries AAA
Delivered	Including battery and certificate of inspection

### Optional accessories

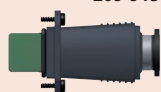
No.	Description
011551	Digimatic Data Output Series 209, For series 209
937387	Digimatic Cable, Round 6-Pin Type, 1m
965013	Digimatic Cable, Round 6-Pin Type, 2m
06AFM380E	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Round 6-Pin Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790E	U-WAVE-T Connection Cable E, Round 6-Pin Type
011530	Holder for Digital Caliper Gauge, 8mm stem for gauge stand

### Consumable spares

No.	Description
011511-1	Battery LR03 (AAA), 4x



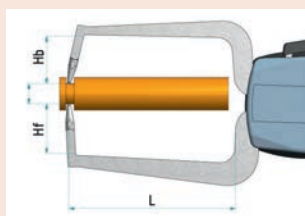
209-915



011551



011530



- (1) Maximum reach of contact arms over workpiece  
 (2) Maximum penetration depth of upper contact  
 (3) Maximum penetration depth of lower contact



209-572



209-913

Measuring contacts : Carbide ball  $\phi 1,5$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb (2) [mm]	Hf (3) [mm]	L (1) [mm]	Type	Mass [g]
209-570	0-10	0,015 mm	0,8-1,2 N	0,005	19,1	18,6	35	Fig. 1	240
209-572	0-20	0,03 mm	1,1-1,6 N	0,01	24,7	24,6	85	Fig. 1	280
209-573	0-20	0,03 mm	1,1-1,6 N	0,01	24,7	2,5	80	Fig. 2	270

Measuring contacts : Carbide ball  $\phi 3,0$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb (2) [mm]	Hf (3) [mm]	L (1) [mm]	Type	Mass [g]
209-913	0-30	0,04 mm	0,9-1,6 N	0,02	30	30	114	Fig. 1	430
209-914	0-30	0,04 mm	0,9-1,6 N	0,02	30	4	116	Fig. 2	410

Measuring contacts : Disc measuring faces  $\phi 10$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb (2) [mm]	Hf (3) [mm]	L (1) [mm]	Type	Mass [g]
209-571	0-10	0,02 mm	0,8-1,2 N	0,005	21,7	14,8	35	Fig. 3	245

Measuring contacts : Disc measuring faces  $\phi 50$  mm

No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb (2) [mm]	Hf (3) [mm]	L (1) [mm]	Type	Mass [g]
209-915	0-30	0,04	0,9-1,6 N	0,02	36	24	116	Fig. 4	430



Figure 1

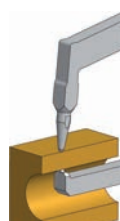


Figure 2



Figure 3

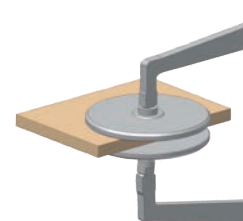


Figure 4

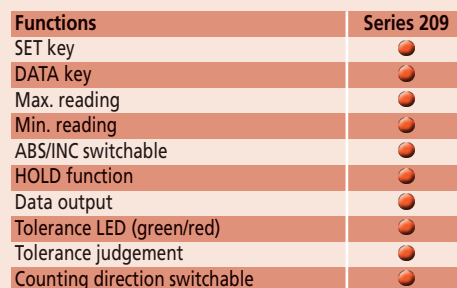


## Series 209



No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	Hf <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-918	0-50	0,06 mm	0,8-1,7 N	0,02	30	30	167	Fig. 1	490
209-919	0-50	0,06 mm	0,8-1,7 N	0,02	30	4,3	169	Fig. 2	460

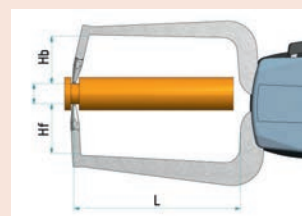
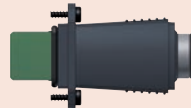
No.	Range [mm]	Accuracy	Measuring force	Graduation [mm]	Hb <sup>(2)</sup> [mm]	Hf <sup>(3)</sup> [mm]	L <sup>(1)</sup> [mm]	Type	Mass [g]
209-920	0-50	0.08 mm	0.8-1.7 N	0.02	36	24	167	Fig. 3	500



Power supply	2 batteries LR3 AAA
Delivered	Including battery and certificate of inspection

No.	Description
937387	Digimatic Cable, Round 6-Pin Type, 1m
965013	Digimatic Cable, Round 6-Pin Type, 2m
06AFM380E	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Round 6-Pin Type
02AZD790E	U-WAVE-T Connection Cable E, Round 6-Pin Type
011530	Holder for Digital Caliper Gauge, 8mm stem for gauge stand
011551	Digimatic Data Output Series 209, For series 209

No.	Description
011511-1	Battery LR03 (AAA), 4x



- (1) Maximum reach of contact arms over workpiece
- (2) Maximum penetration depth of upper contact
- (3) Maximum penetration depth of lower contact

# Internal / External Digimatic Caliper Gauge

## Series 209



Functions	Series 209
SET key	●
DATA key	●
ABS/INC switchable	●
Function lock	●
Data output	●
HOLD	●
mm / inch switching	●
DATA-Logger (100 measured values)	●
Max/Min value	●
Tolerance LED (green/red)	●
Counting direction switchable	●
Auto Power OFF	●
after 1/5/10 min. non use	●

### Specifications

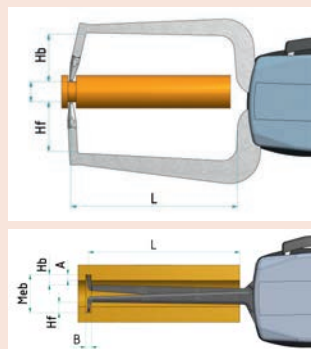
Power supply	Lithium-Polymer power pack
Delivered	Including certificate of inspection and wireless recharge charging pad
Resolution	0,001 / 0,002 / 0,005 / 0,01 mm

### Optional accessories

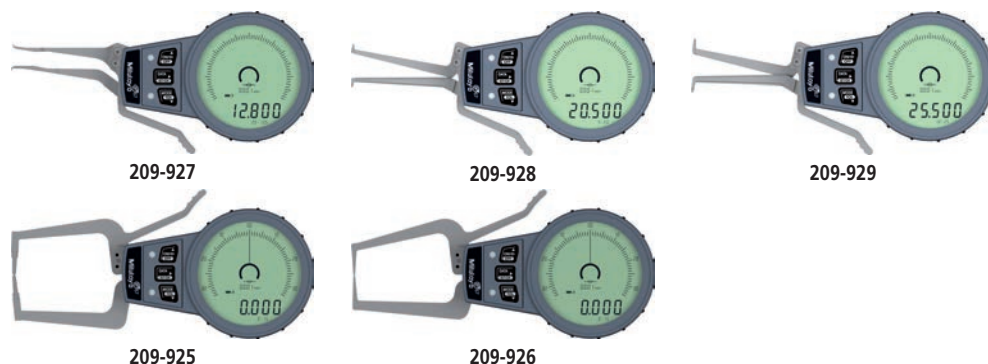
No.	Description
63AAA158	Digimatic Interface Adapter, Series 209
937387	Digimatic Cable, Round 6-Pin Type, 1m
965013	Digimatic Cable, Round 6-Pin Type, 2m
06AFM380E	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Round 6-Pin Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790E	U-WAVE-T Connection Cable E, Round 6-Pin Type
63AAA159	Power Supply Pad for Series 209



63AAA159



- (1) Maximum reach of contact arms over workpiece  
 (2) Maximum penetration depth of upper contact  
 (3) Maximum penetration depth of lower contact



#### 1. Measuring contacts : Carbide R 0,12 mm

No.	Range [mm]	Accuracy	Measuring force	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-927	2,5-12,5	0,01 mm	0,8-1,3 N	0,7	0,6	12	Fig. 4	160

#### 2. Measuring contacts : Carbide ball ø0,6 mm

No.	Range [mm]	Accuracy	Measuring force	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-928	5-20	0,01 mm	0,8-1,3 N	2,2	0,8	44	Fig. 3	160

#### 3. Measuring contacts : Carbide ball ø1,0 mm

No.	Range [mm]	Accuracy	Measuring force	A (2) [mm]	B (3) [mm]	L (1) [mm]	Type	Mass [g]
209-929	10-25	0,01 mm	0,8-1,3 N	4	1,5	46	Fig. 3	160

#### 4. Measuring contacts : Carbide ball ø1,5 mm

No.	Range [mm]	Accuracy	Measuring force	Hb (2) [mm]	Hf (3) [mm]	L (1) [mm]	Type	Mass [g]
209-925	0-15	0,01 mm	1,3 - 1,5 N	17	17	45	Fig. 2	170

#### 5. Measuring contacts : Carbide R 0,4 mm

No.	Range [mm]	Accuracy	Measuring force	Hb (2) [mm]	Hf (3) [mm]	L (1) [mm]	Type	Mass [g]
209-926	0-15	0,015 mm	1,3 - 1,5 N	12	12	45	Fig. 1	170

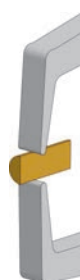


Figure 1

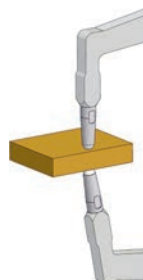


Figure 2

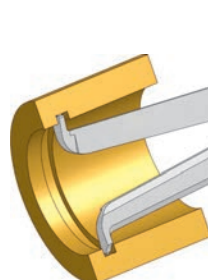


Figure 3

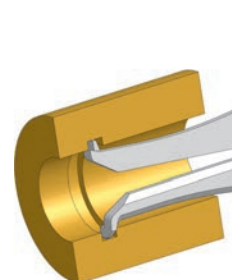


Figure 4

# Spring Balance

## Series 546

This spring balance has a range of applications, offering you the following benefits:

- You can set micro switches, relay springs and valves.
- It enables you testing the measuring force of dial indicators.
- You can also use it for adjusting tension and compression springs.
- A divided dial plate allows you to make measurements in both directions.



### Peak Hold

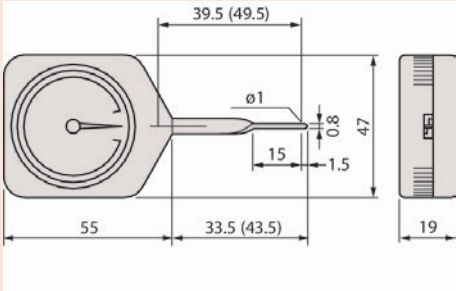
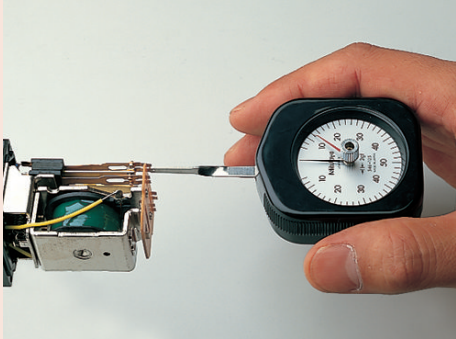
No.	Range	Graduation
546-133	10-100 mN	5 mN
546-134	30-300 mN	10 mN
546-135	0,06-0,5 N	0,02 N
546-136	0,1-1 N	0,05 N
546-137	0,15-1,5 N	0,05 N
546-138	0,3-3 N	0,1 N
546-139	0,6-5 N	0,2 N

### Standard

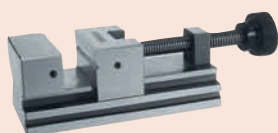
No.	Range	Graduation
546-112	6-50 mN	2 mN
546-113	10-100 mN	5 mN
546-114	30-300 mN	10 mN
546-115	0,06-0,5 N	0,02 N
546-116	0,1-1 N	0,05 N
546-117	0,15-1,5 N	0,05 N
546-118	0,3-3 N	0,1 N
546-119	0,6-5 N	0,2 N

## Specifications

Accuracy	1/2 graduation
Mass	56 g



Dimensions in brackets refer to No. 546-112, 546-113, 546-133



**Stands, Bench Tools, Vices, V-Blocks, Plates,  
Protectors, Levels, Squares, Rules, Spring Calipers**  
Page 300

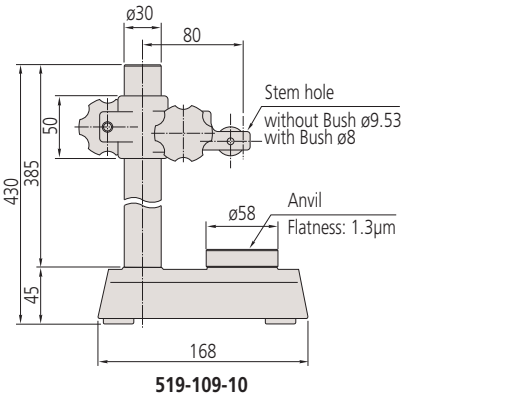
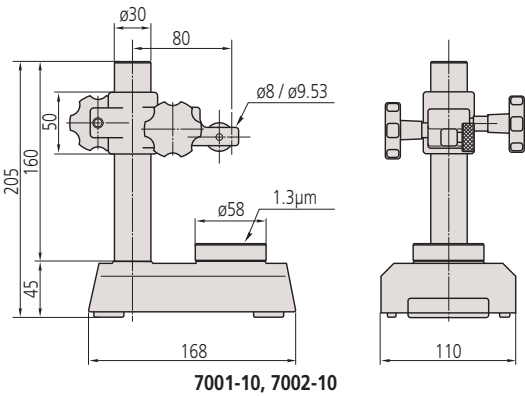
# Gauge Stand with Hardened Steel Anvil

## Series 7

### Standard version



No.	Effective table dimensions [mm]	Column Ø [mm]	Max. measurement height [mm]	Measuring table	Stem hole ø [mm]	Mass [kg]
7001-10	Ø 58	30	95	Serrated (101462)	ø 3/8" / 9,53 mm , 8 mm with bush (standard accessory)	4
7002-10	Ø 58	30	95	Flat (101461)	ø 3/8" / 9,53 mm , 8 mm with bush (standard accessory)	4
519-109-10	Ø 58	30	318	Serrated (101462)	ø 3/8" / 9,53 mm , 8 mm with bush (standard accessory)	6



### Specifications

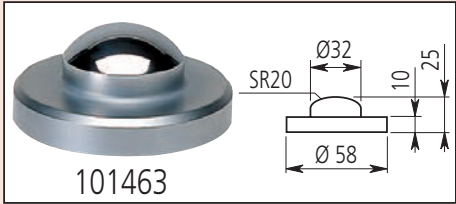
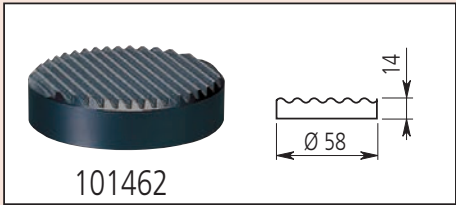
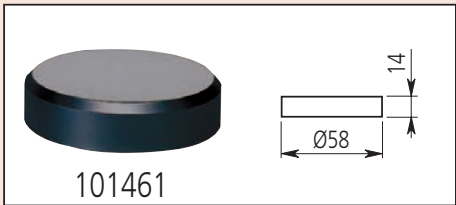
Fine adjustment	1 m
Perpendicularity table-stem hole	0,4/100 mm/mm
Table flatness	1,3 µm µm

### Standard accessories

No.	Description
101461	Flat Anvil for Gauge Stand, Ø58mm
101462	Serrated Anvil for Gauge Stand, Ø58mm
21JAA316	Stem Bush for Gauge Stand, 9,53mm to 8mm

### Optional accessories

No.	Description
101463	Convex Anvil for Gauge Stand, Ø58mm





# Gauge Stand with Hardened Steel Anvil

## Series 215, Series 7

### Specifications

Fine adjustment	1 mm (215-505-10: screw on column)
Perpendicularity table-stem hole	0,4/100 mm/mm
Table flatness	1,3 µm (7007-10) 2,3 µm (215-405-10, 215-505-10) µm

### Standard accessories

No.	Description
21JAA316	Stem Bush for Gauge Stand, 9,53mm to 8mm
21JAA329	Stem Bush for Gauge Stand, 20mm to 8mm
21JAA330	Stem Bush for Gauge Stand, 20mm to 9,53mm

21JAA316 only for 7007-10 + 215-405-10  
21JAA329 and 21JAA330 only for 215-505-10

### Optional accessories

No.	Description
21JAA331	Stem Bush for Gauge Stand, 20mm to 15mm

21JAA331 : only for 215-505-10



7007-10

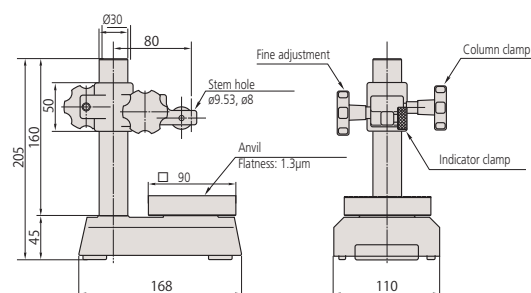


215-405-10

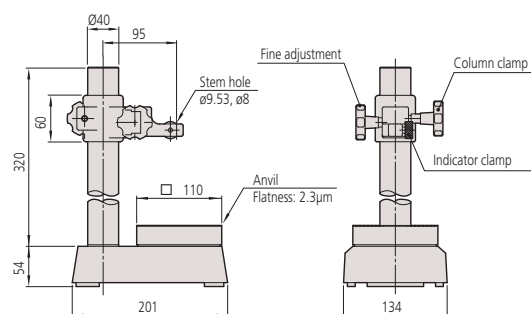


215-505-10 with Linear Gauge (optional)

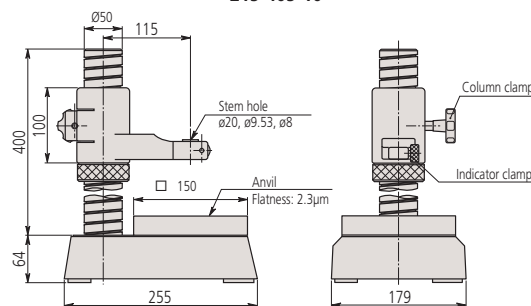
No.	Effective table dimensions [mm]	Column Ø [mm]	Max. measurement height [mm]	Stem hole ø [mm]	Mass [kg]
7007-10	90 x 90	30	90	ø 3/8" / ø 9,53 mm (ø 8 mm with bush)	5
215-405-10	110 x 110	40	235	ø 3/8" 9,53 mm (ø 8 mm with bush)	10,9
215-505-10	150 x 150	50	275	ø 20 mm (ø 3/8" / 9,53 mm 8 mm with bush)	19,7



7007-10



215-405-10



215-505-10

# Gauge Stand with Hardened Steel Anvil

## Series 913

### Standard version

- Simple standard version.



No.	Effective table dimensions [mm]	Max. measurement height [mm]	Stem hole ø [mm]
913-101	ø 50	100	8 mm
913-102	60 x 70	100	8 mm

### Specifications

Column Ø	22 mm
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### Optional accessories

No.	Description
913-201	Horizontal Holder, for 913-101, 913-102

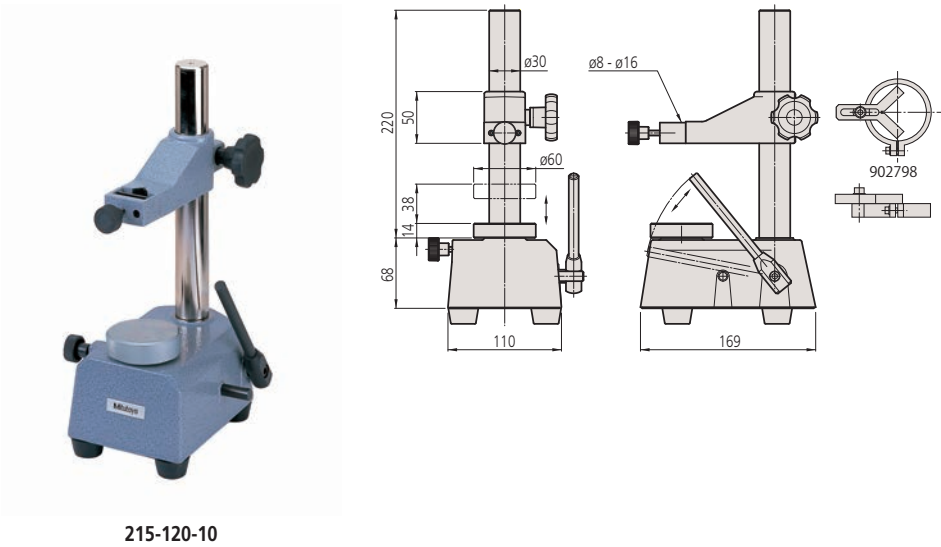


913-201

# Stand for Precision Bore Gauge

## Series 215

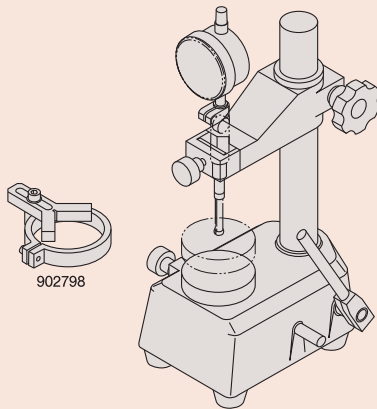
- For batch-measurement of small parts.



No.	Maximum measuring height [mm]	Measuring stroke [mm]	Effective table dimensions [mm]	Mass [kg]
215-120-10	110	max. 38	ø 60	6,5

### Optional accessories

No.	Description
902798	V-Attachment for 215-120-10, Stand for Bore Gauge



# Gauge Stand with Granite Base

## Series 912

This gauge stand comes with a wear-resistant black granite table.



912-101

No.	Base size [mm]	Effective table dimensions [mm]	Column Ø [mm]	Max. meas- urement height [mm]	Throat [mm]	Arm ø [mm]	Stem hole ø [mm]	Table flat- ness [μm]	Mass [kg]
912-101	150 x 100 x 40	100 x 100	16	180	150	16	8	2	2,8

## Series 912

- Black granite, fine diamond-lapped measuring table.
- Arm with 120 mm projection.



912-105

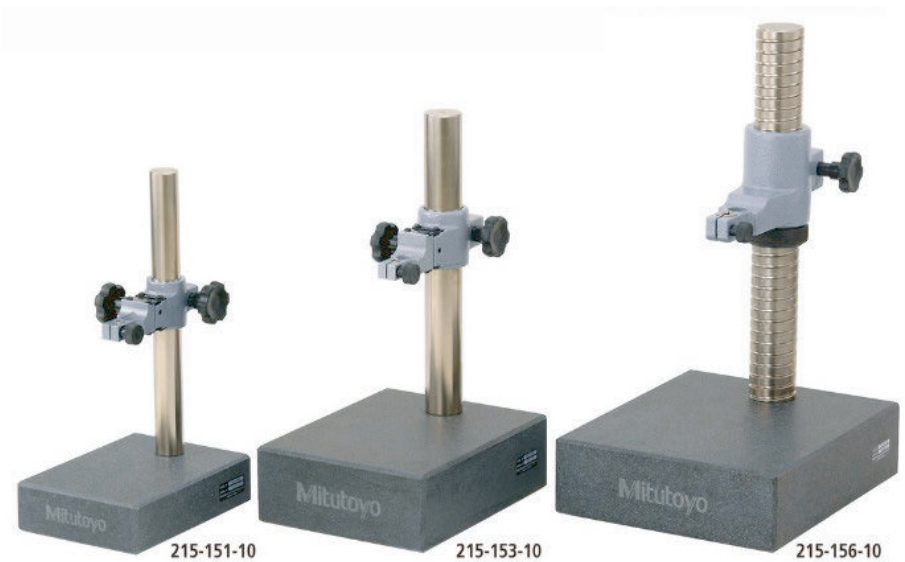
No.	Base size [mm]	Effective table dimensions [mm]	Column Ø [mm]	Max. meas- urement height [mm]	Throat [mm]	Fine ad- justment	Stem hole ø [mm]	Table flat- ness [μm]	Mass [kg]
912-105	260 x 140 x 50	200 x 140	35	180	120	8 mm	8	2	9,5

# Gauge Stand with Granite Base

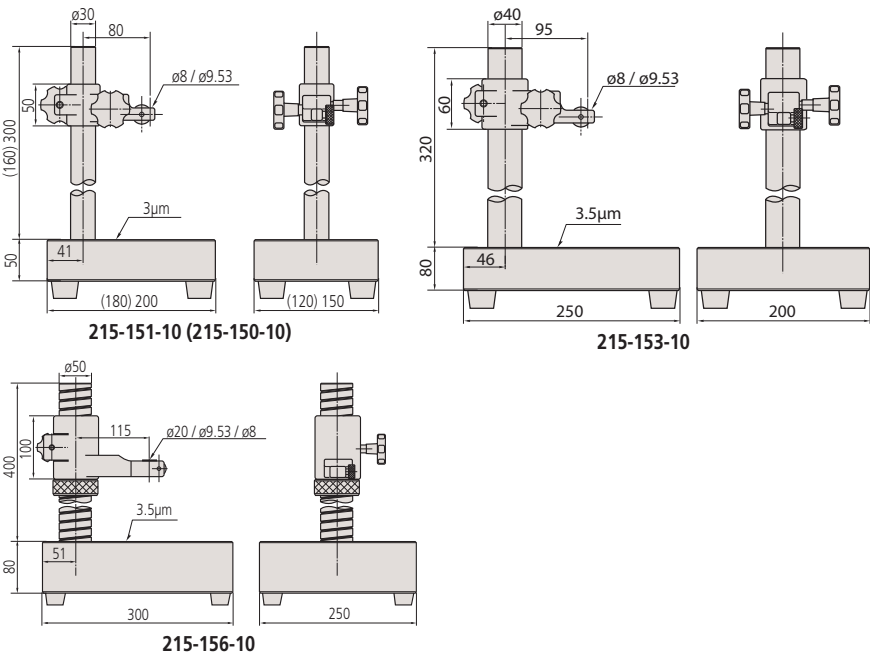
## Series 215

This jointed magnetic stand offers you the following benefits:

- It comes with a mechanical locking system and allows fine adjustment.
- You can also fix a dial indicator in any position by mechanically clamping the articulated arm.



No.	Column Ø [mm]	Max. meas- urement height [mm]	Fine ad- justment [mm]	Stem hole ø [mm]	Table flatness [µm]	Perpendiculi- ty table-stem hole [mm/mm]	Mass [kg]
215-150-10	30	120	1	ø 3/8" / ø 9,53mm (Ø 8 mm with bush)	3	0,2/100	5,4
215-151-10	30	260	1	ø 3/8" / ø 9,53mm (Ø 8 mm with bush)	3	0,2/100	7,5
215-153-10	40	250	1	ø 3/8" / ø 9,53mm (Ø 8 mm with bush)	3,5	0,2/100	16
215-156-10	50	300	1	ø 20 mm (ø 3/8" / 9,53 mm, 8 mm with bush)	3,5	0,2/100	27,5



## Standard accessories

No.	Description
21JAA316	Stem Bush for Gauge Stand, 9,53mm to 8mm
21JAA329	Stem Bush for Gauge Stand, 20mm to 8mm
21JAA330	Stem Bush for Gauge Stand, 20mm to 9,53mm

21JAA316 for 215-150-10, 215-151-10, 215-153-10  
21JAA329 and 21JAA330 for 215-156-10

## Optional accessories

No.	Description
21JAA331	Stem Bush for Gauge Stand, 20mm to 15mm

only for 215-156-10

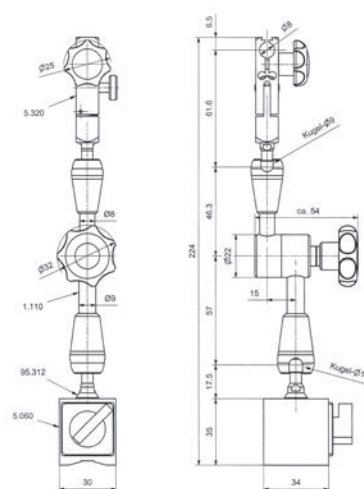
# Jointed Magnetic Stand

## Series 011

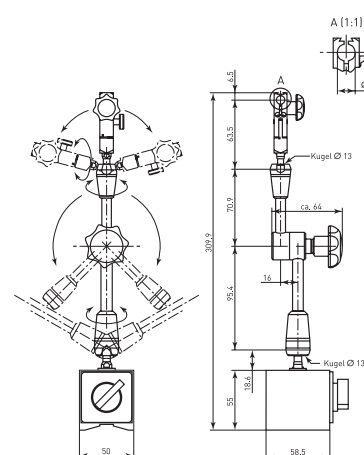
- With mechanical locking system and fine adjustment
- Allows a dial indicator to be fixed in any position by mechanically clamping the articulated arm.



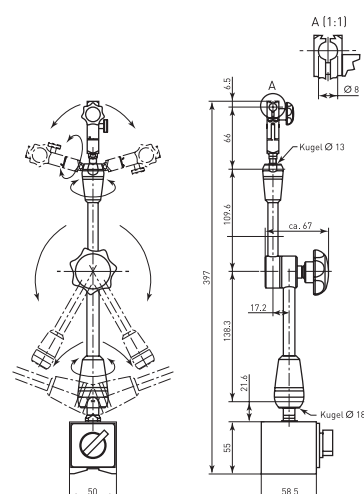
No.	Clamping device	Magnetic force (vertical) [N]	Base size (LxWxH) [mm]	Total height [mm]	Stem hole ø [mm]	Working radius [mm]	Thread Arm/Base	Mass [kg]
011533	magnetic	300	34 x 30 x 35	220	8	130	M6 x 1	0,45
011358	magnetic	750	60 x 50 x 55	310	8	200	M8 x 1,25	1,55
011359	magnetic	750	60 x 50 x 55	397	8	280	M8 x 1,25	1,85
011360	magnetic	900	75 x 50 x 55	517	8	400	M8 x 1,25	2,1



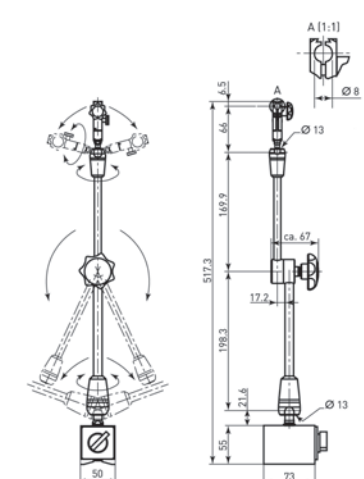
011533



011358



011359



011360



# Jointed Magnetic Stand

## Series 7

This jointed magnetic stand offers you the following benefits:

- It comes with a mechanical locking system and allows fine adjustment.
- You can also fix a dial indicator in any position by mechanically clamping the articulated arm.



7031B



7032B



7033B

No.	Clamping device	Magnetic force (vertical) [N]	Base size (LxWxH) [mm]	Fine adjustment °	Total height [mm]	Stem hole ø [mm]	Working radius [mm]	Thread Arm/ Base	Mass [kg]
7031B	magnetic	300	36 x 30 x 36	±4	214	6, 8, 3/8" / 9,53 mm	159	M5 x 0,8	0,59
7032B	magnetic	600	59 x 50 x 55	±4	345	6, 8, 3/8" / 9,53 mm	260	M8 x 1,25	1,6
7033B	magnetic	600	59 x 50 x 55	±4	425	6, 8, 3/8" / 9,53 mm	352	M8 x 1,25	1,75

# Flexible Jointed Arm

## Series 011 / 56A



56AAK793  
Mechanical clamping  
Dimensions: see 7033B

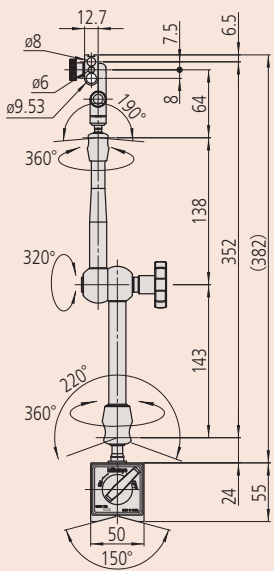


011361  
Mechanical clamping  
Dimensions : see 011359



011362  
Mechanical clamping  
Dimensions : see 011358

No.	Working radius [mm]	Stem hole ø [mm]
011361	±200	8
011362	±280	8
011363	±400	8
56AAK793	±320	6 mm, 8 mm, 3/8" / 9,53 mm



7033B

## Specifications

Thread	M 8 x 1,25 mm
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56AAL200

## Magnetic Base

Series 011 / 7

- V-block base type.

No.	Base size (LxWxH) [mm]	Threaded bore	Magnetic force (vertical) [N]	Mass [kg]
56AAL200	59 x 50 x 55	M 8 x 1,25 mm	600	1
011364	75 x 50 x 55	M 8 x 1,25 mm	900	1,25

## Magnetic Stand

Series 7

- V-block base type.

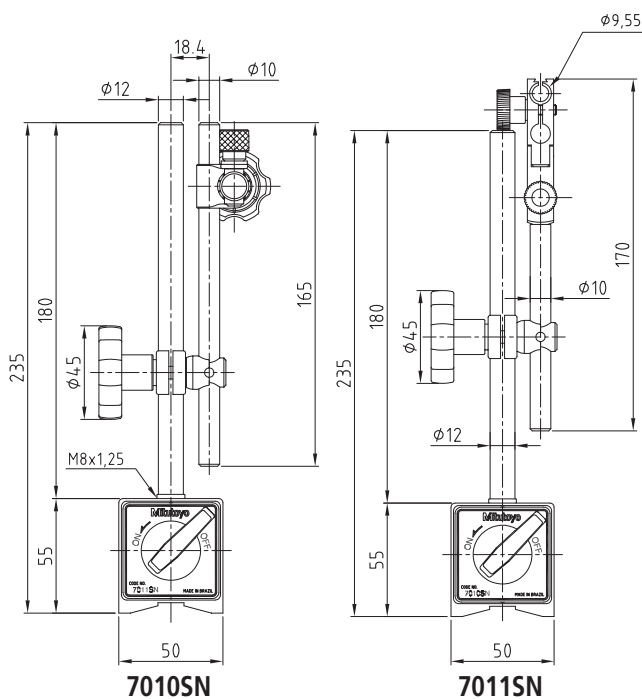


7010SN



7011SN

No.	Clamping device	Fine adjustment [mm]	Total height [mm]	Working radius [mm]	Mass [kg]	Thread Arm/Base
7010SN	magnetic	None	235	150	1,25	M8 x 1,25
7011SN	magnetic	yes	235	160	1,45	M8 x 1,25



7010SN

7011SN

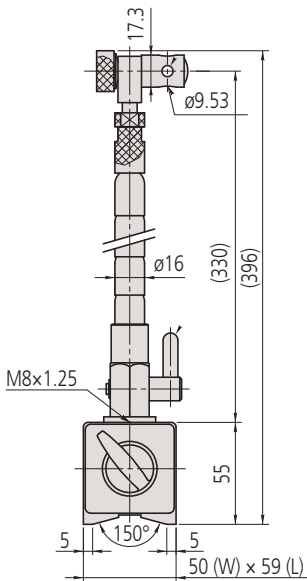
# Magnetic Stand

## Series 7

With V-block base and flexible arm.



7012-10



No.	Clamping device	Total height [mm]	Working radius [mm]	Mass [kg]	Thread Arm/Base
7012-10	magnetic	396	250	1,5	M8 x 1,25

## Series 7

This is a mini type of magnetic stand that offers you the following benefits:

- Mini measuring stand without magnet ON/OFF.
- It is designed to accept dial test indicators with 6mm or 8mm diameter stems, or dovetail.



7014

No.	Clamping device	Magnetic force (vertical) [N]	Total height [mm]	Working radius [mm]	Mass [g]
7014-10	magnetic	150	106	68	170

## Specifications

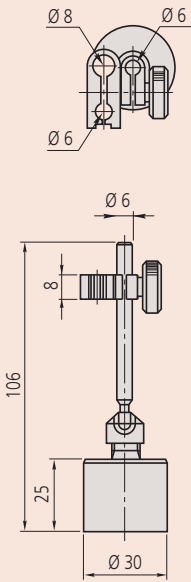
Base size (LxWxH)	59 x 50 x 55 mm
Stem hole ø	ø8 mm with stem bush mm

## Standard accessories

No.	Description
02AZC291	Stem Bush for Magnet Stand, 9,53mm to 8mm

## Specifications

Base size (LxWxH)	ø 30 mm
Stem hole ø	6 / 8 mm



# Precision Bench Centre

## Specifications

Stem hole  $\varnothing$   $\varnothing$  8 mm with stem bush mm

## Standard accessories

No.	Description
02AZA292	Stem Bush for Bench Centre, 9,53mm to 8mm
56AAM331	Rod Assembly for Bench Center, 150mm, Series 967
56AAK960R	Rod Assembly for Bench Centre, 300mm, Series 967

## Series 967

These precision bench centres are used for cylindrical and tapered parts.

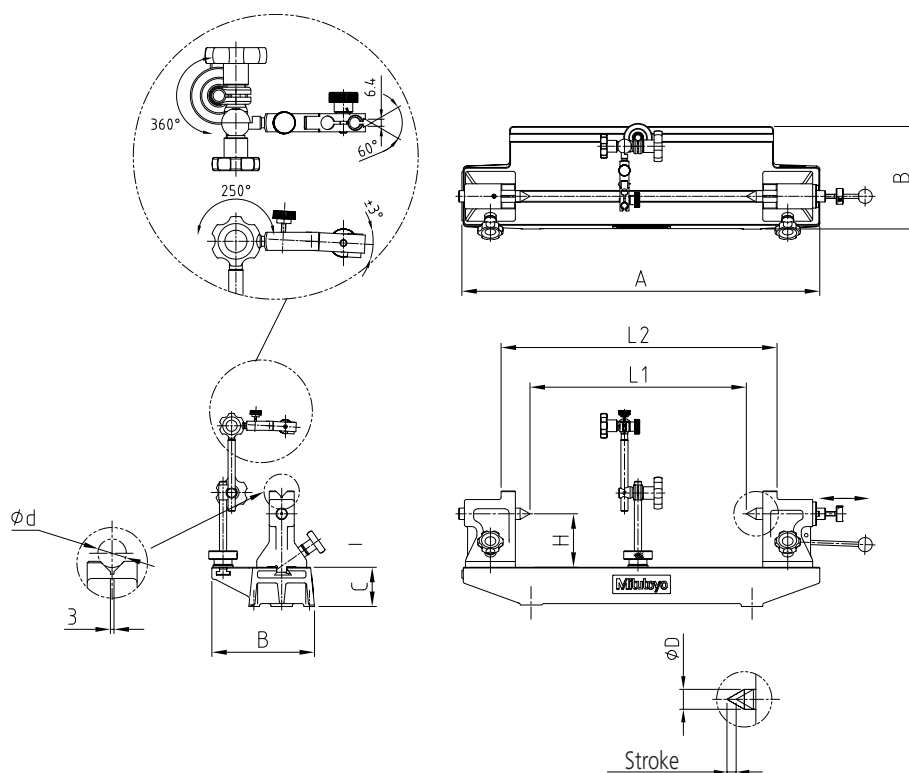
They offer you the following benefits:

- You can make fast and precise checks of runout on cylindrical/tapered parts.
- The base and centre-stocks are manufactured from stress-relieved and aged cast iron.
- The centres are made from hardened and precision ground steel.



967-201-10

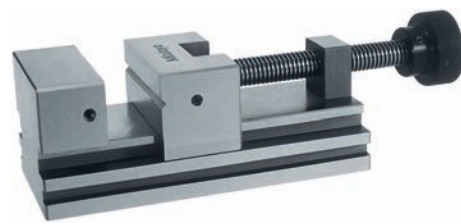
No.	Max. work-piece weight [kg]	Stand No.	$\varnothing d$ Min-Max [mm]	L1 [mm]	L2 [mm]	A [mm]	B [mm]	C [mm]	H [mm]	$\varnothing D$ [mm]	Stroke [mm]	Mass [kg]
967-203-10	7 kg	56AAM331	22	150	220	310	113	40	50	16	10	7
967-201-10	16 kg	56AAM331	22	300	400	500	144	55	75	16	12	13
967-202-10	30 kg	56AAK960R	30	600	730	900	222	100	125	20	15	70



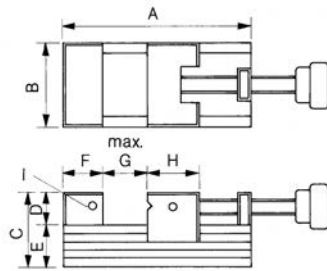
# Precision Vice

## Series 930

- It is made of tool steel, hardened and precision ground.
- It has a horizontally ground V-groove in the movable jaw.



930-602



No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	Mass [kg]
930-611	90	60	50	25	25	25	30	30	M 5	1,6
930-601	160	70	62	30	32	33	80	45	M 6	4
930-602	210	90	80	40	40	40	120	50	M 6	7,6
930-612	285	120	90	40	50	55	150	70	M 6	17,4

## Specifications

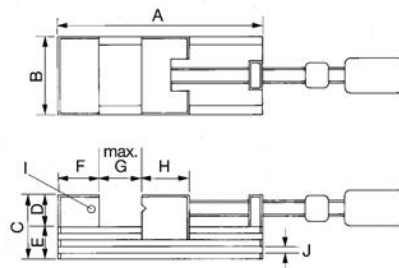
Parallelism	0,002 mm / 100 mm
Squareness	0,005 mm / 100 mm

## Series 930

- It is made of tool steel, hardened and precision ground.
- It includes one key bar with hydraulic amplification of the clamping force.
- It has a horizontally ground V-groove in the movable jaw.



930-616



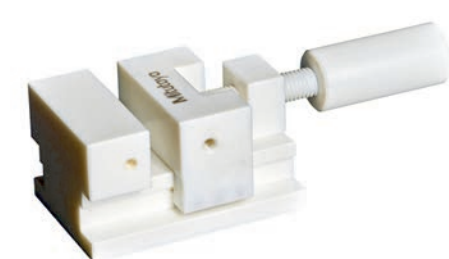
No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G max. [mm]	H [mm]	I [mm]	J Height x Depth [mm]	Mass [kg]
930-616	285	120	90	40	50	55	150	70	M 6	10 x 7	17,7

## Specifications

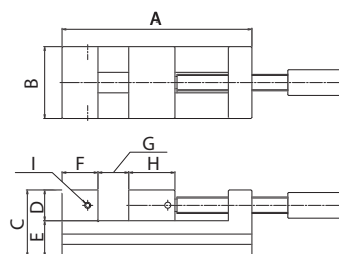
Parallelism	0,002 mm / 100 mm
Squareness	0,03 mm / 100 mm

## Series 930

- It is made of PET plastics, light weight, and protecting workpieces from scratches.



930-641



No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G max. [mm]	H [mm]	I [mm]	Mass [kg]
930-641	90	60	50	25	25	25	30	30	M 5	0,35
930-642	160	70	62	30	32	33	80	45	M 6	0,7

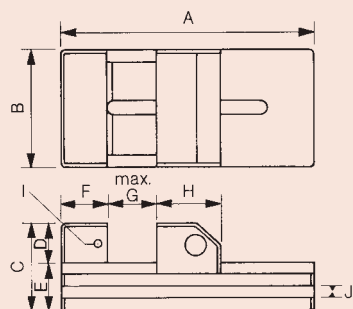
## Specifications

Parallelism	0,02 mm
Squareness	0,03 mm (930-641), 0,05 mm (930-642)



### Specifications

Parallelism	0,002 mm / 100 mm
Squareness	0,005 mm / 100 mm

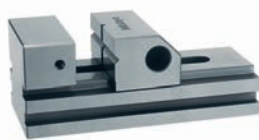


## Precision Vice

### Series 930

This precision vice has a pull-down clamping action and offers you the following benefits:

- It gives you high accuracy for precision grinding, milling, measuring and eroding.
- It is made of tool steel, hardened and precision ground.



930-607



930-632

With horizontally ground V-groove in the movable jaw

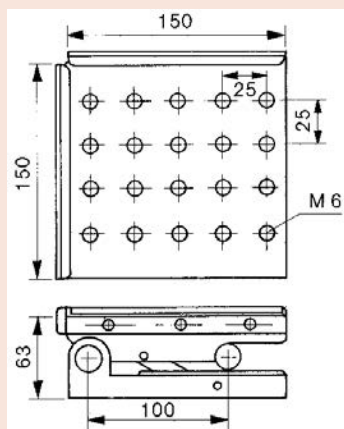
No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G max. [mm]	H [mm]	I [mm]	J Height x Depth [mm]	Mass [kg]
930-630	70	30	35	15	20	20	25	25	M4	-	0,35
930-631	110	45	45	20	25	25	50	35	M5	8 x 6	1
930-632	285	120	90	40	50	60	150	70	M6	12 x 7	13,5
930-633	370	175	95	45	50	60	200	110	M8	12 x 10	28,7

With quick adjustment and vertically and horizontally ground V-groove in the movable jaw

No.	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G max. [mm]	H [mm]	I [mm]	J Height x Depth [mm]	Mass [kg]
930-606	160	70	62	30	32	33	80	45	M 6	8 x 7	3
930-607	210	90	80	40	40	40	120	50	M 6	10 x 7	5,8

### Specifications

Parallelism	0,002 mm / 100 mm
Squareness	0,005 mm / 100 mm
Setting accuracy at 45°	±15"



## Precision Sine Plate

### Series 930

This is a front axis sine vice that offers you the following benefits:

- It is made of tool steel, hardened and precision ground.
- Its bearing and holding bolt is hardened and ground.
- Using the clamping device you can lock the vice in any angular position within the adjustment range.
- Accurate angle setting is made by gauge blocks, max. 46°.



930-626

No.	Mass [kg]
930-626	7,6

# Precision Sine Plate

## Series 930

This is a Precision Sine Plate made of alloyed tool steel that offers you the following benefits:

- It is made of alloyed tool steel, hardened and precision ground.
- Its bearing and holding bolt is hardened and ground.
- Using the clamping device you can lock the vice in any angular position within the adjustment range.
- Accurate angle setting is made by gauge blocks, max. 46°.



930-628



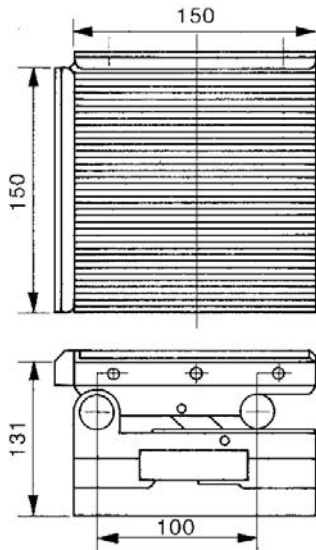
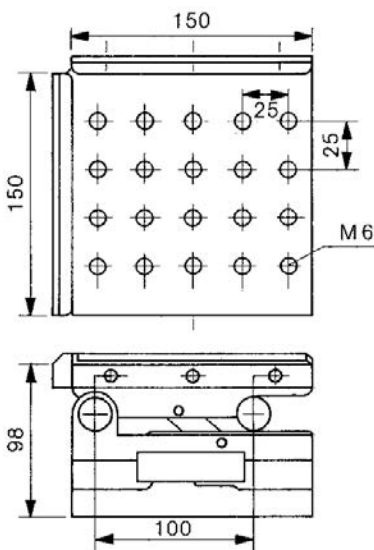
930-629

Compound-axis type  
With M6 clamping holes

No.	Mass [kg]
930-628	11,3

Compound-axis type  
With lever-operated magnetic chuck

No.	Mass [kg]
930-629	20



### Specifications

Parallelism	0,002 mm / 100 mm
Squareness	0,005 mm / 100 mm
Setting accuracy at 45°	± 15"

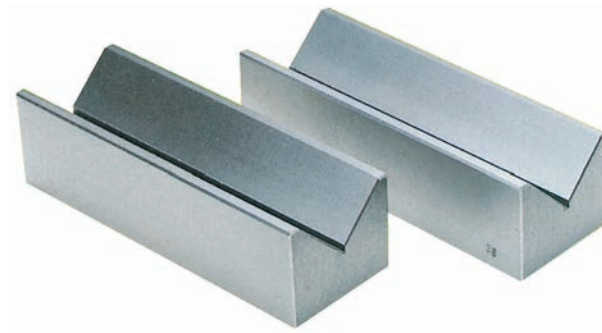
#### Specifications

Parallelism between V-groove and base surface	16 µm
Hardness	180-250 HBW
Difference of the height of the pair	16 µm
Delivered	in pairs

## Cast Iron V-Block

### Series 910

- Made of dense special cast iron, highly wear resistant.
- The 90° V-block cutting angle is parallel to the base and isometric in pairs.
- For scribing, adjusting and testing cylindrical parts.



910-112

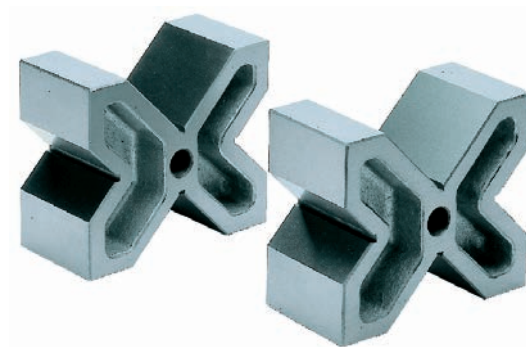
No.	Length [mm]	Width [mm]	Height [mm]	Max. workpiece ø [mm]	Mass [kg]
910-111	100	40	30	6-40	1,5
910-112	150	50	40	8-50	3,5
910-113	200	70	50	8-70	6,5
910-114	250	85	60	12-85	10
910-115	300	100	70	12-100	15

## Cast Iron V-Block

### Series 911

These are quadruple-V type V-Blocks, that offer you the following benefits:

- 90° V-blocks enable you to scribe, adjust and test cylindrical parts.
- There are two V-blocks per set.



911-111

No.	Length [mm]	Width [mm]	Height [mm]	Max. workpiece ø [mm]	Mass [kg]
911-111	60	120	100	8-90	6,5
911-112	75	150	130	8-110	13,5
911-113	90	200	170	8-150	23

# Hardened Steel V-Block

## Series 181

These Hardened Steel V-Blocks have clamp brackets and offer you the following benefits:

- There are two V-blocks per set.
- The feature V-angle 90° clamping brackets.
- Contact faces are ground and lapped.
- Designed as a fixture to enable you to check cylindrical precision machined parts.



181-903-10



Sample application

No.	Length [mm]	Width [mm]	Height [mm]	Max. workpiece ø [mm]	Mass [kg]
181-902-10	41	31,8	31,8	25	0,75
181-903-10	75	58	58	50	3,6

# Magnetic V-Block

## Series 181

These Magnetic V-Blocks are a regular-length type and offer you the following benefits:

- Contact faces are ground and lapped.
- They are of regular length with two differently sized, 90° V-grooves.
- You can use them for holding ferromagnetic cylindrical parts for scribing, adjusting, testing, etc.



181-946

No.	Length [mm]	Width [mm]	Height [mm]	Max. receiver for workpiece V-groove 1 Ø [mm]	Max. receiver for workpiece V-groove 2 Ø [mm]	Magnetic force [N]	Mass [kg]
181-246	98	70	95	50,8	25,4	980	4
181-947	98	70	95	50,8	25,4	980	8
181-946	64	58	79	50,8	25,4	490	3,8

## Specifications

Parallelism between V-groove and all side surfaces	6 µm
Perpendicularity between V-grooves and back surface	9 µm
Hardness	58-63 HRC
Difference of the height of the pair	12 µm
Symmetry of the V-grooves	6 µm
Delivered	In pairs

## Specifications

Parallelism between V-groove and all side surfaces	10 µm
Perpendicularity between V-grooves and back surface	181-246 21 µm 181-947 21 µm 181-946 11 µm
Difference of the height of the pair	10 µm
Symmetry of the V-grooves	10 µm
Delivered	In pairs (181-946 and 181-947) Individually (181-246)

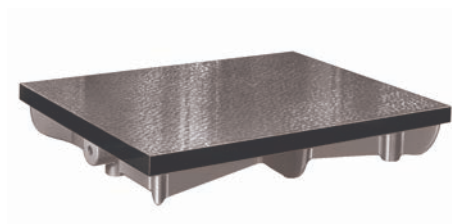
#### Specifications

Accuracy	According to DIN 876 Grade 1 : fine scraped Grade 3 : fine planed
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## Cast Iron Surface Plate

### Series 902

- A ribbed design gives you rigidity with minimum weight, and a special cast iron confers a high degree of wear resistance.



902-304

No.	Dimensions L x W x H [mm]	Remarks	Mass [kg]
902-301	300 x 300 x 85	Accuracy Grade 1	15
902-302	400 x 400 x 90	Accuracy Grade 1	35
902-303	500 x 400 x 100	Accuracy Grade 1	40
902-304	600 x 500 x 120	Accuracy Grade 1	65
902-305	800 x 500 x 140	Accuracy Grade 1	95
902-306	1000 x 750 x 170	Accuracy Grade 1	210
902-307	1200 x 800 x 180	Accuracy Grade 1	230
902-308	1500 x 1000 x 200	Accuracy Grade 1	490
902-309	2000 x 1000 x 220	Accuracy Grade 1	780
902-101	300 x 300 x 85	Accuracy Grade 3	15
902-102	400 x 400 x 90	Accuracy Grade 3	35
902-103	500 x 400 x 100	Accuracy Grade 3	40
902-104	600 x 500 x 120	Accuracy Grade 3	65
902-105	800 x 500 x 140	Accuracy Grade 3	95
902-106	1000 x 750 x 170	Accuracy Grade 3	210
902-107	1200 x 800 x 180	Accuracy Grade 3	230
902-108	1500 x 1000 x 200	Accuracy Grade 3	490
902-109	2000 x 1000 x 220	Accuracy Grade 3	780

## Granite Square 90°

### Series 972

- It is made of natural hard stone, with two sides precision ground.



972-106

No.	Width [mm]	Length [mm]	Mass [kg]
972-106	50	300 x 200	6,5
972-107	50	400 x 250	10
972-108	60	500 x 300	17
972-109	70	600 x 400	30





# Granite Surface Plate DIN 876

## Series 901

These Granite Surface Plates offer you the following benefits:

- Delivery is without a stand but with steel ball inserts.

### 1. Accuracy Grade 00

No.	Dimensions L x W x H [mm]	Max. workpiece load [kg]	Mass [kg]
901-131	400 x 250 x 50	50	15
901-132	400 x 400 x 50	60	25
901-133	630 x 400 x 70	65	53
901-134	630 x 630 x 70	75	83
901-135	1000 x 630 x 100	150	189
901-136	1000 x 1000 x 100	250	300
901-137	1200 x 800 x 160	600	460
901-138	1600 x 1000 x 160	650	768
901-139	2000 x 1000 x 220	750	1320

### 2. Accuracy Grade 0

No.	Dimensions L x W x H [mm]	Max. workpiece load [kg]	Mass [kg]
901-121	400 x 250 x 50	100	15
901-122	400 x 400 x 50	120	25
901-123	630 x 400 x 70	130	53
901-124	630 x 630 x 70	150	83
901-125	1000 x 630 x 100	300	189
901-126	1000 x 1000 x 100	500	300
901-127	1200 x 800 x 160	1200	460
901-128	1600 x 1000 x 160	1300	768
901-129	2000 x 1000 x 220	1500	1320

### 3. Accuracy Grade 1

No.	Dimensions L x W x H [mm]	Max. workpiece load [kg]	Mass [kg]
901-111	400 x 250 x 50	100	15
901-112	400 x 400 x 50	120	25
901-113	630 x 400 x 70	130	53
901-114	630 x 630 x 70	150	83
901-115	1000 x 630 x 100	300	189
901-116	1000 x 1000 x 100	500	300
901-117	1200 x 800 x 160	1200	460
901-118	1600 x 1000 x 160	1300	768
901-119	2000 x 1000 x 220	1500	1320

### 4. Accuracy Grade 2

No.	Dimensions L x W x H [mm]	Max. workpiece load [kg]	Mass [kg]
901-101	400 x 250 x 50	100	15
901-102	400 x 400 x 50	120	25
901-103	630 x 400 x 70	130	53
901-104	630 x 630 x 70	150	83
901-105	1000 x 630 x 100	300	189
901-106	1000 x 1000 x 100	500	300
901-107	1200 x 800 x 160	1200	460
901-108	1600 x 1000 x 160	1300	768
901-109	2000 x 1000 x 220	1500	1320

### Stand

No.	Dimensions L x W x H [mm]	A [mm]	B [mm]	C [mm]	Mass [kg]
901-931	630 x 400 x 70	550	350	770	22
901-932	630 x 630 x 70	550	550	770	25
901-933	1000 x 630 x 100	750	550	740	28
901-934	1000 x 1000 x 100	750	750	740	30
901-935	1200 x 800 x 160	900	600	680	30
901-936	1600 x 1000 x 160	1050	750	680	35
901-937	2000 x 1000 x 220	1450	750	620	40

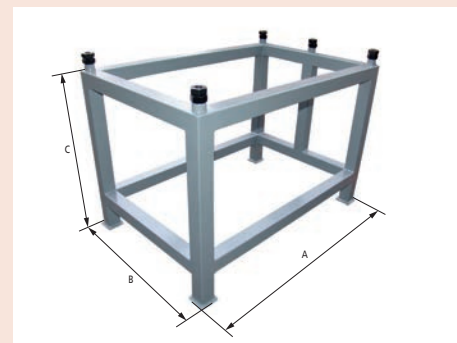


## Specifications

Vickers hardness	HV 850-900
Accuracy	According to DIN 876
Flexural strength	13-22 N/mm <sup>2</sup>
Compressive strength	Approx. 280 N/mm <sup>2</sup>
Linear coefficient of expansion	(5 to 7,5) x 10 <sup>-6</sup> x K <sup>-1</sup>



Granite plate and stand (optional)



Dimensions for stand

# Universal Bevel Protractor

## Series 187

This universal bevel protector offers you the following benefits:

- Its high-precision angle gauge enables you to take accurate angle measurements of machines, moulds and jigs.
- You can attach it to height gauges.
- It comes with a magnifying glass.



187-901

### Metric

No.	Blade edge angle	Blade length	Mass [g]
187-901	w/60°, 45° and 30° edges	150, 300 mm	390
187-907	w/60° and 45° edges	150 mm	284
187-908	w/60° and 45° edges	300 mm	318

## Series 187



187-201

No.	Fixed blade length [mm]	Adjustable blade length [mm]	Mass [g]
187-201	135	150	212

### Specifications

Graduation	5' (0° - 90° - 0°)
Circle division	4 x 90°
Delivered	In a box

### Standard accessories

No.	Description
187-106	Steel Rule, 150mm/6", Metric/Inch
187-107	Steel Rule, 300mm/12", Metric/Inch
950750	Holder for Mounting on Height Gauges, Metric, Series 187

187-106 for 187-901, 187-908

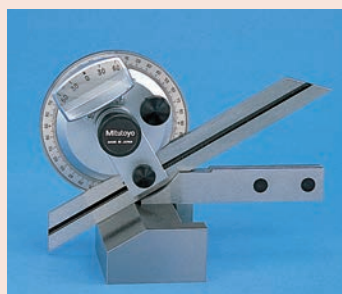
187-107 for 187-901, 187-907

950750 for Height Gage with 9x9 mm scriber shaft

### Optional accessories

No.	Description
187-105	Acute angle attachment, for Series 187

187-105 standard accessory for 187-901



### Specifications

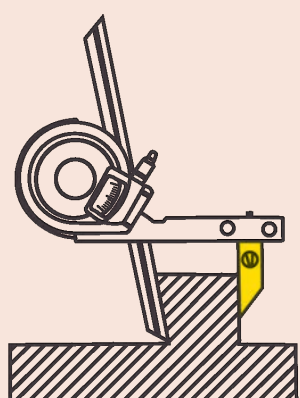
Graduation	5'
Circle division	4 x 90°
Delivered	in a box with acute angle attachment

### Standard accessories

No.	Description
187-105	Acute angle attachment, for Series 187

### Optional accessories

No.	Description
952624	Holder for Mounting on Height Gauges, Metric, 187-201



Application with acute angle attachment

# Digimatic Universal Protractor

## Series 187

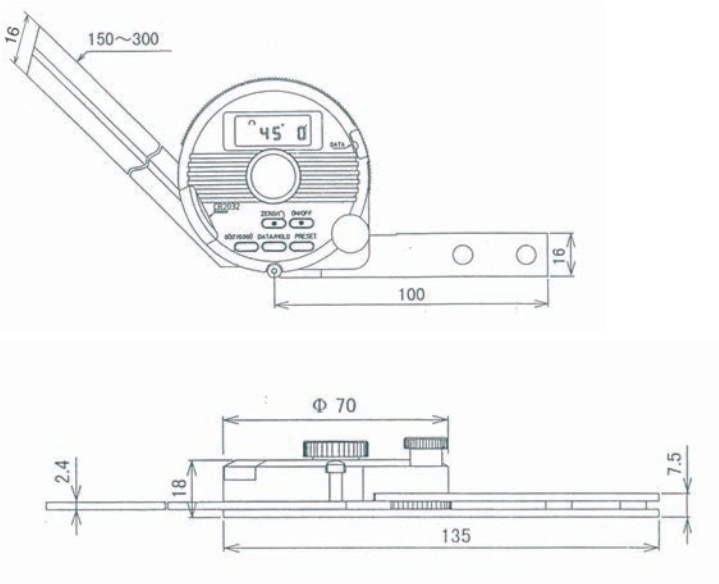
This is a Digimatic Universal Protractor with data output that offers you the following features:

- It has an easy-to-read digital display.
- It automatically turns off after 10 minutes, and gives you fixed reference points for easy adjustment.
- You can slide and clamp the measuring blade over the entire length.
- You can make fine adjustments to precisely adjust arbitrary angle dimensions.
- It comes with a mounting facility on height gauges and tracers of series 192 via holder.



### Metric

No.	Blade length	Mass [g]
187-501	150 mm	624
187-502	300 mm	662



Functions	Series 187
ON/OFF	●
DATA/HOLD	●
Data output	●
ZERO SET	●
PRESET	●
Angle sexagesimal/decimal	●

### Specifications

Digital step	1' (0,01°)
Max. permissible error	2' (0,03°)
Repeatability	1' (0,01°)
Battery life	approx. 2000 hours
Display	LCD with Character Height 6,5 mm
Delivered	in a box including battery

### Standard accessories

No.	Description
187-106	Steel Rule, 150mm/6", Metric/Inch
187-107	Steel Rule, 300mm/12", Metric/Inch
950750	Holder for Mounting on Height Gauges, Metric, Series 187

187-106 for 187-501  
187-107 for 187-502  
950750 for 187-501, 187-502

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
06AFM380F	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat Straight Type
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790F	U-WAVE-T Connection Cable F, Flat Straight Type
187-105	Acute angle attachment, for Series 187

### Consumable spares

No.	Description
05SAA217D	Lithium battery CR-2032, 1 pcs.

Specifications

Accuracy	DIN 2267
Vee angle	140°
Dimensions (WxDxH)	200 x 44 x 39,3 mm
Delivered	In a wooden case

Precision Level

Series 960

- For use in setting machined surfaces precisely horizontal



960-601

No.	Sensibility (mm/m per division)	Sensibility " (Arcsecond)	Max. Permissible Error (indication accuracy)	Flatness of reference face (bottom) [μm]	Mass [kg]
960-601	0,1	20"	20% of sensibility	5	1,57
960-602	0,05	10"	20% of sensibility	5	1,57
960-603	0,02	4"	5 μm/m	5	1,57

Specifications

Accuracy	DIN 2267
Vee angle	140°
Dimensions (WxDxH)	200 x 44 x 200 mm
Delivered	In a wooden case

Precision Frame Level

Series 960

This Precision Frame Level offers you the following benefits:

- You can set machined surfaces to precisely horizontal or vertical.
- It has 2 vee and 2 flat reference faces, and is precision ground.
- It features graduated main (longitudinal) and auxiliary (transverse) vials.



960-701

No.	Sensibility (mm/m per division)	Sensibility " (Arcsecond)	Max. Permissible Error (indication accuracy) [mm/m]	Flatness of reference faces [μm]	Parallelism of reference faces [μm]	Perpendicularity of reference faces [μm]	Mass [kg]
960-701	0,1	20	20% of sensibility	5	5	5	4
960-702	0,05	10	20% of sensibility	5	5	5	4
960-703	0,02	4	5 μm/m	3	3	3	4

# Digital Precision Level

## Series 950

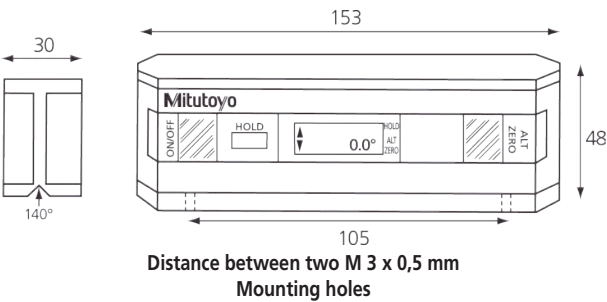
This Digital Precision Level offers you the following benefits:

- You can measure flatness, squareness and angularity.
- Precision support surfaces in aluminium frame provide you with high rigidity and low weight.



950-318

No.	Max. permissible error (degrees)	Repeatability (degrees)	Data output	Sensitivity (degrees)	Mass [g]
950-318	0,05 (0 to 10) 0,1 (80 to 90) 0,2 (10 to 80)	0,05		0,01 (0 to 9,99) 0,1 (10 to 90)	300



# Thickness Gauge

## Series 184 - Thickness Gauge

This thickness gauge is ideal for a variety of measuring tasks and offers you the following benefits:

- Size clearly stamped on each leaf
- Leaves are easy to remove and can be individually locked open.



184-3045

### Metric

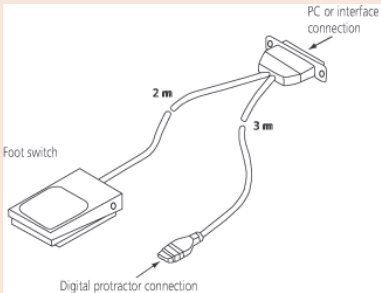
No.	Range	Accuracy	Number of leaves	Leaf length [mm]
184-3045	0,05-1 mm by 0,05 mm step	0,05 up to 0,15 mm : $\pm 0,005$ mm 0,2 up to 0,5 mm : $\pm 0,012$ mm 0,55 up to 1 mm : $\pm 0,02$ mm	20	150

## Specifications

Range	360° (4 x 90°)
Power supply	Standard battery (9 V) 6LR61
Battery life	ca. 500 hours
Delivered	Including box

## Optional accessories

No.	Description
50AAA983A	RS-232C Output Cable, for series 950





# 90° Steel Square

## Series 916

This 90° Steel Square offers you the following benefits:

- Three types of square are available.
- It is hardened, and has precision ground edges.

### Bevelled-edge square

No.	Length [mm]	Cross section [mm]	Remarks	Grade
916-105	50x40	14x4	stainless steel	00
916-106	75x50	15x4	stainless steel	00
916-107	100x70	20x5	stainless steel	00
916-108	150x100	25x6	stainless steel	00
916-109	200x130	30x7	stainless steel	00

### Try square

No.	Length [mm]	Cross section [mm]	Remarks	Grade
916-202	75x50	15x5	stainless steel	0
916-203	100x70	20x5	stainless steel	0
916-204	150x100	25x5	stainless steel	0
916-205	200x130	30x6	stainless steel	0
916-206	250x165	35x7	stainless steel	0
916-207	300x200	40x8	stainless steel	0
916-208	400x265	45x10	stainless steel	0
916-209	500x330	50x10	stainless steel	0
916-222	75x50	15x5	steel	1
916-223	100x70	20x5	steel	1
916-224	150x100	25x5	steel	1
916-225	200x130	30x6	steel	1
916-226	250x165	35x7	steel	1
916-227	300x200	40x8	steel	1
916-228	400x265	45x10	steel	1
916-229	500x330	50x10	steel	1
916-232	75x50	15x5	steel	2
916-233	100x70	20x5	steel	2
916-234	150x100	25x5	steel	2
916-235	200x130	30x6	steel	2
916-236	250x165	35x7	steel	2
916-237	300x175	35x7	steel	2
916-238	400x100	35x7	steel	2
916-239	500x150	40x8	steel	2

### Try square with shoulders

No.	Length [mm]	Cross section [mm]	Remarks	Grade
916-311	75x50	15x5	stainless steel	0
916-312	100x70	20x5	stainless steel	0
916-313	150x100	25x5	stainless steel	0
916-314	200x130	30x6	stainless steel	0
916-315	250x165	35x7	stainless steel	0
916-316	300x200	40x8	stainless steel	0
916-317	400x265	45x10	stainless steel	0
916-318	500x330	50x10	stainless steel	0
916-321	75x50	15x5	steel	1
916-322	100x70	20x5	steel	1
916-323	150x100	25x5	steel	1
916-324	200x130	30x6	steel	1
916-325	250x165	35x7	steel	1
916-326	300x200	40x8	steel	1
916-327	400x265	45x10	steel	1
916-328	500x330	50x10	steel	1
916-332	100x70	20x5	steel	2
916-333	150x100	25x5	steel	2
916-334	200x130	30x6	steel	2
916-335	250x165	35x7	steel	2
916-336	300x175	35x7	steel	2
916-337	400x200	35x7	steel	2
916-338	500x250	40x8	steel	2

## Specifications

### Accuracy

According to DIN 875



Bevelled-edge square



Try square



Try square with shoulders

# Knife Edge Straight Edge

## Series 528

This Knife Edge Straight Edge offers you the following benefits:

- Its straight edges are especially suited to testing the flatness of surfaces.
- It has a hardened, ground and micro lapped measuring edge.



Series 528

No.	Range [mm]	Accuracy	Remarks
528-101	75	DIN 874-2	-
528-100	50	DIN 874-2	-
528-102	100	DIN 874-2	-
528-110	125	DIN 874-2	-
528-103	150	DIN 874-2	-
528-104	200	DIN 874-2	-
528-105	300	DIN 874-2	Supplied in a wooden case
528-106	400	DIN 874-2	Supplied in a wooden case
528-107	500	DIN 874-2	Supplied in a wooden case

# Steel Rules

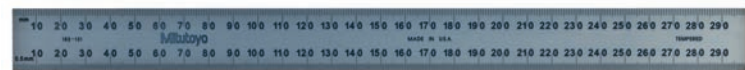
## Series 182

These are rigid and fully-flexible rules that offer you the following benefits:

- They have clear graduations on satin-chrome finish.
- The rules are stainless tempered.



182-211



182-131

### Metric Fully-flexible rule

No.	Range [mm]	Graduation	Width	Thickness
182-211	150	1 mm / 0,5 mm (on both faces)	12 mm	0,4 mm
182-231	300	1 mm / 0,5 mm (on both faces)	12 mm	0,4 mm
182-251	450	1 mm / 0,5 mm (on both faces)	18 mm	0,4 mm
182-271	600	1 mm / 0,5 mm (on both faces)	18 mm	0,4 mm

### Metric Wide rigid rule

No.	Range [mm]	Graduation	Width	Thickness
182-111	150	1 mm / 0,5 mm (on both faces)	19 mm	1,2 mm
182-131	300	1 mm / 0,5 mm (on both faces)	25 mm	1,2 mm
182-151	450	1 mm / 0,5 mm (on both faces)	30 mm	1,2 mm
182-171	600	1 mm / 0,5 mm (on both faces)	30 mm	1,2 mm

## Specifications

Section	60°
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**Height Master**  
Page 324



**Check Master**  
Page 328



**Calibration Tools**  
Page 333

# Digital Height Master

## Series 515

This is a standard model with a digital display, that offers you the following benefits:

- It gives you all the essential specifications required for a versatile height standard.
- You can use it to calibrate and set height gauges and other measuring instruments.
- Models have two measuring faces on the same level, one facing up and the other down.



515-374

### Metric

No.	Range [mm]	Feed error	Retrace error	Total height [mm]	Mass [kg]
515-374	10-310	±2 µm	2 µm	480	9,5
515-376	10-460	±2 µm	2 µm	630	13,6
515-378	10-610	±2,5 µm	2,5 µm	785	16



Functions	Series 515
ZERO/ABS	●
DATA/HOLD	●
Auto Power OFF after 20 min. non use	●
Low voltage alarm	●
Data output	●
PRESET	●

### Specifications

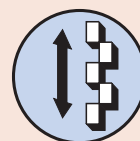
Digital step	0,001 mm
Graduation	0,002 mm
Block arrangement	Staggered
Block step	20 mm
Micrometer adjustment	20 mm
Micrometer feed	0,5 mm
Block pitch accuracy	0 < range ≤ 310 mm : ±1,5 µm 310 < range ≤ 450 mm: ±2,5 µm 450 < range ≤ 610 mm: ±3,5 µm
Parallelism of blocks	0 < range ≤ 310 mm : 2 µm 310 < range ≤ 610 mm : 2,5 µm
Battery life	approx. 1,8 years

### Optional accessories

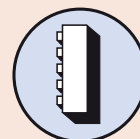
No.	Description
515-111	Auxiliary Block Kit for Bore Gauge, for 515-374/515-376/515-378
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD880G	U-WAVE-T, Buzzer Type, Wireless Transmitter
02AZD730G	U-WAVE-T, IP67 Type, Wireless Transmitter
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

### Consumable spares

No.	Description
938882	Battery SR44 1.5V



Staggered 20 mm blocks (movable)



Vertical orientation



Riser block (optional)

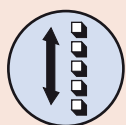
### Specifications

Graduation	0,001 mm
Block arrangement	Straight
Block step	10 mm
Micrometer adjustment	20mm
Block pitch accuracy	0 < range ≤ 310mm: ±1.5µm 310 < range ≤ 610mm: ±2.5µm 610 < range ≤ 1010mm: ±3.5µm
Micrometer feed	0,5mm
Parallelism of blocks	0 < range ≤ 610mm: 1.5µm 610 < range ≤ 1010mm: 2µm

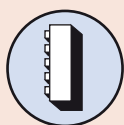
### Optional accessories

No.	Description
900574	Supporting Base for Vertical Operation, for Height Master
515-110	Auxiliary Block Kit for Bore Gauge, for 515-520/515-523

900574 : supplied as a standard for 515-523



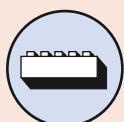
Single-row 10 mm blocks (movable)



Vertical orientation



Riser block (optional)



Horizontal orientation



900574 (optional)  
Supporting base for vertical operation

# Height Master

## Series 515

This height master offers you the following benefits:

- You can use it to calibrate and set height gauges and other measuring instruments.
- Models with the staggered arrangement of blocks have two measuring faces on the same level, one facing up and the other down.
- It is supplied in a fitted wooden case.



515-520



Using in horizontal orientation

### Metric

No.	Range [mm]	Feed error	Retrace error	Mass [kg]
515-520	5-610	±1,2 µm	1,2 µm	45
515-523	5-1010	±1,5 µm	1,5 µm	63,5



# Universal Height Master

## Series 515

This Universal Height Master offers you the following benefits:

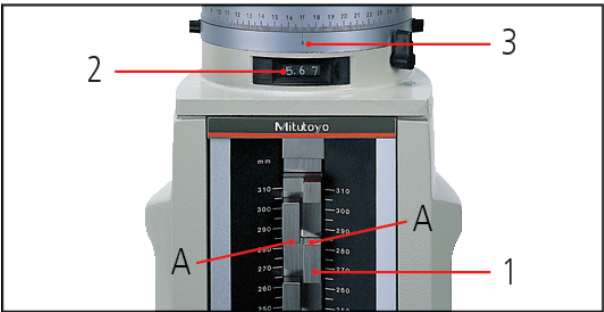
- It is designed for both vertical and horizontal orientations, enabling you to carry out a wide range of applications such as accuracy checking of machine tool table movements.
- It is supplied in a fitted wooden case.



515-322

### Metric

No.	Range [mm]	Block step	Feed error	Retrace error	Mass [kg]
515-322	5-310	20 mm (staggered)	±1µm	1 µm	23



Height A  
1. Scale 280.000 mm  
2. Counter 5.670 mm  
3. Thimble 0.000 mm  

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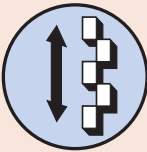
285.670 mm

### Specifications

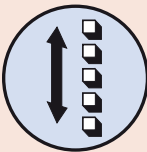
Graduation	0,001 mm
Block arrangement	Staggered
Micrometer adjustment	20 mm
Micrometer feed	0,5 mm
Block pitch accuracy	±1,5 µm
Parallelism of blocks	1 µm

### Optional accessories

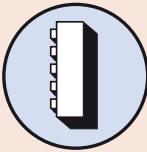
No.	Description
515-112	Auxiliary Block Kit for Bore Gauge, for 515-322



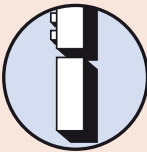
Staggered 20 mm blocks (movable)



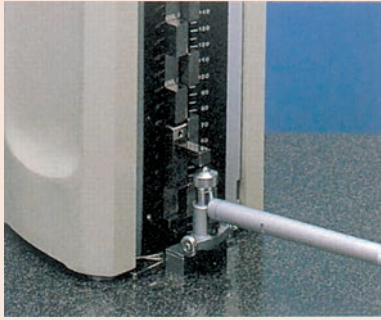
Single-row 10 mm blocks (movable)  
515-310



Vertical orientation



Riser block (optional)



Bore gage reference setting

## Optional Accessories for Height Master

### Series 515

This is an auxiliary block kit that allows you to efficiently carry out reference-setting of dial bore gauges and tubular inside micrometers (18-150mm).



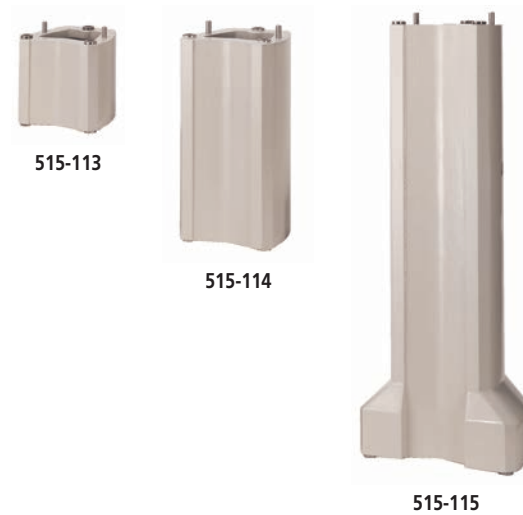
#### Metric

No.	Suitable for Height Master	Mass [g]
515-110	515-520 / 515-523	140
515-111	515-374 / 515-376 / 515-378	142
515-112	515-322	142

### Series 515

These riser blocks offer you the following benefits:

- You can extend the measuring range up to 900mm by using 150, 300 or 600mm riser blocks.
- They can be used with both standard and digital Height Masters.



Sample application

#### Metric

No.	Accuracy	Height [mm]	Parallelism	Mass [kg]
515-113	$\pm 0,6 \mu\text{m}$	150 mm	$0,6 \mu\text{m}$	5,7
515-114	$\pm 1 \mu\text{m}$	300 mm	$0,8 \mu\text{m}$	11,3
515-115	$\pm 2 \mu\text{m}$	600 mm	$1 \mu\text{m}$	31

# Depth Micro Checker

## Series 515

- This Depth Micro Checker offers you the following benefits:
- The Depth Micro Checker is designed to let you check and help set the range-end points of a depth micrometer.
  - A 25mm carbide gauge block is provided as the reference surface.

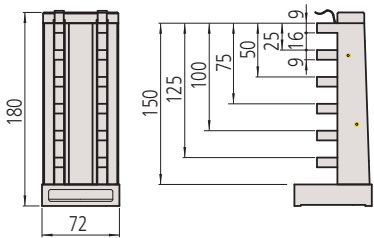


515-571

### Metric

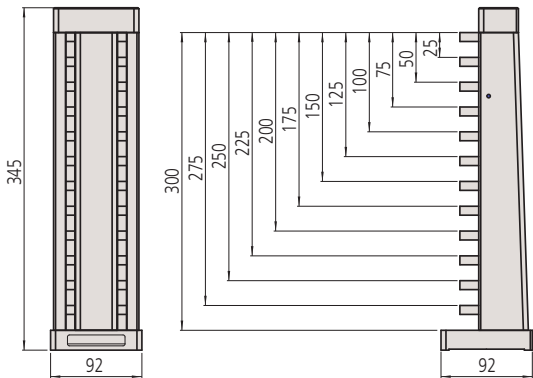
No.	Range [mm]	Reference length	Mass [kg]
515-570	0-150	25, 50, 75, 100, 125, 150 mm	3
515-571	0-300	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300 mm	17

mm



515-570

mm

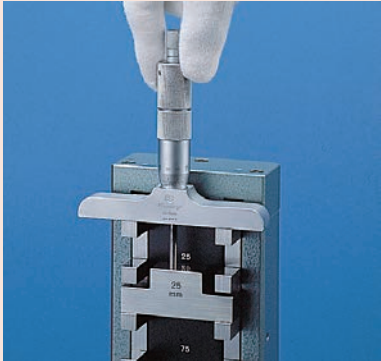


515-571



### Specifications

Anvil block accuracy	±0,5 μm
Block pitch accuracy	±(1+L/150)μm L= lenght to check (mm)

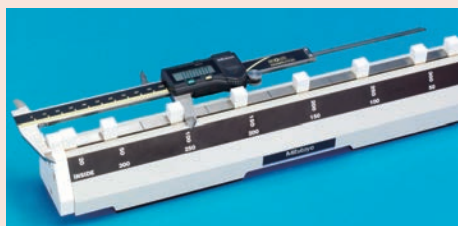


## Specifications

Block pitch accuracy	Range $\leq 300$ mm : $\pm 0,005$ mm Range $\leq 600$ mm : $\pm 0,007$ mm
Parallelism of blocks	Range $\leq 300$ mm : 0,002 mm Range $\leq 600$ mm : 0,004 mm

## Optional accessories

No.	Description
602162	Wooden Case (300 mm), for Caliper Checker
602164	Wooden Case (600 mm), for Caliper Checker

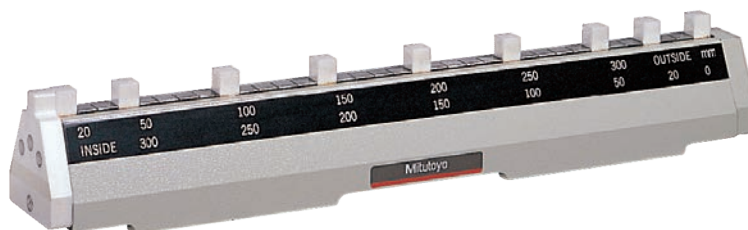


# CERA Caliper Checker

## Series 515

This CERA Caliper Checker offers you the following benefits:

- You can set and inspect caliper and height gauges.
- It comes with ceramic gauge blocks.

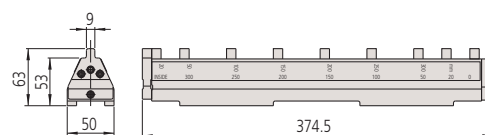


515-555

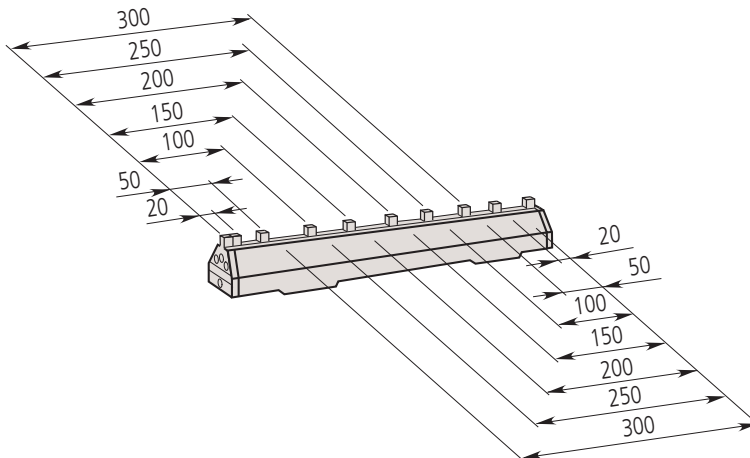
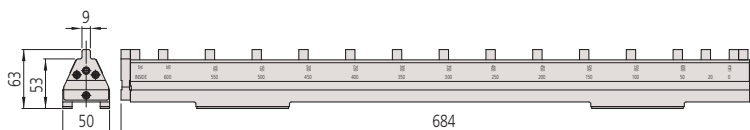
## Metric

No.	Range [mm]	Reference checking lengths available for outside/inside measurement	Mass [kg]
515-555	0-300	20, 50, 100, 150, 200, 250 and 300 mm	4
515-556-2	0-600	20, 50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550 and 600 mm	8,5

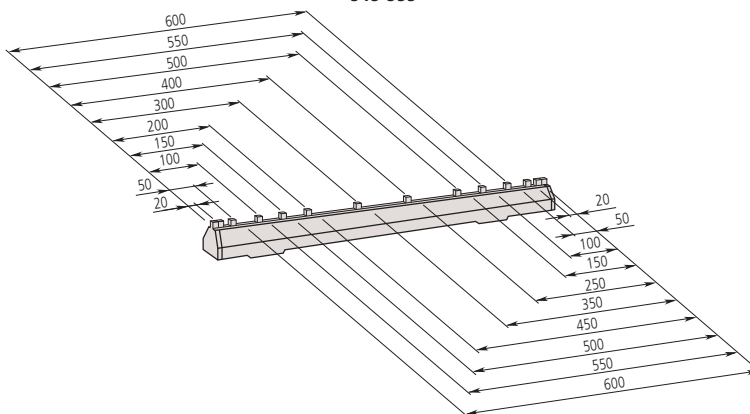
515-555



515-556-2



515-555



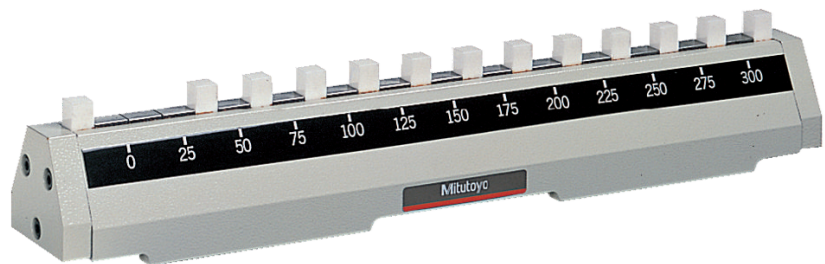
515-556-2

# Inside Micro Checker

## Series 515

This Inside Micro Checker offers you the following benefits:

- Applicable for Series 133 only!
- It designed to act as a setting standard for inside micrometers.
- It comes with ceramic gauge blocks.

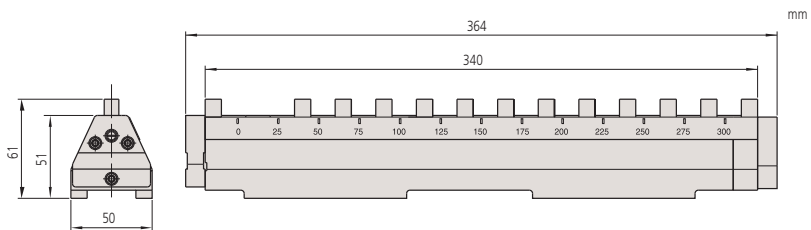


515-585

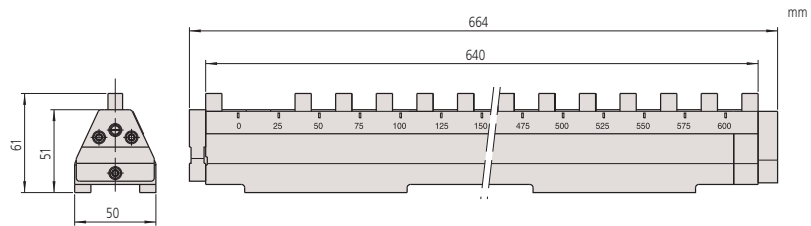


### Metric

No.	Range [mm]	Reference length	Mass [kg]
515-585	25-300	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300 mm	3,9
515-586	25-600	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, 500, 525, 550, 575, 600 mm	7



515-585



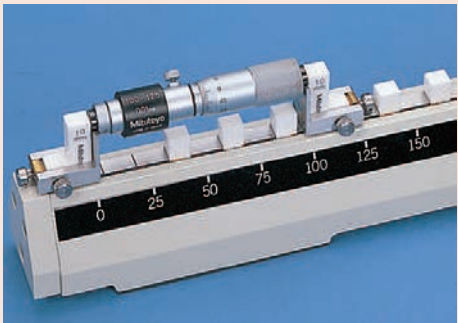
515-586

### Specifications

Block pitch accuracy	$\pm(1+L/150) \mu\text{m}$ L = Length to check (mm)
Delivered	With accessory set

### Optional accessories

No.	Description
602160	Wooden Case, for Inside Micro Checker
602163	Wooden Case, 515-586

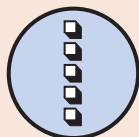


Application with Series 133 only.

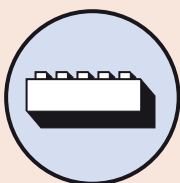


## Specifications

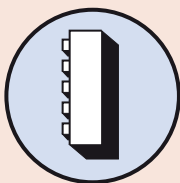
Block step	10 mm
Block pitch accuracy	$0 < \text{range} \leq 310 \text{ mm} : \pm 2,5 \mu\text{m}$ $310 < \text{range} \leq 610 \text{ mm} : \pm 3,5 \mu\text{m}$ $610 < \text{range} \leq 1010 \text{ mm} : \pm 5,0 \mu\text{m}$ $1010 < \text{range} \leq 1510 \text{ mm} : \pm 8,0 \mu\text{m}$
Parallelism of blocks	$0 < \text{range} \leq 310 \text{ mm} : 1,2 \mu\text{m}$ $310 < \text{range} \leq 610 \text{ mm} : 1,5 \mu\text{m}$ $610 < \text{range} \leq 1010 \text{ mm} : 2,0 \mu\text{m}$ $1010 < \text{range} \leq 1510 \text{ mm} : 2,5 \mu\text{m}$
Hardness	More than 64 HRC
Delivered	In wooden box



Single-row 10 mm blocks



Horizontal orientation



Vertical orientation

# Check Master

## Series 515

This Check Master allows you to test precision tool and coordinate measuring machines, and offers you the following benefits:

- You can test the X, Y and Z-coordinate axes of precision tool machines and coordinate measuring machines.
- It consists of rigidly clamped gauge blocks with a step of 10mm.
- It is supplied in a fitted wooden case.



515-722

## Metric

No.	Range [mm]	Mass [kg]
515-720	0-300	7
515-721	0-450	10
515-722	0-600	13
515-723	0-1000	22
515-724	0-1500	30



515-724

515-723

515-722

# High Accuracy Check Master

## Series 515

This High Accuracy Check Master offers you the following benefits:

- You can use it to check the accuracy of table movements of machine tools and calibrate CMMs.
- It features a permanently wrung stack of gauge blocks housed in a rigid frame.
- You can use it in either vertical or horizontal orientation.
- With the Ceramic Check Master, each measuring block is made of zirconia-based ceramic that requires no anti-corrosion treatment for measuring faces.



Metric Ceramic blocks		
No.	Range [mm]	Mass [kg]
515-760	300	3,4
515-761	450	5,2
515-762	600	6,9
515-763	1000	11,5
515-764	1500	17,3

Metric Steel blocks		
No.	Range [mm]	Mass [kg]
515-740	300	3,6
515-741	450	5,4
515-742	600	7,2
515-743	1000	12
515-744	1500	18

## Specifications

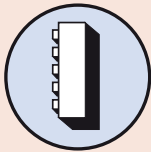
Block step	10 mm
Block pitch accuracy	$0 < \text{range} \leq 310 \text{ mm} : \pm 1,2 \text{ } \mu\text{m}$ $310 < \text{range} \leq 610 \text{ mm} : \pm 1,8 \text{ } \mu\text{m}$ $610 < \text{range} \leq 1010 \text{ mm} : \pm 2,5 \text{ } \mu\text{m}$ $1010 < \text{range} \leq 1510 \text{ mm} : \pm 4,0 \text{ } \mu\text{m}$
Parallelism of blocks	$0 < \text{range} \leq 450 \text{ mm} : 1,0 \text{ } \mu\text{m}$ $450 < \text{range} \leq 1010 \text{ mm} : 1,5 \text{ } \mu\text{m}$ $1010 < \text{range} \leq 1510 \text{ mm} : 2,0 \text{ } \mu\text{m}$
Delivered	In a wooden box

## Optional accessories

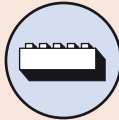
No.	Description
601167	Supporting Base for Vertical Operation, for Check Master



Single-row 10 mm blocks



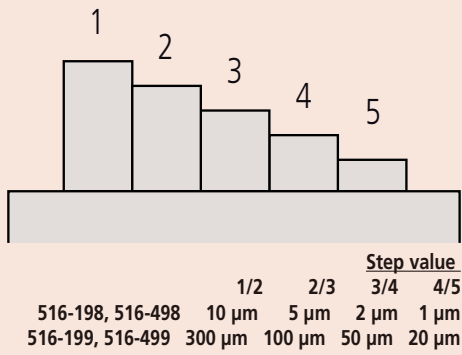
Vertical orientation



Horizontal orientation



601167 (optional)  
Supporting base for vertical operation



## Step Master

### Series 516

The Step Master is a gauge that provides you with four small increments in height and offers you the following benefits:

- It is constructed from an assembly of five highly accurate, steel or ceramic gauge blocks.
- Each adjacent step is calibrated to a resolution of 0,01  $\mu\text{m}$  by using an interferometer with an accuracy tolerance of  $\pm 0,2 \mu\text{m}$ .
- Both steel and ceramic types are available.



516-199 Ceramic type



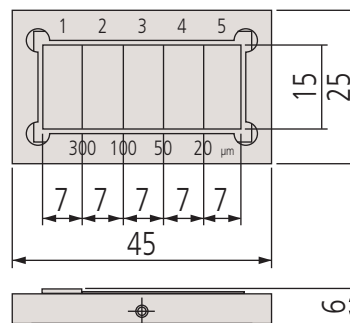
516-499 Steel type



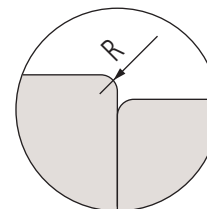
Delivered in a wooden case

### Metric

No.	Block step	Material	Remarks
516-198	10, 5, 2, 1 $\mu\text{m}$	Steel	With certificate of inspection
516-198-24	10, 5, 2, 1 $\mu\text{m}$	Steel	With JCSS calibration certificate
516-199	300, 100, 50, 20 $\mu\text{m}$	Steel	With certificate of inspection
516-199-24	300, 100, 50, 20 $\mu\text{m}$	Steel	With JCSS calibration certificate
516-498	10, 5, 2, 1 $\mu\text{m}$	Ceramic	With certificate of inspection
516-498-24	10, 5, 2, 1 $\mu\text{m}$	Ceramic	With JCSS calibration certificate
516-499	300, 100, 50, 20 $\mu\text{m}$	Ceramic	With certificate of inspection
516-499-24	300, 100, 50, 20 $\mu\text{m}$	Ceramic	With JCSS calibration certificate



mm



# Glass Scales

## Series 182

These high precision glass scales offer you the following benefits:

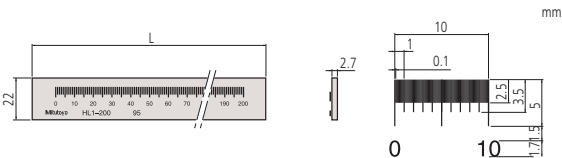
- They are manufactured using Mitutoyo's leading-edge Linear Scale production technology.
- They are ideal for checking the magnification accuracy of profile projectors and microscopes, as well as the table feed accuracy of measuring equipment.



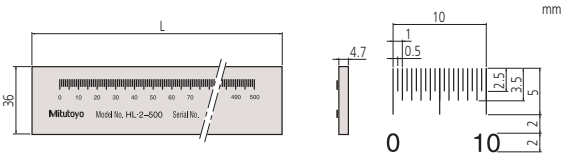
182-525-10 / 182-523-10 / 182-522-10 / 182-513-10

### Metric

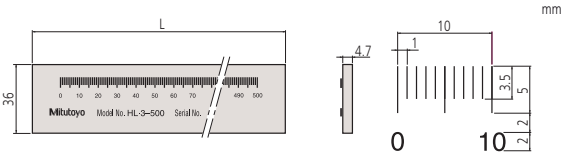
No.	Range [mm]	Graduation [mm]	Thickness of graduation line [μm]	L [mm]	Mass [kg]
182-511-10	50	0,1	20	75	0,23
182-512-10	100	0,1	20	125	0,24
182-521-10	100	0,5	50	130	0,27
182-513-10	150	0,1	20	175	0,35
182-514-10	200	0,1	20	225	0,36
182-522-10	200	0,5	50	230	0,32
182-531-10	250	1	100	280	0,55
182-523-10	300	0,5	50	330	0,57
182-524-10	400	0,5	50	430	0,71
182-525-10	500	0,5	50	530	0,86
182-532-10	500	1	100	530	0,86
182-533-10	750	1	100	780	1,22
182-534-10	1000	1	100	1030	1,54



Graduation : 0,1 mm



Graduation : 0,5 mm



Graduation : 1 mm



### Specifications

Accuracy	(1,5+2L/1.000) μm L = measured length (mm)
Material	Sodium glass
Thermal expansion coefficient	(8±1) x 10 <sup>-6</sup> /K

Specifications

Accuracy	$(0,5+L/1.000) \mu\text{m}$ L = measured length (mm)
Graduation	1 mm
Thickness of graduation line	4 $\mu\text{m}$
Material	Low expansion glass
Thermal expansion coefficient	$(0\pm0,02) \times 10^{-6}/\text{K}$

Low Expansion Glass Scales

Series 182

These high precision glass scales offer you the following benefits:

- They are manufactured using Mitutoyo's leading-edge Linear Scale production technology.
- You can use them as a standard for calibrating graduating scales, with high accuracy.

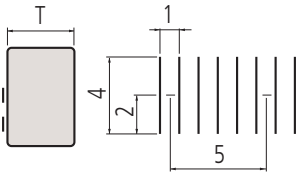
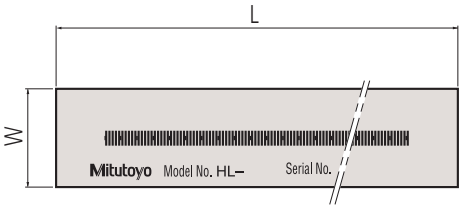


182-502-60  
182-501-60

Metric

No.	Range [mm]	L [mm]	T [mm]	W [mm]	Mass [kg]
182-501-60	250	280	10	20	0,75
182-502-50	500	530	20	30	1,8
182-502-60	500	530	20	30	1,8

-60 : with JCSS certificate



mm



# Calibration Tester

## Series 170

This Calibration Tester offers you the following benefits:

- It enables you to test dial indicators, lever gauges and bore gauges with 0,01mm scale graduation.
- Bore gauges can be supported both horizontally and vertically.



170-102-12

### Metric

No.	Range [mm]	Accuracy	Mass [kg]
170-102-12	0-25	±2 µm	7,5

## Series 521

This allows the calibration of digital and analogue indicators, lever gauges and measuring probes with a maximum measuring span of 5mm.



521-105

### Metric

No.	Range [mm]	Accuracy	Mass [kg]
521-103	0-1	±0,2 µm	7
521-105	0-5	±0,8 µm	7,5



### Specifications

Graduation	0,001 mm
Measuring face	Carbide tipped, rotating

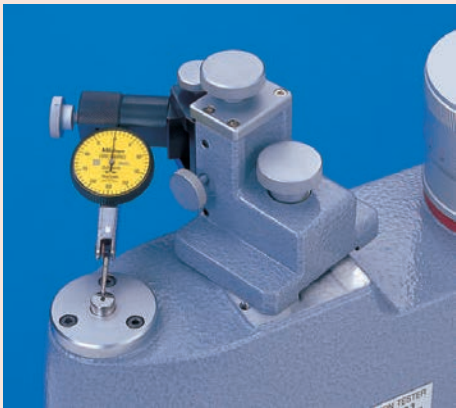
### Optional accessories

No.	Description
12AAK824	Horizontal Holder for Bore Gauge, For Series 170



### Specifications

Graduation	0,0002 mm
Repeatability	0,2 µm
Clamping range	Ø 4-10 mm



# Calibration Tester i-Checker 2000



## Specifications

Digital step	0,01 µm
Scale	Linear encoder
Drive method	Motor drive, semi automatic, fully automatic only for indicator with data output
Power supply	100VAC to 240VAC ±10%, 50/60Hz
Dimensions (WxDxH)	196 x 205,5 x 599,5 mm
Max. drive speed	10 mm/s
Delivered	With ø8 mm stem bush, software i-Pak, certificate of inspection
PC connection	USB

## Optional accessories

No.	Description
02ASK000	Test Indicator Accessory Set, I-Checker, For Ø6mm Stem
02ASK180	Test Indicator Accessory Set, I-Checker, For Ø8mm Stem
02ASK040	Stem Bush for I-Checker, For Ø6mm Stem
02ASL150	Stem Bush for I-Checker, For ø10mm Stem
02ASK060	Stem Bush for I-Checker, For Ø12mm Stem
02ASK070	Stem Bush for I-Checker, For Ø15mm Stem
02ASK080	Stem Bush for I-Checker, For Ø20mm Stem
02ASK710	Stem Bush for I-Checker, For Ø28mm Stem
02ASK090	Stem Bush for I-Checker, For Ø9,525mm (3/8") Stem
02ASU162	Cylinder Gauge Set, IC-2000



Calibration of Dial Test Indicator (Lever Type) with optional accessories

## Series 170

- i-Checker is specially designed to calibrate dial indicators, dial test indicators, bore gauges, electronic digital indicator gauges and other electronic gauges.
- Inspection can be performed 2,5 times faster compared to the previous model.
- This instrument achieves the high accuracy and therefore guarantees ultra-reliable inspection results.
- Digital indicators equipped with a data output function are checked very efficiently due to spindle positioning at the inspection points and recording of measurement results being under fully automatic control.
- Analog type indicators are inspected in semi-automatic mode with the pointer of the indicator being manually adjusted at each measuring point with automatic transfer of inspection results and movement to the next measuring point.



170-402D  
with optional accessories

## Metric

No.	Range [mm]	Accuracy	Remarks	Mass
170-402D	100	±(0,1+0,4L/100) µm L = measured length (mm)	I-Pak software confirms ISO, DIN, VDI/VDE/DGQ, JIS, JMAS, ANSI, ASME	20 kg



# Gauge Block Comparator GBCD-250

## Series 565

This Manual Comparator with Dual Gauge Heads offers you the following benefits:

- It performs gauge block calibration according to EN ISO 3650.
- You can easily compare gauge blocks between 0,1mm and 250mm with reference gauge blocks.
- The upper and lower gauging heads give you of easy, high-accuracy measurement.



No.	Resolution	Range [mm]	Measuring unit	Measuring force
565-151D-01	0,000001 mm (0,001 μm)	0,1-250	Linear Gauge (upper, lower)	0,4 N (upper) 0,2 N (lower)

# Cylindrical Measuring Pin

## Series 926

This is a complete incremental set of plug (or pin) gauges, that offers you the following benefits:

- It includes 91 or 273 pieces that you can use in the inspection room, or on the shop floor in tool and fixture making.



926-210



926-222

Set of 273 pieces

No.	Accuracy grade	Remarks
926-210	1	1-10 mm, rising by 0,1mm 0mm (size); +0,01mm (oversize) and -0,01mm (undersize)
926-212	2	1-10 mm, rising by 0,1mm 0mm (size); +0,01mm (oversize) and -0,01mm (undersize)

Set of 91 pieces

No.	Accuracy grade	Remarks
926-220	1	1-10mm, rising by 0,1mm
926-222	2	1-10mm, rising by 0,1mm

## Optional accessories

No.	Description
02ASQ953	GBPAK-ME V4.0, Software for GBCD-250
02ASP422	RS-232C Cable
937179T	Footswitch for SPC
02ASF040	Heat Protection Shield, For GBCD-250
601644	Cerastone for Gauge Blocks, 150x50x20mm
158-120	Optical Flat, 15mm, Ø60mm, 0,1μm
516-650E	Maintenance Kit for Gauge Blocks
02ASD130	Square Gauge Block Holder, For GBCD-210
516-145-E2	Calibration Master for GB-Comparator, 11pcs., Refer to EA-10/02,

## Specifications

Finish	Very fine ground, from Ø 3 mm inscribed
Accuracy	DIN 2269
Hardness	HRC 60-62
Roughness	RA ≤ 0,1 μm
Length [mm]	up to Ø 6 mm = 50 mm over Ø 6 mm = 70 mm
Delivered	In a wooden box

## Gauge Blocks



**Steel Gauge Block Sets**  
**Page 340**



**Steel individual Gauge Blocks**  
**Page 347**



**CERA Gauge Block Sets**  
**Page 349**



**CERA Individual Gauge Blocks**  
**Page 352**



**Special Gauge Blocks**  
**Page 353**

**Accessories for Gauge Blocks**  
**Page 355**



# Gauge Blocks Overview

## Series 516

Precision gauge blocks are the primary standards vital to dimensional quality control in the manufacture of parts. Mitutoyo offers an extensive selection of gauge blocks available in a choice of rectangular or square, metric or inch, and steel or ceramic types.

### Accuracy

Gauge blocks offered by Mitutoyo have such a high accuracy that users can use them complete confidence. Needless to say, Mitutoyo has established a traceability system for our measurement products, up to the Metrology Management Center of the National Institute of Advanced Industrial Science and Technology (AIST) and we have been certified by the Japanese government as an accredited laboratory.

### Wringing

The lapping technique is one of Mitutoyo's specialties. Our advanced technique, developed over more than a half century, enables us to achieve the best flatness and surface roughness needed for gauge blocks and thus maximize the wringing force.

### Abrasion Resistance and Dimensional Stability of Steel blocks

High-carbon high-chrome steel is employed to satisfy a variety of the material characteristics required for gauge blocks. Our advanced heat treatment technology for steel blocks, which involves repeated high and low temperature cycles, simultaneously achieves excellent abrasion resistance and reduces change in length over time to the minimum.

### CERA Blocks

CERA blocks are made of a ceramic material with a superior surface finish, created by Mitutoyo's ultra-precision machining techniques, that provides a premium quality block.

#### 1. Corrosion Resistant

Anti-corrosion treatment is not required when handled normally (i.e. with fingers), resulting in simple maintenance and storage.

#### 2. No Burrs Caused by Dents, etc.

Since the CERA Block is very hard, it will not scratch and is highly resistant to burrs. If a burr is formed, it can easily be removed with a ceramic deburring stone (Ceraston).

#### 3. Abrasion Resistant

CERA Blocks have 10 times the abrasion resistance of steel gauge blocks.

#### 4. Dimensionally Stable

CERA Blocks are free from dimensional change over time.

#### 5. Sizes Clearly Marked

Black characters, indicating the nominal length, are inscribed by laser and are clearly visible against the white surface of the block.

#### 6. Non-magnetic Nature Prevents Steel Swarf Contamination

#### 7. High Wringing Force

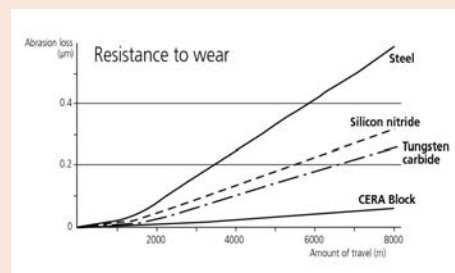
Superior flatness and surface finish

#### 8. Superior Material Characteristics of CERA Block

Property	Material	CERA Block (ZrO <sub>2</sub> )	Steel (Fe)	Carbide (WC-Co)	Silicon nitride (Si <sub>3</sub> N <sub>4</sub> )
Hardness (HV)		1350	800	1650	1500
Coefficient of thermal expansion (10 <sup>-6</sup> /K)		9,3±0,5	10,8±0,5	5,5±1,0	2
Flexural strength (MPa)		1270	1960	1960	580
Fracture toughness K <sub>1c</sub> (MPa·m <sup>1/2</sup> )		7	120	12	6,5
Young's modulus x10 <sup>-4</sup> (MPa)		20,6	20,6	61,8	28,4
Poisson's ratio		0,3	0,3	0,2	0,3
Specific gravity		6,0	7,8	14,8	3,2
Thermal conductivity (W/m·K)		2,9	54,4	79,5	16,7



CERA Blocks



CERA Blocks - Abrasion Resistant



CERA Blocks - Non magnetic

### Selecting Gauge Blocks

Gauge blocks are designed to offer the construction of practically any size, within the range of a set, using the minimum number of blocks. Long block sets are available if a longer length is required than is provided by the standard sets.

Gauge block sets should be selected in accordance with the minimum length step required. Wear block sets should be used if the application is likely to involve rapid wear of the end blocks in a stack (and the minimum sizes required allow this). This will preserve the life of the set by confining wear to the wear blocks, whose cost of replacement is far less than that of a complete set.

If a set containing a large number of gauge blocks is selected, the number of gauge blocks required for any particular length may be reduced and the number of combinations is increased. Accuracy will be retained and wear will be reduced.

Dedicated gauge block sets for micrometer inspection and caliper inspection are available.



# Gauge Blocks Overview

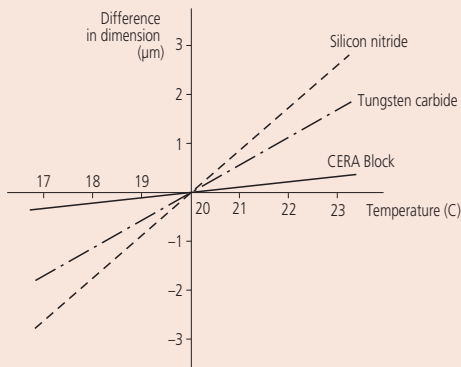
## Series 516

### 9. Closest Expansion Coefficient to Steel

The thermal expansion coefficient of a CERA Block is quite similar to that of a steel gauge block.

### 10. Highly Resistant to Dropping and Impact

The CERA Block material is one of the toughest ceramics. It is extremely difficult to crack a CERA block in normal use.



Differences in the dimension between some materials and steel that are obtained when measuring testpieces with a length of 100 mm at each temperature.

## Grade and Application

The following information can be used to select the gauge block grade according to usage (specified by DIN861, BS4311, JIS B 7506 and EN ISO 3650).

### Grade 2:

These gauge blocks are intended for shop floor use to set and calibrate fixtures as well as precision instruments.

### Grade 1:

This grade is used within an inspection area to verify the accuracy of plug and snap gauges as well as for setting electronic measuring devices.

### Grade 0:

These higher accuracy gauges are intended for use within a controlled environment by skilled inspection staff. Mainly used as reference standards for setting high precision measuring equipment and for the calibration of lower grade gauge blocks.

### Grade K:

Gauge blocks of this accuracy are intended for use within a temperature controlled inspection room or calibration laboratory. They should be used as masters with certificates against other gauge blocks which are calibrated by comparison.

## Certificates

### ILAC

The International Laboratory Accreditation Cooperation is an international cooperation of laboratory and inspection accreditation bodies. The member bodies signed the ILAC Mutual Recognition Arrangement (MRA) which ensures a cross approval of certificates from accredited laboratories from other countries. The Signatories to the ILAC arrangement are almost all European countries.

### JCSS

Mitutoyo Gauge Block Sets can be delivered with a JCSS Certificate of Calibration (Japan Calibration Service System). A JCSS Certificate of Calibration is comparable with e.g. DAkkS, COFRAC, RvA or UKAS Certificate of Calibration. Refer to ILAC this calibration result may be accepted internationally.

# Steel Gauge Block Set - 1 mm Base

## Series 516 - 1 Base

This table shows the most popular configurations for this type of set. For details of other configurations available please contact Mitutoyo.

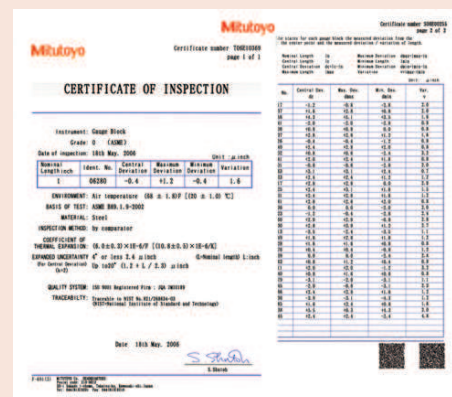


Inspection certificate

## Specifications

Accuracy

EN ISO 3650



Inspection Certificate



Steel 47-block set



Steel 112-block set



Steel 103-block set

Blocks per Set	No.	Block allocation			
		Grade	Size	Step	Quantity
122	516-597-10	0	1,0005	-	1
	516-598-10	1	1,001 - 1,009	0,001	9
	516-599-10	2	1,01 - 1,49	0,01	49
			1,6 - 1,9	0,1	4
			0,5 - 24,5	0,5	49
			30 - 100	10	8
112	516-938-10	0	1,0005	-	1
	516-939-10	1	1,001 - 1,009	0,001	9
	516-940-10	2	1,01 - 1,49	0,01	49
			0,5 - 24,5	0,5	49
			25 - 100	25	4
103	516-942-10	0	1,005	-	1
	516-943-10	1	1,01 - 1,49	0,01	49
	516-944-10	2	0,5 - 24,5	0,5	49
			25 - 100	25	4
87	516-946-10	0	1,001 - 1,009	0,001	9
	516-947-10	1	1,01 - 1,49	0,01	49
	516-948-10	2	0,5 - 9,5	0,5	19
			10 - 100	10	10
47	516-958-10	0	1,005	-	1
	516-959-10	1	1,01 - 1,09	0,01	9
	516-960-10	2	1,1 - 1,9	0,1	9
			1 - 24	1	24
			25 - 100	25	4
47	516-962-10	0	1,005	-	1
	516-963-10	1	1,01 - 1,19	0,01	19
	516-964-10	2	1,2 - 1,9	0,1	8
			1 - 9	1	9
			10 - 100	10	10
46	516-995-10	0	1,001 - 1,009	0,001	9
	516-996-10	1	1,01 - 1,09	0,01	9
	516-997-10	2	1,1 - 1,9	0,1	9
			1 - 9	1	9
			10 - 100	10	10
32	516-966-10	0	1,005	-	1
	516-967-10	1	1,01 - 1,09	0,01	9
	516-968-10	2	1,1 - 1,9	0,1	9
			1 - 9	1	9
			10 - 30	10	3
			60	-	1
8	516-115-10	0	25 - 200	25	8
	516-116-10	1			
	516-117-10	2			

# Steel Gauge Block Set - 1 mm Base with JCSS Certificate

## Specifications

Accuracy

EN ISO 3650

## Series 516 - 1 Base



Calibration certificate



Steel 47-block set



Steel 112-block set



Steel 103-block set



JCSS Calibration Certificate

These Gauge Block Sets are delivered with a JCSS Calibration Certificate (Japan Calibration Service System).

A JCSS Certificate of Calibration is comparable with e.g. DAKKS COFRAC, RVA or UKAS Certificate of Calibration.

This calibration result is accepted internationally.

Blocks per Set	No.	Grade	Block allocation		
			Size	Step	Quantity
122	516-596-60	K	1,0005	-	1
	516-597-60	0	1,001 - 1,009	0,001	9
	516-598-60	1	1,01 - 1,49	0,01	49
	516-599-60	2	1,6 - 1,9	0,1	4
			0,5 - 24,5	0,5	49
			30 - 100	10	8
			25, 75	-	2
112	516-937-60	K	1,0005	-	1
	516-938-60	0	1,001 - 1,009	0,001	9
	516-939-60	1	1,01 - 1,49	0,01	49
	516-940-60	2	0,5 - 24,5	0,5	49
			25 - 100	25	4
103	516-941-60	K	1,005	-	1
	516-942-60	0	1,01 - 1,49	0,01	49
	516-943-60	1	0,5 - 24,5	0,5	49
	516-944-60	2	25 - 100	25	4
87	516-945-60	K	1,001 - 1,009	0,001	9
	516-946-60	0	1,01 - 1,49	0,01	49
	516-947-60	1	0,5 - 9,5	0,5	19
	516-948-60	2	10 - 100	10	10
47	516-957-60	K	1,005	-	1
	516-958-60	0	1,01 - 1,09	0,01	9
	516-959-60	1	1,1 - 1,9	0,1	9
	516-960-60	2	1 - 24	1	24
			25 - 100	25	4
47	516-961-60	K	1,005	-	1
	516-962-60	0	1,01 - 1,19	0,01	19
	516-963-60	1	1,2 - 1,9	0,1	8
	516-964-60	2	1 - 9	1	9
			10 - 100	10	10
46	516-994-60	K	1,001 - 1,009	0,001	9
	516-995-60	0	1,01 - 1,09	0,01	9
	516-996-60	1	1,1 - 1,9	0,1	9
	516-997-60	2	1 - 9	1	9
			10 - 100	10	10
32	516-965-60	K	1,005	-	1
	516-966-60	0	1,01 - 1,09	0,01	9
	516-967-60	1	1,1 - 1,9	0,1	9
	516-968-60	2	1 - 9	1	9
			10 - 30	10	3
			60	-	1
8	516-701-60	K	125 - 175	25	3
	516-702-60	0	200 - 250	50	2
	516-703-60	1	300 - 500	100	3
	516-704-60	2			
8	516-115-60	0	25 - 200	25	8
	516-116-60	1			
	516-117-60	2			

# Steel Gauge Block Set - Thin Blocks

## Series 516

- Thin block set, 0,001 mm step, 0,05 mm step

Ordering example: To order an ISO Standard 18-block grade 1 set with calibration certificate, choose No. 516-975-60.



Inspection  
Certificate



Calibration  
Certificate

Blocks per Set	No.	Standard / grade available and Suffix No. *	Block allocation		
			Size	Step	Quantity
18	516-974	(Grade 0): -X0	0,991 - 0,999	0,001	9
	516-975	(Grade 1): -X0	1,001 - 1,009	0,001	9
	516-976	(Grade 2): -X0			
9	516-981	(Grade K): -X0	1,001 - 1,009	0,001	9
	516-982	(Grade 0): -X0			
	516-983	(Grade 1): -X0			
	516-984	(Grade 2): -X0			
9	516-985	(Grade K): -X0	0,991 - 0,999	0,001	9
	516-986	(Grade 0): -X0			
	516-987	(Grade 1): -X0			
	516-988	(Grade 2): -X0			
9	516-990	(Grade 0): -X0	0,1 - 0,5	0,05	9
	516-991	(Grade 1): -X0			
	516-992	(Grade 2): -X0			

## Specifications

Accuracy

EN ISO 3650



Steel 18-block set

## Suffix No. (-X) for Selecting Certificate Provided

ISO/DIN/JIS		
Suffix No.	Inspection Certificate	Calibration Certificate
1	○	—
6	○	○

# Carbide Wear Block Set

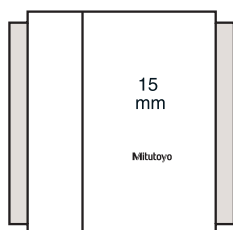
## Series 516 - Carbide Wear Block sets



Inspection  
Certificate



Carbide 2-block set



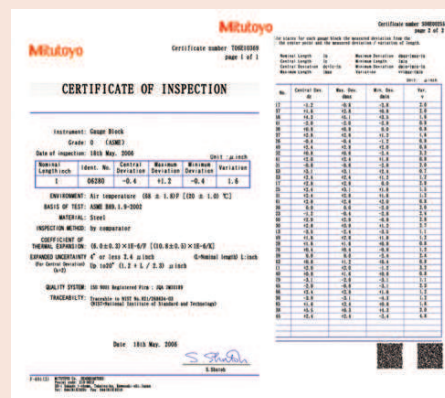
Protection gauge blocks (highlighted in grey above) are placed at each end of the gauge block stack to absorb the wear caused by contact with workpieces.

Blocks per Set	No.	Block allocation			
		Grade	Size	Step	Quantity
2	516-807-10	0	1	-	2
	516-806-10	1			
2	516-803-10	0	2	-	2
	516-802-10	1			

## Specifications

Accuracy

EN ISO 3650



Inspection Certificate



## Specifications

Accuracy

EN ISO 3650



516-107-10



Micro checker  
(See separate entry later in this chapter for a detailed description)

# Steel Micrometer Inspection Gauge Block Set

## Series 516



Calibration  
certificate



Inspection  
certificate

With calibration certificate

Blocks per Set	No.	Grade	Calibration/Standard applications	Block allocation
10	516-580-60	0	For Micrometer with 2 mm spindle pitch. (QuantuMike)	2,2/ 4,8/ 7,8/ 10,4/ 12/ 15,2/ 17,4/ 19,6/ 22,6/ 25 mm
	516-581-60	1		
	516-582-60	2		
10	516-106-60	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, optical parallel (thickness = 12 mm)
	516-107-60	1		
	516-108-60	2		
10	516-135-60	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, Micro Checker, optical parallel (thickness = 12 mm)
	516-136-60	1		
	516-137-60	2		

With inspection certificate

Blocks per Set	No.	Grade	Calibration/Standard applications	Block allocation
10	516-580-10	0	For Micrometer with 2 mm spindle pitch. (QuantuMike)	2,2/ 4,8/ 7,8/ 10,4/ 12/ 15,2/ 17,4/ 19,6/ 22,6/ 25 mm
	516-581-10	1		
	516-582-10	2		
10	516-106-10	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, optical parallel (thickness = 12 mm)
	516-107-10	1		
	516-108-10	2		
10	516-135-10	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/ DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, Micro Checker, optical parallel (thickness = 12 mm)
	516-136-10	1		
	516-137-10	2		

# Steel Caliper Inspection Gauge Block Set

## Series 516



Inspection  
certificate



516-526-10



516-124-10

Blocks per Set	No.	Grade	Mass	Calibration/Standard applications	Block allocation
4	516-526-10	1	1,72	EN ISO 13385-1	4 blocks : 10, 30, 50, 125 mm, setting ring with inspection certificate (Ø4 mm, Ø10 mm), pin gauge (Ø 10 mm), glove
	516-527-10	2	1,72		
3	516-124-10	1	1,72	DIN 862 (1988) VDI/VDE/DGQ 2618	3 blocks : 30, 41,3, 131,4 mm, setting ring without inspection certificate (Ø4 mm, Ø25 mm), glove
	516-125-10	2	1,72		



# Micrometer Inspection Gauge Block Stand

## Series 516 - Micro Checker

This micro checker offers you the following benefits

- For securely holding a stack of gauge blocks to be used for micrometer inspection.
- Can be used vertically and horizontally.
- Parallelism of micrometer measuring faces is checked by optical parallel which can be attached to the stand for convenience in handling.



516-607 with optional gauge blocks

Metric		
Micro Checker (stand only)		
No.	Applicable gauge block sets	Applicable gauge block size [mm]
516-607	516-106-xx, 516-107-xx, 516-108-xx, 516-156-xx, 516-157-xx, 516-158-xx	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25

# Steel Metric Individual Gauge Block

## Specifications

Accuracy	EN ISO 3650
Delivered	Foamed material 0,1-500 mm in a wooden case 600-1000 mm

## Suffix No. ( -XXX ) for Selecting Certificate Provided

ISO/DIN/JIS			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate
-016	K	○	○
-021	0	○	—
-026	0	○	○
-031	1	○	—
-036	1	○	○
-041	2	○	—
-046	2	○	○

## Metric Blocks ≤ 1,19 mm

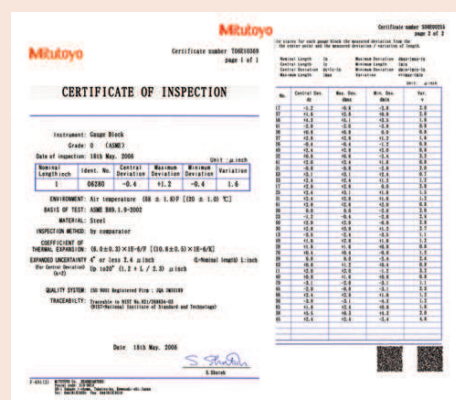
Ordering example: To order a 0,1mm ISO Standard grade 1 block with JCSS calibration certificate, choose No. 611821-036.



Calibration  
Certificate



Inspection  
Certificate



Inspection Certificate



JCSS Calibration Certificate

These Gauge Block Sets are delivered with a JCSS Certificate of Calibration (Japan Calibration Service System).

A JCSS Certificate of Calibration is comparable with e.g. DAKKS COFRAC, RVA or UKAS Certificate of Calibration.

This calibration result is accepted internationally.

Length [mm]	No.	Length [mm]	No.	Length [mm]	No.
0,1	611821	0,53	611894	0,96	611937
0,11	611860	0,54	611895	0,97	611938
0,12	611861	0,55	611896	0,98	611939
0,13	611862	0,56	611897	0,99	611940
0,14	611863	0,57	611898	0,991	611551
0,15	611822	0,58	611899	0,992	611552
0,16	611864	0,59	611900	0,993	611553
0,17	611865	0,6	611901	0,994	611554
0,18	611866	0,61	611902	0,995	611555
0,19	611867	0,62	611903	0,996	611556
0,2	611823	0,63	611904	0,997	611557
0,21	611868	0,64	611905	0,998	611558
0,22	611869	0,65	611906	0,999	611559
0,23	611870	0,66	611907	1	611611
0,24	611871	0,67	611908	1,0005	611520
0,25	611824	0,68	611909	1,001	611521
0,26	611872	0,69	611910	1,002	611522
0,27	611873	0,7	611911	1,003	611523
0,28	611874	0,71	611912	1,004	611524
0,29	611875	0,72	611913	1,005	611525
0,3	611825	0,73	611914	1,006	611526
0,31	611876	0,74	611915	1,007	611527
0,32	611877	0,75	611916	1,008	611528
0,33	611878	0,76	611917	1,009	611529
0,34	611879	0,77	611918	1,01	611561
0,35	611826	0,78	611919	1,02	611562
0,36	611880	0,79	611920	1,03	611563
0,37	611881	0,8	611921	1,04	611564
0,38	611882	0,81	611922	1,05	611565
0,39	611883	0,82	611923	1,06	611566
0,4	611827	0,83	611924	1,07	611567
0,41	611884	0,84	611925	1,08	611568
0,42	611885	0,85	611926	1,09	611569
0,43	611886	0,86	611927	1,1	611570
0,44	611887	0,87	611928	1,11	611571
0,45	611828	0,88	611929	1,12	611572
0,46	611888	0,89	611930	1,13	611573
0,47	611889	0,9	611931	1,14	611574
0,48	611890	0,91	611932	1,15	611575
0,49	611891	0,92	611933	1,16	611576
0,5	611506	0,93	611934	1,17	611577
0,51	611892	0,94	611935	1,18	611578
0,52	611893	0,95	611936	1,19	611579

For prices please refer to the online catalogue

For prices please refer to the online catalogue

For prices please refer to the online catalogue

For prices please refer to the online catalogue

# Steel Metric Individual Gauge Block

Metric Blocks ≤ 1000 mm

**Ordering example:** To order a 1,2 mm ISO Standard grade K block with JCSS calibration certificate, choose 611580-016.



Inspection  
certificate



Calibration  
certificate

Length [mm]	No.
1,2	611580
1,21	611581
1,22	611582
1,23	611583
1,24	611584
1,25	611585
1,26	611586
1,27	611587
1,28	611588
1,29	611589
1,3	611590
1,31	611591
1,32	611592
1,33	611593
1,34	611594
1,35	611595
1,36	611596
1,37	611597
1,38	611598
1,39	611599
1,4	611600
1,41	611601
1,42	611602
1,43	611603
1,44	611604
1,45	611605
1,46	611606
1,47	611607
1,48	611608
1,49	611609
1,5	611641
1,6	611516
1,7	611517
1,8	611518
1,9	611519
2	611612
2,0005	611690
2,001	611691
2,002	611692
2,003	611693
2,004	611694
2,005	611695
2,006	611696
2,007	611697
2,008	611698
2,009	611699
2,01	611701
2,02	611702
2,03	611703
2,04	611704
2,05	611705
2,06	611706
2,07	611707
2,08	611708
2,09	611709
2,1	611710
2,11	611711
2,12	611712
2,13	611713
2,14	611714

For prices please refer to the online catalogue

Length [mm]	No.
2,15	611715
2,16	611716
2,17	611717
2,18	611718
2,19	611719
2,2	611720
2,21	611721
2,22	611722
2,23	611723
2,24	611724
2,25	611725
2,26	611726
2,27	611727
2,28	611728
2,29	611729
2,3	611730
2,31	611731
2,32	611732
2,33	611733
2,34	611734
2,35	611735
2,36	611736
2,37	611737
2,38	611738
2,39	611739
2,4	611740
2,41	611741
2,42	611742
2,43	611743
2,44	611744
2,45	611745
2,46	611746
2,47	611747
2,48	611748
2,49	611749
2,5	611642
2,6	611750
2,7	611751
2,8	611752
2,9	611753
3	611613
3,5	611643
4	611614
4,5	611644
5	611615
5,1	611850
5,5	611645
6	611616
6,5	611646
7	611617
7,5	611647
7,7	611851
8	611618
8,5	611648
9	611619
9,5	611649
10	611671
10,3	611852
10,5	611650
11	611621

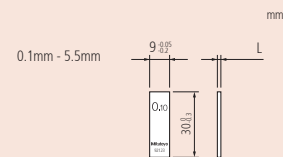
For prices please refer to the online catalogue

Length [mm]	No.
11,5	611651
12	611622
12,5	611652
12,9	611853
13	611623
13,5	611653
14	611624
14,5	611654
15	611625
15,5	611655
16	611626
16,5	611656
17	611627
17,5	611657
17,6	611854
18	611628
18,5	611658
19	611629
19,5	611659
20	611672
20,2	611855
20,5	611660
21	611631
21,5	611661
22	611632
22,5	611662
22,8	611856
23	611633
23,5	611663
24	611634
24,5	611664
25	611635
25,25	611754
30	611673
35	611755
40	611674
41,3	611857
45	611756
50	611675
60	611676
70	611677
75	611801
80	611678
90	611679
100	611681
125	611802
131,4	611858
150	611803
175	611804
200	611682
250	611805
300	611683
400	611684
500	611685
600	611840
700	611841
750	611842
800	611843
900	611844
1.000	611845

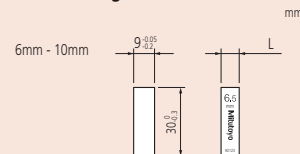
For prices please refer to the online catalogue

Suffix No. ( -XXX )  
for Selecting Certificate Provided

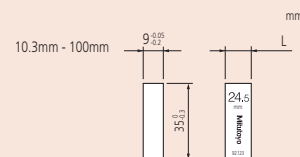
ISO/DIN/JIS			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-016	K	O	O
-021	0	O	—
-026	0	O	O
-031	1	O	—
-036	1	O	O
-041	2	O	—
-046	2	O	O



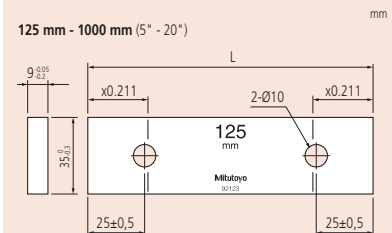
Nominal length: 0.1 mm - 5.5 mm



Nominal length: 6 mm - 10 mm



Nominal length: 10.3 mm - 100 mm



Nominal length: 125 mm - 1000 mm

## Specifications

Accuracy

EN ISO 3650

### Suffix No. (-X) for Selecting Certificate Provided

ISO/DIN/JIS		
Suffix No.	Inspection Certificate	Calibration Certificate
1	○	—
6	○	○

Suffix No. 1: Not available for Grade K sets.



CERA 112-block set



CERA 56-block set



CERA 32-block set

# CERA Gauge Block Set

## Series 516 - 1 Base

Ordering example: To order an ISO Standard 112-block grade 1 set with JCSS calibration certificate choose 516-339-60.



Calibration  
certificate



Inspection  
certificate

Blocks per Set	No.	Standard / grade available and Suffix No. *	Block allocation		
			Size	Step	Quantity
112	516-337	(Grade K): -X0	1,0005	-	1
	516-338	(Grade 0): -X0	1,001 - 1,009	0,001	9
	516-339	(Grade 1): -X0	1,01 - 1,49	0,01	49
	516-340	(Grade 2): -X0	0,5 - 24,5	0,5	49
103	516-341	(Grade K): -X0	25 - 100	25	4
	516-342	(Grade 0): -X0	1,005	-	1
	516-343	(Grade 1): -X0	1,01 - 1,49	0,01	49
	516-344	(Grade 2): -X0	0,5 - 24,5	0,5	49
88	516-370	(Grade 0): -X0	25 - 100	25	4
	516-371	(Grade 1): -X0	1,0005	-	1
	516-372	(Grade 2): -X0	1,001 - 1,009	0,001	9
87	516-345	(Grade K): -X0	1,01 - 1,49	0,01	49
	516-346	(Grade 0): -X0	0,5 - 9,5	0,5	19
	516-347	(Grade 1): -X0	10 - 100	10	10
	516-348	(Grade 2): -X0	1,001 - 1,009	0,001	9
76	516-349	(Grade K): -X0	1,01 - 1,49	0,01	49
	516-350	(Grade 0): -X0	0,5 - 9,5	0,5	19
	516-351	(Grade 1): -X0	10 - 40	10	4
	516-352	(Grade 2): -X0	50 - 100	25	3
56	516-353	(Grade K): -X0	0,5	-	1
	516-354	(Grade 0): -X0	1,001 - 1,009	0,001	9
	516-355	(Grade 1): -X0	1,01 - 1,09	0,01	9
	516-356	(Grade 2): -X0	1,1 - 1,9	0,1	9
47	516-357	(Grade K): -X0	1 - 24	1	24
	516-358	(Grade 0): -X0	25 - 100	25	4
	516-359	(Grade 1): -X0	1,005	-	1
	516-360	(Grade 2): -X0	1,01 - 1,09	0,01	9
47	516-361	(Grade K): -X0	1,1 - 1,9	0,1	9
	516-362	(Grade 0): -X0	1 - 9	1	9
	516-363	(Grade 1): -X0	10 - 100	10	10
	516-364	(Grade 2): -X0	1,001 - 1,009	0,001	9
46	516-394	(Grade K): -X0	1,01 - 1,09	0,01	9
	516-395	(Grade 0): -X0	1,1 - 1,9	0,1	9
	516-396	(Grade 1): -X0	1 - 9	1	9
	516-397	(Grade 2): -X0	10 - 100	10	10
34	516-178	(Grade K): -X0	1,001 - 1,009	0,001	9
	516-179	(Grade 0): -X0	1,01 - 1,09	0,01	9
	516-180	(Grade 1): -X0	1,1 - 1,9	0,1	9
	516-181	(Grade 2): -X0	1 - 5	1	5
32	516-182	(Grade K): -X0	10	-	1
	516-365	(Grade K): -X0	1,005	-	1
	516-366	(Grade 0): -X0	1,01 - 1,09	0,01	9
	516-367	(Grade 1): -X0	1,1 - 1,9	0,1	9
8	516-368	(Grade 2): -X0	1 - 9	1	9
	516-731	(Grade K): -X0	10 - 30	10	3
	516-732	(Grade 0): -X0	60	-	1
	516-733	(Grade 1): -X0	125 - 175	25	3
8	516-734	(Grade 2): -X0	200 - 250	50	2
			300 - 500	100	3



# CERA Gauge Block Set - Thin Blocks

## Series 516 - 0.001 step

These block sets offer you the following benefits:

- Thin block set, 0,001mm step.
- Ordering example: To order an ISO Standard 18-block grade 1 set with calibration certificate, choose 516-375-60.



Calibration  
certificate



Inspection  
certificate

## Specifications

Accuracy

EN ISO 3650

## Suffix No. (-X) for Selecting Certificate Provided

ISO/DIN/JIS		
Suffix No.	Inspection Certificate	Calibration Certificate
1	○	—
6	○	○

Suffix No. 1: Not available for Grade K sets.



CERA 18-block set

CERA 9-block

Blocks per Set	No.	Standard / grade available and Suffix No. *		Block allocation		
		ISO/DIN/JIS		Size	Step	Quantity
18	516-373	(Grade K): -X0		0,991 - 0,999	0,001	9
	516-374	(Grade 0): -X0		1,001 - 1,009	0,001	9
	516-375	(Grade 1): -X0				
	516-376	(Grade 2): -X0				
9	516-381	(Grade K): -X0		1,001 - 1,009	0,001	9
	516-382	(Grade 0): -X0				
	516-383	(Grade 1): -X0				
	516-384	(Grade 2): -X0				
9	516-385	(Grade K): -X0		0,991 - 0,999	0,001	9
	516-386	(Grade 0): -X0				
	516-387	(Grade 1): -X0				
	516-388	(Grade 2): -X0				

# CERA Wear Block Set

## Series 516 - Cera Wear block sets



Inspection  
certificate

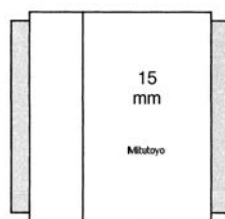
## Specifications

Accuracy

EN ISO 3650

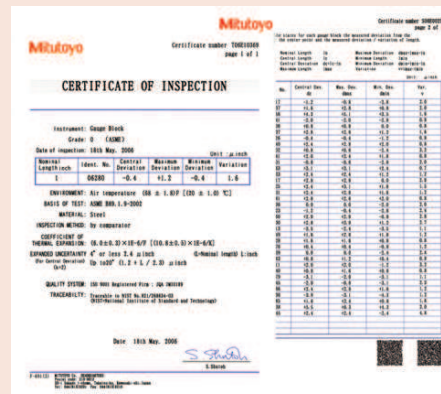


CERA 2-block set



Protection gauge blocks (highlighted in grey above) are placed at each end of the gauge block stack to absorb the wear caused by contact with workpieces.

Blocks per Set	No.	Block allocation			
		Grade	Size	Step	Quantity
2	516-832-10	0	1	-	2
	516-833-10	1			
2	516-830-10	0	2	-	2
	516-831-10	1			



## Mitutoyo Gauge Blocks and Inspection Certificates

A Inspection Certificate is furnished with all Mitutoyo gauge blocks with a serial number on the box (in the case of sets) and an identification number on each block. The deviation of each block from nominal length, at the time of inspection, is stated. For this inspection, each gauge block is measured relative to the upper level master using a gauge block comparator. Grade K gauge blocks are measured by a primary measurement method using an interferometer.



## Specifications

Accuracy

EN ISO 3650



516-391-10



Micro checker 516-607  
applicable gauge block sets  
516-156, 516-157, 516-158



516-566-10

# CERA Micrometer Inspection Gauge Block Set

## Series 516



Calibration  
certificate



Inspection  
certificate

With calibration certificate

Blocks per Set	No.	Grade	Calibration/Standard applications	Block allocation
10	516-390-60	0	Especially for Micrometer with 2 mm spindle pitch (QuantuMike)	2,2/ 4,8/ 7,8/ 10,4/ 12/ 15,2/ 17,4/ 19,6/ 22,6/ 25 mm
	516-391-60	1		
	516-392-60	2		
10	516-156-60	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, optical parallel (thickness = 12 mm)
	516-157-60	1		
	516-158-60	2		
10	516-185-60	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, Micro Checker, optical parallel (thickness = 12 mm)
	516-186-60	1		
	516-187-60	2		

With inspection certificate

Blocks per Set	No.	Grade	Calibration/Standard applications	Block allocation
10	516-390-10	0	Especially for Micrometer with 2 mm spindle pitch. (QuantuMike)	2,2/ 4,8/ 7,8/ 10,4/ 12/ 15,2/ 17,4/ 19,6/ 22,6/ 25 mm
	516-391-10	1		
	516-392-10	2		
10	516-156-10	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, optical parallel (thickness = 12 mm)
	516-157-10	1		
	516-158-10	2		
10	516-185-10	0	EN ISO 3611 DIN 863 (1999) VDI/VDE/DGQ 2618	2,5/ 5,1/ 7,7/ 10,3/ 12,9/ 15/ 17,6/ 20,2/ 22,8/ 25 mm, Micro Checker, optical parallel (thickness = 12 mm)
	516-186-10	1		
	516-187-10	2		

# CERA Caliper Inspection Gauge Block Set

## Series 516



Inspection  
certificate

Blocks per Set	No.	Grade	Calibration/Standard applications	Block allocation
4	516-566-10	1	EN ISO 13385-1	4 blocks : 10, 30, 50, 125 mm, setting ring with inspection certificate (Ø4 mm, Ø10 mm), pin gauge (Ø 10 mm), glove
	516-567-10	2		
3	516-150-10	1	DIN 862 (1988) VDI/VDE/DGQ 2618	3 blocks : 30, 41,3, 131,4 mm, setting ring without inspection certificate (Ø4 mm, Ø25 mm), glove
	516-151-10	2		

# CERA Individual Gauge Block

## Metric Blocks

Ordering example: To order a 0,5mm ISO Standard grade 1 block with JCSS calibration certificate, choose 613506-036.



Length [mm]	No.	Length [mm]	No.	Length [mm]	No.
0,5	613506	1,3	613590	12,9	613853
0,991	613551	1,31	613591	13	613623
0,992	613552	1,32	613592	13,5	613653
0,993	613553	1,33	613593	14	613624
0,994	613554	1,34	613594	14,5	613654
0,995	613555	1,35	613595	15	613625
0,996	613556	1,36	613596	15,5	613655
0,997	613557	1,37	613597	16	613626
0,998	613558	1,38	613598	16,5	613656
0,999	613559	1,39	613599	17	613627
1	613611	1,4	613600	17,5	613657
1,0005	613520	1,41	613601	17,6	613854
1,001	613521	1,42	613602	18	613628
1,002	613522	1,43	613603	18,5	613658
1,003	613523	1,44	613604	19	613629
1,004	613524	1,45	613605	19,5	613659
1,005	613525	1,46	613606	20	613672
1,006	613526	1,47	613607	20,2	613855
1,007	613527	1,48	613608	20,5	613660
1,008	613528	1,49	613609	21	613631
1,009	613529	1,5	613641	21,5	613661
1,01	613561	1,6	613516	22	613632
1,02	613562	1,7	613517	22,5	613662
1,03	613563	1,8	613518	22,8	613856
1,04	613564	1,9	613519	23	613633
1,05	613565	2	613612	23,5	613663
1,06	613566	2,5	613642	24	613634
1,07	613567	3	613613	25	613635
1,08	613568	3,5	613643	25,25	613754
1,09	613569	4	613614	30	613673
1,1	613570	4,5	613644	35	613755
1,11	613571	5	613615	40	613674
1,12	613572	5,1	613850	41,3	613857
1,13	613573	5,5	613645	45	613756
1,14	613574	6	613616	50	613675
1,15	613575	6,5	613646	60	613676
1,16	613576	7	613617	70	613677
1,17	613577	7,5	613647	75	613801
1,18	613578	7,7	613851	80	613678
1,19	613579	8	613618	90	613679
1,2	613580	8,5	613648	100	613681
1,21	613581	9	613619	125	613802
1,22	613582	9,5	613649	131,4	613858
1,23	613583	10	613671	150	613803
1,24	613584	10,3	613852	175	613804
1,25	613585	10,5	613650	200	613682
1,26	613586	11	613621	250	613805
1,27	613587	11,5	613651	300	613683
1,28	613588	12	613622	400	613684
1,29	613589	12,5	613652	500	613685

For prices please refer to the online catalogue

For prices please refer to the online catalogue

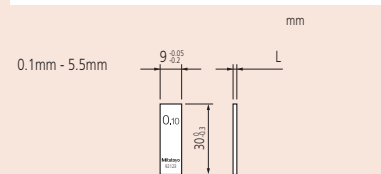
For prices please refer to the online catalogue

## Specifications

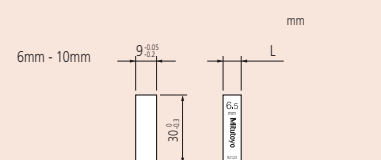
Accuracy	EN ISO 3650
Delivered	Foamed material 0,5-100 mm in a wooden case 125-500 mm

## Suffix No. ( -XXX ) for Selecting Certificate Provided

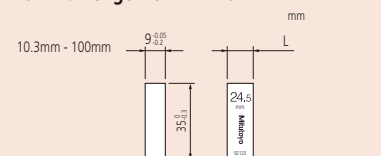
ISO/DIN/JIS			
Suffix No.	Grade	Inspection Certificate	Calibration Certificate JCSS
-016	K	O	O
-021	0	O	—
-026	0	O	O
-031	1	O	—
-036	1	O	O
-041	2	O	—
-046	2	O	O



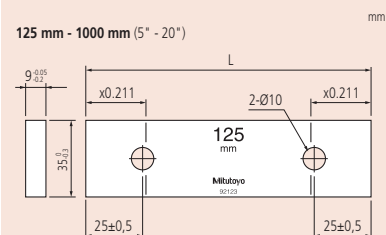
Nominal length: 0.1 mm - 5.5 mm



Nominal length: 6 mm - 10 mm



Nominal length: 10.3 mm - 100 mm



Nominal length: 125 mm - 1000 mm



For prices please refer to the online catalogue

**Mitutoyo**

Page 1 of 1 / 総数1頁中の1頁

Issue No. / 発行 No. 000001

Date of issue / 発行年月日 2009-07-20

**Report of calibration**  
**校正結果**

Product name / 品名	Gauge Block / ゲージブロック	Nominal Length / 呼び寸法	500mm
Order No. / コード No.	611685-01A	Date of calibration / 校正年月日	2009-07-20
Serial No. / 製造 No.	040605	Material / 材質	Steel / スチール

Calibration Item / 校正項目: Coefficient of thermal expansion / 熱膨張係数

Measurement expanded uncertainty (coverage factor: k=2): 校正値の拡張不確かさ(包含係数 k=2):  $U = 0.035 \times 10^{-5} / ^\circ\text{C}$

Result of calibration / 校正結果:

Coefficient of thermal expansion / 熱膨張係数:  $\alpha = 10.818 \times 10^{-6} / ^\circ\text{C}$

Using DFI Double Facing Interferometer, at each temperature (setting value) of 17 °C, 20 °C, and 23 °C, size measurement is performed after sufficient temperature stable, and a Coefficient of thermal expansion is computed from the result.

計測器具: DFI Double Facing Interferometer (D.F.I.) 17°C, 20°C, 23°Cの各温度(設定値)にて、十分な温度安定後、寸法測定を行い、その結果から熱膨張係数を算出します。

Setting temperature / 設定温度 (°C)	17	20	23
Actual temperature / 実際の温度 (°C)	17.110	20.227	22.783
The amount of change of a length / 寸法変化量 (μm)	-16.860	0	13.715

It is based on a size with a setting temperature of 20 °C.  
設定温度 20°Cの寸法を基準とします。

the amount of change of a size / 寸法変化量

Chief inspector / S. Shishida

Mitutoyo Corporation

To each final dimension a factory certificate is supplied.

## Gauge Blocks with a Calibrated CTE

### Gauge Blocks with a Calibrated Coefficient of Thermal Expansion

These are metric gauge blocks with a calibrated coefficient of thermal expansion. They offer you the following benefits:

- Mitutoyo offers top-level gauge blocks (steel and ceramic) which are superior to K class blocks, with their quality supported by Mitutoyo's best technologies.
- They feature an accurately calibrated thermal expansion coefficient measured with a proprietary double-faced interferometer (DFI).
- Each gauge block is calibrated for length on a highly accurate gauge block interferometer (GBI) system.
- Uncertainty of thermal expansion coefficient:  $0.035 \times 10^{-6} / ^\circ\text{C}$  ( $k=2$ ).
- Uncertainty of length measurement: 30 nm ( $k=2$ ), for 100mm blocks.



#### Ceramic

No.	Accuracy
613681-01B	Grade K JIS/DIN/ISO
613802-01B	Grade K JIS/DIN/ISO
613803-01B	Grade K JIS/DIN/ISO
613804-01B	Grade K JIS/DIN/ISO
613682-01B	Grade K JIS/DIN/ISO
613805-01B	Grade K JIS/DIN/ISO
613683-01B	Grade K JIS/DIN/ISO
613684-01B	Grade K JIS/DIN/ISO
613685-01B	Grade K JIS/DIN/ISO

#### Steel

No.	Accuracy
611681-01B	Grade K JIS/DIN/ISO
611802-01B	Grade K JIS/DIN/ISO
611803-01B	Grade K JIS/DIN/ISO
611804-01B	Grade K JIS/DIN/ISO
611682-01B	Grade K JIS/DIN/ISO
611805-01B	Grade K JIS/DIN/ISO
611683-01B	Grade K JIS/DIN/ISO
611684-01B	Grade K JIS/DIN/ISO
611685-01B	Grade K JIS/DIN/ISO



Calibration  
Certificate

# ZERO CERA Blocks

## Ultra-low Expansion Ceramic Gauge Blocks

These are ultra-low expansion ceramic gauge blocks.

The ZERO CERA Blocks offer you the following benefits:

- Thermal expansion at  $20 \pm 1^\circ\text{C}$  is less than 1/500 that of steel.
- There is almost no secular change either in the dimension or coefficient of thermal expansion.
- You will find them light and easy to handle.
- They are rust free.
- They are magnetisation free.



Calibration  
certificate

## Specifications

Material	Ultra-low thermal expansion fine ceramic 826HV10*2
Grade*1	K
Standard accessories	Inspection certificate, Calibration certificate and custom-made aluminium case
Coefficient of thermal expansion	$0 \pm 0,02 \times 10^{-6}/\text{K}$ (at $20^\circ\text{C}$ )*2
Density*2	2,5 g/cm <sup>3</sup>

\*1

If you require a grade other than K, please contact Mitutoyo.

\*2

Value claimed by the material supplier.



No.	Accuracy	Length [mm]
617673-016	Grade K ISO/JIS/DIN	30
617675-016	Grade K ISO/JIS/DIN	50
617681-016	Grade K ISO/JIS/DIN	100
617682-016	Grade K ISO/JIS/DIN	200
617683-016	Grade K ISO/JIS/DIN	300
617684-016	Grade K ISO/JIS/DIN	400
617685-016	Grade K ISO/JIS/DIN	500
617840-016	Grade K ISO/JIS/DIN	600
617841-016	Grade K ISO/JIS/DIN	700
617843-016	Grade K ISO/JIS/DIN	800
617844-016	Grade K ISO/JIS/DIN	900
617845-016	Grade K ISO/JIS/DIN	1000
516-771-60	Grade K ISO/JIS/DIN	Above set

## Characteristics comparison of gauge block materials

	ZERO CERA BLOCK	Low expansion glass	CERA BLOCK	Steel	Tungsten carbide
Coefficient of thermal expansion ( $10^{-6}/\text{K}$ )	$0 \pm 0,02$ *2) *3)	$0 \pm 0,02$ *2) *3)	$9,3 \pm 0,5$	$10,8 \pm 0,5$	$5,5 \pm 1$
Thermal conductivity (W/m*K)	3,7	1,7	2,9	54,4	79,5
Specify gravity	2,5	2,55	6	7,8	14,8
Young modulus (GPa)	130	90	206	206	618
Poisson ratio	0,3	0,25	0,3	0,3	0,2
Flexural strength (3 points) (MPa)	210	143	1270	1960	1960
Fracture toughness (MPa*m <sup>1/2</sup> )	1,2	0,69 *4)	7	120	12
Vickers hardness (HV)	826 *3)	680	1350	800	1650

1) Material for Mitutoyo Products

2) Value at  $20^\circ\text{C}$

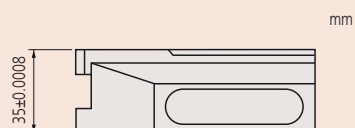
3) Claimed value by the material supplier

4) Value measured by the material supplier (reference)

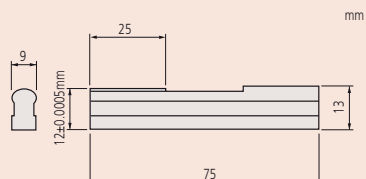
# Gauge Block Accessories

## Series 516

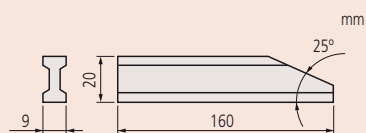
Specially designed for long gauge blocks over 100 mm which have two coupling holes on the body.



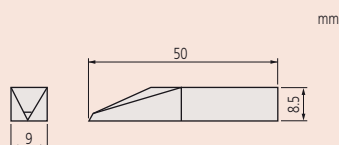
Holder base : 619009



Half-round jaw : 619013



Plain jaw : 619018



Scriber point : 619019

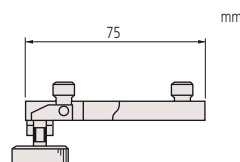


516-605

No.	Included in set
516-605	Holder A (619031)-1 pc
	Holder B (619032)-1 pc
	Holder C (619033)-1 pc
	Holder D (619034)-1 pc
	Holder E (619035)-1 pc
	Adapter (619036)-3 pcs
	Holder base 35mm (619009)-1 pc
	Half-round jaw 12mm (619013)-2 pcs
	Plain jaw (619018)-2 pcs
	Scriber point (619019)-1 pc



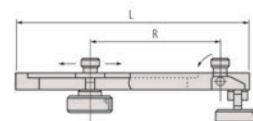
Holder A : 619031  
Used for coupling two long gauge blocks.



619031



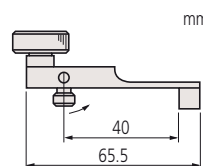
Holder B and C :  
Used for coupling two long gauge blocks together with other gauge blocks up to 35 mm (Holder B) or 140 mm Holder C). Also used for attaching jaws with two adapters.  
Holder B : 619032 (R max.= 90 mm- L= 126 mm)  
Holder C : 619033 (R max.= 200 mm- L= 236 mm)



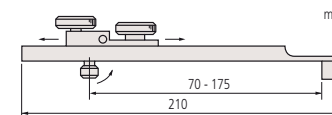
619032 / 619033



Holder D : 619034  
Used for attaching to the holder base.



619034



Holder E : 619035  
Used for attaching to the holder base together with other gauge blocks up to 125 mm. Used for attaching jaws with one adapter.



# Gauge Block Accessories

## Series 619

These accessories are specially designed for long gauge blocks over 100mm which have two coupling holes on the body.



516-601J



516-602J

### 1. Set

No.	Included in set
516-601J	(1 x 619003; 1 x 619004; 1 x 619005; 1 x 619009; 2 x 619010; 2 x 619011; 2 x 619012; 2 x 619013; 2 x 619014; 2 x 619018; 1 x 619019; 1 x 619020; 2 x 619021; 1 x 619022; 1 x 619023)
516-602J	(1 x 619002; 1 x 619003; 1 x 619004; 1 x 619005; 1 x 619009; 2 x 619010; 2 x 619011; 2 x 619012; 1 x 619019; 1 x 619020; 1 x 619022)

### 2. Holder

No.	L [mm]
619002	15-60
619003	5-100
619004	15-160
619005	20-250

### 3. Holder base

No.	Description
619009	35 mm

### 4. Half-round jaw

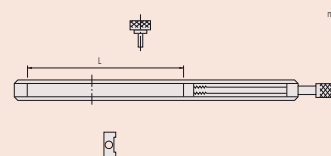
No.	Size	A [mm]	B [mm]	C [mm]	H [mm]
619010	Half-round jaw 2 mm	5,5	40	7,5	2 ±0,0005
619011	Half-round jaw 5 mm	14	45	7,5	5 ±0,0005
619012	Half-round jaw 8 mm	18,5	50	8,5	8 ±0,0005
619013	Half-round jaw 12 mm	25	75	13	12 ±0,0005
619014	Half-round jaw 20 mm	25	125	20,5	20 ±0,0005

### 5. Miscellaneous jaws

No.	Description
619018	Plain jaw
619019	Scriber point
619020	Centre point
619021	Tram point

### 6. Triangular straight edge

No.	A [mm]
619022	16
619023	19,5



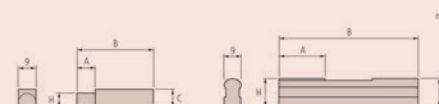
Holder : 619002 to 619005

Used to clamp plain jaws, a scriber point, etc., to a gauge block stack.



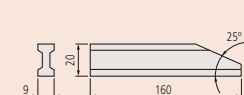
Holder base 35 mm : 619009

Acts as base for a stack of gauge blocks that carry one of the many types of point.



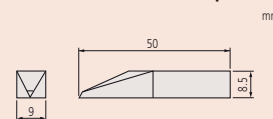
Half round jaw : 619010 to 619014

Used for gauging an outside or inside diameter if used when a pair of jaws in a holder.



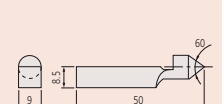
Plain jaw : 619018

Gauges outside and inside dimensions (not inside diameters) when used as a pair of jaws in a holder.



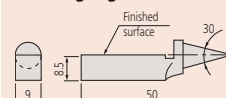
Scriber point : 619019

Scribes a straight line on a workpiece a known distance from a datum plane if used in a holder and holder base.



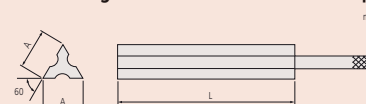
Centre point : 619020

Pushed into a small hole, or conical punch mark, this point provides the pivot for scribing a circular line with a gauge block trammel assembly.



Tram point : 619021

For checking distances between lines and points.



Triangular straight edge : 619022/619023

Can be used to indicate parallelism.

# Ceraston

## Accessory for Gauge Block Maintenance

This accessory for gauge block maintenance offers you the following benefits:

- Alumina-ceramic abrasive stone lets you remove burrs from hard materials such as ceramics, that ordinary stones cannot handle.
- You can use them for both steel gauge blocks and CERA Blocks.



Removing burrs

- 1 Wipe any dust and oil films from the gauge block and the Ceraston (or Arkansas stone) using a solvent.
- 2 Place the gauge block on the Ceraston so that the measuring face that has burrs is on the abrasive surface of the stone. While applying light pressure, move the gauge block to and fro about ten times (Fig. 1). Use a block rubber for thin gauge blocks to apply even pressure (Fig. 2).
- 3 Check the measuring face for burrs with an optical flat. If the burrs have not been removed, repeat step 2. If burrs are too large, they may not be removed with an abrasive stone. If so, discard the gauge block.



**Note:** The abrasive surface of a Ceraston must be made flat by lapping it from time to time. After lapping the ceraston, the lapping powder must be completely removed from the surface of the stone to prevent the gauge block from being scratched. Mitutoyo does not offer Arkansas stones.



601644

601645

No.	Dimensions (WxDxH)	Mass [g]
601645	100 x 25 x 12 mm	110
601644	150 x 50 x 20 mm	530

## Maintenance Kit for Gauge Blocks

### Series 516

This is a maintenance kit for gauge blocks that offers you the following benefits:

- It includes all maintenance tools needed for the daily care and storage of gauge blocks.
- It is supplied in a fitted wooden case for portable use.

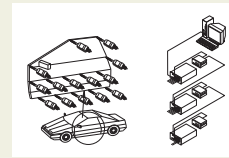


### Consumable spares

No.	Description
601645	Cerastone for Gauge Blocks, 100x25x12mm
600004	Tweezer for Gauge Blocks
600005	Blower Brush for Gauge Blocks
600006	Cleaning Paper for Gauge Blocks
600007	Artificial Leather Mat for Gauge Blocks
600008	Reagent Bottle, 100 ml
600009D	Cotton Gloves, White
158-117	Optical Flat, 12mm, Ø45mm, 0,2µm

No.	Tools and accessories included
516-650E	<p>Ceraston (601645): Used for removing burrs on the measuring surface.</p> <p>Tweezers (600004): Used for handling thin gauge blocks.</p> <p>Blower brush (600005): Used for blowing dust off the measuring surface.</p> <p>Cleaning paper (600006): Used for wiping off rust preventive oil and contamination.</p> <p>Artificial leather mat (600007): Used as a gauge block mat.</p> <p>Reagent bottle (600008): Bottle for wiping solution (100 ml). Solution not included.</p> <p>Gloves (600009D)</p> <p>Optical flat (158-117)</p>

### Linear Gauge Application Examples Page 359



### SENSORPAK Page 360



### Digimatic and Incremental Linear Gauge Page 361



### Counters and Display Units Page 371



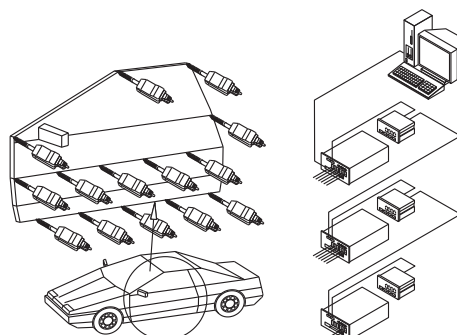
### Mu-Checker Page 376

### Motorized Low Force High Precision Gauges LITEMATIC Page 378

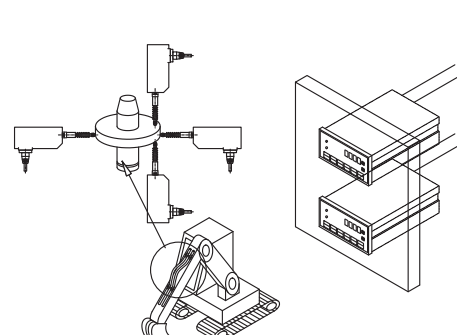


# Linear Gauge Application Examples

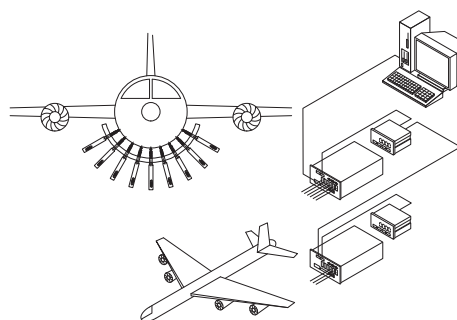
## Linear Gauge Applications



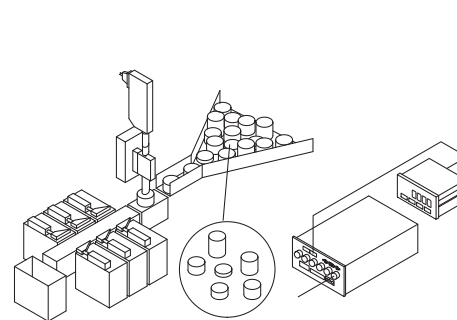
Multi-point measurement on car doors



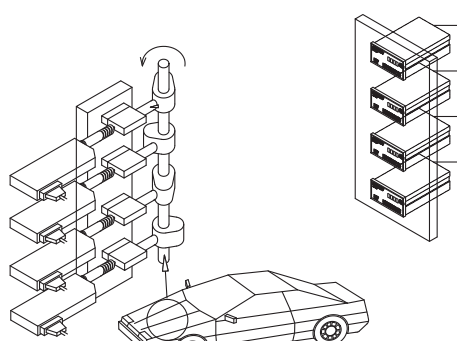
Dimensional measurement of fluid flywheels



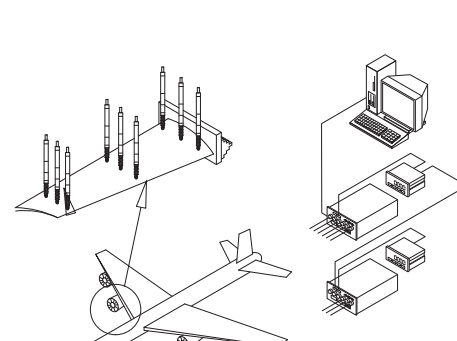
Measurement of aeroplane body deformation



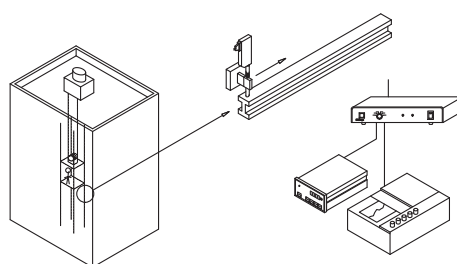
Sorting of parts according to size



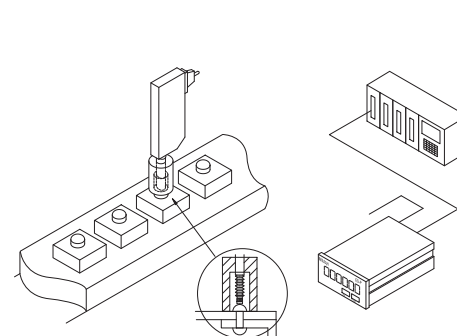
Cam measurement



Multi-point measurement on turbine blades



Measurement of deflection of lift guiding rails



Rivet head testing

# SENSORPAK

The SENSORPAK supports the development of measuring facilities and measuring stations. It offers you the following benefits:

- It can simultaneously display measurement values from up to 60 sensors in real time.
- You can make calculations using measurement values from up to 30 sensors in real time.
- It enables a huge range of different graphical presentations of using measurement, such as number representation, pointer representation, scale representation.
- Data registration can be made in control cards or data tables.
- You can also carry out further data processing with external software, such as Microsoft® Excel® or MeasurLink.



Measurement screen



Meter screen

Model	SENSORPAK
No.	02NGB072
Output function	Direct output to Microsoft® Excel® spreadsheet, CSV file output (compatible with MeasurLink)
Total tolerance judgement	GO/NG judgement (by specifying gauges to be used for total tolerance judgement) GO/NG signal output with optional I/O cable
Input function	Trigger function : by means of keys timer or external TRG (with optional I/O cable) Data input frequency : Max. 9999 times (with 60 gages connected) to 60000 times (with 6 gages connected)
Applicable counter	Counters with RS-232C interface (EH and EV), with USB interface (EH)
Display	Display type : Counter, bar graph, meter, chart (capable of simultaneous display) Tolerance judgement result : Color display (green/red) Connectable gauges : Max. 60 gages

## Specifications

OS compatibility	Windows® 7 (32/64 bit)
	Windows® 8. 1 (32/64 bit)
	Excel® 2007, 2010, 2013
Delivered	License Key, Software CD

## Optional accessories

No.	Description
12AAA807D	Cable RS-232C 2m



# ABSOLUTE Digimatic Linear Gauge LGS Series



## Specifications

Digital step	0,01 mm
Scale	Electrostatic capacitance-type ABSOLUTE linear encoder
Max. response speed	Unlimited (measuring by scanning cannot be performed)
Contact point	Ø3 mm carbide ball thread : M 2,5 x 0,45 mm
Cable length	2 m
Output signal	Digimatic
Environmental conditions	0 °C to 40 °C (20 % to 80 % rel. humidity, no condensation)
Bearing type	Slide bearing

## Optional accessories

No.	Description
02ADF640	Extension Adaptor, for SPC Cables.
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
903594	Air Driving Device, for Indicator
542-007D	Display Unit EC-Counter, CEE, for Digimatic Gauges
542-016	Linear Gauge Counter EG, for Linear Gauge LGS, LGD, Scale Units
542-093-2	Linear Gauge Counter EB, for LGS, LGD, Scale Units
542-072D	Linear Gauge Counter EH, for LGS, LGD, Scale Units
542-064	Linear Gauge Counter EV-D, for LGS, LGD, Scale Units
63AAA033	Digimatic Interface DMX-8/2, 8x Digimatic Input, Serial D-SUB 9 Connector
63AAA026	Digimatic Interface DMX-16, 16x Digimatic Input, Serial D-SUB 9 Connector
63AAA106	Digimatic Interface DMX-16C, 16x Digimatic Input, Serial D-SUB 9 Connector

## Consumable spares

No.	Description
238774	Silicon rubber boot for ID-C, ID-N, ID-S

## Specifications

Throttle	Interior Ø 2,5 mm Exterior Ø 3,2 mm
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## Optional accessories

No.	Description
903594	Air Driving Device, for Indicator

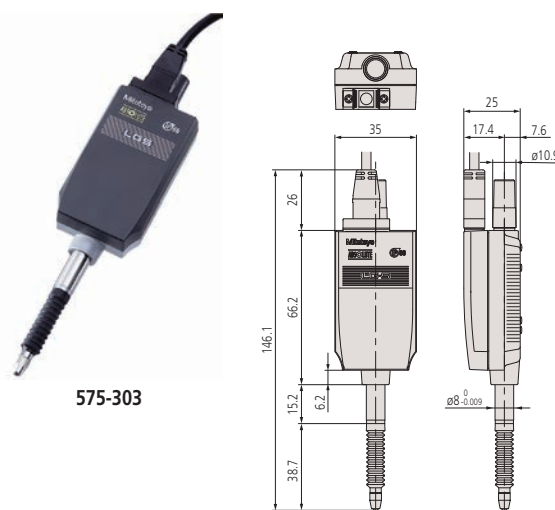


Refer to the Linear Gauge documentation for more details

## Series 575

The LGS is a compact ABS linear gauge that offers you the following benefits:

- Its ABSOLUTE Digimatic data output and IP-66 protection class give you best-of-breed technology.



## Metric

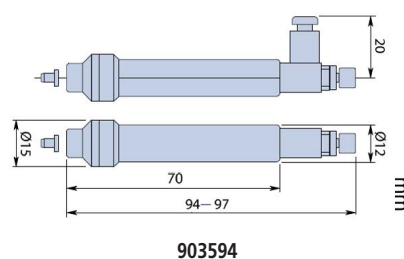
No.	Range [mm]	Accuracy	Measuring force *1	Stem Ø	Direction of counting	Mass [g]
575-303	0-12,7	15 µm	2 N/1,8 N/1,6 N	8 mm	positive	190

\*1 Spindle DOWN/Horizontal/UP

## Air Drive Unit

- Provides smooth lifting and lowering of the contact point of a gauge by pneumatic cylinder.
- The speed of lift can be regulated by the throttle on the remote cylinder.

No.	Range [mm]	Remarks	Suitable for gage model	Air supply [MPa]	Mass [g]
903594	10	Need air filter, regulator and lubricator	LGS	0,5	60



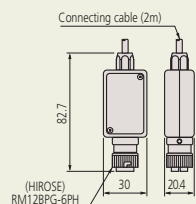


Scale	Photoelectric linear encoder
Contact point	Ø3 mm carbide ball, thread: M 2,5 x 0,45
Cable length	2 m
Power supply	5 V (4,8 V to 5,2 V), 120 mA max.
Output signal	90° phase difference, differential square wave (RS-422A equivalent), minimum edge distance 1000 ns (5 µm type), 500 ns (1 µm type), 250 ns (0.5 µm type), 200 ns (0.1 µm type)
Environmental conditions	0 °C to 40 °C (20 % to 80 % rel. humidity, no condensation)
Bearing type	Linear ball bearing

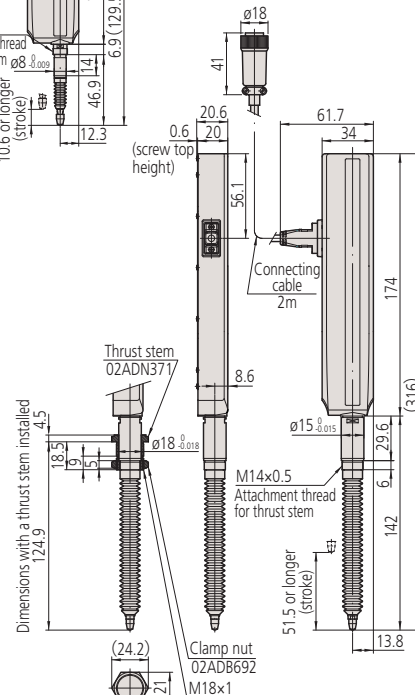
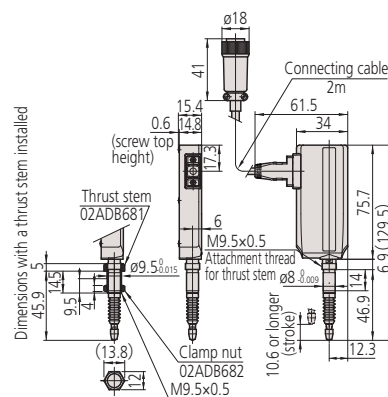
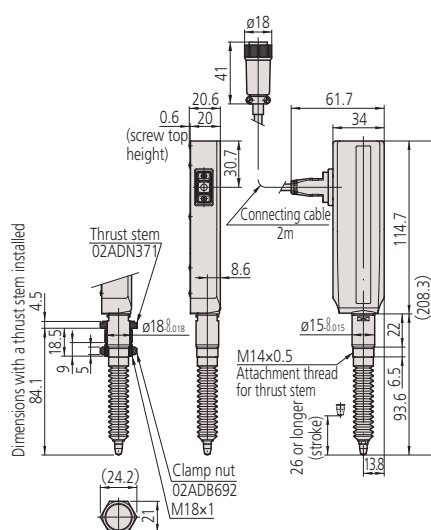
No.	Description
538610	Wrench Key/542

No.	Description
902432	Extension Cable 20m
902433	Extension Cable 10m
902434	Extension Cable 5 m, for Linear Gauge
02ADB680	Thrust Stem (LGF 10mm)
02ADN370	THRUST STEM SET
02ADE230	Air Drive Unit for Linear Gauges, 10 mm
02ADE250	Air Drive Unit for Linear Gauges, 25 mm
02ADE270	Air Drive Unit for Linear Gauges, 50 mm
542-015	Linear Gauge Counter EG, for Linear Gauge LGF, LGK, LGB,LGM, LGH
542-092-2	Linear Gauge Counter EB, for LGF, LGK, LGB, LG, LGM, LGH
542-075D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-071D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-063	Linear Gauge Counter EV, for LGF, LGK, LGB, LG, LGM, LGH

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
238772	Rubber Cap, 542-222/601/604,575-324
962504	Stem Guard 25mm/542
962505	Rubber Cap Assy/542, 50mm type for LGE-1050L



542-181  
542-182



- The advanced construction of the plunger guidance assembly makes it very resistant to external shocks and vibration.
- Its differential square-wave signal output allows you to use it for a wide range of applications.
- It is very long lasting due to linear ball-bearings in the spindle unit.



542-161

No.	Range [mm]	Accuracy	Measuring force *1	Resolution [mm]	Stem Ø	Max. response speed	Signal pitch [µm]	Mass [g]
542-612	0-25	(7,5 + L/50) µm/s	4,6/4,3/4 N	0,005	15 mm	1500 mm/s	20	300
542-613	0-50	(7,5 + L/50) µm/s	5,7/5,3/4,9 N	0,005	15 mm	1500 mm/s	20	400
542-161	0-10	(1,5 + L/50) µm/s	1,2/1,1/1 N	0,001	8 mm	1500 mm/s	4	260
542-162	0-25	(1,5 + L/50) µm/s	4,6/4,3/4 N	0,001	15 mm	1500 mm/s	4	300
542-163	0-50	(1,5 + L/50) µm/s	5,7/5,3/4,9 N	0,001	15 mm	1500 mm/s	4	400
542-171	0-10	(1,5 + L/50) µm/s	1,2/1,1/1 N	0,0005	8 mm	1500 mm/s	2	260
542-172	0-25	(1,5 + L/50) µm/s	4,6/4,3/4 N	0,0005	15 mm	1500 mm/s	2	300
542-173	0-50	(1,5 + L/50) µm/s	5,7/5,3/4,9 N	0,0005	15 mm	1500 mm/s	2	400
542-181	0-10	(0,8 + L/50) µm/s	1,2/1,1/1 N	0,0001	8 mm	400 mm/s	0,4	310
542-182	0-25	(0,8 + L/50) µm/s	4,6/4,3/4 N	0,0001	15 mm	400 mm/s	0,4	350

\*1 Spindle DOWN/Horizontal/UP

# Linear Gauge with Reference Point LGF-Z Series

## Series 542

This is a very robust and economical linear gauge with a reference Point that offers you the following benefits:

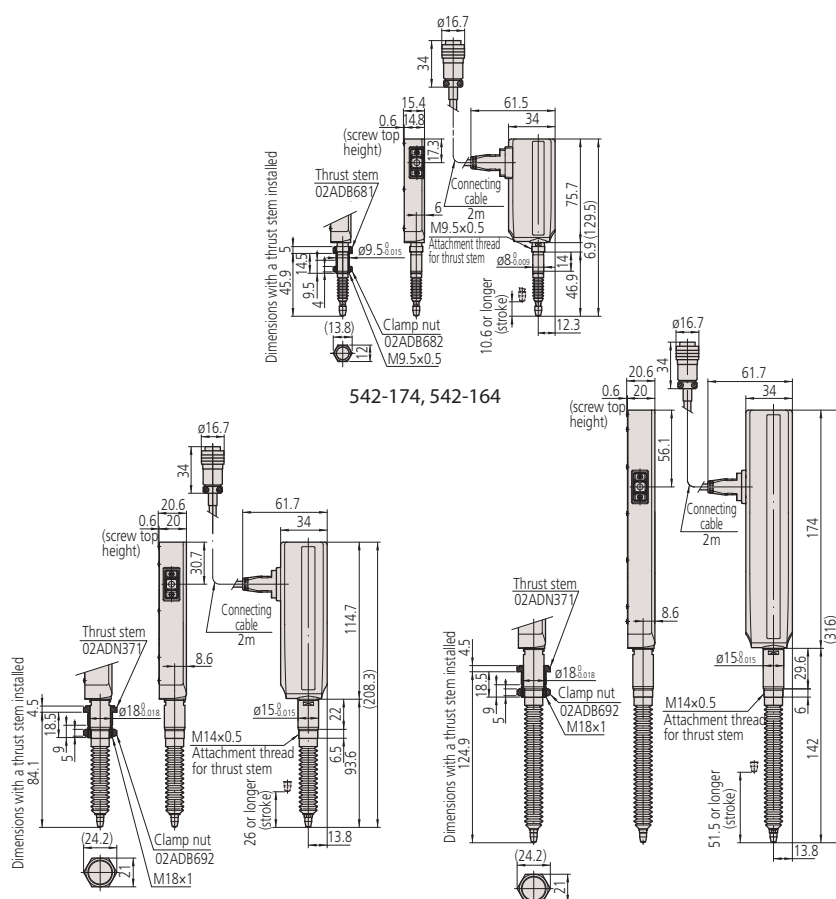
- The advanced construction of the plunger guidance assembly makes it very resistant to external shocks and vibration.
- Its differential square-wave signal output allows you to use it for a wide range of applications.
- It is very long lasting due to linear ball-bearings in the spindle unit.
- The origin point mark on its scale gives you a reference point.



542-164

No.	Range [mm]	Accuracy	Measuring force *1	Resolution [mm]	Stem Ø	Signal pitch [µm]	Mass [g]
542-174	0-10	(1,5 + L/50) µm	1,2 N/1,1 N/1 N	0,0005	8 mm	2	260
542-164	0-10	(1,5 + L/50) µm	1,2 N/1,1 N/1 N	0,001	8 mm	4	260
542-175	0-25	(1,5 + L/50) µm	4,6 N/4,3 N/4 N	0,0005	15 mm	2	300
542-165	0-25	(1,5 + L/50) µm	4,6 N/4,3 N/4 N	0,001	15 mm	4	300
542-176	0-50	(1,5 + L/50) µm	5,7 N/5,3 N/4,9 N	0,0005	15 mm	2	400
542-166	0-50	(1,5 + L/50) µm	5,7 N/5,3 N/4,9 N	0,001	15 mm	4	400

\*1 Spindle DOWN/Horizontal/UP



542-175, 542-165

542-176, 542-166

## Specifications

Scale	Photoelectric linear encoder
Max. response speed	1.500 mm/s
Contact point	Ø3 mm carbide ball, thread: M 2,5 x 0,45
Cable length	2 m
Power supply	5 V (4,8 V to 5,2 V), 120 mA max.
Output signal	90° phase difference, differential square wave (RS-422A equivalent), minimum edge distance 200 ns (1 µm type), 250 ns (0,5 µm type)
Environmental conditions	0 °C to 40 °C (20 % to 80 % rel. humidity, no condensation)
Bearing type	Linear ball bearing
Scale reference point	3 mm from lowest rest point (10 mm type) 5 mm from lowest rest point (25,5 mm type)

## Standard accessories

No.	Description
538610	Wrench Key/542

## Optional accessories

No.	Description
02ADF260	Extension Cable 5m with Origin
02ADF280	Extension Cable 10m with Origin
02ADF300	Extension Cable 20m with Origin
02ADB680	Thrust Stem (LGF 10mm)
02ADN370	THRUST STEM SET
02ADE230	Air Drive Unit for Linear Gauges, 10 mm
02ADE250	Air Drive Unit for Linear Gauges, 25 mm
02ADE270	Air Drive Unit for Linear Gauges, 50 mm
542-017	Linear Gauge Counter EG, for Linear Gauge LGF-Z
542-094-2	Linear Gauge Counter EB, for LGF-Z
542-073D	Linear Gauge Counter EH, for LGF-Z
542-067	Linear Gauge Counter EV, for LGF-Z

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
238772	Rubber Cap, 542-222/601/604,575-324
962504	Stem Guard 25mm/542
962505	Rubber Cap Assy/542, 50mm type for LGE-1050L



Refer to the Linear Gauge documentation for more details

## Specifications

Scale	Photoelectric linear encoder
Stem Ø	8 mm
Contact point	Ø 3 mm carbide ball, thread: M 2,5 x 0,45
Cable length	2 m
Power supply	5 V (4,5 V to 5,2 V), 80 mA max.
Output signal	90° phase difference, differential square wave (RS-422A equivalent) minimum edge distance 200 ns (0,1 µm type), 200 ns (0,5 µm type), 400 ns (1 µm type)
Environmental conditions	0° C to 40° C (20% to 80% rel. humidity, no condensation)
Bearing type	Linear ball bearing

## Standard accessories

No.	Description
538610	Wrench Key/542

## Optional accessories

No.	Description
902434	Extension Cable 5 m, for Linear Gauge
902433	Extension Cable 10m
902432	Extension Cable 20m
02ADE230	Air Drive Unit for Linear Gauges, 10 mm
02ADB680	Thrust Stem (LGF 10mm)
542-015	Linear Gauge Counter EG, for Linear Gauge LGF, LGK, LGB, LGM, LGH
542-092-2	Linear Gauge Counter EB, for LGF, LGK, LGB, LG, LGM, LGH
542-075D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-071D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-063	Linear Gauge Counter EV, for LGF, LGK, LGB, LG, LGM, LGH

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
238772	Rubber Cap, 542-222/601/604,575-324



Refer to the Linear Gauge documentation for more details

# Slim Head Linear Gauge LGK Series

## Series 542

This is a slim type linear gauge that allows you to meet a variety of measurement needs.

The Linear Gage SLIM HEAD LGK offers you the following benefits:

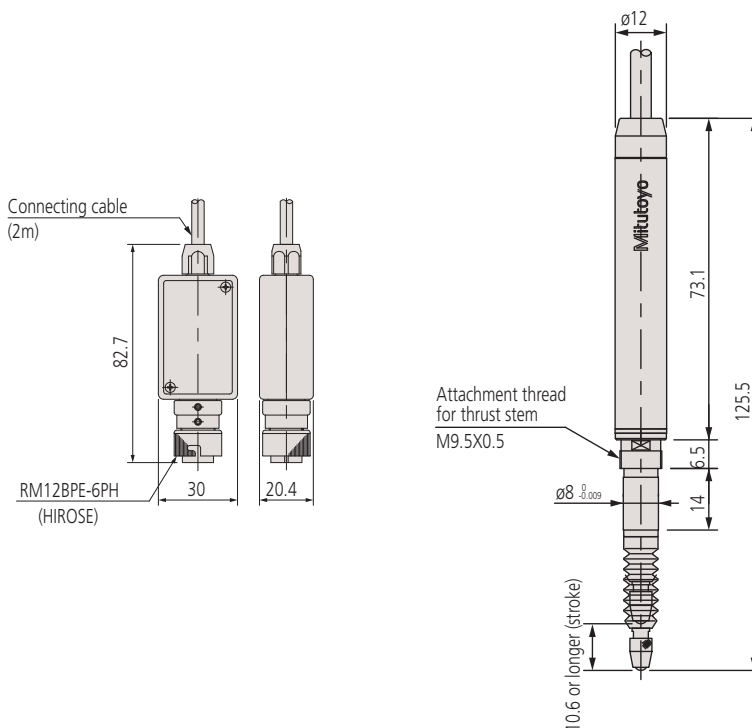
- Differential square-wave signal output enables to use it for a wide range of applications.
- You can install it even where space is restricted, thanks to its small size.
- Its photoelectric scale gives it high precision across the entire measuring range.
- It is very long lasting due to linear ball-bearings in the spindle unit.



542-156  
542-157  
542-158

No.	Range [mm]	Accuracy	Measuring force *1	Resolution [mm]	Signal pitch [µm]	Max. response speed	Mass [g]
542-156	0-10	(1,5 + L/50) µm	0,8 N/0,75 N/0,7 N	0,001	4	1500	175
542-157	0-10	(1,5 + L/50) µm	0,8 N/0,75 N/0,7 N	0,0005	2	1500	175
542-158	0-10	(0,8 + L/50) µm	0,8 N/0,75 N/0,7 N	0,0001	0,4	400	175

\*1 Spindle DOWN/Horizontal/UP





# Slim Head Linear Gauge LGB Series

## Series 542

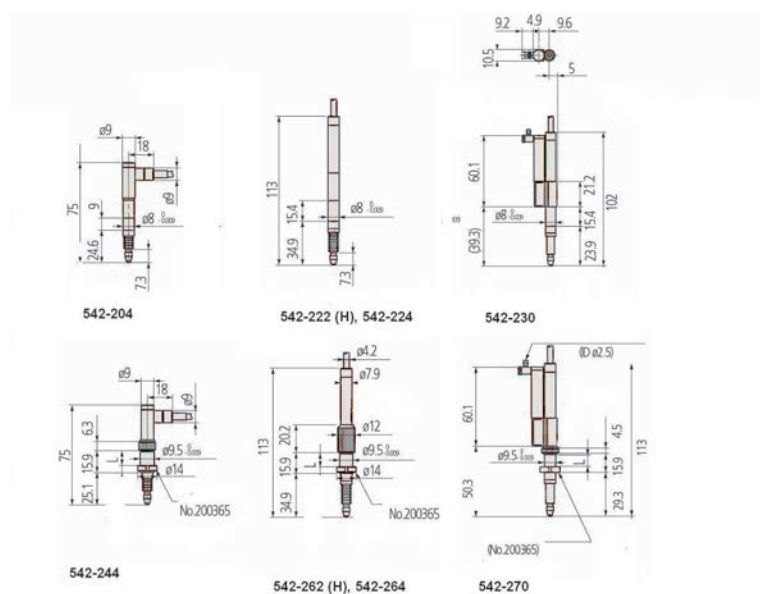
This is an extra slim linear gauge that offers you the following benefits:

- Its differential square-wave signal output allows you to use it for a wide range of applications.
- It is very long lasting due to linear ball-bearings in the spindle unit.



No.	Range [mm]	Accuracy	Measuring force *1	Stem Ø	Remarks	Mass [g]
542-244	0-5	2 µm	0,65 N/0,6 N/0,55 N	9,5 mm	-	160
542-204	0-5	2 µm	0,65 N/0,6 N/0,55 N	8 mm	-	145
542-204H	0-5	1 µm	0,8 N/0,75 N/0,7 N	8 mm	-	145
542-222	0-10	2 µm	0,8 N/0,75 N/0,7 N	8 mm	-	150
542-222H	0-10	1 µm	0,8 N/0,75 N/0,7 N	8 mm	-	150
542-224	0-10	2 µm	0,6 N/0,55 N/0,5 N	8 mm	Low measuring force	165
542-230	0-10	2 µm	0,8 N/0,75 N/0,7 N	8 mm	w/pneumatic cylinder, 0,3 to 0,4 MPa	165
542-262	0-10	2 µm	0,8 N/0,75 N/0,7 N	9,5 mm	-	170
542-262H	0-10	1 µm	0,8 N/0,75 N/0,7 N	9,5 mm	-	170
542-264	0-10	2 µm	0,6 N/0,55 N/0,5 N	9,5 mm	Low measuring force	170
542-270	0-10	2 µm	0,8 N/0,75 N/0,7 N	9,5 mm	w/pneumatic cylinder, 0,3 to 0,4 MPa	170

\*1 Spindle DOWN/Horizontal/UP



## Specifications

Scale	Photoelectric linear encoder
Max. response speed	900 mm/s
Contact point	Ø3 mm carbide ball, thread: M 2,5 x 0,45
Resolution	0,001 mm
Signal pitch	4 µm
Cable length	2 m
Power supply	5 V (4,5 V to 5,2 V), 80 mA max.
Output signal	90° phase difference, differential square wave (RS-422A equivalent)
Environmental conditions	0°C to 40°C (20% to 80% rel. humidity, no condensation)
Bearing type	Linear ball bearing

## Standard accessories

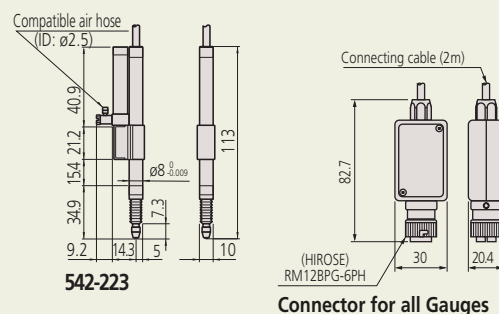
No.	Description
538610	Wrench Key/542

## Optional accessories

No.	Description
902434	Extension Cable 5 m, for Linear Gauge
902433	Extension Cable 10m
902432	Extension Cable 20m
02ADE230	Air Drive Unit for Linear Gauges, 10 mm
542-015	Linear Gauge Counter EG, for Linear Gauge LGF, LGK, LGB, LGM, LGH
542-092-2	Linear Gauge Counter EB, for LGF, LGK, LGB, LG, LGM, LGH
542-075D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-071D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-063	Linear Gauge Counter EV, for LGF, LGK, LGB, LG, LGM, LGH

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
238773	Rubber Cap, 542-204/206/246
238772	Rubber Cap, 542-222/601/604,575-324



# High Resolution Linear Gauge LGB Series



## Specifications

Scale	Photoelectric linear encoder
Max. response speed	380 mm/s
Contact point	Ø3 mm carbide ball, thread: M 2,5 x 0,45
Resolution	0,1 µm
Cable length	2 m
Power supply	5 V (4,5 V to 5,2 V), 150 mA max.
Output signal	90° phase difference differential square wave (RS422 A equivalent)
Environmental conditions	0°C to 30°C (20% to 80% rel. humidity, no condensation)
Bearing type	Linear ball bearing

## Standard accessories

No.	Description
538610	Wrench Key/542

## Optional accessories

No.	Description
902434	Extension Cable 5 m, for Linear Gauge
902433	Extension Cable 10m
902432	Extension Cable 20m
542-015	Linear Gauge Counter EG, for Linear Gauge LGF, LGK, LGB, LGM, LGH
542-092-2	Linear Gauge Counter EB, for LGF, LGK, LGB, LG, LGM, LGH
542-075D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-071D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-063	Linear Gauge Counter EV, for LGF, LGK, LGB, LG, LGM, LGH

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
238773	Rubber Cap, 542-204/206/246



Refer to the Linear Gauge documentation for more details

## Series 542

The Linear Gauge LGB offers you the following benefits:

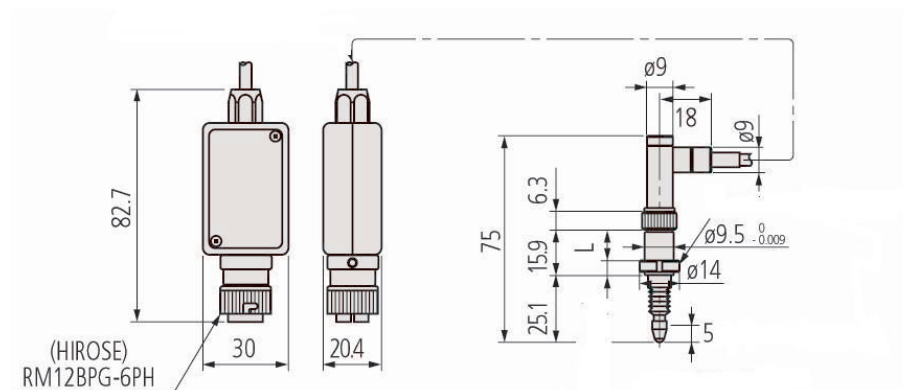
- It has an extra compact design, and its small photoelectric scale lets you measure at high precision across the entire range.
- Differential square-wave signal output allows you to use it for a wide range of applications.
- You can install it in machines and measuring devices.
- Very long life due to the linear ball-bearings in the spindle unit.



542-246

No.	Range [mm]	Accuracy	Measuring force *1	Stem Ø	Mass [g]
542-246	0-5	0,8 µm	0,65 N/0,6 N/0,55 N	9,5 mm	160

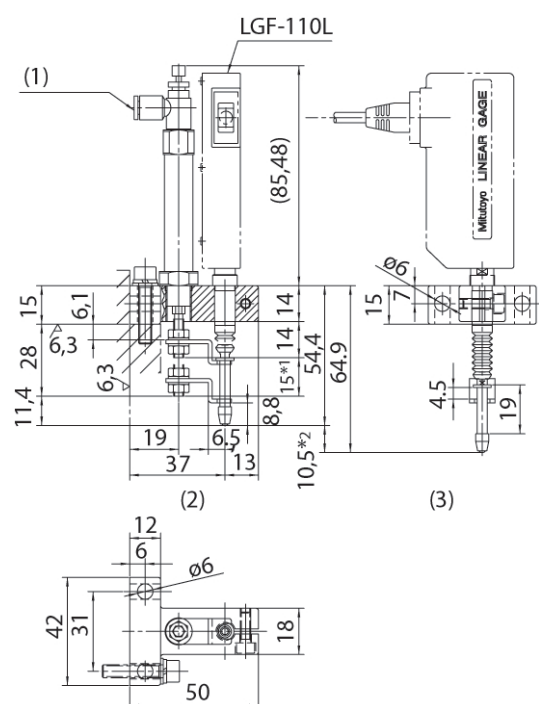
\*1 Spindle DOWN/Horizontal/UP



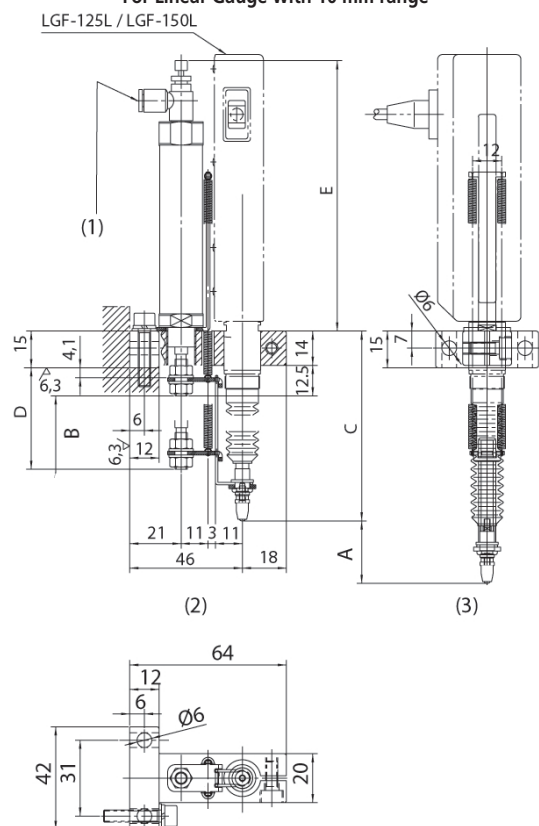
# Air Drive Unit for Linear Gauges



Refer to the Linear Gauge documentation for more details



For Linear Gauge with 10 mm range



For Linear Gauge with 25 mm and 50 mm range

1. Speed controller
2. At air supply off
3. At air supply on

No.	Range [mm]	Remarks	Air supply [MPa]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
02ADE230	0-10	Need air filter, regulator and lubricator	0,2 to 0,4					
02ADE250	0-25	Need air filter, regulator and lubricator	0,2 to 0,4	25,5	30	77,6	41,5	110,5
02ADE270	0-50	Need air filter, regulator and lubricator	0,2 to 0,4	51	50	95,9	66,5	159,5

# Large Measuring Range Linear Gauge LG / LGM Series

## Specifications

Scale	Photoelectric linear encoder
Contact point	Ø 3 mm carbide ball, thread: M 2,5 x 0,45
Dimensions (WxDxH)	90 x 175 x 74 mm (control unit)
Cable length	2 m
Power supply	5 V (4,8 V to 5,2 V) (Control unit No. 542-313D: 230 V 50/60 Hz)
Output signal	90° phase difference, differential square wave (RS-422A equivalent)
Environmental conditions	0°C to 40°C (20% to 80% rel. humidity, no condensation)
Bearing type	Linear ball bearing

## Optional accessories

No.	Description
542-015	Linear Gauge Counter EG, for Linear Gauge LGF, LGK, LGB, LGM, LGH
542-092-2	Linear Gauge Counter EB, for LGF, LGK, LGB, LG, LGM, LGH
542-075D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-071D	Linear Gauge Counter EH, for LGF, LGK, LGB, LG, LGM, LGH
542-063	Linear Gauge Counter EV, for LGF, LGK, LGB, LG, LGM, LGH

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric
02ADA004	RUBBER CAP/LGM

Rubber boot for IP66 type only

## Series 542

This linear gauge has a large measuring range 100 mm



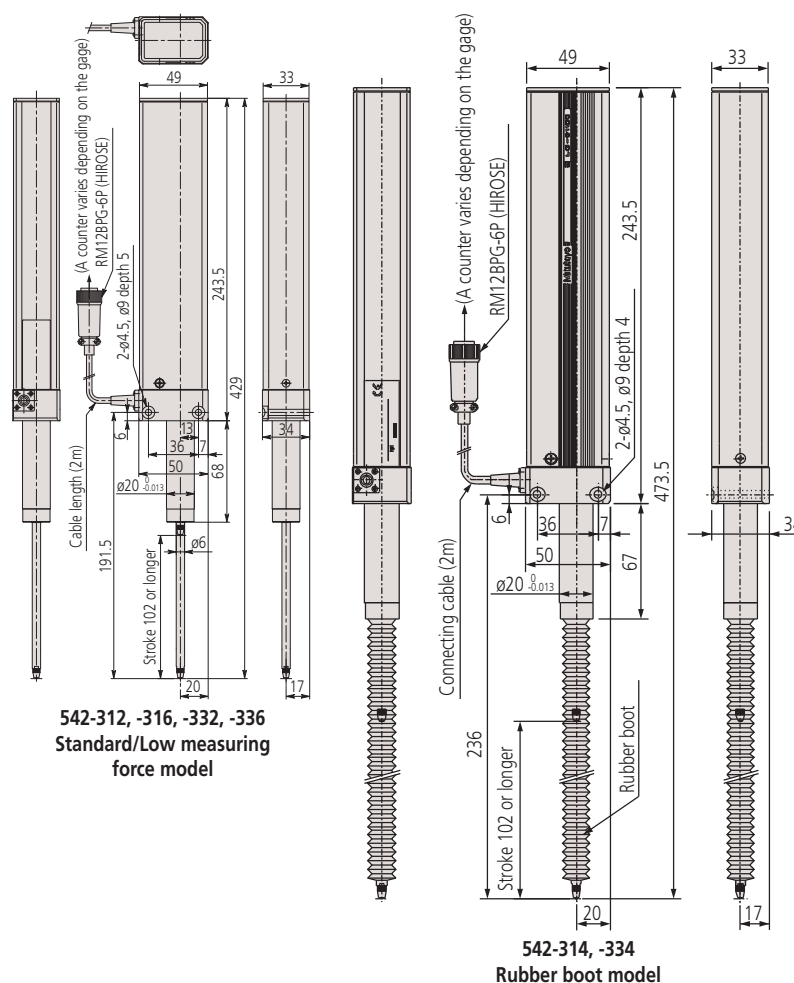
rubber boot type



542-312

No.	Range [mm]	Accuracy	Measuring force *1	Resolution [μm]	Remarks	Max. response speed	Mass [g]
542-312	0-100	$(2 + L/100) \mu\text{m} \leq 2,5 \mu\text{m}$	8 N/6,5 N/5 N	0,1	Standard	400 mm/s	640
542-316	0-100	$(2 + L/100) \mu\text{m} \leq 2,5 \mu\text{m}$	3 N/-/-	0,1	Low measuring force	400 mm/s	750
542-314	0-100	$(2 + L/100) \mu\text{m} \leq 2,5 \mu\text{m}$	8 N/6,5 N/5 N	0,1	w/ rubber boot	400 mm/s	750
542-332	0-100	$(2,5 + L/100) \mu\text{m} \leq 3 \mu\text{m}$	8 N/6,5 N/5 N	1	Standard	800 mm/s	750
542-336	0-100	$(2,5 + L/100) \mu\text{m} \leq 3 \mu\text{m}$	3 N/-/-	1	Low measuring force	800 mm/s	750
542-334	0-100	$(2,5 + L/100) \mu\text{m} \leq 3 \mu\text{m}$	8 N/ 6,5 N/5 N	1	w/ rubber boot	800 mm/s	750

\*1 Spindle DOWN/Horizontal/UP



# Laser Hologage LGH

## Series 542

This is a highly precise dial gauge that uses optical interference so you can measure with unparalleled accuracy.

The Mitutoyo Laser Hologage offers you the following benefits:

- Through optical interference of laser light through a diffraction grating it gives you an extremely precise holographic scale with 0,00001mm resolution
- You can use the Laser Hologage for extremely precise measurements, as well as a transducer in ultra-precise positioning and control systems.



542-715D

No.	Range [mm]	Accuracy	Measuring force *1	Resolution [μm]	Stem Ø	Mass [g]
542-715D	0-10	0,2 μm	0,65 N/0,55 N/0,45 N	0,01	15 mm	220
542-716D	0-10	0,2 μm	0,12 N/ - / -	0,01	15 mm	220

\*1 Spindle DOWN/Horizontal/UP

## Specifications

Repeatability	0,1 μm
Retrace error	0,1 μm
Scale	Laser-hologram measurement sensor
Max. response speed	700 mm/s
Contact point	Ø 3 mm carbide ball, thread: M 2,5 x 0,45
Output signal	90° phase difference, differential square wave (RS-422A equivalent)
Signal pitch	4 μm
Bearing type	High precision linear ball bearing
Environmental conditions	0C to 40°C (20% to 80% rel. humidity, no condensation)
Delivered	With Display Unit

## Standard accessories

No.	Description
538610	Wrench Key/542

## Optional accessories

No.	Description
971750	Laser Hologage stand
971753	Spindle lifting cable
971751	Gage Fixture (A) LHG
971752	Fastening system, Laser Hologage

## Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



Refer to the Linear Gauge documentation for more details



# EC Counter for Linear Gauges

## Series 542

This Digimatic display can be connected to any device with Digimatic output, including micrometers, indicators, calipers and LGS/LGD Linear Gauge.

It offers you the following benefits:

- It has a data output and tolerance evaluation function.



542-007



Functions	Series 542
Digimatic data output	●
ON/OFF	●
External PRESET/ZERO	●
ZERO SET	●
PRESET	●
ABS/INC	●
Error display/output	●
External HOLD	●
mm / inch switching	●
Counting direction switchable	●

### Specifications

Power supply	+ 9 - 12 V DC 400 mA or AC adapter
Display	Green LED display, 6 digits plus sign
Tolerance judgement display	LED display (3 steps: Amber, Green, Red)

### Standard accessories

No.	Description
06AEG302D	AC-Adapter, 9V 500mA, CEE Type

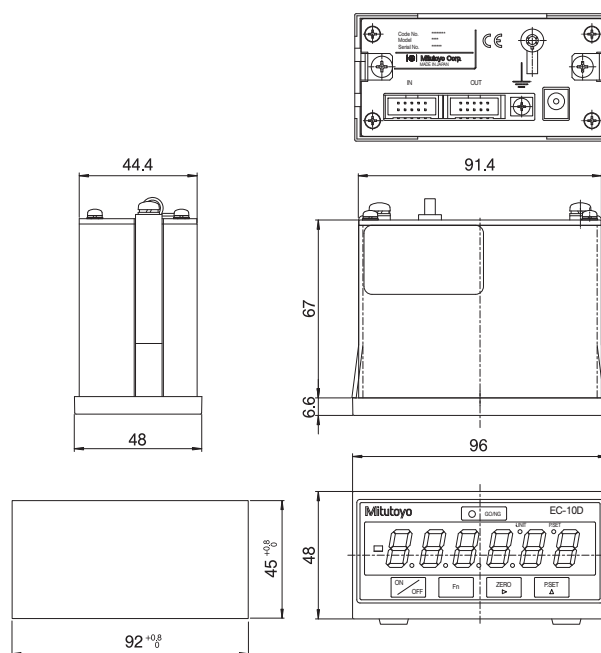
### Optional accessories

No.	Description
C162-155	I/O Cable for Linear Gauge Counter 2m
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type



Refer to the Linear Gauge documentation for more details

No.	Resolution [mm]	Input signal type	Applicable gauge	Gauge inputs
542-007D	0,001/0,01 (automatic setting by gauge)	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	1
542-007E	0,001/0,01 (automatic setting by gauge)	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	1



542-007

# EG Counter for Linear Gauges

## Series 542

This is a compact counter with a control panel that offers you the following benefits:

- Its I/O control function enables tolerance judgement evaluation (3 or 5 steps) or parallel BCD output function.



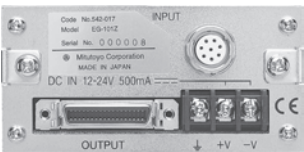
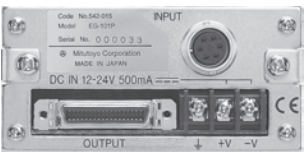
542-015



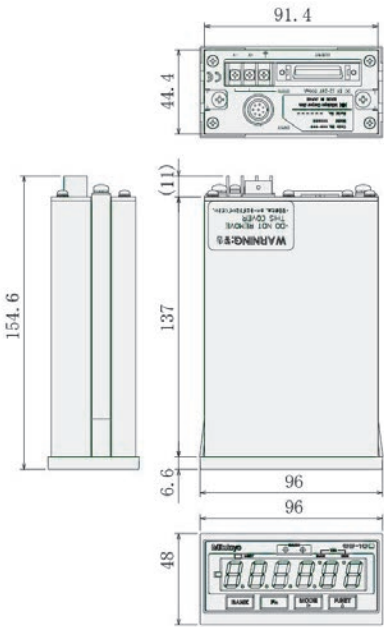
542-017



542-016



No.	Resolution [mm]	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	Mass [g]
542-015	0,0001/0,0005/ 0,001/0,005/0,01	1,25 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LGH with 0,01 µm resolution)	1	400
542-017	0,0001/0,0005/ 0,001/0,005/0,01	1,25 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave with reference point	LGF-Z with reference point	1	400
542-016	0,001/0,01 (automatic setting by gauge)	-	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	1	400



Series 542			
	542-015	542-017	542-016
<b>Functions</b>			
External PRESET/ZERO	●	●	●
ZERO SET	●	●	●
PRESET	●	●	●
ABS/INC	●	●	●
BCD output	●	●	●
Error display/output	●	●	●
MAX / MIN / Difference measurement	●	●	●
mm / inch switching	●	●	●
External peak-hold cancel	●	●	●
Counting direction switchable	●	●	●

<b>Specifications</b>	
Power supply	Terminal block (M3 screws) 12 to 24 V DC, 6W or less (500 mA max.) external supply, AC-adaptor is not standard accessory
Display	Green LED display 6 digits plus sign
Tolerance judgement display	LED display (3 steps : Amber, Green, Red/5 steps : Amber, Amber flashing, Green, Red flashing, Red)

<b>Optional accessories</b>	
No.	Description
02ADB440	Data Plug I/O Interface, for Litematic
02ADN460	Adaptor 220V
02ZAA020	AC Cable
02ADD930	Connecting Cable, 3-Wires for AC Adapter
02ADF180	External Switch Box



02ADB440



02ADD930, 02ADN460, 02ZAA020



Refer to the Linear Gauge documentation for more details

# EB Counter for Linear Gauges

## Series 542

- Its I/O control function enables tolerance judgement evaluation (3 or 5 steps) or serial BCD output function.
- Dynamic measurement possible with simplified analog output.

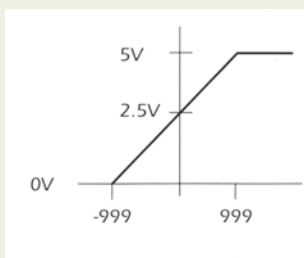
	Series 542		
	542-092-2	542-094-2	542-093-2
<b>Functions</b>			
Digimatic data output	●	●	●
External PRESET/ZERO	●	●	●
ZERO SET	●	●	●
PRESET	●	●	●
ABS/INC	●	●	●
BCD output	●	●	●
Error display/output	●	●	●
External HOLD	●	●	●
MAX / MIN / Difference measurement	●	●	●
mm / inch switching	●	●	●
RS link	●	●	●
Output I/O	●	●	●
Analogue output	●	●	●
Counting direction switchable	●	●	●

### Specifications

Power supply	Terminal block (M3 screws) 12 to 24 V DC, 6W or less (500 mA max.) external supply, AC-adaptor is not standard accessory
Display	Green LED display, 6 digit plus sign
Tolerance judgement display	LED display (3 steps : Amber, Green, Red/5 steps : Amber, Amber flashing, Green, Red flashing, Red)

### Optional accessories

No.	Description
02ADB440	Data Plug I/O Interface, for Litematic
02ADN460	Adaptor 220V
02ZAA020	AC Cable
02ADD930	Connecting Cable, 3-Wires for AC Adapter
02ADF180	External Switch Box
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type



### Specifications :

Output voltage: 2.5 V + counting value x voltage resolution (25mV/2.5 mV)  
Full scale : 0 to 5 V

Response speed: 10 Hz (update time 5 MS)

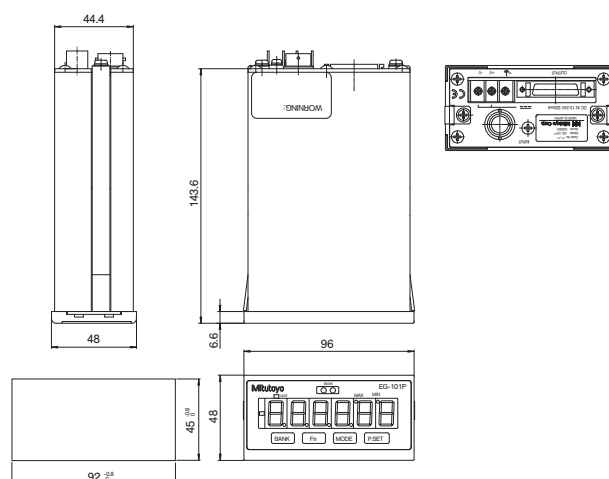
Accuracy :  $\pm 5\%$  (0 to 5 V)  $\pm 0.5\%$  (2.5 V  $\pm 200$  mV, after Offset adjustment)

The accuracy is indicated with respect to full scale 5 V

Load resistance: 300 k $\Omega$  or more



No.	Resolution [mm]	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	Mass [g]
542-092-2	0,0001/0,0005/ 0,001/0,005/0,01	1,25 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LGH with 0,01 $\mu$ m resolution)	1	400
542-094-2	0,0001/0,0005/ 0,001/0,005/0,01	1,25 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave with reference point	LGF-Z with reference point	1	400
542-093-2	0,001/0,01 (automatic setting by gauge)	-	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	1	400



# EH Counter for Linear Gauges

## Series 542

### Multi-functional Counter

- The standard RS-232C and USB interfaces allows easy communication with an external PC (the USB can only be used with SENSORPAK).
- The built-in networking function allows you to easily create a multi-point measuring system (RS link, max. 10 Counter).
- The 2-gauge input type can calculate additions and subtractions between two gauges.



542-075D



542-071D, 542-073D, 542-072D



542-075D



542-071D

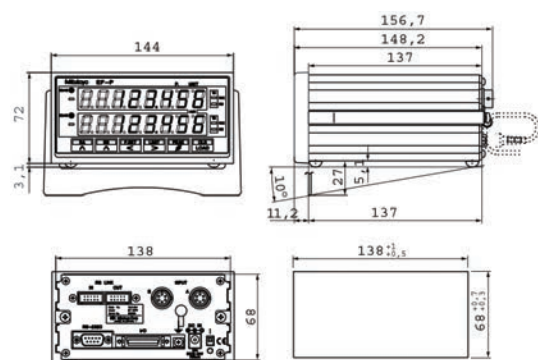


542-073D



542-072D

No.	Resolution [mm]	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	Mass [g]
542-075D	0,0001/0,001/0,01	2,5 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LGH with 0,01 µm resolution)	1	760
542-071D	0,0001/0,001/0,01	2,5 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LGH with 0,01 µm resolution)	2	800
542-073D	0,0001/0,001/0,01	2,5 MHz (2-phase square wave), response speed depends on gauge specification	Differential square-wave with reference point	LGF-Z with reference point	2	800
542-072D	0,001/0,01 (automatic setting by gauge)	-	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	2	800



Series 542				
	542-071D	542-073D	542-072D	542-075D
<b>Functions</b>				
Digimatic data output	●	●	●	●
ON/OFF	●	●	●	●
External PRESET/ZERO	●	●	●	●
ZERO SET	●	●	●	●
PRESET	●	●	●	●
Sum/difference calculation	●	●	●	●
ABS/INC	●	●	●	●
BCD output	●	●	●	●
Error display/output	●	●	●	●
External HOLD	●	●	●	●
MAX / MIN / Difference measurement	●	●	●	●
mm / inch switching	●	●	●	●
External peak-hold cancel	●	●	●	●
Lower digit blank-out	●	●	●	●
RS link	●	●	●	●
RS-232C Output	●	●	●	●
I/O Output	●	●	●	●
USB Output for SENSORPAK	●	●	●	●
Analogue output	●	●	●	●
Extern tolerance set (when a PC is used)	●	●	●	●
Counting direction switchable	●	●	●	●

### Specifications

Power supply	Via AC Adapter (12-24 V DC, 700 mA)
Display	Green LED display, 8 digit plus sign
Tolerance judgement display	LED display (3 steps : Amber, Green, Red/5 steps : Amber, Amber flashing, Green, Red flashing, Red)

### Standard accessories

No.	Description
02ADN460	Adaptor 220V
02ZAA020	AC Cable

### Optional accessories

No.	Description
02ADB440	Data Plug I/O Interface, for Litematic
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type
12AAA807D	Cable RS-232C 2m



02ADB440



# EV Counter for Linear Gauges

## Series 542

- You can connect up to six gauges, and by using the RS Link function, you can connect up to 10 EV Counters to one PC.
- Multi-point measuring systems with a maximum of 60 gauges can be configured.
- You can select several different output modes, including I/O output for tolerance judgement and Segment output, BCD data output and RS-232C output.



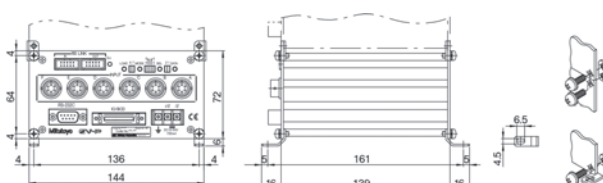
542-063



542-067



542-064

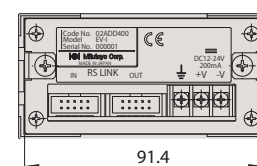
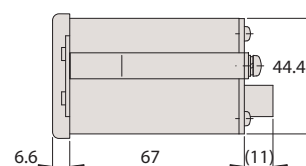
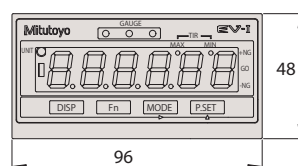


542-063

No.	Resolution [mm]	Max. input frequency	Input signal type	Applicable gauge	Gauge inputs	Mass [g]
542-063	0,0005/0,001/0,005/0,01 (no display)	1,25 MHz (2-phase square wave), response speed depends on gauge specification. Max.counting speed: 5MHz	Differential square-wave	LGF, LGK, LGB, LG, LGM, LGH (excluding LGF-Z with reference point, LGH with 0,01 μm resolution)	6	910
542-067	0,0005/0,001/0,005/0,01 (no display)	1,25 MHz (2-phase square wave), response speed depends on gauge specification. Max.counting speed: 5MHz	Differential square wave with reference point	LGF-Z with reference point	6	910
542-064	0,001/0,01 (automatic setting by gauge)	-	Digimatic code	Digimatic Indicator Digimatic Scale Units Linear Gauge LGS/LGD	6	830

## Specifications for 02ADD400

No.	Description
02ADD400	Allows external display and setting for one EV Counter <b>LED display:</b> channel display (also for judgement result display): 3 (3-color LED) measurement mode display (current data, max. value, min. value, range): 2 <b>Functions:</b> channel switching, measurement mode switching (current value, max. value, min. value, range), parameter setting, preset, and tolerance setting <b>Input/output:</b> RS Link connector: 1 each for IN, OUT <b>Error display:</b> overspeed and others



	542-063	542-067	542-064
<b>Functions</b>			
External PRESET/ZERO	●	●	●
ZERO SET	●	●	●
PRESET	●	●	●
ABS/INC	●	●	●
Calculation function	●	●	●
Error display/output	●	●	●
External HOLD	●	●	●
MAX / MIN / Difference measurement	●	●	●
mm / inch switching	●	●	●
RS link	●	●	●
RS-232C Output	●	●	●
Counting direction switchable	●	●	●

## Specifications

Power supply	Terminal connector (M3 screws), 12 to 24V, (700 mA max. for EV-Counter) (200 mA max. for D-EV Display unit), AC-adaptor is not standard accessory
Display	D-EV Unit: red LED display, 6 digit plus sign 8 digit internal to EV-Counter
Tolerance judgement display	LED display (3 steps: Amber, Green, Red)

## Optional accessories

No.	Description
02ADD400	D-EV Display Unit
02ADB440	Data Plug I/O Interface, for Litematic
02ADN460	Adaptor 220V
02ZAA020	AC Cable
02ADD930	Connecting Cable, 3-Wires for AC Adapter
02ADD950	External Switch Box, EB Counter
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
12AAA807D	Cable RS-232C 2m



02ADD400



02ADB440



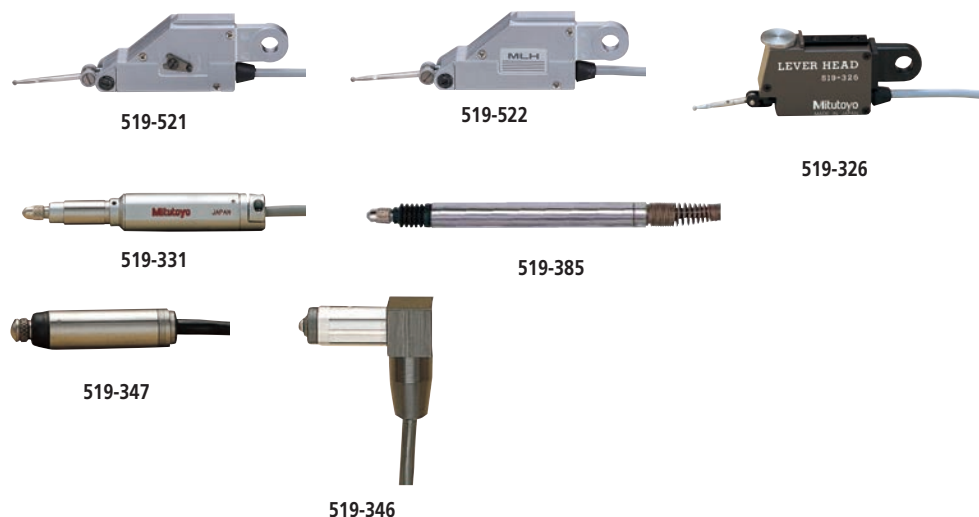
02ADD930, 02ADN460, 02ZAA020



# Inductive Probe Mu-Checker

## Series 519

- A half-bridge circuit connection.
- 519-321 lever head is provided with a direction switch.
- The contact point of 519-326 lever head can be orientated at any direction.



## Specifications

Scale	Linear Voltage differential transformer (half bridge)
Calibration frequency	5 kHz
Calibration voltage	3 V rms (sine wave)
Connector	DIN 5pin
Delivered	with 2 m cable, carbide-tipped stylus $\varnothing$ 1 mm (520940), stylus $\varnothing$ 2 mm (520939), stylus $\varnothing$ 3 mm (520938)

## Optional accessories

No.	Description
900321	Swivel Clamp, for $\varnothing$ 4/8mm, Dovetail
900209	Holding Bar for Swivel Clamp, 9x9mm, 100mm Length
900211	Holding Bar for Swivel Clamp, $\varnothing$ 8mm, 115mm Length



900321



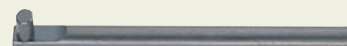
900209



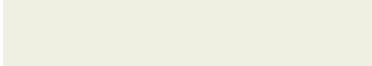
900211



900209



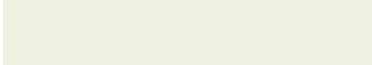
900211



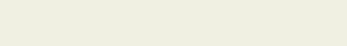
900209



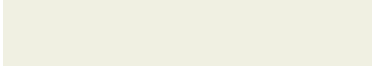
900211



900209



900211



900209



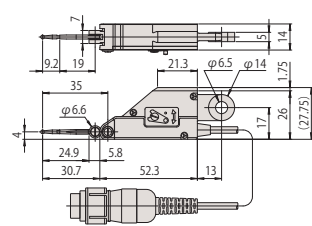
900211

## Cartridge type

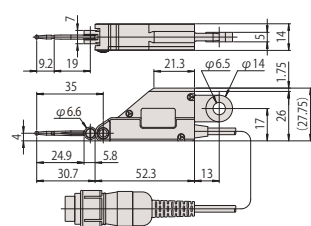
No.	Range	Stroke [mm]	Remarks	Linearity [%]	Measuring force [N]
519-331	$\pm 0,5$	$\pm 0,65$	low force type	$\pm 0,5$	0,25
519-385	$\pm 1,5$	$+ 2,3$ $- 1,7$	standard type	$\pm 0,3$	$0,7 \pm 0,14$ N
519-346	$\pm 0,25$	$+0,34$ $-0,26$	compact type inside	$\pm 0,3$	0,7
519-347	$\pm 0,5$	$+ 0,85$ $- 0,65$	compact type	$\pm 0,3$	0,7

## Lever type

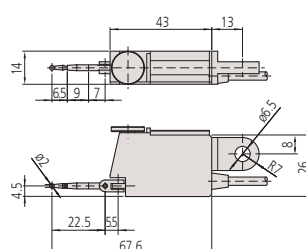
No.	Range	Stroke [mm]	Remarks	Linearity [%]	Measuring force [N]	Mass [g]
519-521	$\pm 0,5$	$\pm 0,6$	pivot bearing switch type reversible direction	$\pm 0,3$	0,2	112
519-522	$\pm 0,5$	$\pm 0,6$	pivot bearing low measuring force type	$\pm 0,3$	0,02	112
519-326	$\pm 0,5$	$\pm 0,6$	parallel spring high accuracy type	$\pm 0,3$	0,15	112



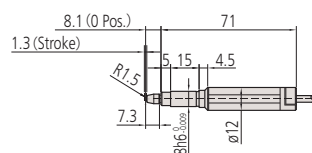
519-521



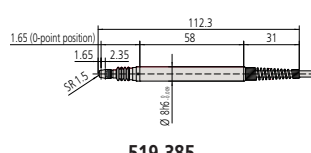
519-522



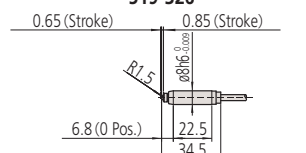
519-326



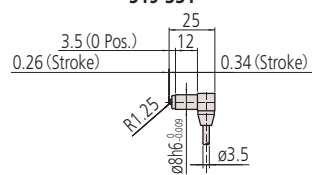
519-331



519-385



519-347



519-346

# Display Mu-Checker

## Series 519

- The Analog Mu-Checker can output digital data via an optional interface unit.

Series 519			
	519-551D	519-553D	519-561D
<b>Functions</b>			
ZERO SET	●	●	●
Calculation function		●	●
Digimatic Output			●

### Specifications

Power supply	AC Adapter 230V 50/60Hz
Output Gain	± 1V/FS Linearity: ±0,1%/FS (Excepts a head's measuring error)
Dimensions (WxDxH)	134 x 183 x 208 mm

### Optional accessories

No.	Description
934795	Signal Cable A
529035	Connector 7P, 519-413
934386	Extension Cord A
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m

\*936937 and 965014 for 519-561D only



519-551D



519-553D



519-561D

No.	Linearity [%]	Response speed	Instant zero-setting effective zone	Channels	Mass [kg]
519-551D	± 1%/FS (Added to a head's measuring error)	approx. 0,3s	± 15%/FS	1	2,4
519-553D	± 1%/FS (Added to a head's measuring error)	approx. 0,3s	± 15%/FS	2	2,4
519-561D	± 3 digit ± 1 (added to a head measuring error)	approx. 0,3s	± 0,68 mm	2	2,6

FS=Full Screen

# LITEMATIC VL-50

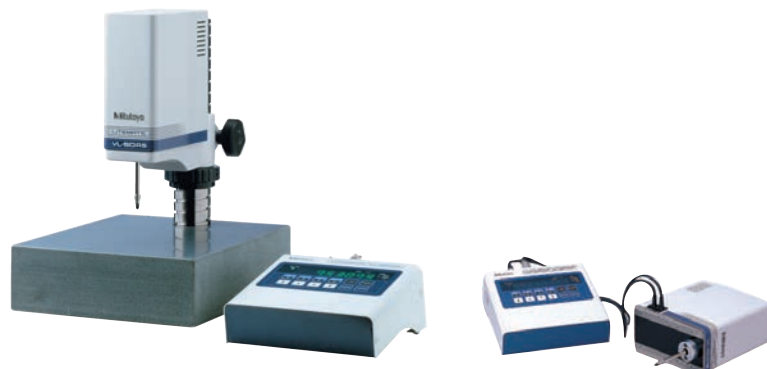
## Motorized low force, high precision gauges

### Series 318

This is a high-accuracy gauge head with a separate controller.

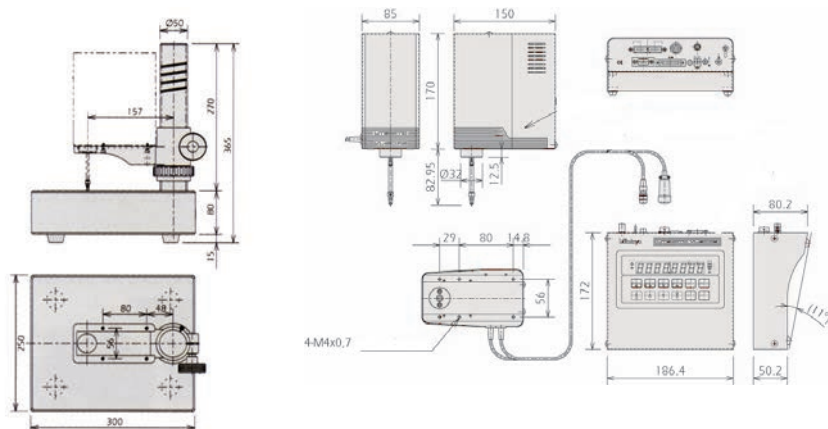
The LITEMATIC VL-50 offers you the following benefits:

- It has a measuring force of **0,01 N** (1 gf) and a resolution of 0,01  $\mu\text{m}$ .
- Its constant and low measuring force makes it especially suitable for measuring soft materials such as rubber, plastic, film thicknesses or sensitive form parts.
- The motor driven plunger gives you a range of approach and retraction speeds for safe and easy operation.
- The head is supplied with a separate controller so you can mount it in a measurement fixture, or on the optional comparator stand.



318-22xD (957460 is optional)

318-22xD



957460 Comparator stand

No.	Accuracy	Measuring force	Type
318-226D	$(0,5 + L/100)\mu\text{m}$ L = Measurement height	0,01 N (1 gf)	VL-50S-B
318-227D	$(0,5 + L/100)\mu\text{m}$ L = Measurement height	0,15 N (15 gf)	VL-50S-15-B
318-228D	$(0,5 + L/100)\mu\text{m}$ L = Measurement height	1 N (102 gf)	VL-50S-100-B

Functions	Series 318
ZERO/ABS	●
Data output	●
PRESET	●
Key lock	●
mm / inch switching	●
Tolerance input (3 or 5 levels)	●
Motorized plunger movement	●
Mode : max-min (TIR) reading	●
Counting direction switchable	●

### Specifications

Measuring range (inside)	0-50 mm
Data output	DIGIMATIC RS 232C INTERFACE I/O

### Optional accessories

No.	Description
957460	Litematic Head Stand
937179T	Footswitch for SPC
02ADB440	Data Plug I/O Interface, for Litematic
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
12AAA807D	Cable RS-232C 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



Refer to the LITEMATIC documentation for more details

## Series 318

- It has a measuring force of **0,01 N** (1 gf) and a resolution of 0,01  $\mu\text{m}$ .
- Its constant and low measuring force makes it especially suitable for measuring soft materials such as rubber, plastic, film thicknesses or sensitive form parts.
- The motor driven plunger gives you a range of approach and retraction speeds for safe and easy operation.

## Specifications

Measuring range (inside)	0-50 mm
Data output	Digimatic RS-232C INTERFACE I/O

### Optional accessories

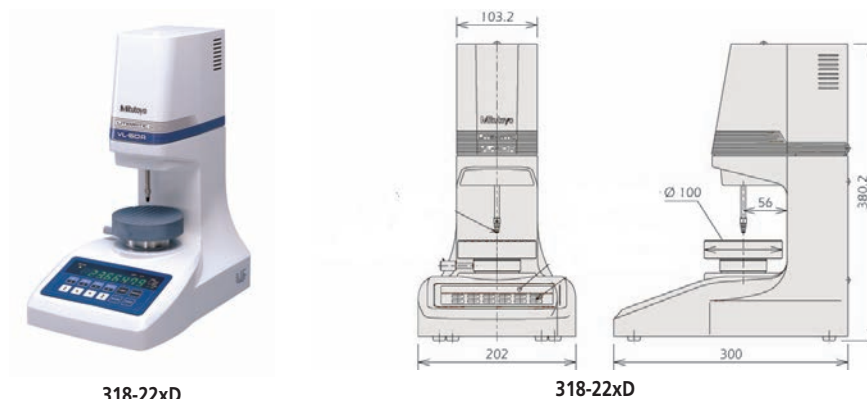
No.	Description
937179T	Footswitch for SPC
02ADB440	Data Plug I/O Interface, for Litematic
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
12AAA807D	Cable RS-232C 2m
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type

### Consumable spares

No.	Description
901312	Contact Element Ball Point, 7,3mm Length, Carbide, Metric



Refer to the LITEMATIC documentation for more details



No.	Accuracy	Measuring force	Type
318-221D	(0,5 + L/100) µm L = Measurement height	0,01 N (1 gf)	VL-50 B
318-222D	(0,5 + L/100) µm L = Measurement height	0,15 N (15 gf)	VL-50-15-B
318-223D	(0,5 + L/100) µm L = Measurement height	1 N (102 gf)	VL-50-100-B

Laser Scan Micrometer Measuring Unit and Display  
Unit Package  
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Laser Scan Micrometer Measuring Unit  
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Laser Scan Micrometer  
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Laser Scan Micrometer Display Unit  
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Laser Scan Micrometer Optional Accessories  
Page 388





# Laser Scan Micrometer Measuring Unit and Display Unit Package

Functions	Series 544
GO/NG judgement	●
OFFSET	●
Sample Measurement	●
Statistical calculations for DP-1VA	●
Data output	●
ZERO SET	●
PRESET	●
Group judgement	●
Workpiece position display	●
Transparent object measurement	●
Automatic measurement	●
Abnormal data elimination	●

## Specifications

Linearity at 20°C *1	Entire range : $\pm 0,5 \mu\text{m}$ Narrow range : $\pm (0,3+0,1\Delta D) \mu\text{m}$
Positional error *2	$\pm 0,5 \mu\text{m}$
Repeatability ( $\pm 2\sigma$ )	$\pm 0,045 \mu\text{m}$
Measuring region	3 x 25 mm
Laser wavelength	650 nm, Visible
Scanning rate	1600 scans/s
Scanning speed	56m/s
Applicable laser standards	IEC
Main display	16-digit fluorescent tube
Interface units equipped	RS-232C, Analog I/O, Footswitch
Power supply	100 - 240VAC, 40 VA, 50/60Hz

## Optional accessories

No.	Description
02AGD180	Calibration Gauge Set, $\varnothing 1-25$
02AGD270	Workstage for LSM
02AGD280	Workstage for LSM

\*1 At the centre of the measuring region

\*2 Potential measurement error due to variation in workpiece position within the measuring region

$\Delta D$  = Difference in diameter between the mastergauge and workpiece



Refer to the LSM brochure

## Series 544

The LSM-6902H is a high accuracy, non-contact measuring system that uses a high speed scanning laser beam to accurately measure workpieces. It is ideal for measuring items that are difficult or impossible to measure with conventional instruments, such as elastic parts or soft parts that might deform under pressure.

The LSM-6902H offers you the following benefits:

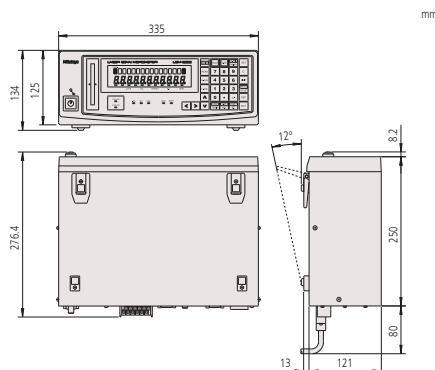
- Suitable for pin and plug gauge measurements.
- It has a wide measuring range of 0,1 mm to 25 mm.
- Provides ultra-high accuracy with a linearity of  $\pm 0,5 \mu\text{m}$  over the entire measuring range and  $\pm (0,3+0,1\Delta D) \mu\text{m}$  in the narrow range.
- Ultra-high repeatability of  $\pm 0,045 \mu\text{m}$ .



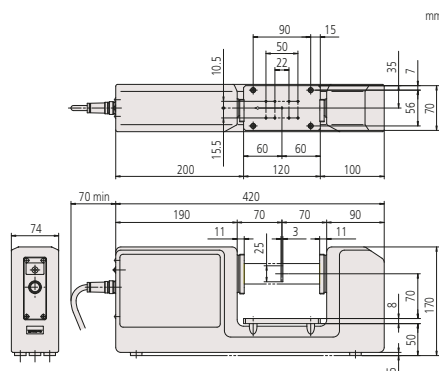
LSM-6902H display unit and LSM-6902H measuring unit

## Metric

No.	Range [mm]	Resolution (selectable)
544-498D	0,1-25	0,01-10 $\mu\text{m}$



LSM-6902H display unit



LSM-6902H measuring unit

# Laser Scan Micrometer Measuring Unit

## Series 544

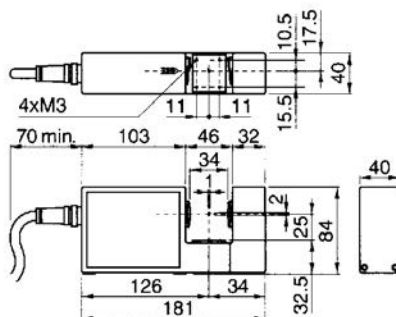
### LSM-500S

High Accuracy Non-contact Measuring System

- Measuring range starting from  $\varnothing 5 \mu\text{m}$ .
- Provides ultra-high accuracy with a linearity of  $\pm 0,3 \mu\text{m}$  over the entire measuring range (5  $\mu\text{m}$  up to 2 mm).
- Ultra-high repeatability of  $\pm 0,03 \mu\text{m}$ .
- High scanning rate of 3200 scans/s



LSM-500S



#### Metric

No.	Range [mm]	Resolution (selectable)
544-532	0,005-2	0,00001-0,01 mm

## Series 544

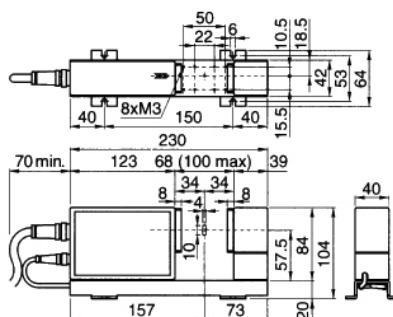
### LSM-501S

High Accuracy Non-contact measuring system

- Provides ultra-high accuracy with a linearity of  $\pm 0,5 \mu\text{m}$  over the entire measuring range (0,05 mm to 10 mm) and  $\pm (0,3+0,1\Delta D) \mu\text{m}$  in the narrow range.
- Ultra-High repeatability of  $\pm 0,04 \mu\text{m}$ .
- High scanning rate of 3200 scans/s



LSM-501S



#### Metric

No.	Range [mm]	Resolution (selectable)
544-534	0,05-10	0,00001-0,01 mm



#### Specifications

Linearity at 20°C *1	$\pm 0,3 \mu\text{m}$
Positional error *2	$\pm 0,4 \mu\text{m}$
Repeatability ( $\pm 2\sigma$ )	$\pm 0,03 \mu\text{m}$
Measuring region	1 x 2 mm
Laser wavelength	650 nm, Visible
Scanning rate	3200 scans/s
Scanning speed	76m/s
Applicable laser standards	IEC, FDA

#### Optional accessories

No.	Description
02AGD110	Membrane sheet, LSM-9506
02AGD200	Wire guiding pulley, for LSM-500
02AGD220	Air Shield LSM-500S
957608	Air Cleaner for Air Shield
02AGN780A	Extension Signal Cable 5m
02AGN780B	Extension Signal Cable 10m
02AGN780C	Extension Signal Cable 15m



#### Specifications

Linearity at 20°C *1	Entire range : $\pm 0,5 \mu\text{m}$ Narrow range : $\pm (0,3+0,1\Delta D) \mu\text{m}$
Positional error *2	$\pm 0,5 \mu\text{m}$
Repeatability ( $\pm 2\sigma$ )	$\pm 0,04 \mu\text{m}$
Measuring region	2 x 10 mm ( $\varnothing 0,05-0,1 \text{ mm}$ ) 4 x 10 mm ( $\varnothing 0,1-10 \text{ mm}$ )
Laser wavelength	650 nm, Visible
Scanning rate	3200 scans/s
Scanning speed	113 m/s
Applicable laser standards	IEC, FDA

#### Optional accessories

No.	Description
02AGD120	Calibration Gauge Set, $\varnothing 0,1 - 10 \text{ mm}$
02AGD210	Wire guiding pulley, for LSM 501S
02AGD400	Workstage for LSM
02AGD440	Centre support LSM-501S/503S/902
02AGD450	V-Block
02AGD230	Air Shield LSM-501S
957608	Air Cleaner for Air Shield
02AGC150A	Relay Extension Cable
02AGN780A	Extension Signal Cable 5m
02AGN780B	Extension Signal Cable 10m
02AGN780C	Extension Signal Cable 15m

02AGD440 and 02AGD450 : use with an adjustable workstage

\*1 At the centre of the measuring region

\*2 Potential measurement error due to variation in workpiece position within the measuring region

$\Delta D$  = Difference in diameter between the mastergauge and workpiece



Refer to the LSM brochure

## Specifications

Linearity at 20°C *1	Entire range : $\pm 1 \mu\text{m}$ Narrow range : $\pm(0,6+0,1\Delta D) \mu\text{m}$
Positional error *2	$\pm 1,5 \mu\text{m}$
Repeatability ( $\pm 2\sigma$ )	$\pm 0,11 \mu\text{m}$
Measuring region	10 x 30 mm
Laser wavelength	650 nm, Visible
Scanning rate	3200 scans/s
Scanning speed	226 m/s
Applicable laser standards	IEC, FDA

## Optional accessories

No.	Description
02AGD130	Calibration Gauge Set, $\varnothing 1 - 30 \text{ mm}$
02AGD490	Workstage for LSM
02AGD440	Centre support LSM-501S/503S/902
02AGD450	V-Block
02AGD240	Air Shield LSM-503S
957608	Air Cleaner for Air Shield
02AGC150A	Relay Extension Cable
02AGC150B	Relay Extension Cable

02AGD440 and 02AGD450 : use with an adjustable workstage

## Specifications

Linearity at 20°C *1	Entire Range : $\pm 3 \mu\text{m}$ Narrow range : $\pm(1,5+0,5\Delta D) \mu\text{m}$
Positional error *2	$\pm 4 \mu\text{m}$
Repeatability ( $\pm 2\sigma$ )	$\pm 0,36 \mu\text{m}$
Measuring region	20 x 60 mm
Laser wavelength	650 nm, Visible
Scanning rate	3200 scans/s
Scanning speed	452 m/s
Applicable laser standards	IEC, FDA

## Optional accessories

No.	Description
02AGD140	Calibration Gauge Set, $\varnothing 1 - 60 \text{ mm}$
02AGD520	Workstage for LSM
02AGD580	Centre support LSM-506S/9506
02AGD590	V-Block
02AGD250	Air Shield LSM-506S
957608	Air Cleaner for Air Shield
02AGC150A	Relay Extension Cable
02AGC150B	Relay Extension Cable

02AGD580 and 02AGD590 : use with an adjustable workstage

\*1 At the centre of the measuring region \*2 Potential measurement error due to variation in workpiece position within the measuring region  
 $\Delta D$  = Difference in diameter between the mastergauge and workpiece



Refer to the LSM brochure

# Laser Scan Micrometer Measuring Unit

## Series 544

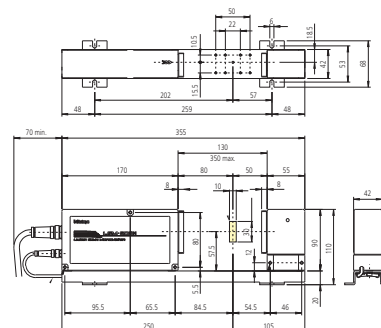
### LSM-503S

High Accuracy Non-contact measuring system

- General-purpose type with a measuring range of 0,3 mm to 30 mm.
- Provides high accuracy with a linearity of  $\pm 1 \mu\text{m}$  over the entire measuring range and  $\pm(0,6+0,1\Delta D) \mu\text{m}$  in the narrow range.
- Excellent repeatability of  $\pm 0,1 \mu\text{m}$ .
- High scanning rate of 3200 scans/s.



LSM-503S



## Metric

No.	Range [mm]	Resolution (selectable)
544-536	0,3-30	0,00002-0,1 mm

## Series 544

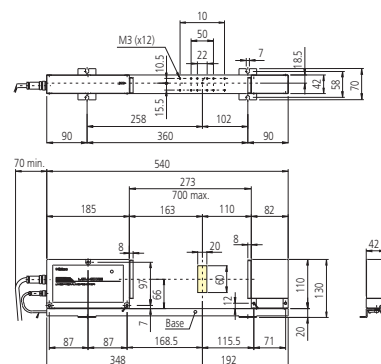
### LSM-506S

High Accuracy Non-contact Measuring System

- General-purpose type with a measuring range of 1 mm to 60 mm.
- Provides high accuracy with a linearity of  $\pm 3 \mu\text{m}$  over the entire measuring range and  $\pm(1,5+0,5\Delta D) \mu\text{m}$  in the narrow range.
- Excellent repeatability of  $\pm 0,36 \mu\text{m}$ .
- High scanning rate of 3200 scans/s.



LSM-506S



## Metric

No.	Resolution (selectable)
544-538	0,00005-0,1 mm





# Laser Scan Micrometer

## Series 544

The LSM-9506 is a bench-top, non-contact measuring system that uses a high speed scanning laser beam to accurately measure workpieces. It is ideal for measuring items that are difficult or impossible to measure with conventional instruments, such as elastic parts or soft parts that might deform under pressure.

The LSM-9506 offers you the following benefits:

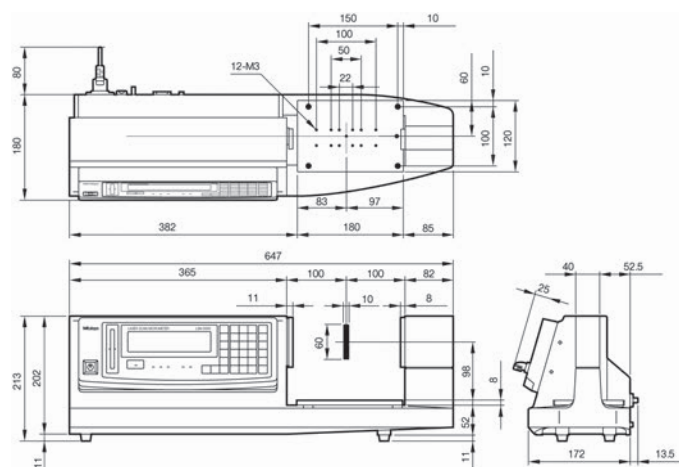
- Its measurement system has an integrated display, allowing easy bench-top inspection.
- A statistical calculation function is also provided.
- Includes standard RS-232C serial port and data output interface.



LSM-9506

## Metric

No.	Range [mm]	Resolution (selectable)
544-115D	0,5-60	0,00005-0,1 mm



Functions	Series 544
GO/±NG judgement	●
OFFSET	●
Sample Measurement	●
Statistical calculations for DP-1VA	●
Data output	●
ZERO SET	●
PRESET	●
Group judgement	●
Workpiece position display	●
Transparent object measurement	●
Automatic measurement	●
Abnormal data elimination	●

## Specifications

Linearity at 20°C *1	±2,5 µm
Positional error *2	±2,5 µm
Repeatability (±2σ)	±0,6 µm
Measuring region	10 x 60 mm
Laser wavelength	650 nm, Visible
Scanning rate	1600 scans/s
Scanning speed	226 m/s
Applicable laser standards	IEC
Main display	16-digit fluorescent tube
Interface units equipped	RS-232C, Digimatic, Foot Switch
Power supply	100-240VAC, 40VA, 50/60Hz



Refer to the LSM brochure

\*1 At the centre of the measuring region

\*2 Potential measurement error due to variation in workpiece position within the measuring region



# Laser Scan Micrometer Display Unit

## Series 544

The LSM-5200 Display Unit is a versatile display unit dedicated to Laser Scan Micrometers. This dual-display design allows setup values to be continuously monitored with. You can also get simultaneous readout of two measurement values, and segment measurement and edge measurement are both supported. Statistical calculation and abnormal-data elimination functions are provided as well.

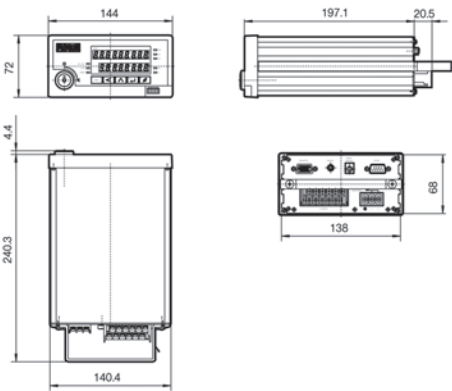
The LSM-5200 Display Unit offers you the following benefits:

- Panel-mount type (with dimensions conforming to DIN 43700) making system integration easy.
- Capable of calculating mean, maximum, and range (maximum to minimum).
- You can select either segment measurement (7 segments max) or edge measurement (1 to 255 edges).
- USB, RS-232C, I/O and analogue interfaces are provided as standard.
- The arithmetical average or moving average can also be selected.
- GO/±NG judgement function.



LSM-5200 display unit

No.  
544-047



Functions	Series 544
ZERO/ABS	●
GO/±NG judgement	●
OFFSET	●
Sample Measurement	●
Statistical calculations for DP-1VA	●
Data output	●
PRESET	●
Workpiece position display	●
Transparent object measurement	●
Automatic measurement	●
Abnormal data elimination	●

### Specifications

Main display	9-digit LED
Interface units equipped	USB2, RS-232C, Analog I/O, Foot Switch
Power supply	+24VDC ±10%, 1A

Functions	Series 544
GO/±NG judgement	●
OFFSET	●
Sample Measurement	●
Statistical calculations for DP-1VA	●
Data output	●
ZERO SET	●
PRESET	●
Group judgement	●
Workpiece position display	●
Transparent object measurement	●
Automatic measurement	●
Abnormal data elimination	●

Specifications	
Applicable laser standards	IEC, FDA (544-534), JIS (544-533)
Main display	16-digit fluorescent tube
Interface units equipped	RS-232C, Analog I/O, Foot Switch
Power supply	100-240V AC, 40 VA, 50/60Hz



# Laser Scan Micrometer Display Unit

## Series 544

The LSM-6200 Display Unit is a versatile display unit dedicated to Laser Scan Micrometers. This dual-display design allows setup values to be continuously monitored with. You can also get simultaneous readout of two measurement values, and segment measurement and edge measurement are both supported. Statistical calculation and abnormal-data elimination functions are provided as well.

The LSM-5200 Display Unit offers you the following benefits:

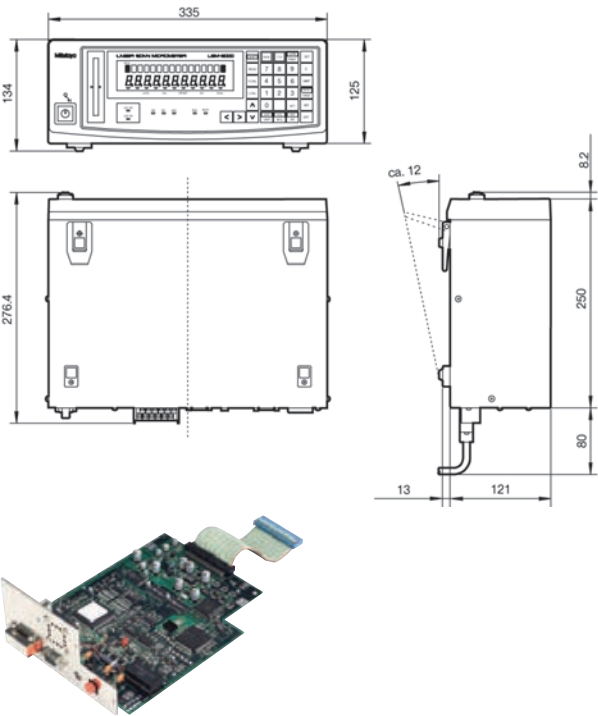
- With this dual-display design, you can continuously monitor setup values, and also simultaneously display two measurement values.
- You can select either the segment measurement (7 segments max) or edge measurement (1 to 255 edges).
- Includes RS-232C and I/O and analogue interface capabilities.
- Includes statistical calculation and abnormal data eliminating functions.



LSM-6200 display unit

## Metric

No.  
544-071D



02AGP150 - Dual-type add-on unit

# Laser Scan Micrometer Optional Accessories

## Series 544 - Accessories



Refer to the LSM brochure

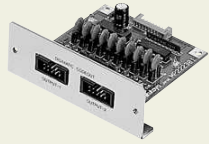


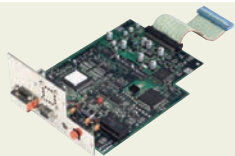
	No.	Application	Description
	02AGD110	LSM-500S	Calibration gauge set (ø0,1-2 mm)
	02AGD120	LSM-501S	Calibration gauge set (ø0,1-10 mm)
	02AGD130	LSM-503S	Calibration gauge set (ø1-30 mm)
	02AGD140	LSM-506S	Calibration gauge set (ø1-60 mm)
	02AGD150	LSM-512S	Calibration gauge set (ø20-120 mm)
	02AGD170	LSM-9506	Calibration gauge set (ø1-60 mm)
	02AGD180	LSM-902	Calibration gauge set (ø1-25 mm)
	02AGM300	LSM-516S	Calibration gage set (ø 20-160 mm)
	02AGD200	LSM-500S	Wire guiding pulley
	02AGD210	LSM-501S	Wire guiding pulley
	02AGD220	LSM-500S	Air shield
	02AGD230	LSM-501S	Air shield
	02AGD240	LSM-503S	Air shield
	02AGD250	LSM-506S	Air shield
	02AGD260	LSM-512S	Air shield
	957608	All LSM models	Air cleaner for air shield
	02AGD270	LSM-501S/503S/902	Workstage
	02AGD280	LSM-902	Adjustable workstage
	02AGD370	LSM-9506	Adjustable workstage
	02AGD400	LSM-501S	Adjustable workstage
	02AGD490	LSM-503S	Adjustable workstage
	02AGD520	LSM-506S	Adjustable workstage
	02AGD680	LSM-9506	Adjustable workstage
	02AGD440	LSM-501S/503S/902	Centre support
	02AGD580	LSM-506S/9506	Centre support
	02AGD450	LSM-501S/503S/902	Adjustable V-block
	02AGD590	LSM-506S/9506	Adjustable V-block
	937179T.		Footswitch



Refer to the LSM brochure

# Laser Scan Micrometer Optional Accessories

## Series 544 - Accessories

	No.	Application	Description
 Digimatic (SPC) code-out unit	02AGC840	LSM-6200/6900	Digimatic (SPC) code-out unit
	02AGC880	LSM-6200/6900	2nd I/O & analog interface
	02AGC910	LSM-6200/6900	BCD interface unit
 Extension relay cable	02AGC150A	All LSM models <sup>(1)</sup>	Extension relay cable 1 m
	02AGC150B	All LSM models <sup>(1)</sup>	Extension relay cable 3 m
	02AGC150C	All LSM models <sup>(1)</sup>	Extension relay cable 5 m
	02AGC330A	All LSM models <sup>(1)</sup>	Output signal cable 5 m
	02AGC330B	All LSM models <sup>(1)</sup>	Output signal cable 10 m
 Extension signal cable	02AGN780A	All LSM models <sup>(2)</sup>	Extension signal cable 5 m
	02AGN780B	All LSM models <sup>(2)</sup>	Extension signal cable 10 m
	02AGN780C	All LSM models <sup>(2)</sup>	Extension signal cable 15 m
	02AGN780D	All LSM models <sup>(2)</sup>	Extension signal cable 20 m
	02AGN780E	All LSM models <sup>(2)</sup>	Extension signal cable 30 m
 Dual-type add-on unit	02AGP150	LSM-6200	Dual-type add-on unit

<sup>(1)</sup> Except for LSM-500S/902

<sup>(2)</sup> Except for LSM-902

Scale Units  
Page 391

DRO linear scale & counter  
Page 398

NC linear scales  
Page 410





# Horizontal ABSOLUTE Scale Coolant Proof IP66



Functions	Series 572 - Horizontal
ORIGIN (ABS-Zero)	
Low voltage alarm	
Data output	

## Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Repeatability	0,01 mm
Max. response speed	Unlimited

## Optional accessories

No.	Description
05CZA624	Digimatic Cable with Data Button IP Type, 1m, Caliper Type
05CZA625	Digimatic Cable with Data Button IP Type, 2m, Caliper Type
02AZD790A	U-WAVE-T Connection Cable A, with Data Button IP Caliper Type, with Data Button IP Caliper Type
06AFM380A	USB Input Tool Direct (Digimatic USB), Digi/Digi2, With Data Button IP Caliper Type

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

## Series 572 - Horizontal

You can use this scale unit in adverse environments with water and cutting oil due to its new detection method (electromagnetic induction).

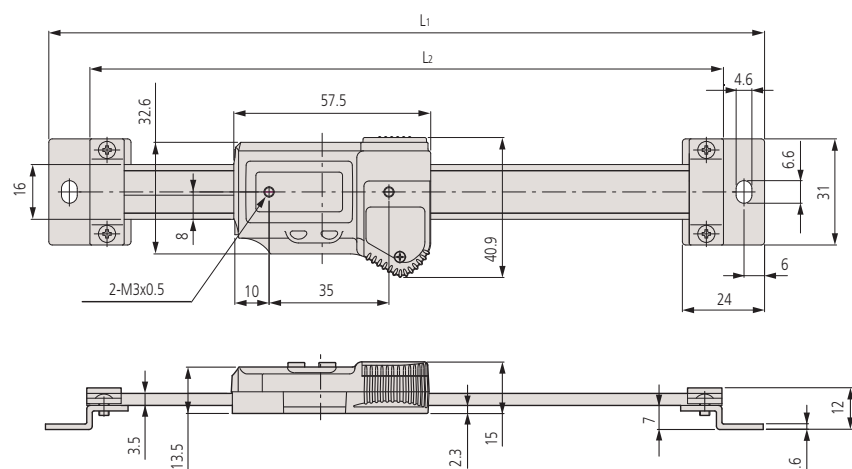
- Specially designed output cables are developed to maintain the water resistant structure.
- You will have no overspeed error since the ABSOLUTE scale does not depend on counting scale graduations.
- Once an absolute zero (origin) point is set, the Digimatic Scale Unit shows the absolute distance from this point when it is powered on, rather than „0“.



572-601

## Metric

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	Mass [g]
572-600	0-100	0,03 mm	209	185	390
572-601	0-150	0,03 mm	259	235	410
572-602	0-200	0,03 mm	311	287	430



# Horizontal ABSOLUTE Scale Standard

## Series 572

This unit has an ABSOLUTE capacitive-type scale.

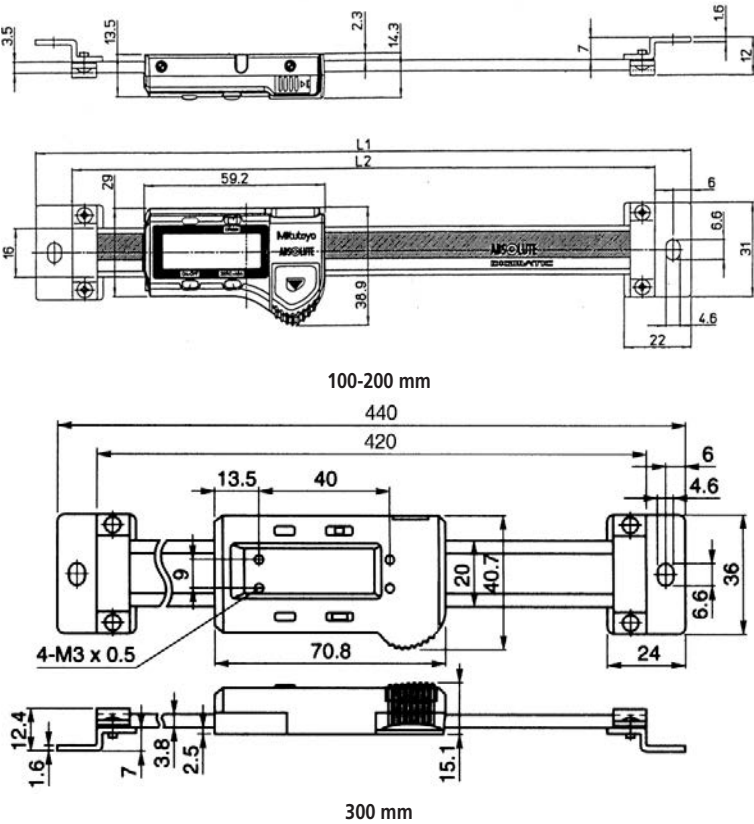
- The ZERO point is set only once and is stored as the absolute ZERO point until the next battery replacement.
- You can make the highest precision measurements even at the highest drive speed.
- The display has large characters, making it easy to read.



572-202-30

### Metric

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	Mass [g]
572-200-30	0-100	0,03 mm	209	185	230
572-201-30	0-150	0,03 mm	259	235	250
572-202-30	0-200	0,03 mm	311	287	270
572-203-10	0-300	0,04 mm	444	420	370



ABSOLUTE®

Functions	Series 572
ON/OFF	●
Low voltage alarm	●
Data output	●
ZERO SET	●
ORIGIN	●

### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Delivered	One battery

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
905689	Digimatic Cable, Flat L-Shape Type, 1m
905690	Digimatic Cable, Flat L-Shape Type, 2m
905691	Digimatic Cable, Flat L-Shape Right Type, 1m
905692	Digimatic Cable, Flat L-Shape Right Type, 2m
905693	Digimatic Cable, Flat L-Shape Left Type, 1m
905694	Digimatic Cable, Flat L-Shape Left Type, 2m
959143	Data Hold Unit
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Horizontal ABSOLUTE Scale Measurement Direction Switching

ABSOLUTE®

Functions	Series 572
ON/OFF	●
DATA/HOLD	●
Low voltage alarm	●
Data output	●
ZERO SET	●
ORIGIN	●
PRESET	●
Counting direction switchable	●

## Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Delivered	One battery

## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
905689	Digimatic Cable, Flat L-Shape Type, 1m
905690	Digimatic Cable, Flat L-Shape Type, 2m
905691	Digimatic Cable, Flat L-Shape Right Type, 1m
905692	Digimatic Cable, Flat L-Shape Right Type, 2m
905693	Digimatic Cable, Flat L-Shape Left Type, 1m
905694	Digimatic Cable, Flat L-Shape Left Type, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

## Series 572

This unit has an ABSOLUTE capacitive-type scale.

It offers you the following benefits:

- The ZERO point is set only once and is stored as the ABSOLUTE ZERO point until the next battery replacement.
- You can make the highest precision measurements even at the highest drive speed.
- The display has large characters, making it easy to read.

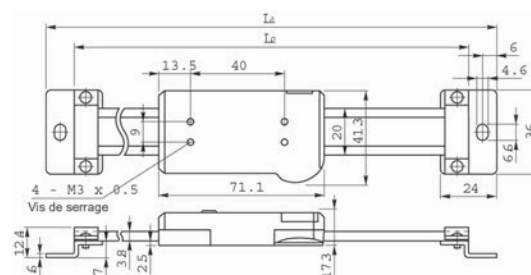


572-461

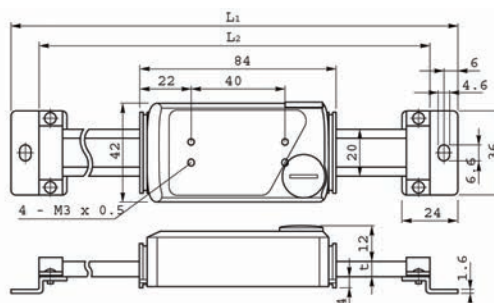
## Metric

Without diameter function, with reversible counting direction

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	Mass [g]
572-460	0-100	0,03 mm	244	220	250
572-461	0-150	0,03 mm	294	270	280
572-462	0-200	0,03 mm	344	320	310
572-463	0-300	0,04 mm	444	420	370
572-464	0-450	0,04 mm	594	570	760
572-465	0-600	0,05 mm	774	750	900
572-466	0-800	0,06 mm	974	950	1710
572-467	0-1000	0,07 mm	1174	1150	2040



100-300 mm



450-1000 mm

# Horizontal ABSOLUTE Scale Diameter Function

## Series 572

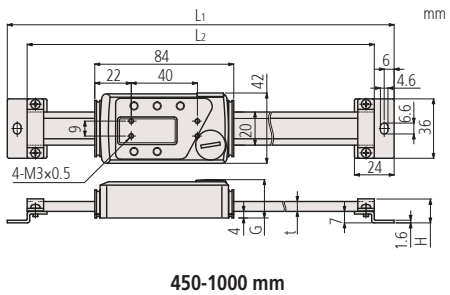
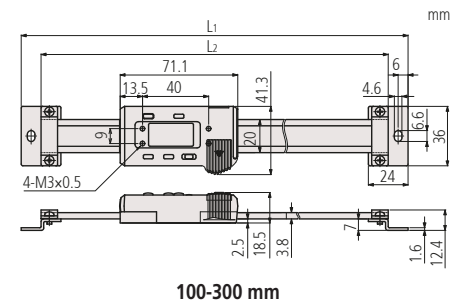
- The ZERO point is set only once and is stored as the ABSOLUTE ZERO point until the next battery replacement
- You can make the highest precision measurements even at the highest drive speed.



### Metric

Horizontal multi-function type with diameter displaying function

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	t [mm]	Mass [g]
572-480-10	0-100	0,03 mm	244	220		250
572-481-10	0-150	0,03 mm	294	270		280
572-482-10	0-200	0,03 mm	344	320		310
572-483-10	0-300	0,04 mm	444	420		370
572-484-10	0-450	0,04 mm	594	570	6	760
572-485-10	0-600	0,05 mm	774	750	6	900
572-486-10	0-800	0,06 mm	974	950	10	1710
572-487-10	0-1000	0,07 mm	1174	1150	10	2040



ABSOLUTE<sup>®</sup>

Functions	Series 572
ON/OFF	
DATA/HOLD	
Low voltage alarm	
Data output	
ZERO SET	
PRESET	
Diameter function	
ORIGIN	

### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max response speed	Unlimited
Delivered	One battery

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
905689	Digimatic Cable, Flat L-Shape Type, 1m
905690	Digimatic Cable, Flat L-Shape Type, 2m
905691	Digimatic Cable, Flat L-Shape Right Type, 1m
905692	Digimatic Cable, Flat L-Shape Right Type, 2m
905693	Digimatic Cable, Flat L-Shape Left Type, 1m
905694	Digimatic Cable, Flat L-Shape Left Type, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Vertical ABSOLUTE Scale Standard

ABSOLUTE®

Functions	Series 572
ON/OFF	
Low voltage alarm	
Data output	
ZERO SET	
ORIGIN	
Counting direction switchable	

## Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications. (excluding quantizing error)
Max. response speed	Unlimited
Delivered	One battery

## Optional accessories

No.	Description
959143	Data Hold Unit
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
905689	Digimatic Cable, Flat L-Shape Type, 1m
905690	Digimatic Cable, Flat L-Shape Type, 2m
905691	Digimatic Cable, Flat L-Shape Right Type, 1m
905692	Digimatic Cable, Flat L-Shape Right Type, 2m
905693	Digimatic Cable, Flat L-Shape Left Type, 1m
905694	Digimatic Cable, Flat L-Shape Left Type, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

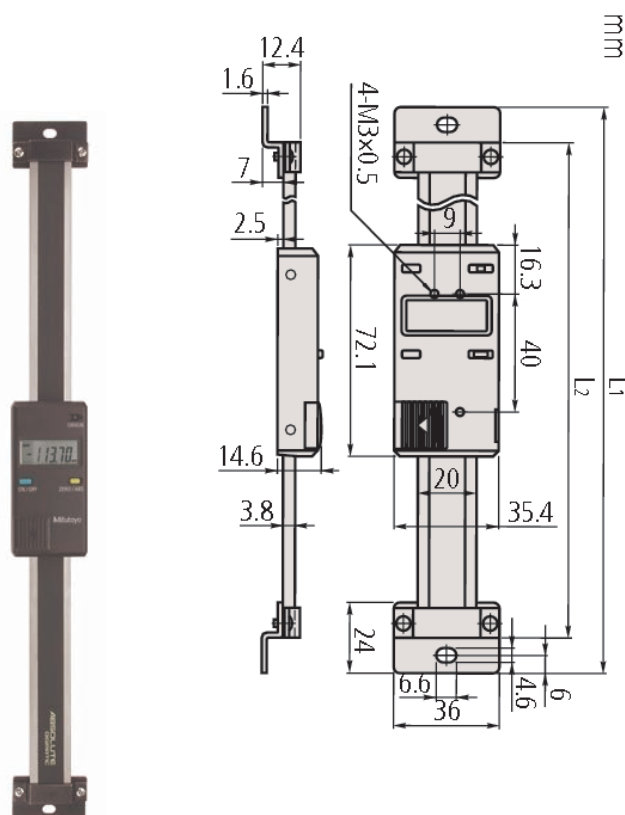
## Consumable spares

No.	Description
938882	Battery SR44 1.5V

## Series 572

This unit has an ABSOLUTE capacitive-type scale.  
It offers you the following benefits:

- The ZERO point is set only once and is stored as the absolute ZERO point until the next battery replacement.
- You can make the highest precision measurements even at the highest drive speed.
- The display has large characters, making it easy to read.



572-302-10

## Metric

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	Mass [g]
572-300-10	0-100	0,03 mm	244	220	250
572-301-10	0-150	0,03 mm	294	270	280
572-302-10	0-200	0,03 mm	344	320	310
572-303-10	0-300	0,04 mm	444	420	370



# Vertical ABSOLUTE Scale Measurement Direction Switching

## Series 572

ABSOLUTE®

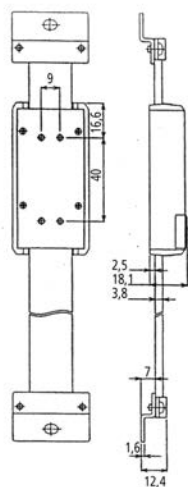
This unit has an ABSOLUTE capacitive-type scale.

It offers you the following benefits:

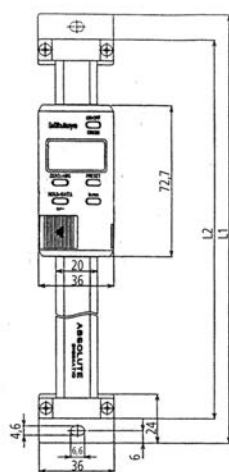
- The ZERO point is set only once and is stored as the absolute ZERO point until the next battery replacement.
- The display has large characters, making it easy to read.
- Measurement direction switching function is included.



572-560



100-300 mm



450-1000 mm

### Metric

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	G [mm]	t [mm]	Mass [g]
572-560	0-100	0,03 mm	244	220			250
572-561	0-150	0,03 mm	294	270			280
572-562	0-200	0,03 mm	344	320			310
572-563	0-300	0,04 mm	444	420			370
572-564	0-450	0,04 mm	594	570	23,2	6	760
572-565	0-600	0,05 mm	774	750	23,2	6	900
572-566	0-800	0,06 mm	974	950	27,2	10	1710
572-567	0-1000	0,07 mm	1174	1150	27,2	10	2040

Functions	Series 572
ORIGIN (ABS-Zero)	●
ON/OFF	●
DATA/HOLD	●
Data output	●
ZERO SET	●
PRESET	●
Counting direction switchable	●

### Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. response speed	Unlimited
Delivered	One battery

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
905689	Digimatic Cable, Flat L-Shape Type, 1m
905690	Digimatic Cable, Flat L-Shape Type, 2m
905691	Digimatic Cable, Flat L-Shape Right Type, 1m
905692	Digimatic Cable, Flat L-Shape Right Type, 2m
905693	Digimatic Cable, Flat L-Shape Left Type, 1m
905694	Digimatic Cable, Flat L-Shape Left Type, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

### Consumable spares

No.	Description
938882	Battery SR44 1.5V

# Vertical ABSOLUTE Scale Diameter Function

ABSOLUTE®

Functions	Series 572
ON/OFF	●
DATA/HOLD	●
Low voltage alarm	●
Data output	●
ZERO SET	●
PRESET	●
Diameter function	●
ORIGIN	●

## Specifications

Digital step	0,01 mm
Accuracy	Refer to the list of specifications (excluding quantizing error)
Max. drive speed	Unlimited
Delivered	One battery

## Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
905409	Digimatic Cable, Flat Straight Type, 2m
905689	Digimatic Cable, Flat L-Shape Type, 1m
905690	Digimatic Cable, Flat L-Shape Type, 2m
905691	Digimatic Cable, Flat L-Shape Right Type, 1m
905692	Digimatic Cable, Flat L-Shape Right Type, 2m
905693	Digimatic Cable, Flat L-Shape Left Type, 1m
905694	Digimatic Cable, Flat L-Shape Left Type, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button

## Consumable spares

No.	Description
938882	Battery SR44 1.5V

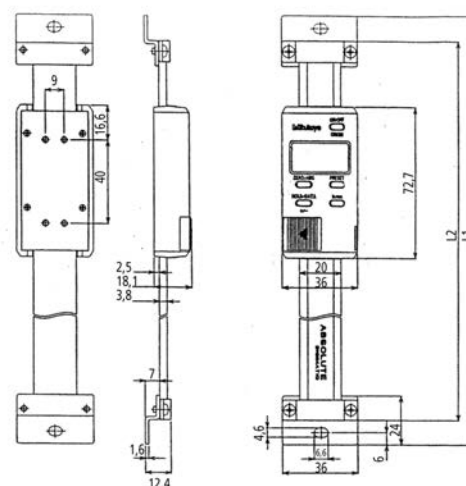
## Series 572

This unit has an ABSOLUTE capacitive-type scale.

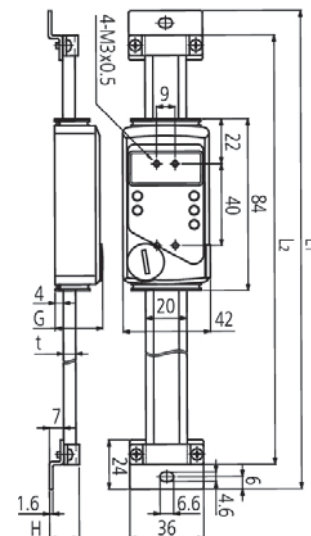
- The ZERO point is set only once and is stored as the absolute ZERO point until the next battery replacement.
- The display has large characters, making it easy to read.
- Diameter measurement function is included.



572-580



100-300 mm



450-1000 mm

## Metric

No.	Range [mm]	Accuracy	L1 [mm]	L2 [mm]	G [mm]	H [mm]	t [mm]	Mass [g]
572-580-10	0-100	0,03 mm	244	220				250
572-581-10	0-150	0,03 mm	294	270				280
572-582-10	0-200	0,03 mm	344	320				310
572-583-10	0-300	0,04 mm	444	420				370
572-584-10	0-450	0,04 mm	594	570	23,2	14,6	6	760
572-585-10	0-600	0,05 mm	774	750	23,2	14,6	6	900
572-586-10	0-800	0,06 mm	974	950	27,2	18,6	10	1710
572-587-10	0-1000	0,07 mm	1174	1150	27,2	18,6	10	2040

# DRO LINEAR SCALES AT103

## Series 539 - sealed incremental - full size housing

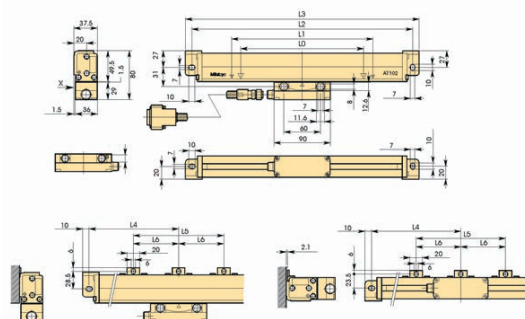
These linear scales offer : Sturdy construction-high resistance to vibration-protection rating are similar in upright and reclining position

- The innovative rubber lips keep out contaminants when you are using the scale in a machine shop.
- An armoured signal cable is used to connect the scale unit to the DRO counter, so you can operate it safely even in hostile environments.
- The signal cable outlet can be positioned on either side of the slider so you can connect the signal cable from either direction.



539-133

No.	Cable length [m]	Effective range	L <sup>1</sup> [mm]	L <sup>2</sup> [mm]	L <sup>3</sup> [mm]	L <sup>4</sup> [mm]	L <sup>5</sup> [mm]	L <sup>6</sup> [mm]	Mass [kg]
539-111-30	3	100 mm	120	248	268				1,5
539-112-30	3	150 mm	170	298	318				
539-113-30	3	200 mm	220	348	368				
539-114-30	3	250 mm	270	398	418				
539-115-30	3	300 mm	330	458	478				
539-116-30	3	350 mm	380	508	528				
539-117-30	3	400 mm	430	558	578				
539-118-30	3	450 mm	480	608	628				
539-119-30	3	500 mm	540	668	688				
539-121-30	3	600 mm	650	778	798				2,6
539-123-30	3	700 mm	760	888	908				2,8
539-124-30	3	750 mm	810	938	958				2,9
539-125-30	3	800 mm	860	988	1008				3
539-126-30	3	900 mm	960	1088	1108				3,3
539-127-30	5	1000 mm	1060	1188	1208	594			3,7
539-128-30	5	1100 mm	1160	1288	1308	644			4
539-129-30	5	1200 mm	1260	1388	1408	694			4,2
539-130-30	5	1300 mm	1360	1488	1508	744			4,4
539-131-30	5	1400 mm	1460	1588	1608	794			4,6
539-132-30	5	1500 mm	1560	1688	1708	844			4,8
539-133-30	5	1600 mm	1690	1818	1838		610		5,1
539-134-30	5	1700 mm	1790	1918	1938		650		5,3
539-135-30	5	1800 mm	1890	2018	2038		670		5,5
539-136-30	5	2000 mm	2100	2228	2248		740		6
539-137-30	5	2200 mm	2300	2428	2448		800		6,4
539-138-30	7	2400 mm	2500	2628	2648	1314	1300	650	7,1
539-139-30	7	2500 mm	2600	2728	2748	1364	1340	670	7,3
539-140-30	7	2600 mm	2700	2828	2848	1414	1400	700	7,5
539-141-30	7	2800 mm	2900	3028	3048	1514	1500	750	7,9
539-142-30	7	3000 mm	3100	3228	3248	1614	1600	800	8,3



## Specifications

Accuracy	(5+5L/1.000) μm L = Effective range (mm)
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp)
Operation temperature	0°C to 45°C
Power supply	5V DC ± 10%
Max. drive speed	120 m/min.
Signal period	20 μm
Scale reference points	every 50 mm
Dust/water protection level	IP53

## Optional accessories

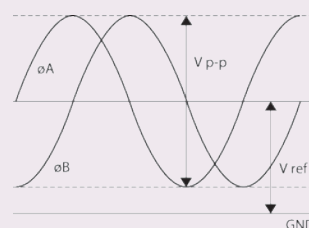
No.	Description
09AAA033A	Extension Cable 2M
09AAA033B	Extension Cable 5M
09AAA033C	Extension Cable 7M
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213



Extension cable

## Legend

- L0 Effective range
- L1 Travel range
- L2 Bore centre distance
- L3 Total length
- L4-L6 Support bracket position



V ref ≈ 2.5V  
V p-p = 2V

## Output waveform

## Specifications

Accuracy	(5+8L/1.000) $\mu$ m L = Effective range (mm)
Output waveform	Two 90° phased-shifted sinusoidal signals (2Vpp)
Operation temperature	0°C to 45°C
Power supply	5V DC $\pm$ 10%
Max. drive speed	50 m/min.
Signal period	20 $\mu$ m
Scale reference points	every 50 mm
Dust/water protection level	IP53

## Optional accessories

No.	Description
09AAA033A	Extension Cable 2M
09AAA033B	Extension Cable 5M
09AAA033C	Extension Cable 7M
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213



Extension cable

## Legend

L0 Effective range

L1 Travel range

L2 Bore centre distance

L3 Total length

L4-L6 Support bracket position



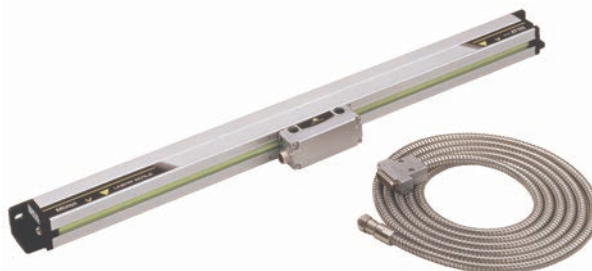
Please refer to the DRO leaflet for more details.

# DRO LINEAR SCALES AT103

## Series 539 - sealed incremental - full size housing -larger measuring length

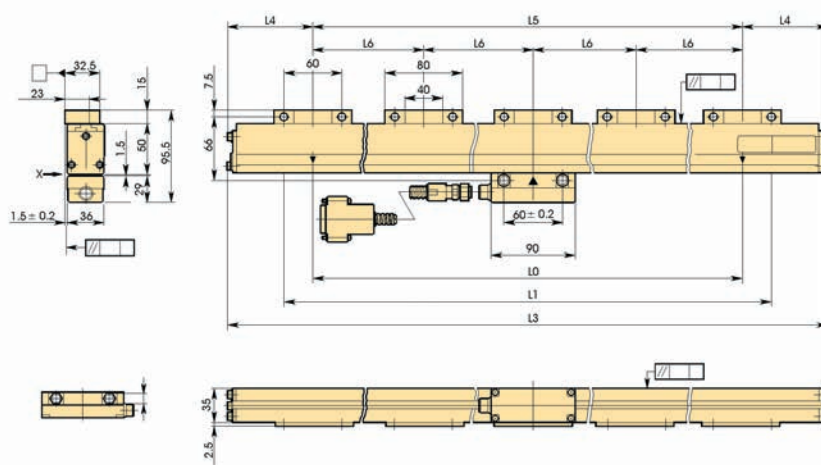
These linear scales offer : Sturdy construction-high resistance to vibration-protection rating are similar in upright and reclining position

- The innovative rubber lips keep out contaminants when you are using the scale in a machine shop.
- An armoured signal cable is used to connect the scale unit to the DRO counter, so you can operate it safely even in harsh environments.
- The signal cable outlet can be positioned on either side of the slider, so you can connect the signal cable from either direction.



539-133

No.	Cable length [m]	Effective range	L <sup>1</sup> [mm]	L <sup>3</sup> [mm]	L <sup>4</sup> [mm]	L <sup>5</sup> [mm]	L <sup>6</sup> [mm]	Mass [kg]
539-143-30	10	3250 mm	3350	3470	135	3200	800	10,8
539-144-30	10	3500 mm	3600	3720	160	3400	850	11,4
539-145-30	10	3750 mm	3850	3970	125	3720	930	12
539-146-30	10	4000 mm	4100	4220	110	4000	1000	12,6
539-147-30	10	4250 mm	4350	4470	135	4200	1050	13,2
539-148-30	10	4500 mm	4600	4720	160	4400	1100	13,8
539-149-30	15	4750 mm	4850	4970	85	4800	800	15,2
539-150-30	15	5000 mm	5100	5220	120	4980	830	15,8
539-151-30	15	5250 mm	5350	5470	125	5220	870	16,4
539-152-30	15	5500 mm	5600	5720	130	5460	910	17
539-153-30	15	5750 mm	5850	5970	135	5700	950	17,6
539-154-30	15	6000 mm	6100	6220	110	6000	1000	18,2



# DRO LINEAR SCALES AT103 - High Accuracy

Series 539 - sealed incremental - full size housing- with very high repeatability

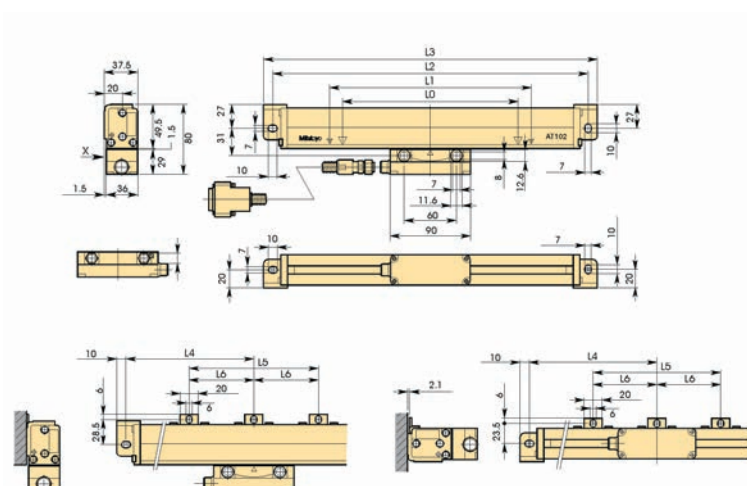
These linear scales offer : Sturdy construction-high resistance to vibration-protection rating are similar in upright and reclining position

- The innovative rubber lips keep out contaminants when you are using the scale in a machine shop.
- An armoured signal cable is used to connect the scale unit to the DRO counter, so you can operate it safely even in harsh environments.
- The signal cable outlet can be positioned on either side of the slider so you can connect the signal cable from either direction.



539-133

No.	Cable length [m]	Effective range	L <sup>1</sup> [mm]	L <sup>2</sup> [mm]	L <sup>3</sup> [mm]	L <sup>4</sup> [mm]	L <sup>5</sup> [mm]	Mass [kg]
539-111-40	3	100 mm	120	248	268			1,5
539-112-40	3	150 mm	170	298	318			
539-113-40	3	200 mm	220	348	368			
539-114-40	3	250 mm	270	398	418			
539-115-40	3	300 mm	330	458	478			
539-116-40	3	350 mm	380	508	528			
539-117-40	3	400 mm	430	558	578			
539-118-40	3	450 mm	480	608	628			
539-119-40	3	500 mm	540	668	688			
539-121-40	3	600 mm	650	778	798			2,6
539-123-40	3	700 mm	760	888	908			2,8
539-124-40	3	750 mm	810	938	958			2,9
539-125-40	3	800 mm	860	988	1008			3
539-126-40	3	900 mm	960	1088	1108			3,3
539-127-40	5	1000 mm	1060	1188	1208	594		3,7
539-128-40	5	1100 mm	1160	1288	1308	644		4
539-129-40	5	1200 mm	1260	1388	1408	694		4,2
539-130-40	5	1300 mm	1360	1488	1508	744		4,4
539-131-40	5	1400 mm	1460	1588	1608	794		4,6
539-132-40	5	1500 mm	1560	1688	1708	844		4,8
539-133-40	5	1600 mm	1690	1818	1838		610	5,1
539-134-40	5	1700 mm	1790	1918	1938		650	5,3
539-135-40	5	1800 mm	1890	2018	2038		670	5,5
539-136-40	5	2000 mm	2100	2228	2248		740	6



## Specifications

Accuracy	(3+3L/1000) μm L = Effective range (mm)
Operation temperature	0°C to 45°C
Power supply	5V DC ± 10%
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp)
Scale reference points	every 50 mm
Signal period	20 μm
Dust/water protection level	IP53
Max. drive speed	up to 120 m/min.

## Optional accessories

No.	Description
09AAA033A	Extension Cable 2M
09AAA033B	Extension Cable 5M
09AAA033C	Extension Cable 7M
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213



Extension cable

## Legend

- L0 Effective range
- L1 Travel range
- L2-L3 Mount interval
- L4 Overall length
- L5-L6 Support bracket position



Refer to the DRO System leaflet for more details.



# DRO LINEAR SCALES AT113

## Specifications

Accuracy	(5+5L/1000) µm L = Effective range (mm)
Operation temperature	0°C to 45°C
Power supply	5V DC ± 10%
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp)
Max. drive speed	120 m/min
Signal period	20 µm
Scale reference points	every 50 mm
Dust/water protection level	IP53

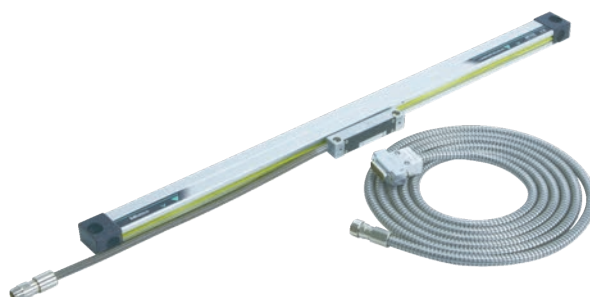
## Optional accessories

No.	Description
09AAA033A	Extension Cable 2M
09AAA033B	Extension Cable 5M
09AAA033C	Extension Cable 7M
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213

## Series 539 - sealed incremental - slimline scale housing

These linear scales are built for limited installation space

- Glass scale - Zero not coded
- Expansion factor  $(8 \pm 1) \times 10^{-6}/K^{-1}$
- An armoured inox signal cable is used to connect the DRO counter



539-201-30

No.	Cable length [m]	Effective range	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]	Mass [kg]
539-201-30	3,5	100 mm	120	258	242	276				0,9
539-202-30	3,5	150 mm	170	308	292	326				
539-203-30	3,5	200 mm	220	358	342	376				
539-204-30	3,5	250 mm	270	408	392	426				
539-205-30	3,5	300 mm	330	468	452	486				
539-206-30	3,5	350 mm	380	518	502	536				
539-207-30	3,5	400 mm	430	568	552	586				
539-208-30	3,5	450 mm	480	618	602	636				
539-209-30	3,5	500 mm	540	678	662	696	339	331		
539-211-30	3,5	600 mm	640	778	762	796	389	381		1,3
539-213-30	3,5	700 mm	740	878	862	896	439	431		1,3
539-215-30	3,5	800 mm	840	978	962	996	489	481		1,4
539-216-30	3,5	900 mm	940	1078	1062	1096	539	531		1,4
539-217-30	5	1000 mm	1040	1178	1162	1196	589	581		1,9
539-218-30	5	1100 mm	1140	1278	1262	1296			430	1,9
539-219-30	5	1200 mm	1240	1378	1362	1396			460	2
539-220-30	5	1300 mm	1340	1478	1462	1496			490	2,2
539-221-30	5	1400 mm	1440	1578	1562	1596			530	2,2
539-222-30	5	1500 mm	1540	1678	1662	1696			560	2,2

## Legend

L0 Effective range

L1 Travel range

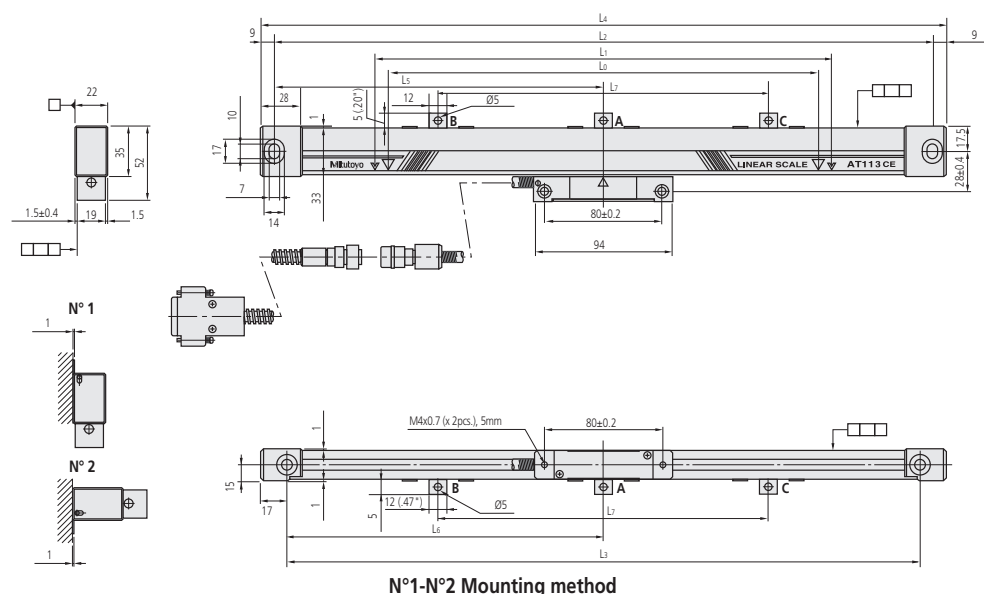
L2-L3 Mount interval

L4 Overall length

L5-L7 Support bracket position



Refer to the DRO System leaflet for more details.





# DRO LINEAR SCALE AT112 - High Accuracy



## Specifications

Accuracy	(3+3L/1000) µm L = Effective range (mm)
Operation temperature	0°C to 45°C
Power supply	5V DC ± 10%
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp)
Max. drive speed	up to 72 m/min
Signal period	20 µm
Scale reference points	every 50 mm
Dust/water protection level	IP53
Delivered	Mounting set

## Optional accessories

No.	Description
09AAA033A	Extension Cable 2M
09AAA033B	Extension Cable 5M
09AAA033C	Extension Cable 7M
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213



Refer to the DRO System leaflet for more details.

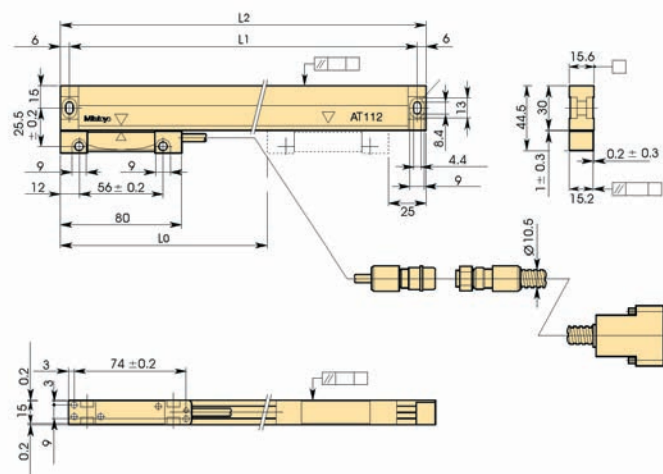
## Series 539 - sealed incremental - super slim housing - with very high repeatability

- Extra-slim construction
- Glass scale - Zero not coded
- Expansion factor  $(8 \pm 1) \times 10^{-6}/K^{-1}$
- An armoured inox signal cable is used to connect the DRO counter



## High accuracy

No.	Cable length [m]	Effective range	L <sup>1</sup> [mm]	L <sup>2</sup> [mm]	Mass [kg]
539-251-10	3	50 mm	143	155	0,72
539-252-10	3	70 mm	163	175	0,74
539-253-10	3	120 mm	213	225	0,8
539-254-10	3	170 mm	263	275	0,85
539-255-10	3	220 mm	313	325	0,9
539-256-10	3	270 mm	363	375	0,95
539-257-10	3	320 mm	413	425	1
539-258-10	3	370 mm	463	475	1,05
539-259-10	3	420 mm	513	525	1,1
539-260-10	3	470 mm	563	575	1,15
539-261-10	3	520 mm	613	625	1,2
539-262-10	3	570 mm	663	675	1,25
539-263-10	3	620 mm	713	725	1,3
539-264-10	3	670 mm	763	775	1,35
539-265-10	3	720 mm	813	825	1,4
539-266-10	3	770 mm	863	875	1,45
539-267-10	3	820 mm	913	925	1,5
539-268-10	3	920 mm	1013	1025	1,56
539-269-10	3	1020 mm	1113	1125	1,62



## Legend

- L0 Effective range
- L1 Mount interval
- L2 Overall length

# DRO LINEAR SCALES AT116

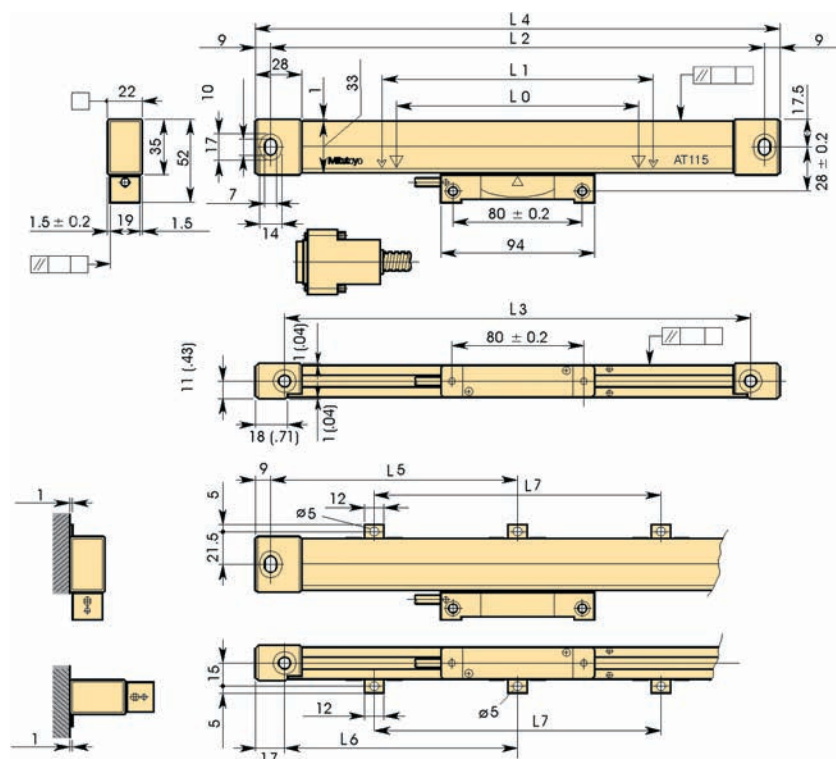
## Series 539 - sealed incremental - slimline housing - price aggressive

- Suitable for milling machines, XY tables, jigs, etc.
- Glass scale - Zero not coded
- Expansion factor  $(8 \pm 1) \times 10^{-6}/K^{-1}$
- An armoured inox signal cable is used to connect the DRO counter



539-271-30

No.	Cable length [m]	Effective range	L <sup>1</sup> [mm]	L <sup>2</sup> [mm]	L <sup>3</sup> [mm]	L <sup>4</sup> [mm]	L <sup>5</sup> [mm]	L <sup>6</sup> [mm]	L <sup>7</sup> [mm]	Mass [g]
539-271-30	3,5	100 mm	120	258	242	276				550
539-272-30	3,5	150 mm	170	308	292		326			600
539-273-30	3,5	200 mm	220	358	342	376				700
539-274-30	3,5	250 mm	270	408	392	426				800
539-275-30	3,5	300 mm	330	468	452	486				900
539-276-30	3,5	350 mm	380	518	502	536				1000
539-277-30	3,5	400 mm	430	568	552	586				1050
539-278-30	3,5	450 mm	480	618	602	636				1150
539-279-30	3,5	500 mm	540	678	662	696	339	331		1250
539-281-30	3,5	600 mm	640	778	762	796	389	381		1450
539-283-30	3,5	700 mm	740	878	862	896	439	431		1600
539-284-30	3,5	750 mm	780	918	902	936	459	451		1700
539-285-30	3,5	800 mm	840	978	962	996	489	481		1800
539-286-30	3,5	900 mm	940	1078	1062	1096	539	531		1950
539-287-30	5	1000 mm	1040	1178	1162	1196	589	581		2350
539-288-30	5	1100 mm	1140	1278	1262	1296			430	2500
539-289-30	5	1200 mm	1240	1378	1362	1396			460	2700
539-290-30	5	1300 mm	1340	1478	1462	1496			490	2850
539-291-30	5	1400 mm	1440	1578	1562	1596			530	3050
539-292-30	5	1500 mm	1540	1678	1662	1696			560	3250



### Specifications

Accuracy	(5+5L/1000) $\mu$ m L = Effective range (mm)
Operation temperature	0°C to 45°C
Power supply	5V DC $\pm$ 10%
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp)
Max. drive speed	up to 50 m/min
Signal period	20 $\mu$ m
Scale reference points	every 50 mm
Dust/water protection level	IP53

### Optional accessories

No.	Description
09AAA720A	2M Cable for AT115, Conduit Armed
09AAA720B	5M Cable for AT115, Conduit Armed
09AAA720C	Cable, for Linear Scale 7m
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213



Extension cable

### Legend

- L0 Effective range
- L1 Travel range
- L2-L3 Mount interval
- L4 Overall length
- L5-L7 Support bracket position

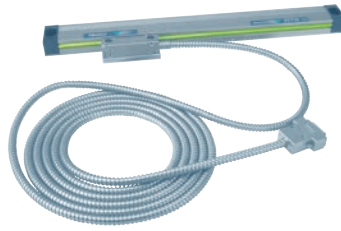


Refer to the DRO System leaflet for more details.



Accuracy	100 to 500 mm $\pm 5 \mu\text{m}$ 600 to 1800 mm $\pm 7 \mu\text{m}$ 2000 to 3000 mm $\pm 10 \mu\text{m}$
Operation temperature	0-45 °C
Power supply	5V DC $\pm 10\%$
Max. drive speed	50 m/min
Signal period	20 $\mu\text{s}$
Measuring method	Electromagnetic induction system

No.	Description
09AAB674A	Extension Cable 2m, for AT715
09AAB674B	Extension Cable 5m, for AT715
09AAB674C	Extension Cable 7m, for AT715
174-147D	Linear Scale Counter KLD-214
174-183D	Linear Scale Counter KA-212
174-185D	Linear Scale Counter KA-213



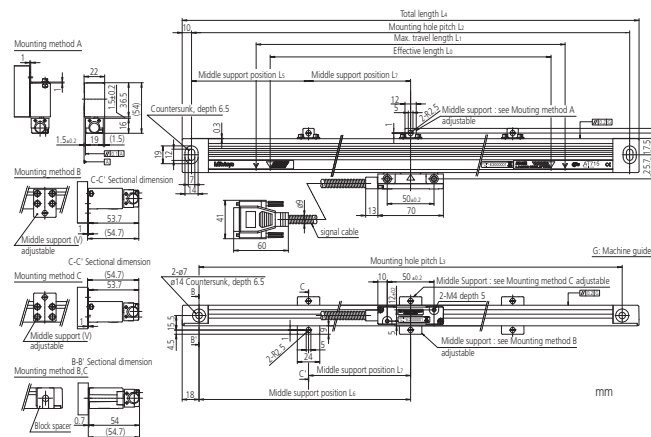
No.	Cable length [m]	Effective range	L <sup>1</sup> [mm]	L <sup>2</sup> [mm]	L <sup>3</sup> [mm]	L <sup>4</sup> [mm]	L <sup>5</sup> [mm]	L <sup>6</sup> [mm]	L <sup>7</sup> [mm]	L <sup>8</sup> [mm]
539-801	3,5	100 mm	120	258	242	278				
539-802	3,5	150 mm	170	308	292	328				
539-803	3,5	200 mm	220	358	342	378				
539-804	3,5	250 mm	270	408	392	428				
539-805	3,5	300 mm	330	468	452	488				
539-806	3,5	350 mm	380	518	502	538				
539-807	3,5	400 mm	430	568	552	588				
539-808	3,5	450 mm	480	618	602	638				
539-809	3,5	500 mm	540	678	662	698	339	331		
539-811	3,5	600 mm	640	778	762	798	389	381		
539-813	3,5	700 mm	740	878	862	898	439	431		
539-814	3,5	750 mm	780	918	902	938	459	451		
539-815	3,5	800 mm	840	978	962	998	489	481		
539-816	3,5	900 mm	940	1078	1062	1098	539	531		
539-817	5	1000 mm	1040	1178	1162	1198	589	581		
539-818	5	1100 mm	1140	1278	1262	1298	424	416	430	
539-819	5	1200 mm	1240	1378	1362	1398	459	451	460	
539-820	5	1300 mm	1340	1478	1462	1498	494	486	490	
539-821	5	1400 mm	1440	1578	1562	1598	524	516	530	
539-822	5	1500 mm	1540	1678	1662	1698	559	551	560	
539-823	5	1600 mm	1640	1778	1762	1798	459	451	430	215
539-824	5	1700 mm	1740	1878	1862	1898	479	471	460	230
539-825	5	1800 mm	1840	1978	1962	1998	459	451	530	280
539-860	5	2000 mm	2040	2178	2162	2198	539	531	550	
539-861	5	2200 mm	2240	2378	2362	2398	469	461	480	
539-862	7	2400 mm	2440	2578	2562	2598	509	501	520	
539-863	7	2500 mm	2540	2678	2662	2698	529	521	540	
539-864	7	2600 mm	2640	2778	2762	2798	549	541	560	
539-865	7	2800 mm	2840	2978	2962	2998	489	481	500	
539-866	7	3000 mm	3040	3178	3162	3198	529	521	530	

Extended cable 2 m is attached to 2400-3000 mm of effective length at signal cable 5 m, and it is 7 m in total!

L0 Effective range  
L1 Travel range  
L2-L4 Mounting hole pitch  
L5-L8 Middle support positions



Refer to the DRO System leaflet for more details.





# Universal DRO KA-200 Counter

## Series 174 - DRO counter for Linear Scales

This counter displays length indication transmitted from a linear scale.  
The KA-Counter offers you the following benefits:

- Can be used as a “standard counter” or a “lathe counter” by modifying parameters.
- Downsizing, weight saving and multiple function have been realized.
- Sub display for easy operation.
- Text data can be output using the optional USB interface.
- The optional external interface RS-232C enables connection to a PC and a printer.



174-185D

No.	Axes	Mass
174-183D	2	1,25 kg
174-185D	3	1,33 kg

Functions	Series 174 - DRO counter for Linear Scales
ZERO SET	●
PRESET	●
Diameter display	●
1/2 calculation	●
mm/inch conversion	●
Bolt-hole circle machining	●
Scale reference points	●
Linearity error compensation	●
Zero approach function (Incremental mode)	●
Addition of 2-scale data	●
Coordinate system switching	●
Error message	●
Lower digit blanking out	●
Measurement direction setting	●
Memory backup	●
Pitch machinig	●
Resolution setting	●
Smoothing	●

### Specifications

Display	7-segment, 8-digit + sign + 8-character alphabet LED display
Power supply	100-240V-AC 50/60 Hz
Dimensions (WxDxH)	300 x 70 x 167 mm mm
Resolution	With AT100 Series: 0,05 - 0,0001 mm With AT715: 0,01 - 0,001 mm
Operation temperature	0°C to 45°C
Macro functions	Rectangular drilling and round milling newly added
Main features	Feed speed display; taper machining function; tool data; multipoint compensation; scale check function; calculation function
Output (optional)	RS-232C / USB

### Optional accessories

No.	Description
06AET993	RS 232 C code out unit
06ACF941	Load/Zero Cable f. KA
937179T	Footswitch for SPC

\*with Linear Scale AT1xx only

# DRO KLD200 Counter

## Series 174

The KLD200 Counter is a single axis linear scale display unit with limit signal output. The KLD200 offers you the following benefits:

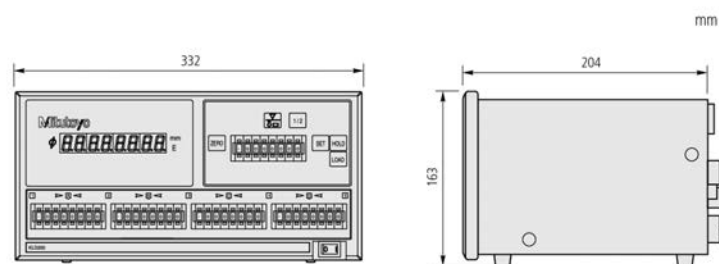
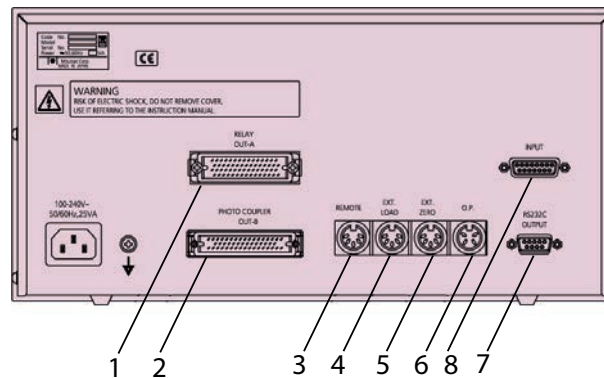
- The counter is designed to signal when a linear scale displacement value and a preset limit value coincide.
- You have a choice of two types of limit settings (2 step and 4 step).
- Ideal for controlling vertical positioning on an EDM or a grinding machine.
- You can connect it to a computer or a sequencer via an RS-232C Interface or limit signal output (offered as standard).
- You can connect the following linear scales to the counter: AT103/AT112/AT113/AT116/AT181/AT715.



174-147

No.	Mass [kg]	Description
174-147D	3	4-step limit signal output
174-146D	3	2-step limit signal output

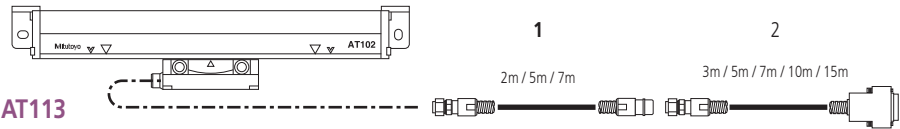
1. Relay signal output
2. Photocoupler signal output
3. Remote signal input
4. External load signal input
5. External zero-set signal input
6. Touch signal input
7. RS-232C interface
8. Input Linear Scale Signal



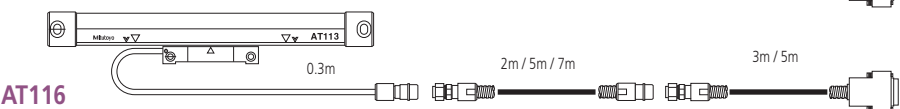
# DRO Extension cables selection guide

Series 0944

AT103



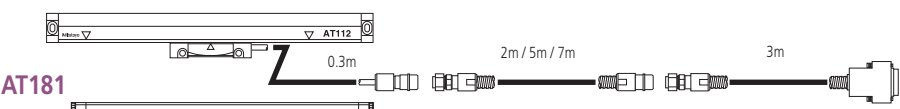
AT113



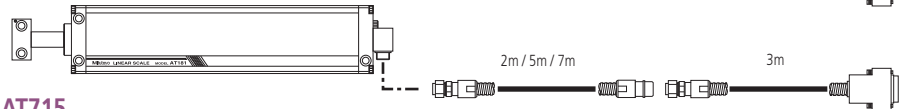
AT116



AT112



AT181



AT715



Extension cable selection guide



KA Counter



KLD Counter

# Overview of CNC Linear Scale System

	Scale Name (code)	Reference point	ABSOLUTE function	Main scale grating pitch	Signal output pitch	Signal unit	No. of Division	Resolution	Maximum response speed	Minimum edge interval
Separate Type Linear Scales	ST36B ST36C (ST36A) (ST36D)	○	×	8μm	4μm	- (PSU-200)	400	0.01μm	70mm/s	125ns
							200	0.02μm	150mm/s	
							80	0.05μm	260mm/s	
							40	0.1μm	720mm/s	
	ST24B ST24C	○	×	20μm	10μm	-	200	0.05μm	360mm/s	125ns
							100	0.1μm	720mm/s	
							20	0.5μm	1200mm/s	250ns
							10	1μm	1200mm/s	
	ST46-EZA	○	×	20μm	20μm	-	400	0.05μm	900mm/s	50ns
							200	0.1μm	1800mm/s	
							40	0.5μm	2600mm/s	
							20	1μm	2600mm/s	
	ST422	○	×	40μm	40μm	-	200	0.2μm	1500mm/s	125ns
							80	0.5μm	3600mm/s	
							40	1μm	5000mm/s	250ns
							8	5μm	5000mm/s	
	ABS ST700 Compact type	-	○	3.072mm	3.072mm	-	30720	0.1μm	5000mm/s	-
Assembly Type Linear Scales	AT402E	○	△	20μm	20μm	-	-	-	2000mm/s	1Vp-p differential sine wave
	AT211	○	×	20μm	20μm	-	200	0.1μm	710mm/s	125ns
							100	0.2μm	1400mm/s	
							40	0.5μm	2000mm/s	
							20	1μm	2000mm/s	250ns
							8	2.5μm	2000mm/s	500ns
	AT203	○	×	20μm	20μm	-	4	5μm	2000mm/s	1000ns
							200	0.1μm	333mm/s	250ns
							40	0.5μm	1833mm/s	
							20	1μm	2000mm/s	
	ABS AT500	-	○	20μm	20μm	-	4096	0.005μm	2500mm/s*1	-
	ABS AT300	-	○	20μm	20μm	-	400	0.05μm	2000mm/s	-

\*1 Maximum response speed of H type with 0.005μm resolution is 1200mm/s.

# CNC LINEAR SCALES AT402E

Series 539 - sealed incremental - zero coded-standard size housing - high traverse speed

Universal & High vibration (20G) and shock (40G) - resistant type.

- 20 µm grating pitch
- output signal 1Vpp
- zero coded every 20 µm
- suggested resolution 1 - 0,5 µm



Specifications	
Operation temperature	0°C to 45°C
Power supply	5V DC ± 10%
Accuracy	140 to 540 mm ±2 µm 640 to 3040 mm ± 3 µm
Max. drive speed	over 120 m/min
Signal period	20 µm
Output waveform	Two 90° phase-shifted sinusoidal signals (1 Vpp) Differential (RS-485)

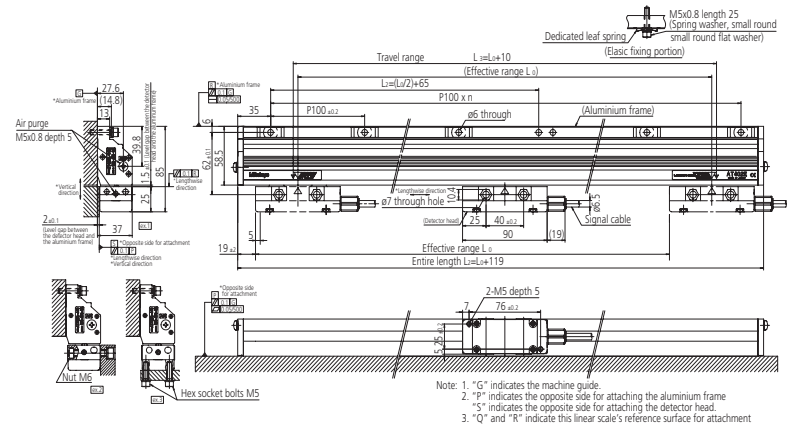
## Optional accessories

No.	Description
09AAC071A	Signal-Cable A, 1m/AT402E
09AAC071B	Signal-Cable A, 3m/AT402E
09AAC071C	Signal-Cable A, 6m/AT402E
09AAC071D	Signal-Cable A, 9m/AT402E
09AAC079A	Signal-Cable B, 1m/AT402E
09AAC079B	Signal-Cable B, 3m/AT402E
09AAC079C	Signal-Cable B, 6m/AT402E
09AAC079D	Signal-Cable B, 9m/AT402E
09AAC073A	Signal-Cable C, 1m/AT402E
09AAC073B	Signal-Cable C, 3m/AT402E
09AAC073C	Signal-Cable C, 6m/AT402E
09AAC073D	Signal-Cable C, 9m/AT402E

Without cable (-00)

No.	Effective range	L <sup>1</sup> [mm]	L <sup>2</sup> [mm]	L <sup>3</sup> [mm]
539-371-00	140 mm	259	135	150
539-373-00	240 mm	359	185	250
539-374-00	340 mm	459	235	350
539-375-00	440 mm	559	285	450
539-376-00	540 mm	659	335	550
539-377-00	640 mm	759	385	650
539-378-00	740 mm	859	435	750
539-379-00	840 mm	959	485	850
539-380-00	940 mm	1059	535	950
539-381-00	1040 mm	1159	585	1050
539-382-00	1140 mm	1259	635	1150
539-383-00	1240 mm	1359	685	1250
539-384-00	1340 mm	1459	735	1350
539-385-00	1440 mm	1559	785	1450
539-386-00	1540 mm	1659	835	1550
539-387-00	1640 mm	1759	885	1650
539-388-00	1740 mm	1859	935	1750
539-389-00	1840 mm	1959	985	1850
539-390-00	2040 mm	2159	1085	2050
539-391-00	2240 mm	2359	1185	2250
539-392-00	2440 mm	2559	1285	2450
539-393-00	2640 mm	2759	1385	2650
539-394-00	2840 mm	2959	1485	2850
539-395-00	3040 mm	3159	1585	3050

mm





#### Specifications

Power supply	5V DC $\pm$ 10%
Accuracy	100 to 1500 mm (3+3L/1000) $\mu$ m 1600 to 3000 mm (5+5L/1000) $\mu$ m 3250 to 6000 mm (5+8L/1000) $\mu$ m L = Effective range (mm)
Max. drive speed	up to 120 m/min
Scale reference points	every 50 mm
Cable length	5 m
Output waveform	Two 90° phase-shifted quadrature signals (RS422) Differential line driver
Resolution	0,1; 0,5; 1

#### Specifications

Power supply	5V DC $\pm$ 10%
Accuracy	100 to 1500 mm (3+3L/1000) $\mu$ m (standard type) (2+2L/1000) $\mu$ m (high-accuracy type) 500 to 1500 mm (3+3L/1000) $\mu$ m L = Effective range (mm)
Max. drive speed	up to 120 m/min
Signal period	20 $\mu$ s
Resolution	0,1; 0,5; 1 $\mu$ m
Output waveform	Two 90° phase-shifted quadrature signals (RS422) Differential line driver

## CNC LINEAR SCALES AT203

Series 539 - sealed incremental - full size housing - high traverse speed-larger measuring length



- Accuracy : from 100 up to 1500 mm  $\pm$  3  $\mu$ m
- from 1600 up to 3040 mm  $\pm$  5  $\mu$ m
- from 3250 up to 6000 mm  $\pm$  10  $\mu$ m
- Protection from IP 53 up to IP 64 (pressure device connection)



## CNC LINEAR SCALES AT211

Series 539 - Sealed incremental - slimline size housing - high traverse speed-with very high repeatability



- 20  $\mu$ m grating pitch-output signal square wave (RS 422)
- suggested resolution 1 - 0,5  $\mu$ m
- high traverse speed
- Accuracy - standard version: from 100 up to 1500 mm  $\pm$  3  $\mu$ m
- Accuracy - high repeatability from 100 up to 1500  $\pm$  2  $\mu$ m
- Protection from IP 53 up to IP 64 (pressure device connection)



AT211A



AT211B

## CNC ABS LINEAR SCALES AT300

### Series 539 - Sealed Absolute type - Standard dimension

This sealed-type, ABSOLUTE linear scale gives you very fine resolution up to 0,05µm. The AT300 offers you the following benefits:

- You can connect it directly with NC machine tools.
- ABS AT303: Supports Mitutoyo standard serial interface.
- ABS AT343: Supports Mitsubishi® Electric high-speed serial interface.
- ABS AT353: Supports Fanuc® high-speed serial interface.
- Installation dimensions are available from Mitutoyo – please contact.



AT300



#### Specifications

Power supply	5V DC ± 10%
Accuracy	100 to 1500 mm (3+3L/1000) µm 1600 to 3000 mm (5+5L/1000) µm L = Effective range (mm)
Max. drive speed	up to 120 m/min
Resolution	0,05 µm
Signal period	20 µm



Refer to the NC Linear Scale brochure for more details

## CNC ABS LINEAR SCALES AT500

### Series 539 - Sealed Absolute type - Slim line

This sealed-type, ABSOLUTE linear scale gives you very fine resolution up to 0,05µm. The AT500 offers you the following benefits:

- You can connect it directly with NC machine tools.
- ABS AT505/AT503: Supports Mitutoyo standard serial interface.
- ABS AT545/AT543: Supports Mitsubishi® Electric high-speed serial interface.
- ABS AT555/AT553: Supports Fanuc® high-speed serial interface.
- You have a choice of two types:
  - SC model: high-rigidity type
  - HC model: high-accuracy type.
- Installation dimensions are available from Mitutoyo – please contact.



AT553-HC

AT553-SC



#### Specifications

Power supply	5V DC ± 10%
Accuracy	S model (3+3L/1000) µm H model (2+2L/1000) µm E model (2+2L/1000) µm L = Effective range (mm)
Max. drive speed	S model 150 m/min. H model 72 m/min E model 72/150 m/min 0,05/0,005 µm
Resolution	AT5_5 model: 0,005 µm AT5_3 model: 0,05 µm AT5_ _E model : 0,05 /0,005µm
Signal period	20 µm



Refer to the NC Linear Scale brochure for more details

#### Specifications

Detection Method	Electromagnetic induction
Resolution	0,05 $\mu\text{m}$
Maximum effective range	3040 mm
Cross section	85 x 37 mm
Accuracy	3+5L/1000) $\mu\text{m}$ L= 140 to 2040 mm (5+5L/1000) $\mu\text{m}$ L= 2240 to 3040 mm
Response speed	3 m/s
Compatible interface	FANUC Corporation's Serial Interface Mitsubishi Electric Corporation's High-speed Serial Interface

## CNC ABS LINEAR SCALES AT1100

### Series 579 - Electromagnetic induction Absolute Scale

ABSOLUTE®

This scale unit leverages Mitutoyo's unique electromagnetic induction technology to provide excellent resistance to oil and water compared with the optical linear encoder type, elevating the ABS AT1100 to the level of a highly reliable NC machine-tool scale suitable for tough shop floor conditions.

- Additional factors in providing the high performance of the ABS AT1100 are the innovative shaping and location of the detector track in the aluminum frame and the extreme coolant resistance of the track-seal material. Together these combine in a highly effective first defence against contamination of the scale and sensor even in extremely severe installation environments.



## CNC LINEAR SCALES ST24

### Series 579 - Open scales with Sine & Square-Wave Output

This standard-type linear scale gives you a maximum response speed of up to 1200mm/s. The AT500 offers you the following benefits:

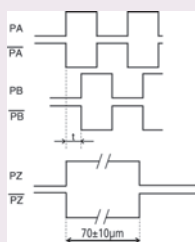
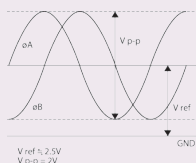
- It Includes an LED alarm enabling you to detect overspeed and sinusoidal signal anomalies.
- Installation dimensions are available from Mitutoyo – please contact.



ST24

#### Specifications

Power supply	5V DC $\pm$ 10%
Accuracy	10 - 300 mm $\pm$ 1 $\mu\text{m}$ 350 - 500 mm $\pm$ 2 $\mu\text{m}$ 600 - 1000 mm $\pm$ 3 $\mu\text{m}$ 1100 - 3000 mm $\pm$ 3 $\mu\text{m}/\text{m}$
Max. drive speed	Up to 1200 mm/sec
Scale reference points	10 - 80 mm Scale center point 100 - 3000 mm every 50 mm
Resolution	0,05; 0,1; 0,5; 1 $\mu\text{m}$
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp) Two 90° phase-shifted square-wave signals (RS422) Line driver
Signal period	10 $\mu\text{m}$



## CNC LINEAR SCALES ST36

### Series 579 - Open scales with Sine & Square-Wave Output

This is a high resolution, high accuracy, portable model designed for exposed installations. The ST36 offers you the following benefits:

- High reliability with stable signal output.
- Outputs two-phase sinusoidal signal (signal pitch 4 $\mu$ m) and two-phase square-wave signal simultaneously.
- Outputs two-phase sinusoidal signal (signal pitch 4 $\mu$ m) and two-phase square-wave signal simultaneously.
- You are provided with a compact interface box as standard.  
Installation dimensions are available from Mitutoyo – please contact.



ST36

## CNC LINEAR SCALES ST422

### Series 579 - Open scales with Sine & Square Wave Output

This compact-type, exposed-type incremental linear scale gives you a maximum response speed of 5000 mm/sec.

The ST422 offers you the following benefits:

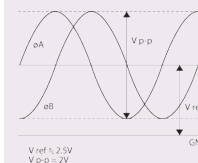
- It is provided with alarm LED error indication with fault detection signal output for overspeed and sinusoidal signal anomalies.
- Installation dimensions are available from Mitutoyo – please contact.



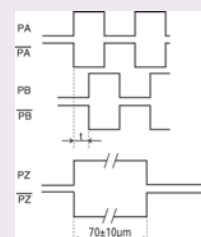
ST422

#### Specifications

Power supply	5V DC $\pm$ 10%
Accuracy	10 - 300 mm $\pm$ 0,5 $\mu$ m 350 - 500 mm $\pm$ 1 $\mu$ m 600 - 1000 mm $\pm$ 2 $\mu$ m 1100 - 3000 mm $\pm$ 2 $\mu$ m/m
Max. drive speed	1200 mm/sec
Signal period	8 $\mu$ m
Scale reference points	10 - 75 mm Center point scale 100 - 3000 mm every 50 mm
Signal period	4 $\mu$ m
Resolution	0,01; 0,02; 0,05; 0,1 $\mu$ m
Output waveform	Two 90° phase-shifted sinusoidal signals 2Vpp (Model A and C) Two 90° phase-shifted square-wave signals (Model B and C) RS422 Line Driver



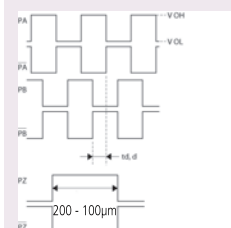
Model A/C



Model B/C

#### Specifications

Power supply	5V DC $\pm$ 10%
Accuracy	10 - 300 mm $\pm$ 1 $\mu$ m 350 - 500 mm $\pm$ 2 $\mu$ m 600 - 1000 mm $\pm$ 3 $\mu$ m 1100 - 3000 mm $\pm$ 3 $\mu$ m
Max. drive speed	up to 5000 mm/sec
Scale reference points	10 - 75 mm Center point scale 100 - 3000 mm every 50 mm
Signal period	40 $\mu$ m
Resolution	0,2; 0,5; 1; 5 $\mu$ m
Output waveform	Two 90° phase-shifted sinusoidal signals (2Vpp) Two 90° phase-shifted square-wave signals (RS422) Line driver



Two 90° phase-shifted square waves signals



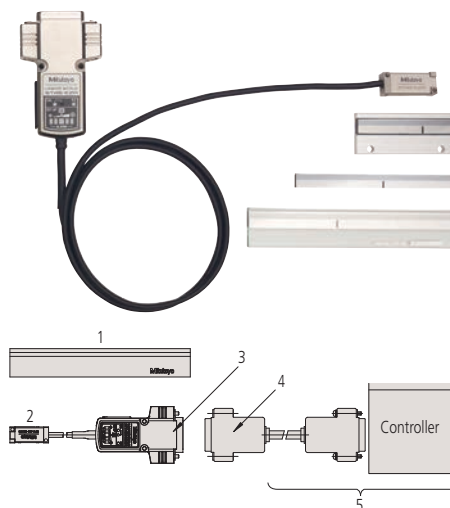
Refer to the NC Linear Scale brochure for more details

# CNC Linear Scale ST46-EZA

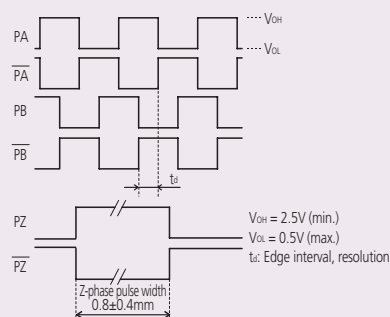
## Series 579 - Fotoelectric metal tape linear scales

- Grating pitch 20  $\mu\text{m}$
- Zero reference not coded
- Output signal sinusoidal 2Vpp or square wave signal(RS 422) sticky or double sided tape version
- LED display function anomalie

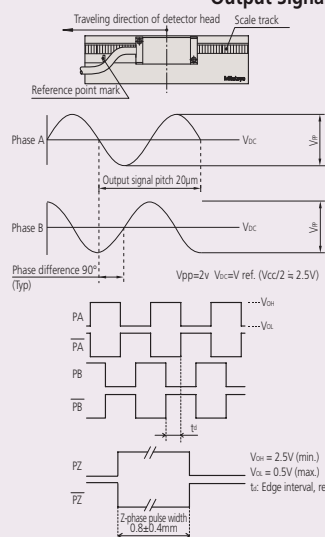
No.	Detection Method
ST46EZA Type B	Reflective photoelectric linear encoder
ST46EZA Type C	Reflective photoelectric linear encoder



1: Main scale; 2: Detector unit; 3: Output connector (included); 4: Feedback cable; 5: To be supplied by customer (feedback cable/controller)



Output Signal Type B



Output Signal Type C



Brochure on request



# CNC LINEAR SCALES ST700

## Series 579 - Electromagnetic induction Absolute Scale

ABSOLUTE scales have eliminated the need to re-establish the origin. The ST700 offers you the following benefits:

- It is optimized for the control of linear motors.
- Optimized for high-speed, high-acceleration control.
- A non-contact detection system ensures a long service life for your product.
- Signal adjustment at installation is automatically performed with dedicated software.



Refer to the Linear Scale ST700 brochure for more details



Applicable system	Resolution 0,1 µm 50 mm head No.
[Amplifiers supporting Mitutoyo ENSIS interface] Nikki Denso Co., Ltd. VC Series Servoland Corporation SVF Series PMAC JAPAN Co., Ltd. controller	ABS ST708A ABS ST708AL
FANUC® Ltd. FS-I Series control unit, Power Mate® i	ABS ST758 ABS ST758L
Mitsubishi® Electric Corporation MELDAS® Series Supported amplifier : MDS-Vn-V1/V2	ABS ST748 ABS ST748L
Mitsubishi® Electric Corporation MR-J2S/MR-J3 Series	ABS ST748A ABS ST748AL
Panasonic Matsushita® Electric Industrial Co, Ltd., Motor Company MINAS® A4, A4P, A4N Series	ABS ST778A ABS ST778L
Yaskawa® Electric Corporation Σ-III Series	ABS ST788A ABS ST788L

Item	Scale type	Scale base type	Glass scale type
Resolution		0.1µm (0.05µm: special order)	
Detection method		Electromagnetic induction Absolute position detection method*	
Shape		Separate type scale	
Effective range (accuracy guarantee range)		100 to 3000mm / 3200 to 6000mm	100 to 1100mm
Accuracy (20°C)		(5+5L/1000) µm L: Effective range mm	(3+3L/1000) µm L: Effective range mm
Maximum feed speed		5 m/s	
Thermal expansion coefficient		(12.0±1.5) ×10 <sup>-6</sup> /°C (when attached to material equivalent to steel)	(8±1.0) ×10 <sup>-6</sup> /°C
Operating conditions	Temperature	0 to 50°C	
	Humidity	20 to 80%RH	
Storage conditions	Temperature	-20 to 70°C	
	Humidity	20 to 80%RH	
Power supply voltage		5V±10% (at the detector head) (Ripple and spike noise should not exceed 100mV)	
Current consumption		270mA (Max.)	
Vibration resistance		300m/s <sup>2</sup> (55 to 2000Hz)	100m/s <sup>2</sup> (55 to 2000Hz)
Shock resistance		500m/s <sup>2</sup> (half-sine, 11ms)	150m/s <sup>2</sup> (half-sine, 11ms)
Head cable	Length/cable diameter	1m / ø3.8mm (high-flex cable)	
	Connector	1) D-sub (15-pin pin type) connector (not waterproof) 2) D-sub (9-pin socket type) connector (not waterproof): for ST788A	
Maximum signal cable length		Up to 29m (head cable length included) (Please consult the user's manual)	
Detector mounting		1 location each on top and sides	
Direction of cable outlet		4 sides (top, bottom, left, right) can be selected	

# Linear Scale ABS ST1300

## Series 579 - High-speed, high-resolution Absolute Tape Scale

Long, fast and diverse connectivity

- Realizes a 12m maximum effective length, 8-m/s max. response speed and 1nm minimum resolution.
  - Extensive interface compatibility. See specifications below for details.
  - Outstanding robustness against contamination compared to earlier photoelectric types achieved using a new detection principle.
  - Choice between double-sided tape and fixed-ends mounting methods.
  - Signal validation program facilitates mounting adjustment and maintenance.
  - Applicable Interfaces: FANUC; Mitsubishi Electric; Yaskawa Electric; Panasonic; Mitutoyo ENSIS standard interface
- \*: dependent on controller



### Specifications

Range	max. 12 m
Accuracy	10 $\mu\text{m}/\text{m}$ ( $\pm 5\mu\text{m}$ )
Applicable Interfaces	FANUC; Mitsubishi Electric; Yaskawa Electric; Panasonic; Mitutoyo ENSIS standard interface
Max. response speed	8 m/s (Varies according to the interface)
Min. resolution	1 nm / 10 nm
Scale specifications	Metal tape

# Linear Scale - Fiber Scale

## Series 579 - Ultra-compact Linear Encoder

Small detector head allows reduction in size and weight of equipment

- Separating electronic components from the inside of the detector head using an optical fiber-guided wave enables an ultra-compact unit without a heat source and free of electromagnetic noise.
- The ultra-compact detector head, the world's smallest, is ideal for reducing the size and weight of systems.
- 2µm signal output cycle contributes to the development of high-resolution systems.
- LED indicators on the interface unit eliminate the need for an oscilloscope during detector head mounting adjustment, helping to reduce installation work.



Specifications	
Signal output cycle	2 µm
Output signal	2-phase sine wave (2Vpp); 2-phase square wave
Effective length	max. 100 mm
Detector head dimensions	5 x 9,6 x 15 mm (S type); 6 x 20 x 10,4 mm (L Type)
Fiber-optic cable length	2, 3, 5, 10 m (or 20, 30 m by special order)
Max. response speed	0,8 m/s (with sine-wave output)
Min. resolution	10 nm (with square-wave output)



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**Objective Lenses and Eyepieces**  
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# Measuring Microscope TM Generation B Series

## Series 176

With this Toolmaker's Microscope you can measure dimensions and angles on small workpieces thanks to the optional analogue or digital micrometer heads and the built-in circular scale.

Further benefits of the TM Generation B include:

- Toolmakers microscopes well-suited for measuring dimensions and angles of features on small workpieces with the XY stage and rotating eyepiece scale.
- Compact design with recessed grips for better portability. The slim design makes this microscope ideal for use in areas with limited space.
- Powerful adjustable LED light sources for contour and surface illumination provide optimum lighting conditions for workpiece inspection.
- The TM Generation B is available with work stages of 50 x 50 mm or 100 x 50 mm.



TM-505B fitted with optional digimatic micrometer heads



TM-1005B with optional LED ringlight (63AAA001), 0.37X Eyepiece adapter (63AAA060) and digital HDMI camera (63AAA059)



Rotating eyepiece with angle reading

### Specifications

Observation image	Erect
Angle reading	Range : 360° Minimum reading : 6' (by vernier)
Objective lens	2X (176-138) Working distance: 67 mm Optional: 5X, 10X
Eyepiece	15X (176-116), View field ø13 mm Optional : 10X, 20X
Total magnification	30X
Transmitted illumination	Light source : White LED with green filter Functions: Light intensity adjustable
Surface illumination	Light source : White LED Functions: Light intensity adjustable
Power supply	100/240V AC, 50/60Hz
Mass	TM-505B: 14 [kg] TM-1005B: 15 [kg]

### Standard accessories

No.	Description
176-116	Eyepiece for TM 15X
176-138	Objective Lens for TM 2X
176-126	Reticle for TM, 90° Broken Cross-hair

### Optional accessories

No.	Description
63AAA001	LED Ringlight, for TM-500
63AAA353	HDMI USB camera set for TM microscopes, set consist of HDMI6MDPX camera, 0.37X optical adapter and mechanical adapter

63AAA353 - Set includes:  
63AAA059 - HDMI6MDPX camera, including HDMI cable, mouse and simple calculation and reporting software on SD card  
63AAA060 - 0.37X C-mount to Eyepiece adapter for TM microscopes  
63AAA155 - Mechanical adapter for mounting the HDMI camera on the ocular tube



Optional LED Ring Light  
63AAA001

### Digital camera for TM microscopes

Mounting the HDMI6MDPX digital camera into the ocular tube transforms the TM microscope into a digital microscope.

- HDMI6MDPX, 6 megapixel colour camera with direct HDMI output to a monitor, no PC necessary
- Integrated SD card for saving images and pre-installed software for performing basic in-screen measurements
- Intuitive operation of the software with standard supplied USB mouse

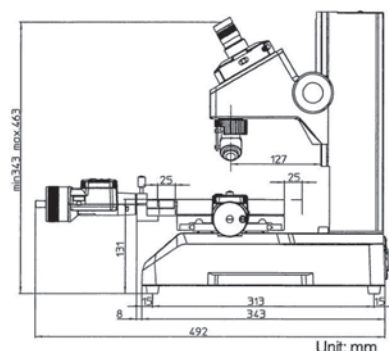
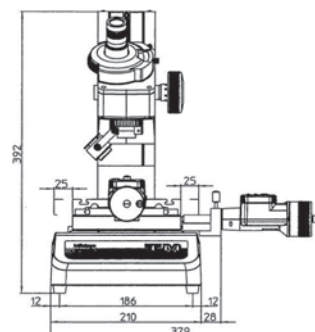


# Measuring Microscope TM Generation B Series

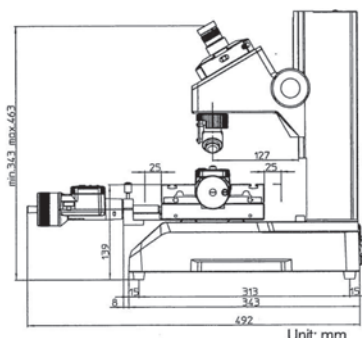
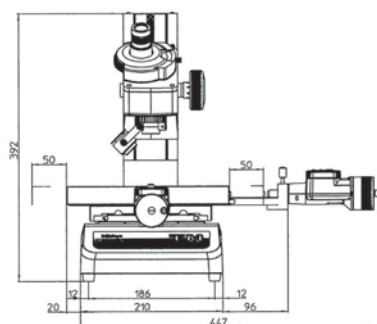
## Series 176

### Dimensions

Model	TM-505B	TM-1005B
No.	176-818D	176-819D
XY stage table top size	152 x 152 mm	240 x 152 mm
Effective area of table	96 x 96 mm	154 x 96 mm
XY stage travel range	50 x 50 mm	100 x 50 mm
Max. workpiece height mm	115	107



TM-505B



TM-510B

# Accessories for Measuring Microscope TM Generation B

## Series 176

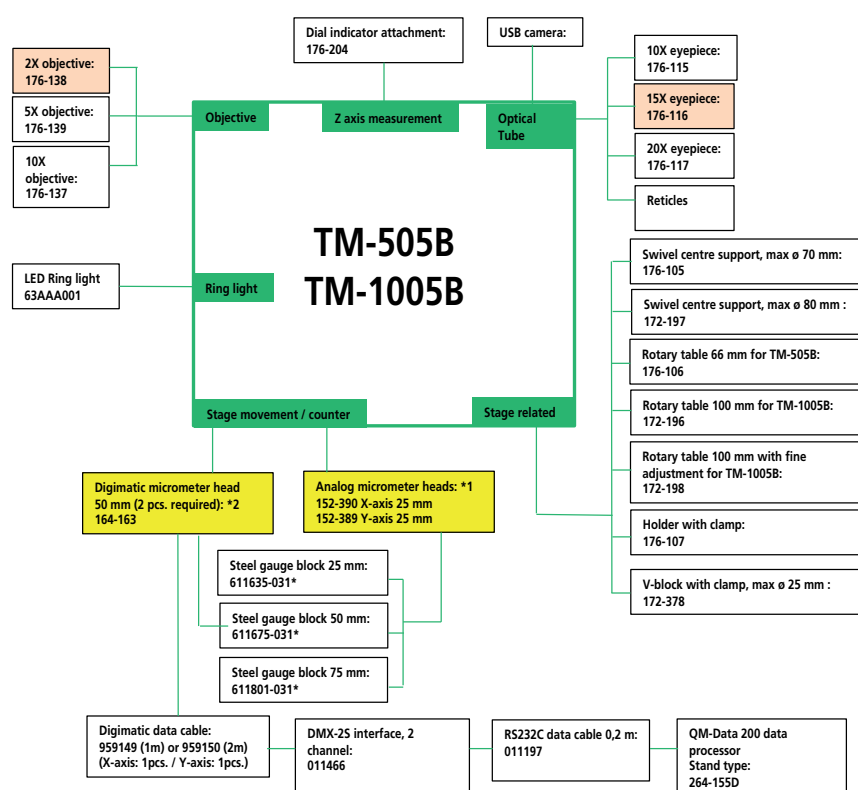
### Accessories

#### Objective Lenses and Eyepieces

No.	Objective lens	Eyepiece 10X (176-115)	Eyepiece 15X (176-116)	Eyepiece 20X (176-117)
176-137	10X	100X (1,3 mm)	150X (1,3 mm)	200X (1 mm)
176-138	2X <sup>(1)</sup>	20X (6,5 mm)	30X (6,5 mm)	40X (5 mm)
176-139	5X	50X (2,6 mm)	75X (2,6 mm)	100X (2 mm)

<sup>(1)</sup> Standard accessory

The number in brackets is the diameter of the field of view



Standard accessory

Necessary option either chose \*1 or \*2

\* Necessary gauge blocks for extending stage travel range:

Stage travel range	TM with analog micrometer heads 0-25 mm	TM with digimatic micrometer heads 0-50 mm
Range 25-50 mm	X-axis:611635-031 Y-axis:611635-031	
Range 25-75 mm	X-axis:611675-031	
Range 25-100 mm	X-axis:611801-031	
Range 50-100 mm		X-axis:611675-031

#### Optional accessories

No.	Description
176-115	Eyepiece for TM 10X
176-117	Eyepiece for TM 20X
176-139	Objective Lens for TM 5X
176-137	Objective Lens for TM 10X
152-390	Micrometer Head XY-Stage, Thimble 49mm, 0-25mm, X-Axis
152-389	Micrometer Head XY-Stage, Thimble 49mm, 0-25mm, Y-Axis
176-204	Dial Indicator Attachment, for TM
176-106	Rotary table
176-105	Fixture/clamping material, Swivel center support
172-197	Fixture/clamping material Swivel center support
172-378	Fixture/clamping material, V-block with clamp
176-107	Fixture/clamping material, Holder with clamp
990561	Fixture/clamping material, Workpiece holding clip for 172-Series
63AAA001	LED Ringlight, for TM-500
164-163	Digital Micrometer Head, 0-50mm, Digimatic
959149	Digimatic Cable, Straight, Data Button, 1m
959150	Digimatic Cable with Data Button, 2m
06AFM380C	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Straight, with Data Button
02AZD790C	U-WAVE-T Connection Cable C, Straight, with Data Button
611635-031	Gauge Block, Metric, Inspection Cert., ISO, Grade 1, Steel, 25mm
611675-031	Gauge Block, Metric, Inspection Cert., ISO, Grade 1, Steel, 50mm
172-196	Rotary table, 100 mm for TM-1005B
172-198	Rotary table, 100 mm with fine feed knob for TM-1005B

176-106 : for stage 50 x 50 mm

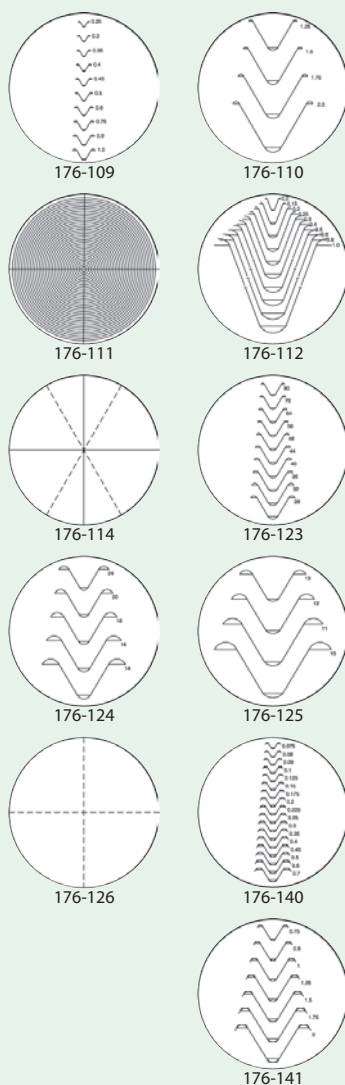
172-196 and 172-198 : for stage 100 x 50 mm

# Accessories for Measuring Microscope TM Generation B

## Series 176

### Reticles

No.	Remarks
176-109	Metric screw threads (pitch = 0,25 - 1 mm)
176-110	Metric screw threads (pitch = 1,25 - 2 mm)
176-111	Concentric circle (up to ø 4 mm, 0,05 mm increment)
176-112	20° involute gear teeth (normal rack type)
176-114	60° angle
176-123	Unified screw threads (80 - 28TPI)
176-124	Unified screw threads (24 - 14TPI)
176-125	Unified screw threads (13 - 10TPI)
176-126	Cross-hair (standard accessory)
176-140	ISO metric screw threads (0,075 - 0,7 mm)
176-141	ISO metric screw threads (0,75 - 2 mm)



# Measuring Microscope MF Generation D Series

## Series 176

### MF Generation D Series: Manual models

This versatile measuring microscope, whether you use it to boost the performance with Mitutoyo’s vision unit, for data management on a PC or other applications, offers you further improved measuring efficiency.

The MF offers you the following benefits:

- Measuring accuracy that is one of the highest in its class.
- Proven high-NA objectives from the ML optical series (long working distance type).
- Integration of metallurgical and measurement microscope functions enabling you to make high-resolution observations and high-accuracy measurements.
- Illumination unit (reflected/transmitted) gives you the option of a high-intensity LED or halogen bulb.
- The variable aperture diaphragm (reflected/ transmitted) allows observation measurement while suppressing light diffraction.
- Variety of standardized stages in sizes up to 400 × 200 mm.
- Quick-release mechanism enabling you to move the stage quickly when measuring large or numerous workpieces.
- High-magnification eyepiece observation up to 2000X.
- A good choice of optional accessories, including a Vision Unit, various digital cameras or data management on a PC, promises a wide field of application and excellent measuring efficiency.



MF-B2017D



Using optional slide type nosepiece with 2-lens mount (factory-fit option)



Specifications	
Observation image	Erect image
Optical tube	Monocular or binocular tube (depression: 25°), Reticle projection method, with TV mount, Optical path ratio (eyepiece/TV mount: 50/50)
Eyepiece	10X, 15X, 20X
Objective lens	Standard: 3X Optional: 1X, 5X, 10X, 20X, 50X, 100X
Transmitted illumination	Optical system: Telecentric illumination with adjustable aperture diaphragm Functions: Light intensity adjustable, non-stepped brightness adjustment
Surface illumination	Optical system: Koehler illumination with adjustable aperture diaphragm Functions: Light intensity adjustable, non-stepped brightness adjustment
Display unit	No. of axes: 2 (MF-A type) or 3 (MF-B type) Resolution: 0,001 mm/0,0005 mm/0,0001 mm Functions: Zero-setting, Direction switching, Data output (USB and RS-232C interface)
Indication accuracy (at 20°C)	XY-axis: (2,2+0,02L) μm Z-axis: (5+0,04L) μm L: Measuring length (mm) when not loaded, JIS B 7.153
Floating function	X and Y axes with Quick-release mechanism
Power supply	100/110/120/220/240 VAC, 50/60Hz



Reticle mounts (standard accessories)



176-392  
Optional monocular



176-393  
Optional binocular



Refer to the MF / MF-U microscopes brochure

# Measuring Microscope MF Generation D Series

## Series 176

### Specifications/Dimensions



### Optional accessories

No.	Description
12BAB345	Bulb, Halogen; 12V/50W (2 Pin Fitting)
176-308	Vibration Isolator, Spring Pad
375-056	Calibration Micro Scale
264-155D	2D Data processor, QM-Data 200, stand type
12AAJ088	Footswitch
63AAA355	Invenio 5SCIII camera set, set consists of Invenio USB camera and 0.5X C-mount adapter for MF/MF-U microscopes

### Eyepieces

176-393	Optical Tube, Binocular
176-392	Optical Tube, Monocular
375-043	Protractor Eyepiece 10X
176-313D	Eyepiece for MF Gen. B, Digital Protractor Type
378-856-5	Eyepiece 10X
378-857-5	Eyepiece 15X
378-858-5	Eyepiece 20X

### Filters

12AAA643	Illumination Filter ND2
12AAA644	Illumination Filter ND8
12AAA645	Illumination Filter GIF
12AAA646	Illumination Filter LB80

### Invenio 5SCIII camera

63AAA066	Mitutoyo MF package: This software package includes Insight Basic EEEF extended depth of focus Topography Segmentation and counting
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### Mounts

375-054	Camera Adaptor, 0.5X incl. C-Mount
970441	Camera Adaptor, C-Mount
176-370-1	Slide Type Nosepiece, Parfocal
176-370-2	Slide Type Nosepiece, w. Magnification Guaranteed

### Objective Lenses

375-036-2	ML Objective Lens 1X
375-037-1	ML Objective Lens 3X
375-034-1	ML Objective Lens 5X
375-039	ML Objective Lens 10X
375-051	ML Objective Lens 20X
375-052	ML Objective Lens 50X
375-053	ML Objective Lens 100X

### Digital camera for MF / MF-U microscopes

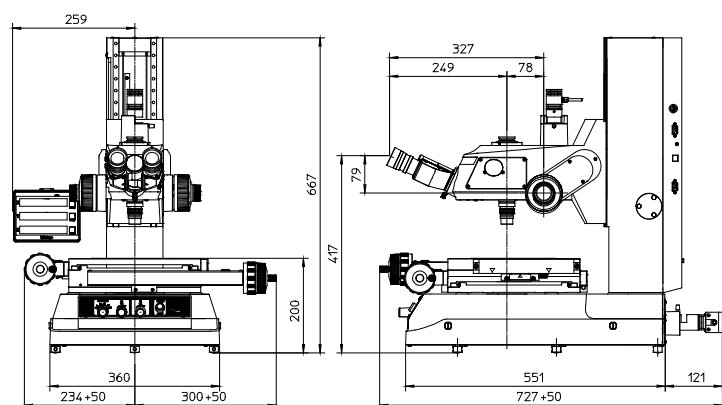
Mounting the Invenio camera onto the C-mount adapter transforms the MF microscope into a powerful digital microscope.

- Invenio 5SCIII, 5 megapixel colour camera with high speed USB3 communication
- Ideal for documentation and analysis for a wide range of applications
  - Mitutoyo MF software package enhances the functionality of the microscope with:
    - Reporting functionality of images and measurement results
    - Images with extended depth of focus
  - 3D topography observation by stacking images in Z-direction
    - Counting of particles

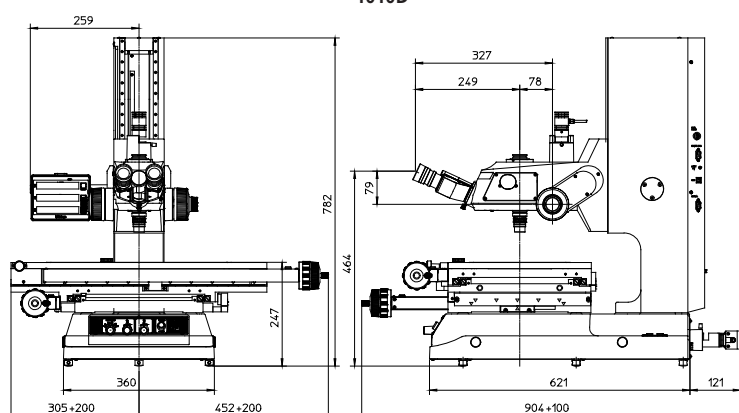
Model	1010D	2010D	2017D	3017D	4020D
No.	176-861-10 176-866-10	176-862-10 176-867-10	176-863-10 176-868-10	176-864-10 176-869-10	176-865-10 176-870-10
MF-A (2 axis) No.	176-861-10	176-862-10	176-863-10	176-864-10	176-865-10
MF-B (3 axis) No.	176-866-10	176-867-10	176-868-10	176-869-10	176-870-10
XY stage travel range	100 x 100 mm	200 x 100 mm	200 x 170 mm	300 x 170 mm	400 x 200 mm
Z-axis travel range mm	150	150	220	220	220
XY stage top size mm	280 x 280	350 x 280	410 x 342	510 x 342	610 x 342
Effective glass size mm	180 x 180	250 x 150	270 x 240	370 x 240	440 x 240
Swivelling function	-	-	±5° (left)	±5° (left)	±3° (left)
Max. stage loading kg	10	10	20	20	15
Max. workpiece height mm	150	150	220	220	220
Mass kg	65,5	69,5	130	138	144



# Measuring Microscope MF Generation D Series



1010D



4020D



Focus pilot FP-05  
Focus assisting system



QM-Data 200



Vision Unit  
PC-based vision measuring system



Invenio digital camera (63AAA058) with  
0.5X C-mount adapter (63AAA067) for advanced observations

# Measuring Microscope MF Generation D Series

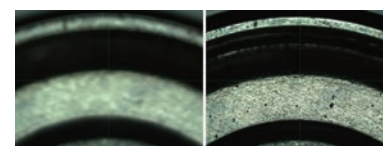
## Series 176

### MF Generation D Series: Models with motorized Z-axis movement

The MF Generation D version with a motorized Z-axis. This feature renders fast and accurate Auto Focus possible when used in combination with the optional Vision Unit. The MF with motorized Z-axis is available in 3 stage sizes and incorporates all the functionality of the standard MF Generation D series.

The MF Generation D with motorized Z-axis offers the following benefits:

- Auto Focus function when using the optional Vision Unit.
- A measuring accuracy that is one of the highest in its class.
- Proven high-NA objectives (long working distance type).
- Integration of metallurgical and measurement microscope functions enabling you to make high-resolution observations and high-accuracy measurements.
- Illumination unit (reflected/transmitted) offers the option of a high-intensity LED or halogen bulb.
- The variable aperture diaphragm (reflected/ transmitted) allows observation measurement while suppressing light diffraction.
- Variety of 3 standardized stages in sizes up to 400 × 200 mm.
- Quick-release mechanism enabling you to move the stage quickly when measuring large or numerous workpieces.
- High-magnification eyepiece observation up to 2000X.
- A large lineup of optional accessories, including a Vision Unit, various digital cameras and data management for a PC, grants a wide field of applications and excellent measuring efficiency.



Screen image before and after Auto Focus\*  
\* When using optional Vision Unit



MF-J2017D

### Specifications

Observation image	Erect image
Optical tube	Monocular or binocular tube (depression: 25"), Reticle projection method, with TV mount, Optical path ratio (eyepiece/TV mount: 50/50)
Eyepiece	10X, 15X, 20X
Objective lens	Standard: 3X Optional: 1X, 5X, 10X, 20X, 50X, 100X
Transmitted illumination	Optical system: Telecentric illumination with adjustable aperture diaphragm Functions: Light intensity adjustable, non-stepped brightness adjustment
Surface illumination	Optical system: Koehler illumination with adjustable aperture diaphragm Functions: Light intensity adjustable, non-stepped brightness adjustment
Display unit	No. of axes: 3 Resolution: 0,001 mm/0,0005 mm/0,0001 mm Functions: Zero-setting, Direction switching, Data output (USB and RS-232C interface)
Indication accuracy (at 20°C)	XY-axis: (2,2+0,02L) μm Z-axis: (5+0,04L) μm L: Measuring length (mm) when not loaded, JIS B 7.153
Floating function	X and Y axes with Quick-release mechanism
Power supply	100/110/120/220/240 VAC, 50/60Hz
Remote Box	- Speed adjustment - Coarse/Fine Speed switching - Jog shuttle - Emergency stop switch - AF button - Counter reset button - Data output button - Power switch - Limit setting (Z-axis) Remote Box

### Optional accessories

No.	Description
63AAA355	Invenio 55CIII camera set, set consists of Invenio USB camera and 0.5X C-mount adapter for MF/MF-U microscopes



Refer to the MF / MF-U microscopes brochure

# Measuring Microscope MF Generation D Series

## Series 176

### Specifications/Dimensions

#### MF Generation D: Models with motorized Z-axis movement

Model	MF-J2017D	MF-J3017D	MF-J4020D
No.	176-891D	176-892D	176-893D
XY stage travel range	200 x 170 mm	300 x 170 mm	400 x 200 mm
Z-axis travel range mm	220	220	220
XY stage top size mm	410 x 342	510 x 342	610 x 342
Effective glass size mm	270 x 240	370 x 240	440 x 240
Swivelling function	±5° (left)	±5° (left)	±3° (left)
Max. stage loading kg	20	20	15



Focus pilot FP-05  
Focus assisting system



QM-Data 200



Vision Unit  
PC-based vision measuring system



Invenio digital camera (63AAA058) with  
0.5X C-mount adapter (63AAA067) for advanced observations

#### Optional accessories

No.	Description
12BAB345	Bulb, Halogen; 12V/50W (2 Pin Fitting)
176-308	Vibration Isolator, Spring Pad
375-056	Calibration Micro Scale
264-155D	2D Data processor, QM-Data 200, stand type
12AAJ088	Footswitch
<b>Eyepieces</b>	
176-392	Optical Tube, Monocular
176-393	Optical Tube, Binocular
375-043	Protractor Eyepiece 10X
176-313D	Eyepiece for MF Gen. B, Digital Protractor Type
378-856-5	Eyepiece 10X
378-857-5	Eyepiece 15X
378-858-5	Eyepiece 20X
<b>Filters</b>	
12AAA643	Illumination Filter ND2
12AAA644	Illumination Filter ND8
12AAA645	Illumination Filter GIF
12AAA646	Illumination Filter LB80
<b>Invenio 55CIII camera</b>	
63AAA058	Invenio 55CIII camera, including Insight LE software on 8GB USB stick and USB3.0 cable
63AAA066	Mitutoyo MF package: This software package includes Insight Basic EEEF extended depth of focus Topography Segmentation and counting
63AAA067	0.5x camera adapter with C-mount for MF/MF-U microscope
<b>Mounts</b>	
375-054	Camera Adaptor, 0.5X incl. C-Mount
970441	Camera Adaptor, C-Mount
176-370-1	Slide Type Nosepiece, Parfocal
176-370-2	Slide Type Nosepiece, w. Magnification Guaranteed
<b>Objective Lenses</b>	
375-036-2	ML Objective Lens 1X
375-037-1	ML Objective Lens 3X
375-034-1	ML Objective Lens 5X
375-039	ML Objective Lens 10X
375-051	ML Objective Lens 20X
375-052	ML Objective Lens 50X

#### Digital camera for MF / MF-U microscopes

Mounting the Invenio camera onto the C-mount adapter transforms the MF microscope into a powerful digital microscope.

- Invenio 55CIII, 5 megapixel colour camera with high speed USB3 communication
- Ideal for documentation and analysis for a wide range of applications
- Mitutoyo MF software package enhances the functionality of the microscope with:
  - Reporting functionality of images and measurement results
  - Images with extended depth of focus
  - 3D topography observation by stacking images in Z-direction
  - Counting of particles

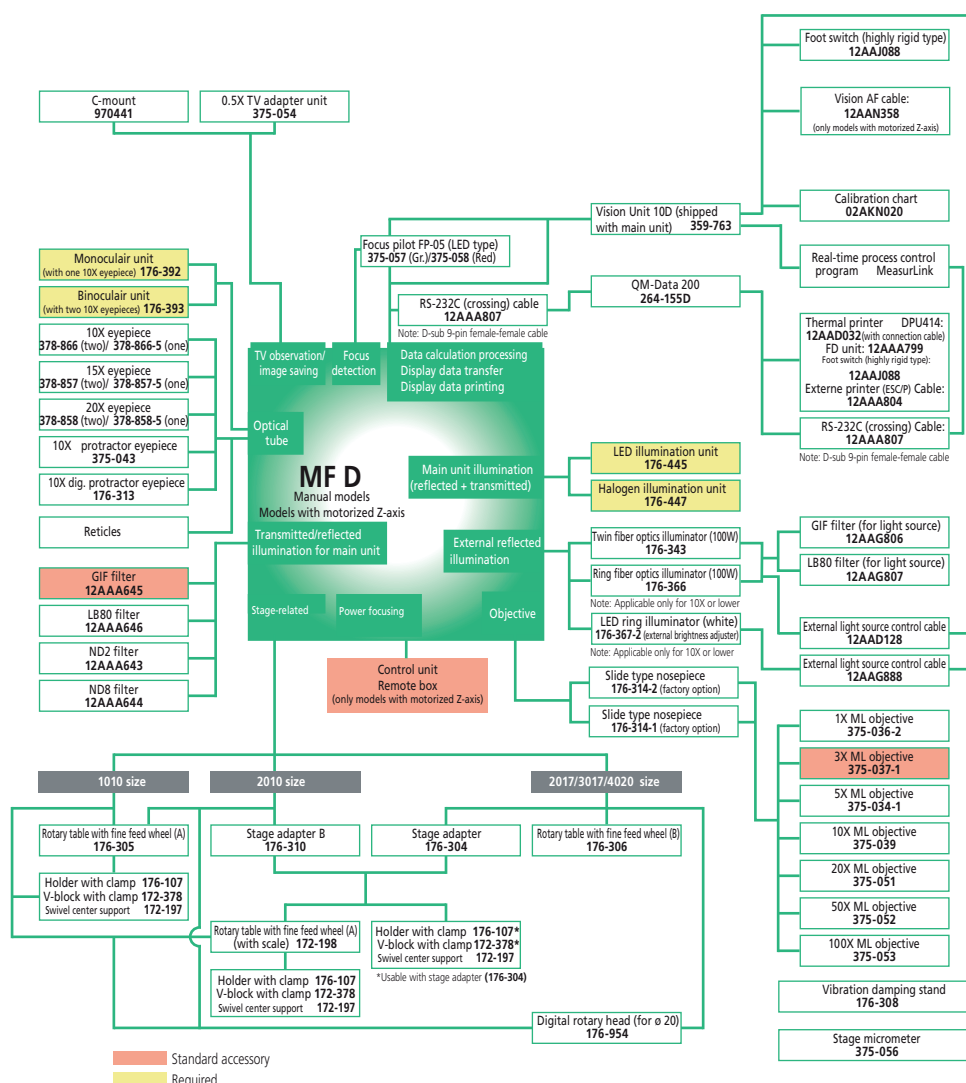
# Accessories for Measuring Microscope MF Generation D

## Series 176

### Accessories/system diagram system for MF manual and motorized Z-axis models

#### Optional accessories

No.	Description
176-305	Rotary Table, Type A, D=240 mm
176-306	Rotary Table, Type B, D=270 mm
176-107	Fixture/clamping material, Holder with clamp
172-197	Fixture/clamping material Swivel center support
172-378	Fixture/clamping material, V-block with clamp
172-198	Rotary table, 100 mm with fine feed knob for TM-1005B
12AAA807D	Cable RS-232C 2m
12AAG806	Illumination Filter GIF
12AAG807	Illumination Filter LB80
12AAJ088	Footswitch
<b>Eyepieces</b>	
378-856	Eyepiece, 10X/24
378-856-5	Eyepiece 10X
<b>Lighting</b>	
176-343D	Twin Fiber Illumination, for MF, MF-U
176-367-2D	Ringlight LED
176-351-6	Oblique Surface Illumination for MF
<b>Lighting (required option)</b>	
176-445D	Illumination Unit LED
176-447D	Illumination Unit, Halogen
<b>Reticles</b>	
12AAG838	Reticle for MF, Broken Cross-hair (7 $\mu$ m line width)
12AAG847	Reticle for MF Gen. B, Metric Coarse Screw Thread (p=0,5-1,0)
12AAG848	Reticle for MF, Metric Coarse Screw Thread (p=1,25-2,0)
12AAG849	Reticle for MF, Involute Gear Tooth 14.5° (m=0,1-1,0)
12AAG850	Reticle for MF, Involute Gear Tooth 20° (m=0,1-1,0)
12AAG851	Reticle for MF, Unified Screw Thread (80-28TPI)
12AAG852	Reticle for MF, Unified Screw Thread (24-14TPI)
12AAG853	Reticle for MF, Unified Screw Thread (13-10TPI)
12AAG836	Reticle for MF, Broken Cross-hair (5 $\mu$ m line width)
12AAG873	Reticle for MF, Broken Cross-hair (3 $\mu$ m line width)
12AAG840	Reticle for MF, Cross-hair and 60° Broken Lines
12AAG841	Reticle for MF, Zeiss Type Pattern
12AAG842	Reticle for MF, Cross-hair 20 mm scale (0,1 Reading)
12AAG843	Reticle for MF, Concentric Circles (1,2-18 mm)
12AAG844	Reticle for MF Gen. B, Scale 10 mm (0,1 mm Reading)
12AAG839	Reticle for MF, Cross-hair and 45° Broken Lines
12AAG845	Reticle for MF, Scale 5 mm (0,05 mm Reading)



# Measuring Microscope MF-U Generation D Series

## Series 176

### MF-U Generation D Series: Manual models

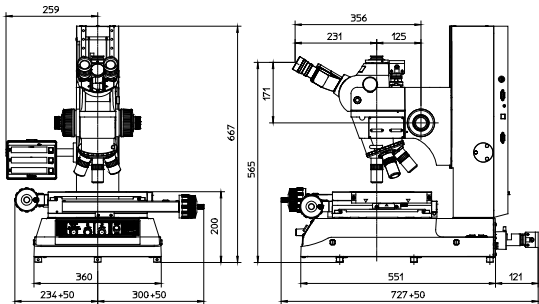
This high-power multi-function measuring microscope gives you detailed observation with a clear and flare-less erect image and a wide field of view.

The MF-U offers you the following benefits:

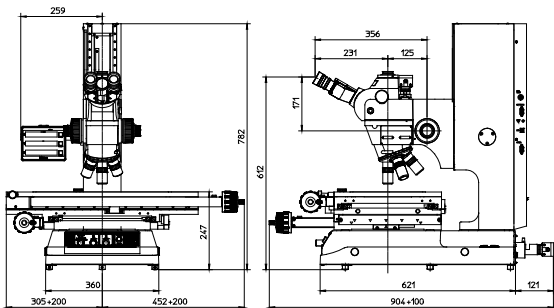
- Measuring accuracy that is one of the highest in its class.
- Proven high-NA objectives from the FS optical system (long working distance type).
- Integration of metallurgical and measurement microscope functions enabling you to make high-resolution observations and high-accuracy measurements.
- Illumination unit (reflected/transmitted) gives you the option of a high-intensity LED or halogen bulb.
- The variable aperture diaphragm (reflected/ transmitted) allows observation measurement while suppressing light diffraction.
- Variety of standardized stages in sizes up to 400 × 200 mm.
- Quick-release mechanism enabling you to move the stage quickly when measuring large or numerous workpieces.
- High-magnification eyepiece observation up to 2000X.
- A good choice of optional accessories, including a Vision Unit, various digital cameras or data management on a PC, promises a wide field of application and excellent measuring efficiency.



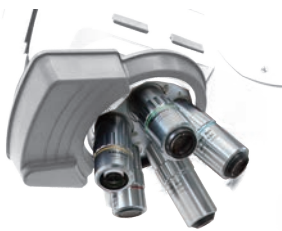
MF-UB 3017D  
(turret, objectives and illumination are optional)



1010D



4020D



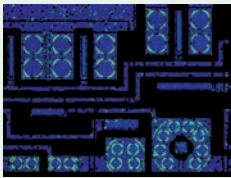
Optional 5 positions motorized turret

### Specifications

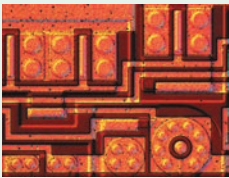
Observation image	Erect image
Optical tube	Siedentoph type (pupil distance adjustment : 51 - 76 mm), 1X tube lens, Binocular tube (depression : 30°), Reticle projection method, with TV mount, Optical path ratio (eyepiece/TV mount : 50/50)
Focusing method	Manual (coarse focusing : 10 mm/ rev., fine focusing : 0,1 mm/rev.)
Indication accuracy (at 20°C)	XY-axis: (2,2+0,02L) μm Z-axis: (5+0,04L) μm L: Measuring length (mm) when not loaded, JIS B 7.153
Floating function	X and Y axes with Quick-release mechanism
Power supply	220/240V AC, 50/60Hz
Eyepiece lens	10X (field No.: 24 mm) Optional : 15X, 20X
Turret (optional)	Manual or motorized
Objective lens (optional)	M / BD Plan Apo objective from 1X to 100X
Transmitted illumination optional	Light source : Halogen bulb (12V, 50W) Optical system : Telecentric illumination with adjustable aperture diaphragms Functions : Light intensity adjustable, Non-stepped brightness adjustment
Surface illumination optional	Light source : Optional halogen illumination unit (fiber-optic cold light illumination) Optical system : Koehler illumination with adjustable aperture diaphragms Functions : Light intensity adjustable, Non-stepped brightness adjustment
Display unit	Resolution: 0,001mm / 0,0005mm / 0,0001mm No. of axis : 2 axis or 3 axis Functions : Zero-setting, Direction switching, Data output (USB and RS-232C interface)

### Optional accessories

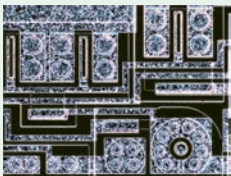
No.	Description
63AAA355	Invenio 5SCIII camera set, set consists of Invenio USB camera and 0.5X C-mount adapter for MF/MF-U microscopes



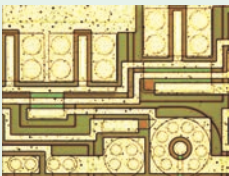
Polarized light



Differential interference contrast



Dark field



Bright field



Refer to the MF / MF-U microscopes brochure



# Measuring Microscope MF-U Generation D Series

## Series 176 - High-power Multi-function



Model 1010D



Model 2010D

### Model 1010D

XY stage travel range : 100 x 100 mm  
Z-axis travel range : 150 mm  
XY stage top size : 280 x 280 mm  
Effective glass size : 180 x 180 mm  
Max. stage loading : 10 kg  
Max. workpiece height : 150 mm  
Mass : 65,5 kg

Model	MF-UA1010D	MF-UB1010D	MF-UC1010D	MF-UD1010D
No.	176-871-10	176-876-10	176-881-10	176-886-10
Measurement system	X and Y axis (2 axes)	X, Y and Z axis (3 axes)	X and Y axis (2 axes)	X, Y and Z axis (3 axes)
Observation type	Bright Field (BF)	Bright Field (BF)	Bright/Dark Field (BF/DF)	Bright/Dark Field (BF/DF)

### Model 2010D

XY stage travel range : 200 x 100 mm  
Z-axis travel range : 150 mm  
XY stage top size : 350 x 280 mm  
Effective glass size : 250 x 150 mm  
Max. stage loading : 10 kg  
Max. workpiece height : 150 mm  
Mass : 69,5 kg

Model	MF-UA2010D	MF-UB2010D	MF-UC2010D	MF-UD2010D
No.	176-872-10	176-877-10	176-882-10	176-887-10
Measurement system	X and Y axis (2 axes)	X, Y and Z axis (3 axes)	X and Y axis (2 axes)	X, Y and Z axis (3 axes)
Observation type	Bright Field (BF)	Bright Field (BF)	Bright/Dark Field (BF/DF)	Bright/Dark Field (BF/DF)

### Optional accessories

No.	Description
375-054	Camera Adaptor, 0.5X incl. C-Mount
970441	Camera Adaptor, C-Mount
375-056	Calibration Micro Scale
172-378	Fixture/clamping material, V-block with clamp
176-305	Rotary Table, Type A, D=240 mm
176-306	Rotary Table, Type B, D=270 mm
264-155D	2D Data processor, QM-Data 200, stand type
12AAJ088	Footswitch
<b>Bulbs</b>	
12BAB345	Bulb, Halogen; 12V/50W (2 Pin Fitting)
517181	Bulb, Halogen, 12V/100W
12BAD602	Bulb, Halogen; 12V/100W
<b>DIC Units</b>	
378-076	DIC Unit, 100X, SL80X, SL50X
378-078	DIC Unit, 50X, SL20X
378-079	DIC Unit 20X
378-080	DIC Unit, 5X, 10X
<b>Eyepieces</b>	
378-857	Eyepiece, 15X/16
378-858	Eyepiece, 20X/12
<b>Filters</b>	
12AAA643	Illumination Filter ND2
12AAA644	Illumination Filter ND8
12AAA645	Illumination Filter GIF
12AAA646	Illumination Filter LB80
12AAG806	Illumination Filter GIF
12AAG807	Illumination Filter LB80
<b>Lighting (required option)</b>	
176-343D	Twin Fiber Illumination, for MF, MF-U
176-315D	Illumination Unit, 100W Fiber Optic
176-316D	Illumination Unit, 150 W Fiber Optic
176-448D	Illumination Unit, Halogen
<b>Reticles</b>	
12AAG876	Reticle for MF-U Gen. B, Broken Cross-hair (3 µm line width)
12AAG877	Reticle for MF-U Gen. B, Broken Cross-hair (5 µm line width)
12AAG878	Reticle for MF-U Gen. B, Broken Cross-hair (7 µm line width)
12AAG879	Reticle for MF-U Gen. B, Cross-hair and 45° Broken Lines
12AAG880	Reticle for MF-U Gen. B, Cross-hair and 60° Broken Lines
12AAG881	Reticle for MF-U Gen. B, Zeiss Type Pattern
<b>Stands</b>	
176-308	Vibration Isolator, Spring Pad
176-107	Fixture/clamping material, Holder with clamp
172-197	Fixture/clamping material Swivel center support
<b>Turrets (required option)</b>	
378-018	Turret, Manual (BF), 4 Pos.
378-216D	Turret, Motorized (BF), 5 Pos.
176-211	Turret for MF-U, Manual (BD), 4 Pos.
176-212D	Turret for MF-U, Motorized (BD), 4 Pos.

# Measuring Microscope MF-U Generation D Series

## Series 176



Model 2017D



Model 3017D



Model 4020D

### Model 2017D

XY stage travel range : 200 x 170 mm  
 Z-axis travel range : 220 mm  
 XY stage top size : 410 x 342 mm  
 Effective glass size : 270 x 240 mm  
 Swivelling function (left) :  $\pm 5^\circ$   
 Max. stage loading : 20 kg  
 Max. workpiece height : 220 mm  
 Mass : 130 kg

Model	MF-UA2017D	MF-UB2017D	MF-UC2017D	MF-UD2017D
No.	176-873-10	176-878-10	176-883-10	176-888-10
Measurement system	X and Y axis (2 axes)	X, Y and Z axis (3 axes)	X and Y axis (2 axes)	X, Y and Z axis (3 axes)
Observation type	Bright Field (BF)	Bright Field (BF)	Bright/Dark Field (BF/DF)	Bright/Dark Field (BF/DF)

### Model 3017D

XY stage travel range : 300 x 170 mm  
 Z-axis travel range : 220 mm  
 XY stage top size : 510 x 342 mm  
 Effective glass size : 370 x 240 mm  
 Swivelling function (left) :  $\pm 5^\circ$   
 Max. stage loading : 20 kg  
 Max. workpiece height : 220 mm  
 Mass : 138 kg

Model	MF-UA3017D	MF-UB3017D	MF-UC3017D	MF-UD3017D
No.	176-874-10	176-879-10	176-884-10	176-889-10
Measurement system	X and Y axis (2 axes)	X, Y and Z axis (3 axes)	X and Y axis (2 axes)	X, Y and Z axis (3 axes)
Observation type	Bright Field (BF)	Bright Field (BF)	Bright/Dark Field (BF/DF)	Bright/Dark Field (BF/DF)

### Model 4020D

XY stage travel range : 400 x 200 mm  
 Z-axis travel range : 220 mm  
 XY stage top size : 610 x 342 mm  
 Effective glass size : 440 x 240 mm  
 Swivelling function (left) :  $\pm 3^\circ$   
 Max. stage loading : 15 kg  
 Max. workpiece height : 220 mm  
 Mass : 144 kg

Model	MF-UA4020D	MF-UB4020D	MF-UC4020D	MF-UD4020D
No.	176-875-10	176-880-10	176-885-10	176-890-10
Measurement system	X and Y axis (2 axes)	X, Y and Z axis (3 axes)	X and Y axis (2 axes)	X, Y and Z axis (3 axes)
Observation type	Bright Field (BF)	Bright Field (BF)	Bright/Dark Field (BF/DF)	Bright/Dark Field (BF/DF)

# Measuring Microscope MF-U Generation D Series

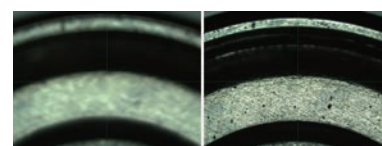
## Series 176

### MF-U Generation D Series: Models with motorized Z-axis movement

The MF-U Generation D version with a motorized Z-Axis. This feature renders fast and accurate Auto Focus possible when used in combination with the optional Vision Unit. The MF-U with motorized Z-axis is available in 3 stage sizes and incorporates all the functionality of the standard MF-U Generation D series.

The MF-U Generation D with motorized Z-axis offers you the following benefits:

- Auto Focus function when using the optional Vision Unit.
- A measuring accuracy that is one of the highest in its class.
- Proven high-NA objectives from the FS optical system (long working distance type).
- Integration of metallurgical and measurement microscope functions enabling you to make high-resolution observations and high-accuracy measurements.
- Illumination unit (reflected/transmitted) gives you the option of a high-intensity LED or halogen bulb.
- The variable aperture diaphragm (reflected/ transmitted) allows observation measurement while suppressing light diffraction.
- Variety of 3 standardized stages in sizes up to 400 × 200 mm.
- Quick-release mechanism enabling you to move the stage quickly when measuring large or numerous workpieces.
- High-magnification eyepiece observation up to 2000X.
- A large lineup of optional accessories - including a Vision Unit, various digital cameras or data management on a PC - grants a wide field of application and excellent measuring efficiency.



Screen image before and after Auto Focus\*  
\* When using optional Vision Unit



MF-UJ 2017D  
(turret, objectives and illumination are optional)

Specifications	
Observation image	Erect image
Optical tube	Siedentoph type (pupil distance adjustment : 51 - 76 mm), 1X tube lens, Binocular tube (depression : 30°), Reticle projection method, with TV mount, Optical path ratio (eyepiece/TV mount : 50/50)
Focusing method	Manual (coarse focusing : 10 mm/ rev., fine focusing : 0,1 mm/rev.)
Indication accuracy (at 20°C)	XY-axis : (2,2+0,02L) μm Z-axis : (5+0,04L) μm L : Measuring length (mm) when not loaded, JIS B 7.153
Floating function	X and Y axes with Quick-release mechanism
Power supply	220/240V AC, 50/60Hz
Eyepiece lens	10X (field No.: 24 mm) Optional : 15X, 20X
Turret (optional)	Manual or motorized
Objective lens (optional)	M / BD Plan Apo objective from 1X to 100X
Transmitted illumination optional	Light source : Halogen bulb (12V, 50W) Optical system : Telecentric illumination with adjustable aperture diaphragms Functions : Light intensity adjustable, Non-stepped brightness adjustment
Surface illumination optional	Light source : Optional halogen illumination unit (fiber-optic cold light illumination) Optical system : Koehler illumination with adjustable aperture diaphragms Functions : Light intensity adjustable, Non-stepped brightness adjustment
Display unit	Resolution: 0,001mm / 0,0005mm / 0,0001mm No. of axis : 2 axis or 3 axis Functions : Zero-setting, Direction switching, Data output (USB and RS-232C interface)
Remote Box	- Speed adjustment - Coarse/Fine Speed switching - Jog shuttle - Emergency stop switch - AF button - Counter reset button - Data output button - Power switch - Limit setting (Z-axis) Remote Box

### Optional accessories

No.	Description
63AAA355	Invenio 5SCIII camera set, set consists of Invenio USB camera and 0.5X C-mount adapter for MF/MF-U microscopes



Refer to the MF / MF-U microscopes brochure

# Measuring Microscope MF-U Generation D Series

## Series 176

### MF-U Generation D: Models with motorized Z-axis

#### 1. Bright Field Observation

Model	MF-UJ2017D	MF-UJ3017D	MF-UJ4020D
No.	176-894D	176-895D	176-896D
XY stage travel range	200 x 170 mm	300 x 170 mm	400 x 200 mm
Effective glass size mm	270 x 240	370 x 240	440 x 240
Z-axis travel range mm	220	220	220
XY stage top size mm	410 x 342	510 x 342	610 x 342
Max. stage loading kg	20	20	15

#### 2. Bright Field/ Dark Field Observation

Model	MF-UK2017D	MF-UK3017D	MF-UK4020D
No.	176-897D	176-898D	176-899D
XY stage travel range	200 x 170 mm	300 x 170 mm	400 x 200 mm
Effective glass size mm	270 x 240	370 x 240	440 x 240
Z-axis travel range mm	220	220	220
XY stage top size mm	410 x 342	510 x 342	610 x 342
Max. stage loading kg	20	20	15

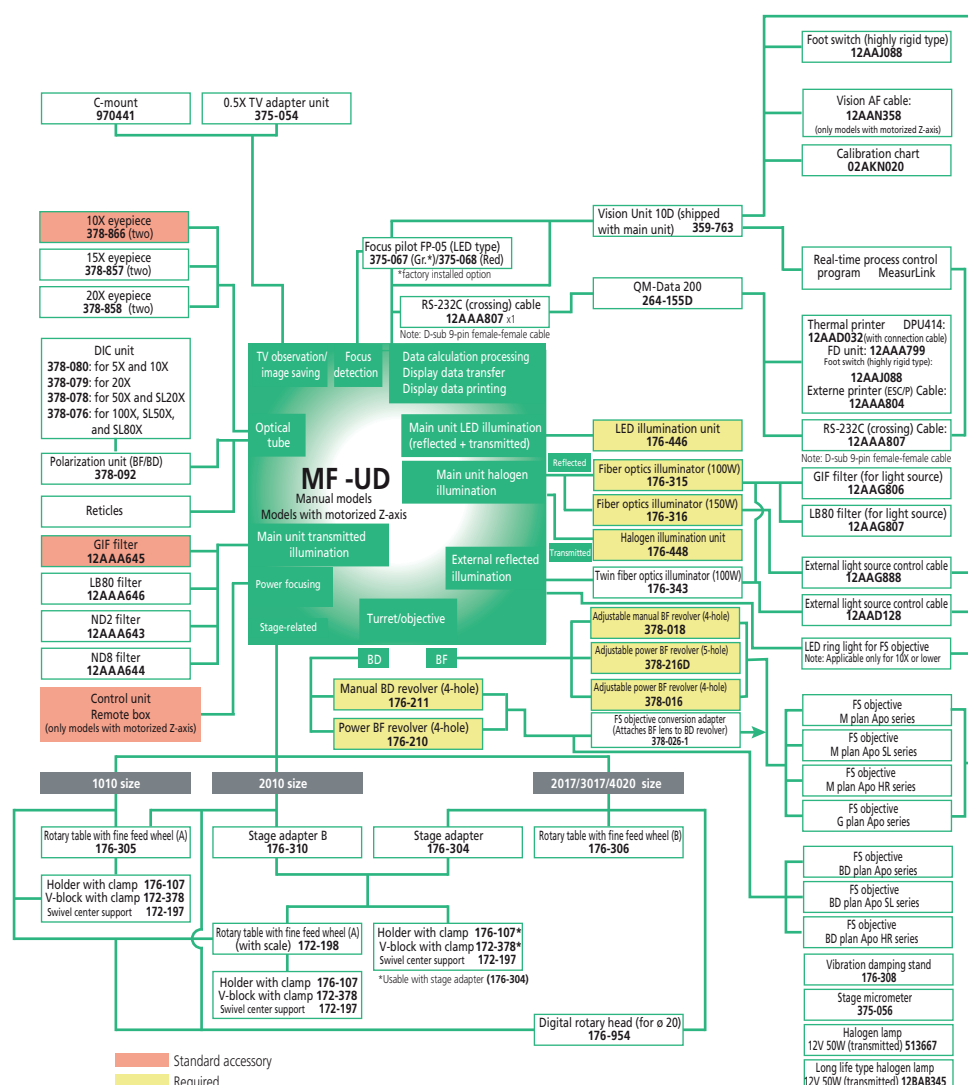
#### Optional accessories

No.	Description
375-054	Camera Adaptor, 0.5X incl. C-Mount
970441	Camera Adaptor, C-Mount
375-056	Calibration Micro Scale
172-378	Fixture/clamping material, V-block with clamp
176-305	Rotary Table, Type A, D=240 mm
176-306	Rotary Table, Type B, D=270 mm
264-155D	2D Data processor, QM-Data 200, stand type
12AAJ088	Footswitch
<b>Bulbs</b>	
12BAB345	Bulb, Halogen; 12V/50W (2 Pin Fitting)
517181	Bulb, Halogen, 12V/100W
12BAD602	Bulb, Halogen; 12V/100W
<b>DIC Units</b>	
378-076	DIC Unit, 100X, SL80X, SL50X
378-078	DIC Unit, 50X, SL20X
378-079	DIC Unit 20X
378-080	DIC Unit, 5X, 10X
<b>Eyepieces</b>	
378-857	Eyepiece, 15X/16
378-858	Eyepiece, 20X/12
<b>Filters</b>	
12AAA643	Illumination Filter ND2
12AAA644	Illumination Filter ND8
12AAA645	Illumination Filter GIF
12AAA646	Illumination Filter LB80
12AAG806	Illumination Filter GIF
12AAG807	Illumination Filter LB80
<b>Lighting (required option)</b>	
176-343D	Twin Fiber Illumination, for MF, MF-U
176-315D	Illumination Unit, 100W Fiber Optic
176-316D	Illumination Unit, 150 W Fiber Optic
176-448D	Illumination Unit, Halogen
<b>Reticles</b>	
12AAG876	Reticle for MF-U Gen. B, Broken Cross-hair (3 µm line width)
12AAG877	Reticle for MF-U Gen. B, Broken Cross-hair (5 µm line width)
12AAG878	Reticle for MF-U Gen. B, Broken Cross-hair (7 µm line width)
12AAG879	Reticle for MF-U Gen. B, Cross-hair and 45° Broken Lines
12AAG880	Reticle for MF-U Gen. B, Cross-hair and 60° Broken Lines
12AAG881	Reticle for MF-U Gen. B, Zeiss Type Pattern
<b>Stands</b>	
176-308	Vibration Isolator, Spring Pad
176-107	Fixture/clamping material, Holder with clamp
172-197	Fixture/clamping material Swivel center support
<b>Turrets (required option)</b>	
378-018	Turret, Manual (BF), 4 Pos.
378-216D	Turret, Motorized (BF), 5 Pos.
176-211	Turret for MF-U, Manual (BD), 4 Pos.
176-212D	Turret for MF-U, Motorized (BD), 4 Pos.

# Accessories for Measuring Microscope MF-U Generation D

## Optional accessories

No.	Description
375-054	Camera Adaptor, 0.5X incl. C-Mount
970441	Camera Adaptor, C-Mount
375-056	Calibration Micro Scale
172-378	Fixture/clamping material, V-block with clamp
176-305	Rotary Table, Type A, D=240 mm
176-306	Rotary Table, Type B, D=270 mm
12AAJ088	Footswitch
<b>Bulbs</b>	
12BAB345	Bulb, Halogen; 12V/50W (2 Pin Fitting)
517181	Bulb, Halogen, 12V/100W
12BAD602	Bulb, Halogen; 12V/100W
<b>DIC Units</b>	
378-076	DIC Unit, 100X, SL80X, SL50X
378-078	DIC Unit, 50X, SL20X
378-079	DIC Unit 20X
378-080	DIC Unit, 5X, 10X
<b>Eyepieces</b>	
378-857	Eyepiece, 15X/16
378-858	Eyepiece, 20X/12
<b>Filters</b>	
12AAA643	Illumination Filter ND2
12AAA644	Illumination Filter ND8
12AAA645	Illumination Filter GIF
12AAA646	Illumination Filter LB80
12AAG807	Illumination Filter LB80
12AAG806	Illumination Filter GIF
<b>Lighting</b>	
176-343D	Twin Fiber Illumination, for MF, MF-U
176-315D	Illumination Unit, 100W Fiber Optic
176-316D	Illumination Unit, 150 W Fiber Optic
176-448D	Illumination Unit, Halogen
<b>Reticles</b>	
12AAG876	Reticle for MF-U Gen. B, Broken Cross-hair (3 µm line width)
12AAG877	Reticle for MF-U Gen. B, Broken Cross-hair (5 µm line width)
12AAG878	Reticle for MF-U Gen. B, Broken Cross-hair (7 µm line width)
12AAG879	Reticle for MF-U Gen. B, Cross-hair and 45° Broken Lines
12AAG880	Reticle for MF-U Gen. B, Cross-hair and 60° Broken Lines
12AAG881	Reticle for MF-U Gen. B, Zeiss Type Pattern
<b>Stands</b>	
176-308	Vibration Isolator, Spring Pad
<b>Turrets (required option)</b>	
378-018	Turret, Manual (BF), 4 Pos.
378-216D	Turret, Motorized (BF), 5 Pos.
176-211	Turret for MF-U, Manual (BD), 4 Pos.
176-212D	Turret for MF-U, Motorized (BD), 4 Pos.
378-016D	Turret, Motorized (BF), 4 Pos.
<b>Workpiece Fixture</b>	
176-107	Fixture/clamping material, Holder with clamp
172-197	Fixture/clamping material Swivel center support

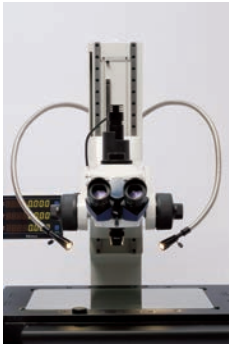




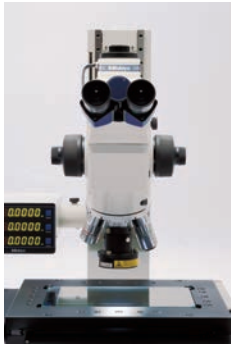
# Optional Light Sources for Measuring Microscopes

## MF/MF-U Generation D

Series 176



Dual Swan-neck Light-pipe



LED Ring Light  
(for FS Objective lenses)

**Dual Swan-neck Light-pipe illuminator**  
Applicable microscopes : MF, MF-U models  
Length of fibre cable : 700 mm  
Light source : Halogen bulb (12V, 100W) (517181 : halogen bulb)  
Dimensions : Light unit 235 x 76 x 120 mm

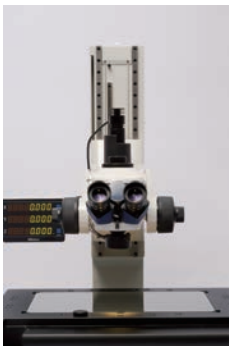
No.  
176-343D

**Fibre-optic Ring Light**  
Applicable microscopes : MF models  
Length of fibre cable : 1000 mm  
Light source : Halogen bulb (12V, 100W) (517181 : halogen bulb)  
Dimensions : Light unit 235 x 76 x 120 mm

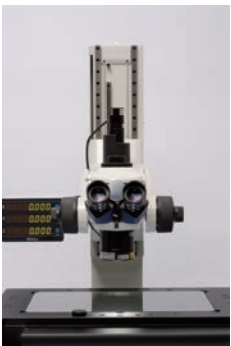
No.  
176-366CED

**LED Ring Light**  
Applicable microscopes : MF models with 1X, 3X, 5X, 10X objective  
Light source : White LED  
Length of LED cable : 1500 mm

No.  
176-367-2D



Fibre-optic Ring Light



LED Ring Light



Dual Swan-neck Light-pipe



Fibre-optic Ring Light



LED Ring Light

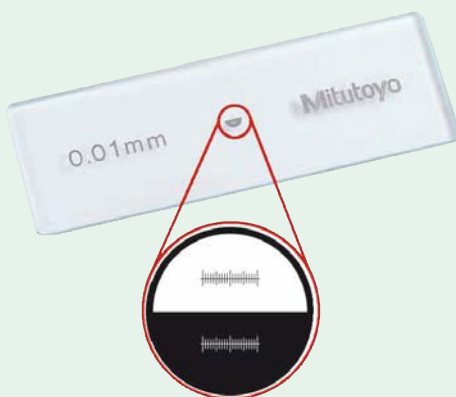
## Accessories for MF/MF-U Generation D



Focus Pilot is factory set option



Manual and Power Turrets



Stage Micrometer  
375-056

### Focus Pilot FP-05 / FP-05U

By installing this system on the camera mount of an MF series measuring microscope and projecting the focusing chart onto the workpiece surface, you can detect the focal point with high accuracy and high repeatability.

The Focus Pilot FP-05 / FP-05U offers you the following benefits:

- You can easily adjust the brightness of the image.
- You can achieve a wide view field observation on the monitor using a CCD camera (a C-mount adapter is included).
- You are offered a choice of four chart patterns, so you can select the pattern that works best with your workpiece surface texture type.



Concentric circle



Slit



### Focus Pilot

Magnification : 0.5X, Accuracy : 0.1% (within 2/3 area from the centre of field of view)

Camera adapter : C-mount (provided)

Applicable CCD camera : Up to 2/3-inch / 16.9 mm

Mass : 1.8 kg

No.	Model	Light source
375-057D	MF	Green LED
375-058D	MF	Red LED
375-067D	MF-U	Green LED
375-068D	MF-U	Red LED

### Manual Turrets for MF-U

No.	Objective lens	Remarks
176-211	Bright Field / Dark Field	4 Mounts
378-018	Bright Field	4 Mounts

### Power Turrets for MF-U

Power supply : 240V AC, 50/60 Hz

Dimensions : Turret : 164 x 65 x 137 mm

Control Box : 108 x 72 x 193 mm

No.	Objective lens	Remarks
176-212D	Bright Field / Dark Field	4 Mounts
378-016D	Bright Field	4 Mounts
378-216D	Bright Field	5 Mounts

### Set includes:

63AAA058 - Invenio 55CIII camera, including Insight LE software on 8GB USB stick and USB3.0 cable

63AAA067 - 0.5x camera adapter with C-mount for MF/MF-U microscope

No.
63AAA355

### Stage Micrometer

No.	Range [mm]	Accuracy	Mass [g]
375-056	1	(1+L) $\mu$ m L : Measuring length (mm)	16

# Measuring Microscope Hyper MF/MF-U Generation B Series

## Series 176

This measuring microscope has one of the highest XY measuring accuracies at 0,9+3L/1000 µm. The Hyper MF-B/MF-UB offers you the following benefits:

- One of the highest XY measuring accuracies in the world (0,9+3L/1000)<sup>1</sup> µm
- Selectable LAF (Laser Auto Focus) function.
- High operability and repeatability.
- Three-axis motorized control.
- You are offered the power-drive auto focus unit as standard.
- A range of useful fixtures is available that includes a wafer holder and swivel-centre support.

1. (L = measured length (mm) in XY plane, stage unloaded).



**Hyper MF-UF2515B**  
with optional turret and objective lenses

Measuring unit : Linear encoder  
Resolution : 0,01 µm  
Max. workpiece height : 150 mm

Model	Hyper MF-B2515B	Hyper MF-UB2515B	Hyper MF-UD2515B	Hyper MF-UE2515B	Hyper MF-UF2515B
No.	176-430D	176-431D	176-432D	176-433D	176-434D
Laser auto focus function	-	-	-	Available	Available
XY stage travel range	250 x 150 mm	250 x 150 mm	250 x 150 mm	250 x 150 mm	250 x 150 mm
Effective glass size mm	300 x 200	300 x 200	300 x 200	300 x 200	300 x 200
Observation type	Bright Field	Bright Field	Bright Field or Bright Field/Dark Field	Bright Field	Bright Field or Bright Field/Dark Field
XY stage top size mm	460 x 350	460 x 350	460 x 350	460 x 350	460 x 350
Max. stage loading kg	30	30	30	30	30
Mass	14 kg (power unit) Hyper MF : 250 kg (main unit) Hyper MF-U : 255 kg (main unit)	14 kg (power unit) Hyper MF : 250 kg (main unit) Hyper MF-U : 255 kg (main unit)	14 kg (power unit) Hyper MF : 250 kg (main unit) Hyper MF-U : 255 kg (main unit)	14 kg (power unit) Hyper MF : 250 kg (main unit) Hyper MF-U : 255 kg (main unit)	14 kg (power unit) Hyper MF : 250 kg (main unit) Hyper MF-U : 255 kg (main unit)

## Specifications

Observation image	Erect image
Optical tube	Reticle projection method, with TV mount, Optical path ratio <b>Hyper MF</b> : Monocular or binocular tube (optional depression : 25°) <b>Hyper MF-U</b> : Siedentoph type (pupil distance adjustment : 51 - 76 mm), 1X tube lens, Binocular tube (depression : 25°)
Eyepiece	<b>Hyper MF</b> : Optional 10X, 15X, 20X <b>Hyper MF-U</b> : 10X (field No. : 24 mm), Optional : 15X, 20X <b>Hyper MF-U</b> : Motorized Objective (optional) : M / BD Plan Apo objective from 1X to 100X
Turret (optional)	
Transmitted illumination	Light source : Halogen bulb (12V, 100W)(fiber-optic cold light illumination) Optical system : Telecentric illumination with adjustable aperture diaphragms Functions : Light intensity adjustable, 100 steps brightness adjustment
Surface illumination	Light source : Halogen bulb (12V, 50W) Optical system : Koehler illumination with adjustable aperture diaphragms Functions : Light intensity adjustable, 100 steps brightness adjustment
Data output	Via RS-232C interface
Power supply	220/240V AC, 50/60 Hz
Optional Accessories	See MF accessories for Hyper MF or MF-U models
Dimensions (WxDxH)	160 x 476 x 381 mm (power unit) <b>Hyper MF</b> : 880 x 913 x 730 mm (main unit) <b>Hyper MF-U</b> : 880 x 913 x 770 mm (main unit) mm



Control panel for fast traverse and three-axis positioning



Laser Auto Focus Optical Tube



Refer to the Hyper MF / MF-U brochure

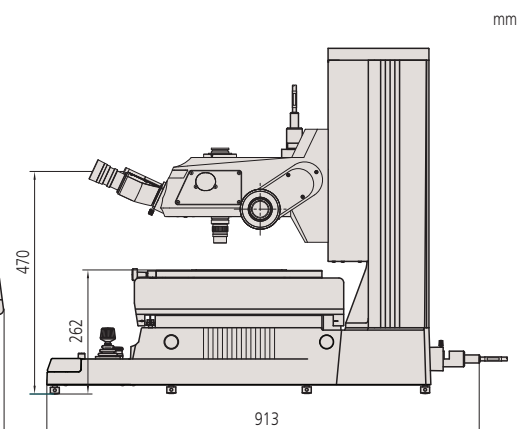
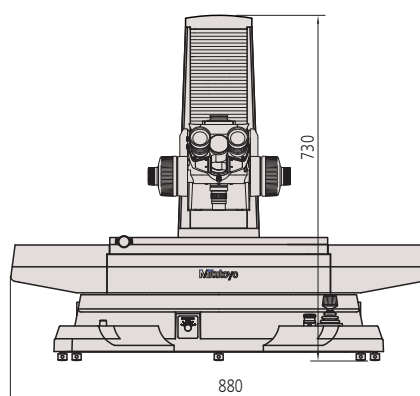
# Measuring Microscope Hyper MF/MF-U Generation B Series

## Series 176

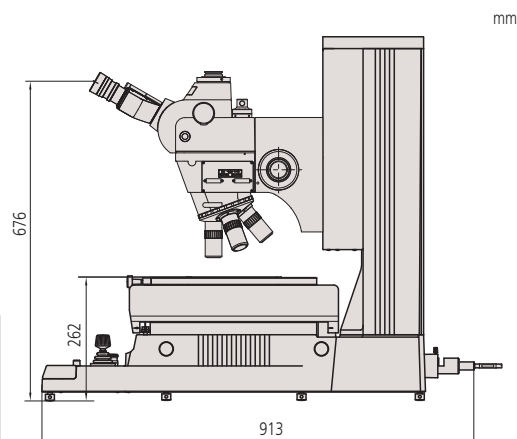
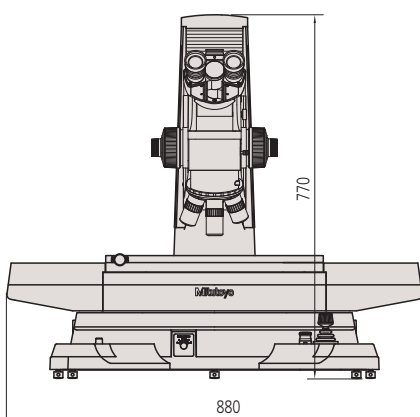
### Optional accessories

No.	Description
264-159D	2D Data processor, QM-Data 200 for Hyper MF

See MF accessories for Hyper MF models or MF-U accessories for Hyper MF-U models



Hyper MF-B2515B



Hyper MF-UB2515B



QM-Data 200  
2-D data processing unit



Vision Unit  
PC-based vision measuring system



# Vision Unit

## Series 359

This vision system retrofit for microscopes allows you to complete your measurement in one easy step with its automatic edge-detection tools and various macro icons.

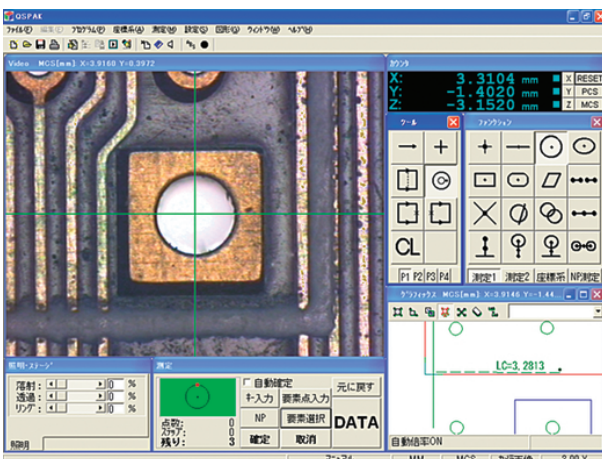
The Vision Unit offers you the following benefits:

- Easy operation due to the graphics and measurement navigation functions.
- Image data input/storage function.
- Measurement results are output to Microsoft® Excel®; this lets you generate an inspection table on the same computer.
- The unit allows you to verify that measurement results are within the tolerance zones and to carry out various types of statistical processing for each item.
- Combined use with the focus pilot gives you high accuracy in height measurements (patent pending).
- You can perform a series of measuring operations using just one screen display.
- The auto-brightness control function reproduces type and degree of illumination used.



The PC system, QSPAK VUE software and microscope are optional.

No.	Model	Description
359-763	Vision Unit 10D	For MF-D / MF-UD generation manual and motorized models
359-727	Vision Unit 9D	For MF-C generation
359-729	Vision Unit 9UD	For MF-UC generation
359-717	Vision Unit 8D	For MF-B generation
359-719	Vision Unit 8UD	For MF-UB generation
359-779	Vision Unit 7D	For Hyper MF-B / Hyper MF-UB generation
359-707	Vision Unit 6D	For MF-A generation
359-709	Vision Unit 6UD	For MF-UA generation



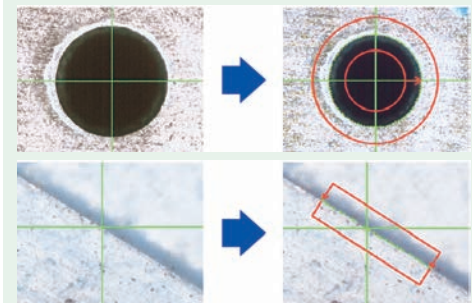
QSPAK VUE Measurement Window

## Specifications

Projected image	Inverted
Camera unit	Image sensor : 1/2" / 12,7 mm color CMOS camera Dimensions : 100 x 58 x 89 mm (W x D x H) Mass : 0,4 kg
Adapter unit	Operating software : QSPAK VUE (optional) Dimensions : 45 x 123 mm Magnification : 0,5X Mass : 0,3 kg
Magnification	19X - 1900X on 22" / 56 cm monitor (image resizable)
QSPAK VUE, optional software	<b>For observation/comparison of form</b> <ul style="list-style-type: none"> <li>- Template matching function</li> <li>- Manual pattern matching function</li> </ul> <b>For simple measurement</b> <ul style="list-style-type: none"> <li>- One-click edge detection tool function</li> <li>- Smart tool function</li> <li>- User macro function</li> </ul> <b>Functions for repeated measurement/auto-measurement</b> <ul style="list-style-type: none"> <li>- Quick navigation</li> <li>- Playback</li> <li>- Graphic</li> <li>- External data output</li> <li>- Statistical calculation</li> </ul>

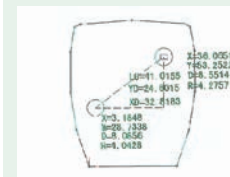
## Standard accessories

No.	Description
12AAJ088	Footswitch



## One-click Edge Detection

Just by clicking the mouse near the edge of a workpiece, QSPAK automatically scans the edge and detects it, showing its coordinates. This function also works with the point tool, box tool, circle tool and auto-focus tool.



## Graphic Window

The measurement results and measured elements are plotted in the graphic window in real-time. By using this function the user can check the current measuring position at a glance. The graphic window can be used for geometrical calculations.



# Microscope Unit FS70 Series

## Series 378 - Microscope Unit for Semiconductor Inspection

- Excellent operability with the inward rotating turret and high quality objective lenses with long working distance.
- Ideal as the microscope unit of a probe station for semiconductors.
- The L- and L4-models support YAG laser wavelength ranges from 266 up to 1064 nm allowing laser cutting of thin films and liquid crystal substrates.
- Ergonomic design with combined knob for coarse- and enlarged fine focus adjustment.



Model	FS70	FS70-TH	FS70Z	FS70Z-TH
No.	378-184-1	378-184-3	378-185-1	378-185-3
Model short base	FS70-S	FS70-THS	FS70Z-S	FS70Z-THS
Order No. short base model	378-184-2	378-184-4	378-185-2	378-185-4
Optical pass ratio	50/50	50/50	50/50	50/50
Tube lens	1X	1X	1X, 2X zoom	1X, 2X zoom
Camera mount	C-mount (using optional adapter B)	C-mount (using optional adapter B)	C-mount (using optional adapter B)	C-mount (using optional adapter B)
Loading (*) kg	14,5	13,6	14,1	13,2
Mass kg	6,1	7,1	6,6	7,5

(\*) Loading on optical tube excluding weight of objective lenses and eyepieces.

Model	FS70L	FS70L-TH	FS70L4	FS70L4-TH
No.	378-186-1	378-186-3	378-187-1	378-187-3
Model short base	FS70L-S	FS-70L-THS	FS70L4-S	FS70L4-THS
Order No. short base model	378-186-2	378-186-4	378-187-2	378-187-4
Optical pass ratio	100/0 or 0/100	100/0 or 0/100	100/0 or 0/100	100/0 or 0/100
Protective filter	Built-in laser beam filter	Built-in laser beam filter	Built-in laser beam filter	Built-in laser beam filter
Tube lens	1X	1X	1X	1X
Applicable laser	1064/532/355 nm	1064/532/355 nm	532/266 nm	532/266 nm
Camera mount	Use a laser with TV port.	Use a laser with TV port.	C-mount receptacle (with green filter switch)	C-mount receptacle (with green filter switch)
Objective, optional (for laser-cutting)	M/LCD Plan NIR M/LCD Plan NUV	M/LCD Plan NIR M/LCD Plan NUV	M Plan UV	M Plan UV
Loading (*) kg	14,2	13,5	13,9	13,1
Mass kg	6,4	7,2	6,7	7,5

(\*) Loading on optical tube excluding weight of objective lenses and eyepieces.

### Specifications

Focus adjustment	<b>Method</b> : With concentric coarse and fine focusing wheels (right and left) <b>Range</b> : 50mm travel range, 0,1mm/rev. for fine adjustment, 3,8mm/rev. for coarse adjustment
Trinocular tube Image	Erect image
Interpupillary distance	Siedentopf type, adjustment range : 51-76mm
Field number	24
Tilt angle	0°- 20° (only - TH, - THS models)
Illumination system	Reflective illumination for bright field ( Koehler illumination, with aperture diaphragm)
Light source	12 V / 100 W fibre-optic, non-stopped adjustment, light guide length 1,5m, power consumption 150W
Objective lens (optional)	M Plan Apo, M Plan Apo SL, G Plan Apo
FS-70L/L4	<ul style="list-style-type: none"> <li>• The FS70L supports three YAG laser wavelengths (1.064 nm, 532 nm and 355 nm), while the FS70L4 supports two wavelengths (532 nm and 266 nm), thus expanding the scope of laser applications, allowing laser-cutting of thin-films used in semiconductors and liquid crystal substrates. However, Mitutoyo assumes no responsibility whatever for the performance and/or safety of the laser system used with Mitutoyo microscopes. A careful examination is recommended when selecting a laser-emission unit.</li> <li>• Bright field, Differential Interference Contrast (DIC) and polarized observations are standard with the FS70Z. The FS70L and FS70L4 do not support the DIC method.</li> <li>• By employing an inward-leaning turret, the long working distance objectives provide excellent operability.</li> </ul>



Refer to the Microscope Units and objective lenses brochure

# Video Microscope Unit VMU Series

## Series 378

The VMU is a compact, lightweight and easy-to-install microscope unit for CCD camera monitoring in semiconductor fabrication facilities.

The VMU offers you the following benefits:

- The optical system features ultra-long working distance objectives and correction for the wide range of radiation wavelengths in use.
- Reflected illumination keeps your workpiece free from thermal expansion (the fibreoptic illuminator is required.)
- Also available with a laser mount or turret (objective mount).



VMU-V  
378-505

VMU-H  
378-506



VMU-LB  
378-513

VMU-L4B  
378-514

### Selection Guide to System Configuration (Depends on each system configuration)

No.	Applicable Wavelength	Vertical CCD camera mount	Horizontal CCD camera mount	YAG laser mount	Fibre optic illumination unit mount	Mass [g]
378-505	Near-infrared and visible radiation	Yes			Yes	570
378-506	Near-infrared and visible radiation		Yes		Yes	590
378-513	Near-infrared, visible, near-ultraviolet radiation	Yes		Yes	Yes	1270
378-514	Near infrared, visible, near ultraviolet and ultraviolet radiation	Yes		Yes	Yes	1300

### Specifications

Magnification of tube	1X
Reflected illumination	- Telecentric system with aperture stop system - Fibre-optic illuminator (optional) is required
Light source	Halogen bulb (21V, 150W) (optional)
Objective lenses for bright field observation (Optional accessory)	M Plan Apo, M Plan Apo SL, G Plan Apo
Objective lenses for laser cutting (Optional accessory)	M plan Apo NIR, LCD Plan Apo NIR, M Plan Apo NUV and LCD Plan Apo NUV
Objective lenses for laser machining (Optional accessory)	M Plan UV (for 378-514 only)



Refer to the microscope units and objective lenses brochure



Refer to the microscope units and objective lenses brochure

# Video Microscope Unit VMU Series

## Series 378

The WIDE VMU series takes video microscopy to the next level with a 7 times bigger field of view than conventional models. It supports both bright field and dark field observation.

The WIDE VMU offers the following benefits:

- Supported sensor size of 2-inch-equivalent, APS-C format
- Image field of ø30 mm with 1X tube lens
- Both F-mount and C-mount cameras can be mounted
- BF observations are supported by the WIDE VMU-V and -H models ,
- BD observations are supported by the WIDE VMU-BDV and -BDH models
- With the flexible orientation for camera and illumination mounting very compact arrangements can be configured.



WIDE VMU-V



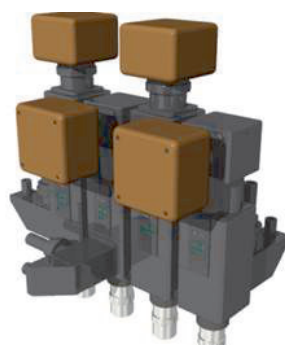
WIDE VMU-H



WIDE VMU-BDV



WIDE VMU-BDH



Highly compact configuration of 4 WIDE VMU units

No.	Camera mount	Observation type	Illumination mount	Suitable objectives
378-515	Vertical	Bright field (BF)	Single port	M Plan Apo, M Plan Apo HR, M Plan Apo SL, G Plan Apo
378-516	Horizontal	Bright field (BF)	Single port	M Plan Apo, M Plan Apo HR, M Plan Apo SL, G Plan Apo
378-517	Vertical	Bright field / Dark field (BD)	Dual port	BD Plan Apo, BD Plan Apo HR, BD Plan Apo SL
378-518	Horizontal	Bright field / Dark field (BD)	Dual port	BD Plan Apo, BD Plan Apo HR, BD Plan Apo SL

Optional accessories: Motorized turret, focusing unit, polarizer

# Wide Field Eyepiece WF

## Series 378

- Extra-wide field of view type.
- Optional reticles are available.
- Applicable microscope models: MF-C, MF-UC, Hyper MF, Hyper MF-U, FS70.



### Individual

No.	Magnification	Field number	Correction range	Eye point	Mass [g]
378-856-5	10X	24	-10D to +5D	High	85
378-857-5	15X	16	-8D to +5D	Normal	40
378-858-5	20X	12	-8D to +5D	Normal	55

### Two-piece sets

No.	Magnification	Field number	Correction range	Eye point	Mass [g]
378-856	10X	24	-10D bis +5D	High	85
378-857	15X	16	-8D to +5D	Normal	40
378-858	20X	12	-8D to +5D	Normal	55

# Finity Corrected Objective Lens ML-Series

## Series 375

The Mitutoyo 375 Series finity corrected objective lenses realize clear images and long working distance.



No.	Magnification	N.A.	W.D. [mm]	D.F. [μm]
375-036-2	1X	0,03	61	306
375-037-1	3X	0,09	77	34
375-034-1	5X	0,13	61	23
375-039	10X	0,21	51	6,2
375-051	20X	0,42	20	1,6
375-052	50X	0,55	13	0,9
375-053	100X	0,7	6	0,6

### Optional accessories

No.	Description
516848	Reticle, Cross hair
516576	Reticle, Broken Cross hair and 60° Angle
516578	Reticle, Concentric Circles
516577	Reticle, Cross hair with 20 mm Scale
516849	Reticle, 10 mm Scale (0,01 mm Reading)
516850	Reticle, 5 mm Scale (0,005 mm Reading)



Refer to the microscope units and objective lenses brochure

### Specifications

Abbreviations in product table	Mag. : Magnification N.A. : Numerical aperture W.D. : Working distance D.F. : Focal depth
--------------------------------	--

# Objective Lens M Plan Series

## Specifications

### Features

- The long working distance type objective lenses provide excellent clearance between the lens surface and the workpiece surface in focus, making it possible to observe workpieces which are usually hard-to-focus because of awkward projections.
- The metallurgical plan apochromatic (M Plan Apo) objective lens is an excellent optical system. This objective provides a flat, chromatic aberration-free image throughout the field of view, making it is suitable for any type of microscope.
- Specially designed objective lenses are also available with correction for the near-infrared, near-ultraviolet and ultraviolet regions of the spectrum, or various thicknesses of LCD screen glass.
- The mounting screw threads of objective lenses are designed to conform to JIS B-7141-1994.



Refer to the microscope units and objective lenses brochure

## Series 378

The Mitutoyo 378 Series objectives have one of the world's longest working distances and an infinity-corrected optical system. These objectives give you flexible observation at high magnifications and independent correction of chromatic aberration.



M Plan Apo and M Plan Apo SL  
Objectives for bright field observation



BD Plan Apo and BD Plan Apo SL  
Objectives for bright/dark field observation



Near-ultraviolet wavelength corrected M Plan Apo NUV objectives



Ultraviolet wavelength corrected M Plan UV objectives



Near-infrared wavelength corrected M Plan Apo NIR objectives



# Objective Lens for Brightfield Observation

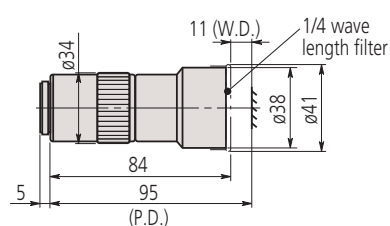
## Series 378 - M Plan Apo

### M Plan Apo for Bright Field Observation

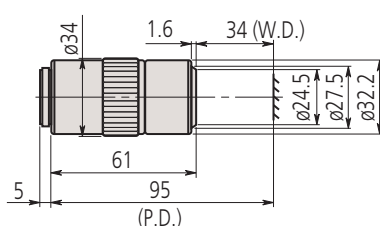
Compatible with microscope types VMU / FS-70 / MF-U / Hyper MF-U

Note : Polarizing unit (**378-074**) is required when using 1X objective.

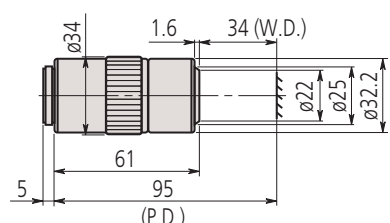
No.	Model	N.A.	W.D. [mm]	P.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-800-3	M Plan Apo 1X	0,025	11	95	200	11	440	ø24	4,8x6,4	300
378-801-6	M Plan Apo 2X	0,055	34	95	100	5	91	ø12	2,4x3,2	220
378-802-6	M Plan Apo 5X	0,14	34	95	40	2	14	ø4,8	0,96x1,28	240
378-807-3	M Plan Apo 7,5X	0,21	35	95	26,67	1,3	6,2	ø3,6	0,64x0,85	240
378-803-3	M Plan Apo 10X	0,28	34	95	20	1	3,5	ø2,4	0,48x0,64	230
378-804-3	M Plan Apo 20X	0,42	20	95	10	0,7	1,6	ø1,2	0,24x0,32	270
378-805-3	M Plan Apo 50X	0,55	13	95	4	0,5	0,9	ø0,48	0,1x0,13	290
378-806-3	M Plan Apo 100X	0,7	6	95	2	0,4	0,6	ø0,24	0,05x0,06	320



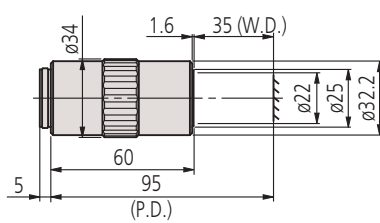
M Plan Apo 1X



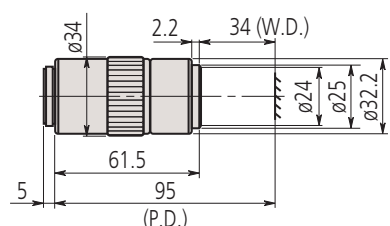
M Plan Apo 2X



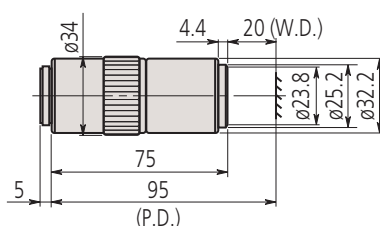
M Plan Apo 5X



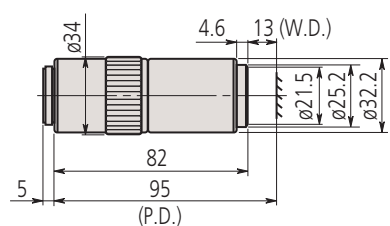
M Plan Apo 7.5X



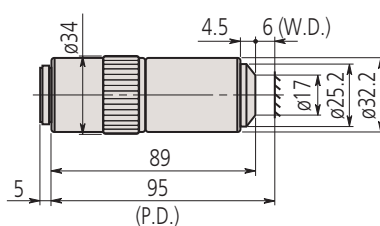
M Plan Apo 10X



M Plan Apo 20X



M Plan Apo 50X



M Plan Apo 100X

### Specifications

#### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using ø24 mm eyepiece  
FOV 2 : Field of view when using a digital camera with 1/2" chip size



Refer to the microscope units  
and objective lenses brochure

# Objective Lens for Brightfield Observation

## Specifications

### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using  
ø24 mm eyepiece  
FOV 2 : Field of view when using  
a digital camera with 1/2" chip  
size

## Series 378 - M Plan Apo HR

### M Plan Apo HR for Bright Field Observation

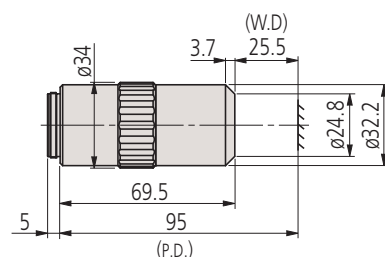
Compatible with microscope types VMU / FS-70 / MF-U / Hyper MF-U

Note : These objectives offer extra-high resolving power.

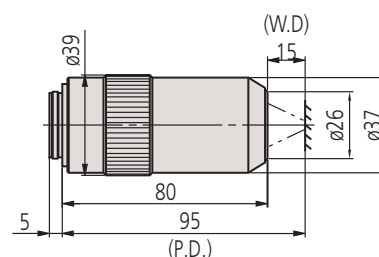
No.	Model	N.A.	W.D. [mm]	P.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-787-4	M Plan Apo HR 5X	0,21	25,5	95	40	1,3	6,2	ø4,8	0,96x1,28	285
378-788-4	M Plan Apo HR 10X	0,42	15	95	20	0,7	1,6	ø2,4	0,48x0,64	460
378-814-4	M Plan Apo HR 50X	0,75	5,2	95	4	0,4	0,49	ø0,48	0,1x0,13	400
378-815-4	M Plan Apo HR 100X	0,9	1,3	95	2	0,3	0,34	ø0,24	0,05x0,06	410



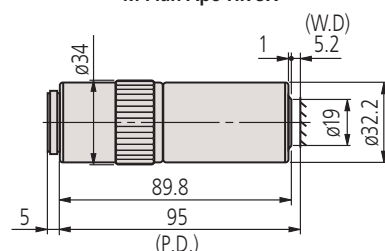
Refer to the microscope units  
and objective lenses brochure



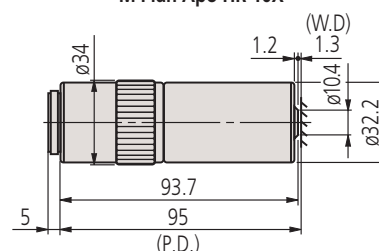
M Plan Apo HR 5X



M Plan Apo HR 10X



M Plan Apo HR 50X



M Plan Apo HR 100X

# Objective Lens for Brightfield Observation

## Series 378 - M Plan Apo SL

M Plan Apo SL for Bright Field Observation  
Compatible with microscope types VMU / FS-70 / MF-U / Hyper MF-U  
Note : These objectives offer extra-long working distance.

No.	Model	N.A.	W.D. [mm]	P.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-810-3	M Plan Apo SL 20X	0,28	30,5	95	10	1	3,5	ø1,2	0,24x0,32	240
378-811-15	M Plan Apo SL 50X		20,5	95	4	0,7	1,6	ø0,48	0,1x0,13	280
378-813-3	M Plan Apo SL 100X	0,55	13	95	2	0,5	0,9	ø0,24	0,05x0,06	290

### Specifications

#### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using  
ø24 mm eyepiece  
FOV 2 : Field of view when using  
a digital camera with 1/2" chip  
size



Refer to the microscope units  
and objective lenses brochure

# Objective Lens for Brightfield Observation

## Series 378 - G Plan Apo

### Specifications

#### Abbreviations in product table

Mag. : Magnification  
N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using  
ø24 mm eyepiece  
FOV 2 : Field of view when using a  
digital camera with 1/2" chip size

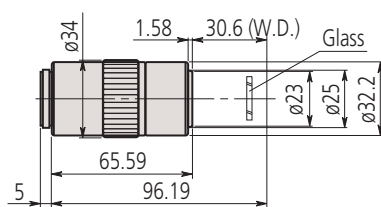
### Glass Thickness Corrected

#### G Plan Apo for Bright Field Observation

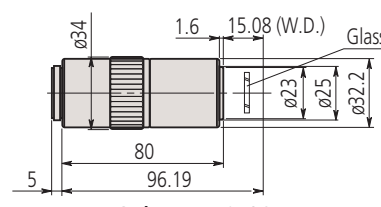
Compatible with microscope types VMU / FS-70 / MF-U / Hyper MF-U

Note : The G Plan Apo Series are designed for observing a workpiece through glass (thickness : 3,5 mm).

No.	Model	N.A.	W.D. [mm]	P.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-847	G Plan Apo 20X	0,28	29,42	96,19	10	1	3,5	ø1,2	0,24x0,32	270
378-848-3	G Plan Apo 50X	0,5	13,89	96,19	4	0,6	1,1	ø0,48	0,1x0,13	320



G Plan Apo 20X/t3,5



G Plan Apo 50X/t3,5



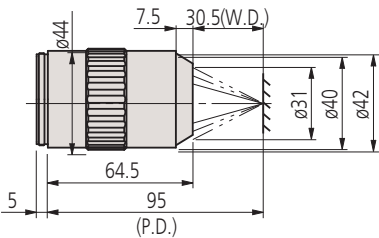
Refer to the microscope units  
and objective lenses brochure

# Objective Lens for Brightfield/Darkfield Observation FS-Series

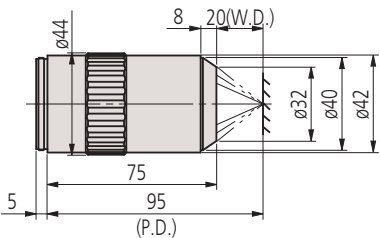
Series 378 BD Plan Apo SL

BD Plan Apo SL for Bright/Dark Field Observation  
Compatible with microscope types MF-U / Hyper MF-U  
Note : These objectives offer extra-long working distance.

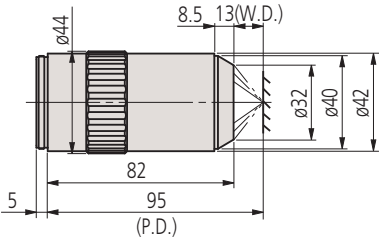
No.	Model	Magnification	N.A.	W.D. [mm]	P.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-840-7	BD Plan Apo SL 20X	20X	0,28	30,5	95	10	1	3,5	ø1,2	0,24x0,32	350
378-841-7	BD Plan Apo SL 50X	50X	0,42	20	95	4	0,7	1,6	ø0,48	0,1x0,13	410
378-842-7	BD Plan Apo SL 80X	80X	0,5	13	95	2,5	0,6	1,1	ø0,3	0,06x0,08	430
378-843-7	BD Plan Apo SL 100X	100X	0,55	13	95	2	0,5	0,9	ø0,24	0,05x0,06	440



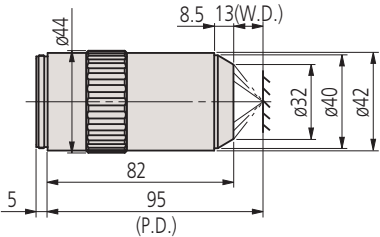
BD Plan Apo SL 20X



BD Plan Apo SL 50X



BD Plan Apo SL 80X



BD Plan Apo SL100X





# Objective Lens for Brightfield/Darkfield Observation FS-Series

## Specifications

### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using  
ø24 mm eyepiece  
FOV 2 : Field of view when using  
a digital camera with 1/2" chip  
size



Refer to the microscope units  
and objective lenses brochure

## Series 378 - BD Plan Apo

### BD Plan Apo for Bright/Dark Field Observation

Compatible with microscope types MF-U / Hyper MF-U

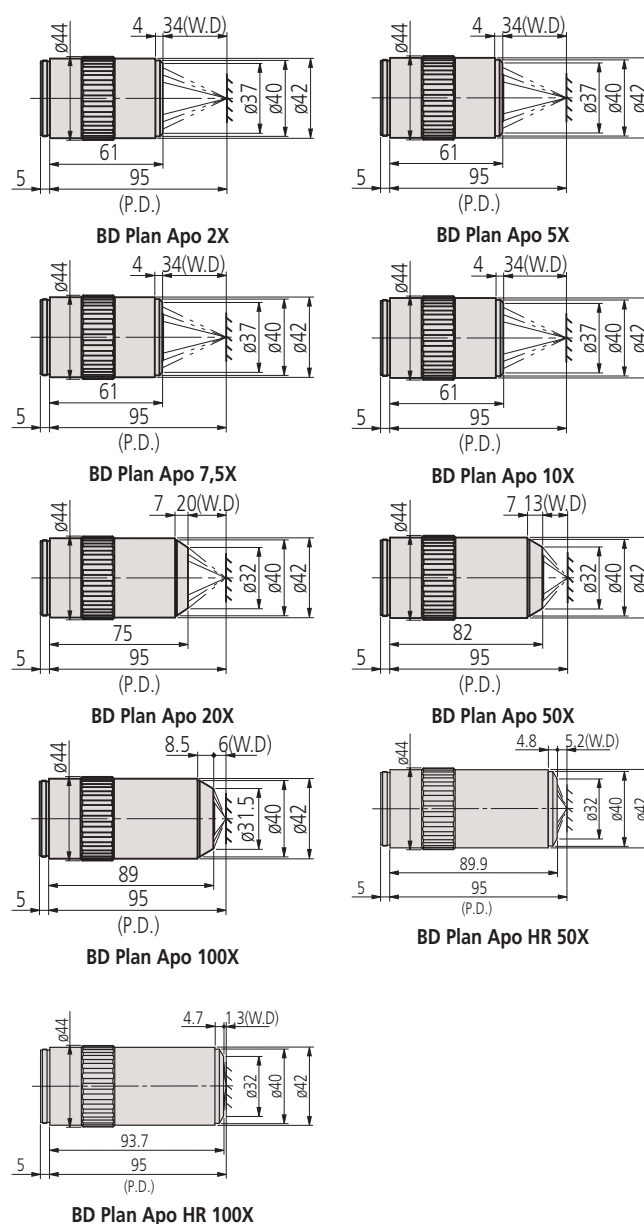
No.	Model	Magnification	N.A.	W.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-831-7	BD Plan Apo 2X	2X	0,055	34	100	5	91	ø12	2,4x3,2	340
378-832-7	BD Plan Apo 5X	5X	0,14	34	40	2	14	ø4,8	0,96x1,28	350
378-830-7	BD Plan Apo 7,5X	7,5X	0,21	34	26,67	1,3	6,2	ø3,6	0,64x0,85	350
378-833-7	BD Plan Apo 10X	10X	0,28	34	20	1	3,5	ø2,4	0,48x0,64	350
378-834-7	BD Plan Apo 20X	20X	0,42	20	10	0,7	1,6	ø1,2	0,24x0,32	400
378-835-7	BD Plan Apo 50X	50X	0,55	13	4	0,5	0,9	ø0,48	0,1x0,13	440
378-836-7	BD Plan Apo 100X	100X	0,7	6	2	0,4	0,6	ø0,24	0,05x0,06	460

### BD Plan Apo HR for Bright/Dark Field Observation

Compatible with microscope types MF-U / Hyper MF-U

Note : These objectives offer extra-high resolving power.

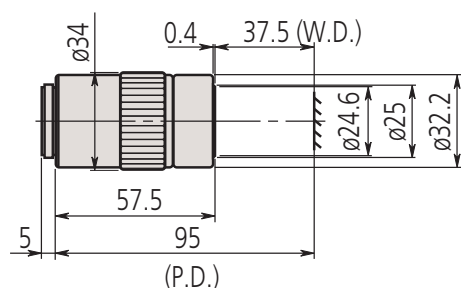
No.	Model	Magnification	N.A.	W.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-845-7	BD Plan Apo HR 50X	50X	0,75	5,2	4	0,4	0,49	ø0,48	0,1x0,13	530
378-846-7	BD Plan Apo HR 100X	100X	0,9	1,3	2	0,3	0,34	ø0,24	0,05x0,06	545



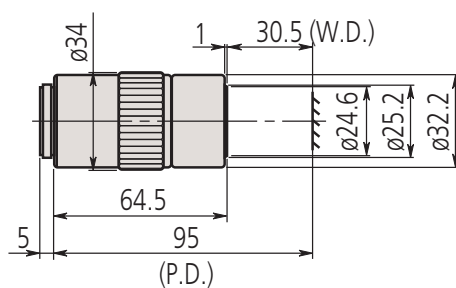
# Objective Lens for NIR, NUV and UV Observation FS-Series

## Series 378 - M Plan Apo NIR / M Plan Apo NIR HR

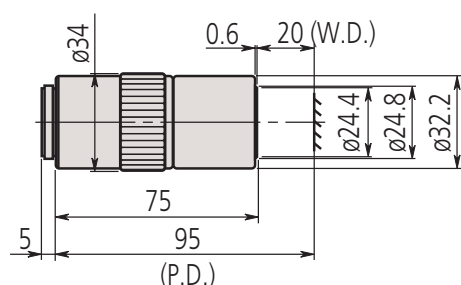
No.	Model	Magnification	N.A.	W.D. [mm]	P.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-822-5	M Plan Apo NIR 5X	5X	0,14	37,5	95	40	2	14	ø4,8	0,96x1,28	220
378-823-5	M Plan Apo NIR 10X	10X	0,26	30,5	95	20	1,1	4,1	ø2,4	0,48x0,64	250
378-824-5	M Plan Apo NIR 20X	20X	0,4	20	95	10	0,7	1,7	ø1,2	0,24x0,32	300
378-825-5	M Plan Apo NIR 50X	50X	0,42	17	95	4	0,7	1,6	ø0,48	0,1x0,13	315
378-826-5	M Plan Apo NIR 100X	100X	0,5	12	95	2	0,6	1,1	ø0,24	0,05x0,06	335
378-863-5	M Plan Apo NIR HR 50X	50X	0,65	10	95	4	0,42	0,65	ø0,48	0,1x0,13	450
378-864-5	M Plan Apo NIR HR 100X	100X	0,7	10	95	2	0,39	0,56	ø0,24	0,05x0,06	450



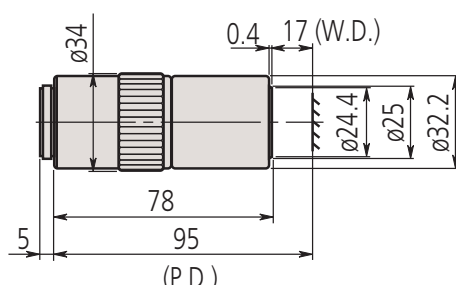
M Plan Apo NIR 5X



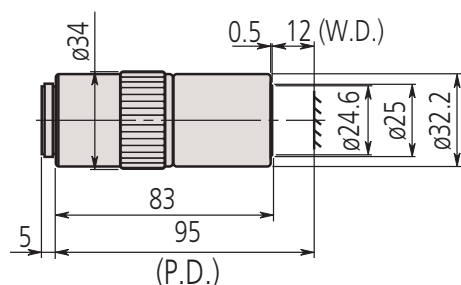
M Plan Apo NIR 10X



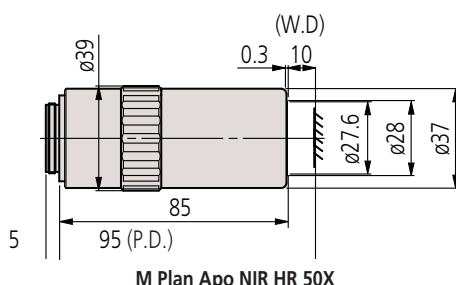
M Plan Apo NIR 20X



M Plan Apo NIR 50X



M Plan Apo NIR 100X



M Plan Apo NIR HR 50X  
M Plan Apo NIR HR 100X

### Specifications

#### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using ø24 mm eyepiece  
FOV 2 : Field of view when using a digital camera with 1/2" chip size

#### M Plan Apo NIR

Note :  
These objective lenses are designed so that the image of a workpiece remains focused within the focal depth even when the wavelength used is changed from within the visible range up to the near-infrared (480 to 1800 nm). Therefore the M Plan NIR Series are suitable for laser repair. However, when the wavelength used exceeds 1100 nm, the focussing position may deviate slightly from that in the visible range due to changes in glass dispersion and refractive index.



Refer to the microscope units and objective lenses brochure

# Objective Lens for NIR, NUV and UV Observation FS-Series

## Series 378 - M Plan Apo NIR B

### Specifications

#### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Focal depth  
FOV 1 : Field of view when using  
ø24 mm eyepiece  
FOV 2 : Field of view when using a  
digital camera with 1/2" chip size

#### M Plan Apo NIR

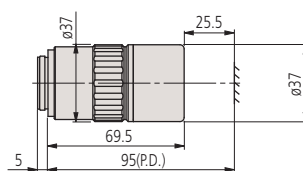
Note :  
These objective lenses are  
designed so that the image of a  
workpiece remains focused within  
the focal depth even when the  
wavelength used is changed from  
within the visible range up to the  
near-infrared (480 to 1800 nm).  
Therefore the M Plan NIR Series  
are suitable for laser repair.  
However, when the wavelength  
used exceeds 1100 nm, the  
focussing position may deviate  
slightly from that in the visible  
range due to changes in glass  
dispersion and refractive index.



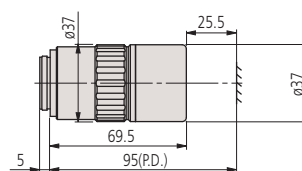
Refer to the microscope units  
and objective lenses brochure



No.	Model	Magnification	N.A.	W.D. [mm]	f [mm]	P.D. [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]
378-867-5	M Plan Apo NIR B 20X	20X	0,4	25,5	10	95	0,7	1,7	1,2	0,24x0,32
378-868-5	M Plan Apo NIR B 50X	50X	0,42	25,5	4	95	0,7	1,6	0,48	0,24x0,13



M Plan Apo NIR B 20X



M Plan Apo NIR B 50X

# Objective Lens for NIR, NUV and UV Observation FS-Series

## Series 378 - LCD Plan Apo NIR - LCD Plan Apo NIR HR

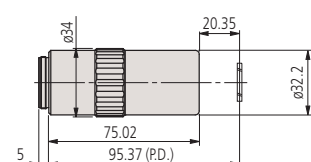
Near-infrared wavelength with LCD Glass Thickness Correction

LCD Plan Apo NIR for Bright Field Observation

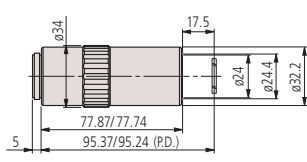
Compatible with microscope types VMU / FS-70

Note : W.D. is just measured in air, not through an LCD glass

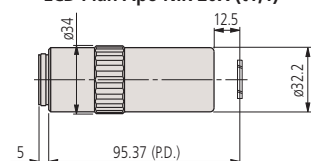
No.	Model	Mag./glass thickness [mm]	N.A.	W.D. [mm]	f [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-827-5	LCD Plan Apo NIR 20X (t1,1)	20X/t1,1	0,4	19,98	10	0,7	1,7	ø1,2	0,24x0,32	305
378-828-5	LCD Plan Apo NIR 50X (t1,1)	50X/t1,1	0,42	17,13	3,9	0,7	1,6	ø0,48	0,1x0,13	320
378-829-5	LCD Plan Apo NIR 50X (t0,7)	50X/t0,7	0,42	17,26	3,9	0,7	1,6	ø0,48	0,1x0,13	320
378-752-15	LCD Plan Apo NIR 100X (t1,1)	100X/t1,1	0,5	12,13	2	0,6	1,1	0,24	0,05x0,06	335
378-754-15	LCD Plan Apo NIR 100X (t0,7)	100X/t0,7	0,5	12,06	2	0,6	1,1	0,24	0,05x0,06	335
378-869-5	LCD Plan Apo NIR HR 50X (t0,7)	50X/t0,7	0,65	9,6	4	0,4	0,7	0,48	0,1x0,13	450
378-870-5	LCD Plan Apo NIR HR 100X (t0,7)	100X/t0,7	0,7	9,6	2	0,4	0,6	0,24	0,05x0,06	450



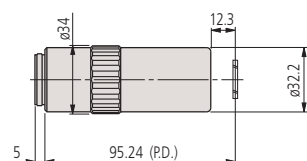
LCD Plan Apo NIR 20X (t1,1)



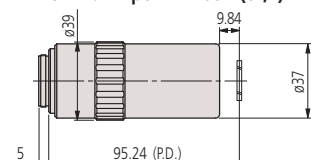
LCD Plan Apo NIR 50X (t1,1)/(t0,7)



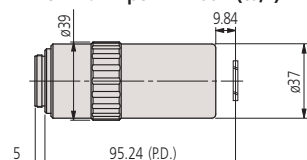
LCD Plan Apo NIR 100X (t1,1)



LCD Plan Apo NIR 100X (t0,7)



LCD Plan Apo NIR HR 50X (t0,7)



LCD Plan Apo NIR HR 100X(t0,7)

### Specifications

#### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Depth of focus  
FOV 1 : Field of view when using ø24 mm eyepiece  
FOV 2 : Field of view when using a digital camera with 1/2" chip size



Refer to the microscope units  
and objective lenses brochure

# Objective Lens for NIR, NUV and UV Observation FS-Series

## Specifications

### Abbreviations in product table

N.A. : Numerical aperture  
W.D. : Working distance  
P.D. : Parfocal distance  
f : Focal distance  
R : Resolving power  
D.F. : Depth of focus  
FOV 1 : Field of view when using  
ø24 mm eyepiece  
FOV 2 : Field of view when using  
a digital camera with 1/2" chip  
size



Refer to the microscope units  
and objective lenses brochure

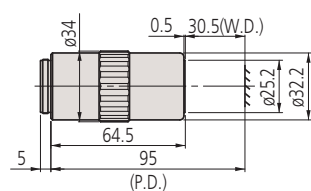
## Series 378 M Plan Apo NUV/LCD Plan Apo NUV/M Plan UV/LCD Plan UV

No.	Model	Magni- fication	Mag./ glass thick- ness [mm]	N.A.	W.D. [mm]	f [mm]	P.D. [mm]	R [μm]	D.F. [μm]	FOV 1 [mm]	FOV 2 [mm]	Mass [g]
378-809-5	M Plan Apo NUV 10X	10X		0,28	30,5	20	95	1	3,5	ø2,4	0,48x0,64	255
378-817-8	M Plan Apo NUV 20X	20X		0,42	17	10	95	0,7	1,7	1,2	0,24x0,32	340
378-818-6	M Plan Apo NUV 50X	50X		0,42	15	4	95	0,7	1,6	ø0,48	0,1x0,13	350
378-819-4	M Plan Apo NUV 100X	100X		0,5	11	2	95	0,6	1,1	ø0,24	0,05x0,06	380
378-888-6	M Plan Apo NUV HR 50X	50X		0,65	10	4	95	0,42	0,65	ø0,48	0,1x0,13	500
378-890-8	LCD plan Apo NUV 20X (t0,7)	20X	20X/t0,7	0,42	16,96	10	95	10	1,7	1,2	0,24x0,32	340
378-753-6	LCD Plan Apo NUV 50X (t1,1)	50X	50X/t1,1	0,42	14,53	4	95	0,7	1,6	ø0,48	0,1x0,13	310
378-820-8	LCD Plan Apo NUV 50X (t0,7)	50X	50X/t0,7	0,44	14,76	4	95	0,7	1,6	0,48	0,1x0,13	350
378-751-4	LCD Plan Apo NUV 100X (t1,1)	100X	100X/ t1,1	0,5	11,03	2	95	0,6	1,1	ø0,24	0,05x0,06	380
378-891-6	LCD plan Apo NUV HR 50X (t0,7)	50X	50X/t0,7	0,65	9,76	4	95	0,4	0,7	ø 0,48	0,1x0,13	500
378-844-15	M Plan UV 10X	10X		0,25	20	20	95	1,1	4,4	ø2,4	0,48x0,64	310
378-837-7	M Plan UV 20X	20X		0,36	15	10	95	0,8	2,1	ø1,2	0,24x0,32	330
378-838-8	M Plan UV 50X	50X		0,4	12	4	95	0,7	1,7	ø0,48	0,1x0,13	400
378-839-5	M Plan UV 80X	80X		0,55	10	2,9	95	0,5	0,9	ø0,3	0,06x0,08	380
378-892-8	LCD Plan UV 20X (t0,7)	20X	20X/t0,7	0,37	15	10	95	0,8	2,1	1,2	0,24x0,32	370
378-893-8	LCD Plan UV 50X (t0,7)	50X	50X/t0,7	0,41	12,4	4	95	0,7	1,6	ø0,48	0,1x0,13	400

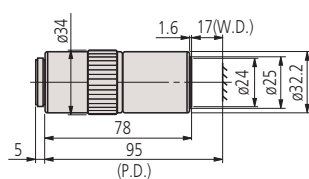


# Objective Lens for NIR, NUV and UV Observation

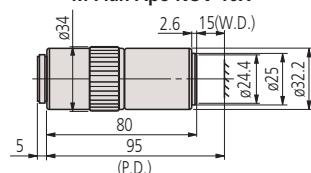
## FS-Series



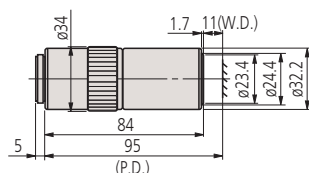
**M Plan Apo NUV 10X**



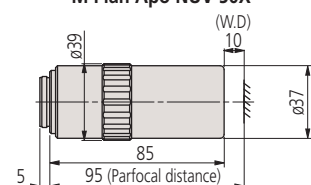
**M Plan Apo NUV 20X**



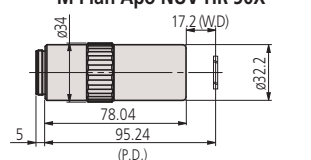
**M Plan Apo NUV 50X**



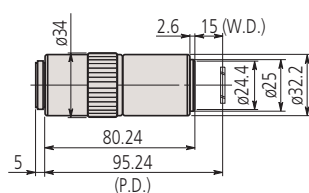
**M Plan Apo NUV 100X**



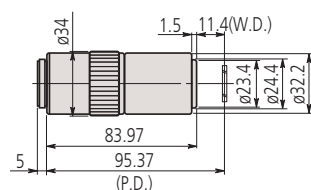
**M Plan Apo NUV HR 50X**



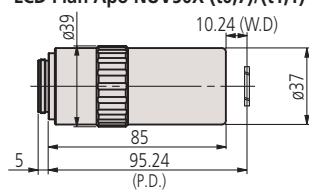
**LCD Plan Apo NUV 20X (t0,7)**



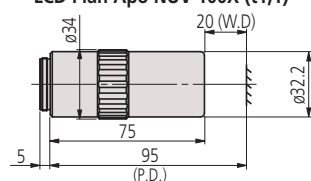
**LCD Plan Apo NUV 50X (t0,7)/(t1,1)**



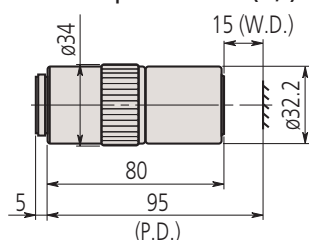
**LCD Plan Apo NUV 100X (t1,1)**



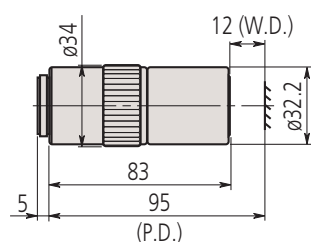
**LCD Plan Apo NUV HR 50X (t0,7)**



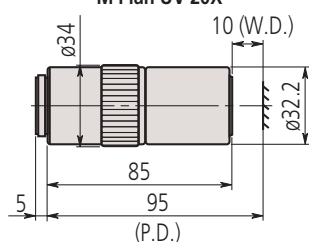
**M Plan UV 10X**



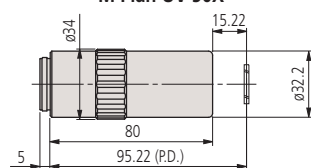
**M Plan UV 20X**



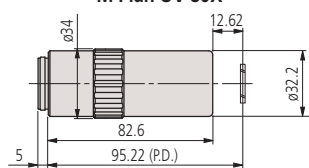
**M Plan UV 50X**



**M Plan UV 80X**



**LCD Plan UV 20X (t0,7)**

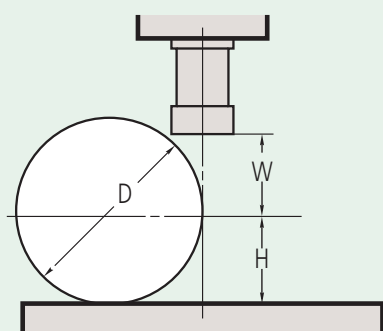


**LCD Plan UV 50X (t0,7)**

# Measuring Projector PJ-A3000 Series

## Specifications

Projected image	Inverted
Projector screen	Effective diameter : 315 mm Screen material : Fine-ground glass Screen rotation : $\pm 360^\circ$ , fine feed and clamp Angle display : Digital counter (LED) Resolution : 1' or 0,01° (switchable) Range : $\pm 370^\circ$ ABS/INC mode switching, Zero Set Reference lines : Cross-hairs
Projection lens	10X (172-202) Optional : 20X, 50X, 100X
Magnification accuracy	Contour illumination : $\pm 0,1\%$ or better Surface illumination : $\pm 0,15\%$ or better
Contour illumination	Light source : Halogen bulb (24V, 150W) Optical system : Telecentric Functions : 2-step (High/Low) brightness switch, Heat-absorbing filter, Cooling fan
Surface illumination	Light source : Halogen bulb (24V, 150W) Optical system : Vertical illumination with adjustable condenser lens Functions : Heat-absorbing filter, Cooling fan
Focusing	Manual
Resolution	0,001 mm (0,001 mm : digital head)
Power supply	220 - 240V AC, 50/60Hz



D : Max. workpiece diameter  
W : Working distance  
H : Max. workpiece height

	Magnification			
	10X	20X	50X	100X
View field	$\phi 31.5$	$\phi 15.7$	$\phi 6.3$	$\phi 3.1$
W	66 (20)	32.5 (2)	12.6	5
H	-50 models*	123.5	123.5	123.5
	-100 models	91	91	91
	-150 models	103.5	103.5	103.5
	200 models	92.5	92.5	92.5
D	-50 models*	224 (198)	87 (61)	27
	-100 models	182	87 (61)	27
	-150 models	207 (198)	87 (61)	27
	200 models	185	87 (61)	27

( ) When using surface illumination



Refer to the PJ-A3000 brochure

## Series 302

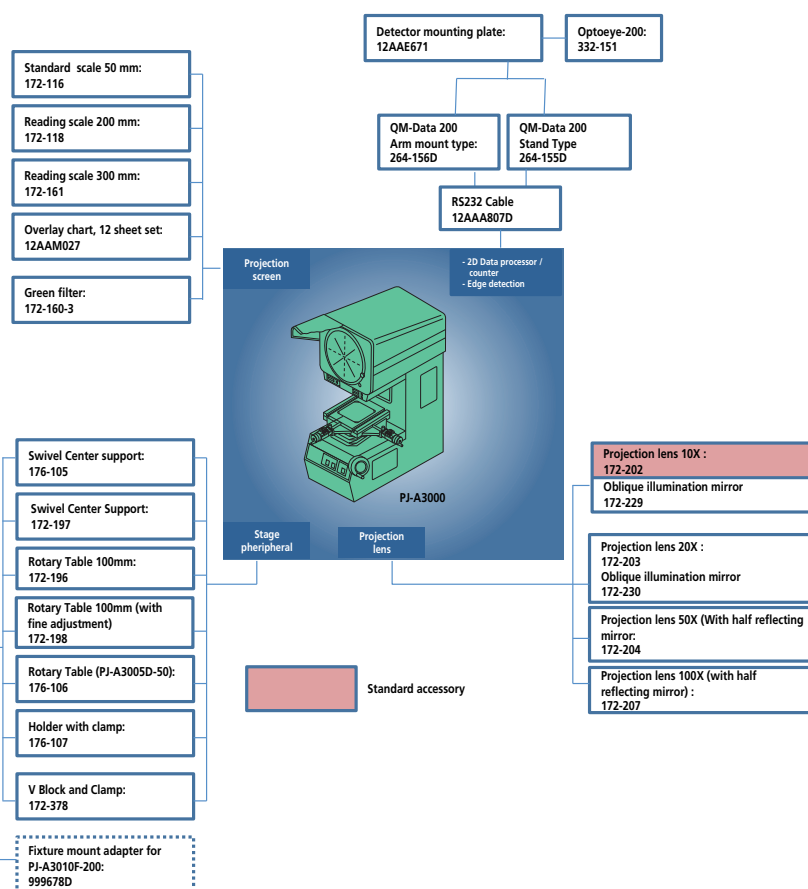
The PJ-A3000 Series profile projector is a medium-sized model that gives you excellent versatility and easy operation.

The PJ-A3000 offers you the following benefits:

- The easy-to-read digital XY counter is located near the projection screen to minimize eye movement.
- You can measure angles easily with the digital readout protractor screen.



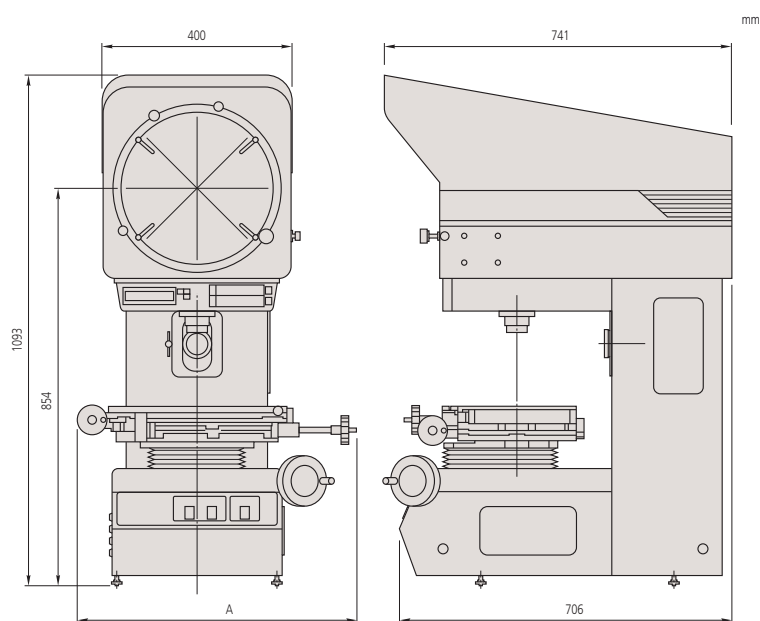
302-701-1D



# Measuring Projector PJ-A3000 Series

## Series 302 - Metric model

Metric XY stage 50 x 50 or 150 x 50 or 100 x 100 or 200 x 100 mm				
Model	PJ-A3005D-50	PJ-A3005F-150	PJ-A3010F-100	PJ-A3010F-200
No.	302-704-1D 302-704-1E	302-702-1D	302-703-1D 302-703-1E	302-701-1D 302-701-1E
XY stage [mm]	50 x 50	150 x 50	100 x 100	200 x 100
XY stage [mm]	50 x 50	-	100 x 100	200 x 100
Measuring method	Digimatic micrometer head	Linear encoder	Linear encoder	Linear encoder
Measuring method	Digimatic micrometer head	-	Linear encoder	Linear encoder
Quick-release mechanism	-	X and Y axes	X and Y axes	X and Y axes
Quick-release mechanism	-	-	X and Y axes	X and Y axes
XY stage table top size [mm]	152 x 152	280 x 152	250 x 250	380 x 250
XY stage effective area [mm]	82 x 82	185 x 84	142 x 142	266 x 170
Stage glass No.	380405	381349	12BAE041	382762
Table swiveling function	-	-	-	±3°
Table swiveling function	-	-	-	±3°
Max stage loading [kg]	10	8	10	8
Mass kg	107	116	112	140



A = 593 mm : 302-701-1D, A = 446 mm : 302-702-1D  
A = 427 mm : 302-703-1D



## Standard accessories

No.	Description
172-202	Projection lens set, 10X magnification
383876	Cover, Vinyl cover for PJ-3010F projector
512305	Halogen Lamp for Measuring Projector, 24V/150W

## Optional accessories

No.	Description
172-116	Inspection tool, Standard scale 50 mm/0,1 mm
172-160-3	Green Filter, Colour filter
172-161	Inspection tool, Reading Scale 300 mm/0,5 mm
172-197	Fixture/clamping material Swivel center support
172-203	Projection lens set, 20X magnification
172-204	Projection lens set, 50X magnification
172-207	Projection lens set, 100X magnification
172-229	Lens accessory, Oblique reflecting mirror for 10X lens
172-230	Lens accessory, Oblique reflecting mirror for 20X lens
172-378	Fixture/clamping material, V-block with clamp
176-107	Fixture/clamping material, Holder with clamp
172-118	Inspection tool, Reading scale 200 mm/0,5 mm
172-160-2	Green filter
176-105	Fixture/clamping material, Swivel center support
999678D	Adapter, Stage mount adapter
512305	Halogen Lamp for Measuring Projector, 24V/150W
12AAE671	Attachment, Optoeye-200 Attachment A, 250-350 mm
332-151	Sensor, Optoeye-200 edge detection sensor
176-106	Rotary table
172-196	Rotary table, 100 mm for TM-1005B
172-198	Rotary table, 100 mm with fine feed knob for TM-1005B
264-155D	2D Data processor, QM-Data 200, stand type
264-156D	2D Data processor, QM-Data 200, arm mount type

176-106 : for stage 150 x 50 mm

172-196 and 172-198 : for stage 100 x 100 and 200 x 100 mm

METRIC - (INCH/METRIC)		
302-7000 - (302-714E)	302-7010D - (302-711E)	
302-7040 - (302-718E)	302-7020D - (302-712E)	
302-7080 - (302-719E)	302-7030D - (302-713E)	
302-7090	302-7050	
	302-7060	
	302-7070	
176-106	X	—
172-196	—	X*
172-198	—	X*
176-105	X	X*
172-197	—	X*
176-107	X	X*
172-378	X	X*

\* Fixture mount adapter (999678)  
is required for 302-701-1D



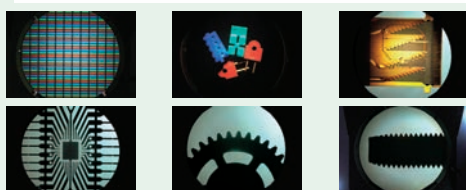
# Measuring Projector PJ-H30 Series

## Specifications

Accuracy	(3+0,02L) $\mu$ m L : Max length measurement
Projected image	Erect
Projector screen	Effective diameter : 306 mm Screen material : Fine-ground glass Screen rotation : $\pm 360^\circ$ , fine adjustment and clamp Angle display : Digital counter (LED) Resolution : 1' or 0,01° (switchable) Range : $\pm 370^\circ$ ABS/INC mode switching, Zero Set Reference lines : Cross-hairs
Projection lens	10X (172-472) Optional : 5X, 20X, 50X, 100X
Magnification accuracy	Contour illumination : $\pm 0,1\%$ or better Surface illumination : $\pm 0,15\%$ or better
Contour illumination	Light source : Halogen bulb (24V, 150W) Optical system : Telecentric zoom Functions : Continuously variable brightness adjustment, Heat-absorbing filter, Cooling fan
Surface illumination	Light source : Halogen bulb (24V, 150W) Optical system : Vertical/Oblique illumination with an adjustable condenser lens Functions : Continuously variable brightness adjustment, Heat-absorbing filter, Cooling fan
Power supply	220V AC, 50/60Hz
Resolution	0,001 mm

Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	$\phi 61.2$	$\phi 30.6$	$\phi 15.3$	$\phi 6.12$	$\phi 3.06$
H	105	105	105	105	105
W	66	70.5	56.5	50	50
D	148	197	137	114	114



Profile Projector brochure on request

## Series 303

This measuring projector has adjustable incident illumination.

The PJ-H30 offers you the following benefits:

- By rotating the condenser lens and changing the angle of the mirror in the objective, you can represent even poorly reflecting surfaces optimally.
- Improved light intensity of a projected subject thanks to the new optical contour illumination system.
- High measuring accuracy (above JIS standard).
- Measuring stage with rapid single-handed adjustment on both axes enabling you to switch smoothly between quick positioning and fine adjustment.
- Constant current power supply unit with acceleration control to maximize the service life of the halogen lamp.
- Easily read digital counter with large digit display.
- The PJ-H30D models also offer you a built-in precision edge detector (Optoeye).
- RS-232C output.



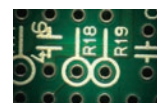
303-735-1D



Vertical / oblique switchable surface illumination



Vertical illumination



Oblique illumination



1010B



2010B



2017B

# Measuring Projector PJ-H30 Series

## Series 303

### Model 1010B - 100 x 100 mm

XY stage table size : 300 x 240 mm

XY stage effective area : 180 x 150 mm

Stage glass No. : **380412**

Swiveling function :  $\pm 3^\circ$

Max stage loading : 10 kg

Mass : 176 kg

Model	PJ-H30A	PJ-H30D
No.	<b>303-712-1D</b>	<b>303-732-1D</b>
Focusing	Manual	Power focus
Edge detector	Optional	Built-In

### Model 2010B - 200 x 100 mm

XY stage table size : 350 x 280 mm

XY stage effective area : 250 x 150 mm

Stage glass No. : **382762**

Swiveling function :  $\pm 3^\circ$

Max stage loading : 10 kg

Mass : 178 kg

Model	PJ-H30A	PJ-H30D
No.	<b>303-713-1D</b>	<b>303-733-1D</b>
Focusing	Manual	Power focus
Edge detector	Optional	Built-In

### Model 2017B - 200 x 170 mm

XY stage table size : 410 x 342 mm

XY stage effective area : 270 x 240 mm

Stage glass No. : **12BAD363**

Swiveling function :  $\pm 5^\circ$

Max stage loading : 20 kg

Mass : 205 kg

Model	PJ-H30A	PJ-H30D
No.	<b>303-714-1D</b>	<b>303-734-1D</b>
Focusing	Manual	Power focus
Edge detector	Optional	Built-In

### Model 3017B - 300 x 170 mm

XY stage table size : 510 x 342 mm

XY stage effective area : 370 x 240 mm

Stage glass No. : **12BAD330**

Swiveling function :  $\pm 5^\circ$

Max stage loading : 20 kg

Mass : 212 kg

Model	PJ-H30A	PJ-H30D
No.	<b>303-715-1D</b>	<b>303-735-1D</b>
Focusing	Manual	Power focus
Edge detector	Optional	Built-In



# Measuring Projector PJ-H30 Series

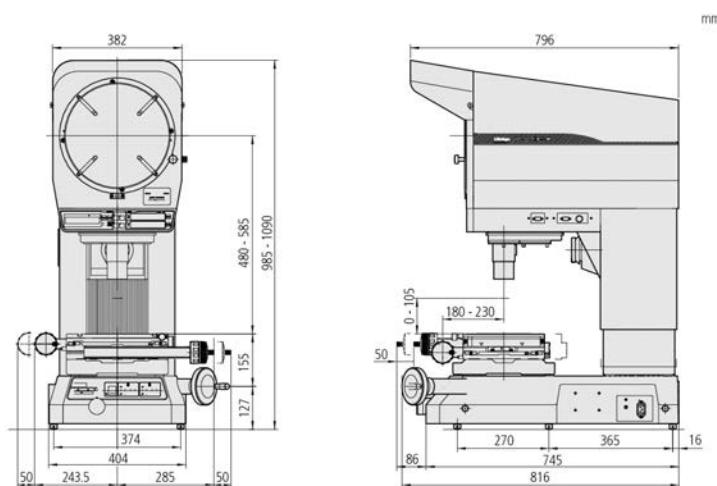
## Series 303

### Optional accessories

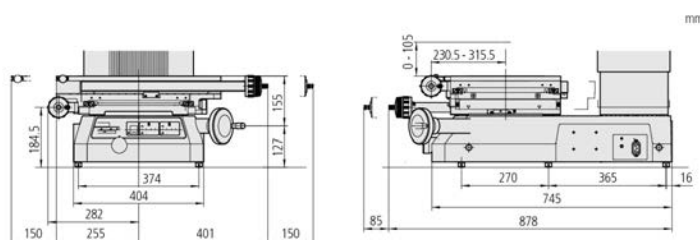
No.	Description
332-151	Sensor, Optoeye-200 edge detection sensor
12AAE671	Attachment, Optoeye-200 Attachment A, 250-350 mm
12AAG983	Attachment, Optoeye-200 Attachment for PJ-H30 Series
12AAG981	Filter, Green filter for PJ-H30 Series projector
172-116	Inspection tool, Standard scale 50 mm/ 0,1 mm
172-118	Inspection tool, Reading scale 200 mm/ 0,5 mm
172-161	Inspection tool, Reading Scale 300 mm/ 0,5 mm
172-271	Projection lens, 5X magnification for PJ-311
172-473	Projection lens, 20X magnification for PJ-H30 Series
172-474	Projection lens, 50X magnification for PJ-H30 Series
172-475	Projection lens, 100X magnification for PJ-H30 Series
176-105	Fixture/clamping material, Swivel center support
172-197	Fixture/clamping material Swivel center support
172-198	Rotary table, 100 mm with fine feed knob for TM-1005B
172-378	Fixture/clamping material, V-block with clamp
176-305	Rotary Table, Type A, D=240 mm
176-306	Rotary Table, Type B, D=270 mm
011534	MC Special Cleaner
12AAA807D	Cable RS-232C 2m
12AAG982	Stand, Stand for QM-Data 200 on PJ-H30 Series
264-155D	2D Data processor, QM-Data 200, stand type
264-156D	2D Data processor, QM-Data 200, arm mount type



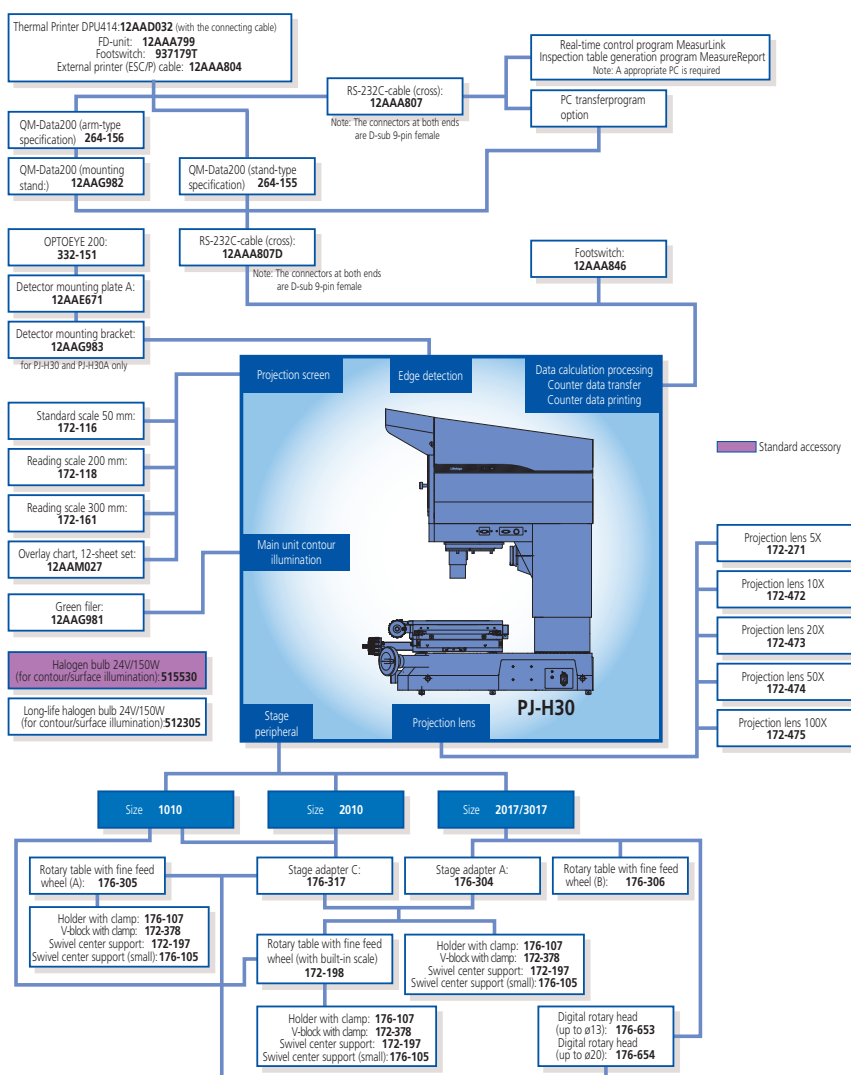
264-155D  
QM-Data 200



1010B model



3017B model



# Measuring Projector PV-5110

## Series 304

- This measuring projector is a robust stand-alone device.
- The large rotatable screen guarantees you good observation and easy measuring.



304-919D  
Counter is optional



KA Counter



QM-Data 200



OPTOEYE 200

Specifications	
Projected image	Inverted
Projector screen	Effective diameter : 508 mm Screen material : Fine-ground glass Screen rotation : $\pm 360^\circ$ , fine adjustment and clamp Angle reading : Digital counter (LED) Resolution : 1' or 0,01° (switchable) Range : $\pm 370^\circ$ ABS/INC mode switching, Zero Set Reference lines : Cross-hairs
Projection lens	10X (172-402) Optional : 5X, 20X, 50X, 100X
Magnification accuracy	Contour illumination : $\pm 0,1\%$ or better Surface illumination : $\pm 0,15\%$ or better
Contour illumination	Light source : Halogen bulb (24V, 150W) Optical system : Telecentric zoom Functions : 2-step (High/Low) brightness switch, Heat-absorbing filter, Cooling fan
Surface illumination	Light source : Halogen bulb (24V, 150W) Optical system : Vertical illumination Functions : Adjustable condenser lens, Oblique illumination (for 5X, 10X and 20X), Heat-absorbing filter, Cooling fan
Focusing	Manual
Resolution	0,001 mm
Power supply	220 - 240V AC, 50/60Hz
Mass	210 kg

	Magnification				
	5X	10X	20X	50X	100X
View field	ø101.6	ø50.8	ø25.4	ø10.16	ø5.08
H	125	181	206	87	87
W	60 (27)	60	60	32.4	22.5
D	120	120	120	64.8	45

( ) When using surface illumination



Profile Projector brochure on request

# Measuring Projector PV-5110

## Standard accessories

No.	Description
172-402	Projection lens set, 10X magnification
512305	Halogen Lamp for Measuring Projector, 24V/150W
12AAF182	Counter stand, For PV-5110 projector
382762	Stage glass, 280 x 180 mm, for projector
172-422	Illumination, Surface illumination unit PV-5110

## Optional accessories

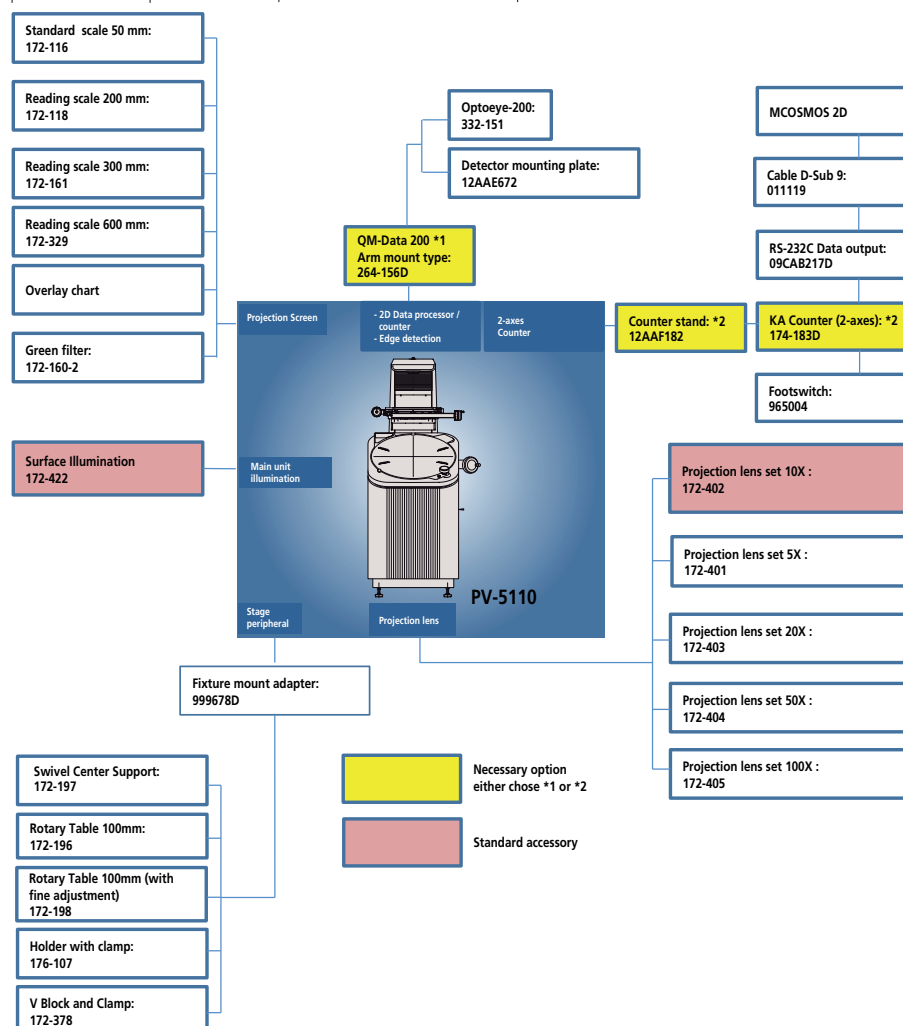
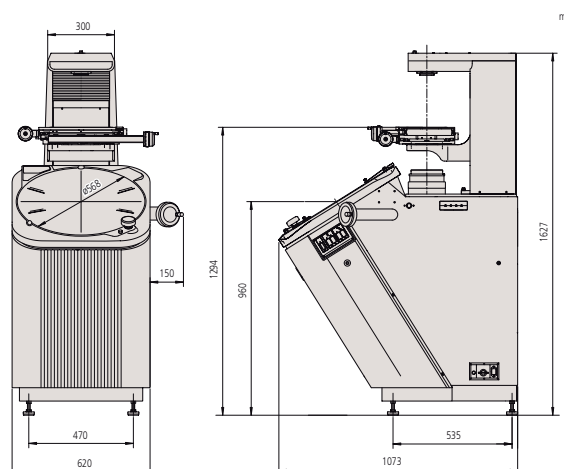
No.	Description
172-401	Projection lens set, 5X magnification
172-403	Projection lens set, 20X magnification
172-404	Projection lens set, 50X magnification
172-405	Projection lens set, 100X magnification
172-116	Inspection tool, Standard scale 50 mm/ 0,1 mm
172-330	Inspection tool, Standard scale 80 mm/ 0,1 mm
172-161	Inspection tool, Reading Scale 300 mm/ 0,5 mm
172-329	Inspection tool, Reading scale 600 mm/ 0,5 mm
172-160-2	Green filter
172-319	Canopy
510189	Vinyl cover for PV500/600 projector
172-198	Rotary table, 100 mm with fine feed knob for TM-1005B
172-197	Fixture/clamping material Swivel center support
176-107	Fixture/clamping material, Holder with clamp
172-378	Fixture/clamping material, V-block with clamp
011534	MC Special Cleaner
174-183D	Linear Scale Counter KA-212
12AAE672	Attachment, Optoeye-200 Attachment B, 500-600 mm
264-156D	2D Data processor, QM-Data 200, arm mount type



172-319

## Series 304 - Accessories/Dimensions

Model	PV-5110
No.	304-919D
XY stage [mm]	200 x 100
Measuring method	Linear encoder
Quick-release mechanism	X and Y axes
XY stage table top size [mm]	380 x 250
XY stage effective area [mm]	266 x 170
Stage glass No.	382762
Table swiveling function	$\pm 3^\circ$
Max stage loading [kg]	5



# Measuring Projector PH-A14

Series 172

## Measuring Projector PH-A14

- Due to the PH-A14's horizontal-beam illumination, you can easily measure larger and heavier workpieces including toothed racks and punching tools.
- You can use the projector for a wide range of applications due to its generous 203 x 102 mm stage travel and 45 kg allowable stage loading.



172-810-20D



KA Counter

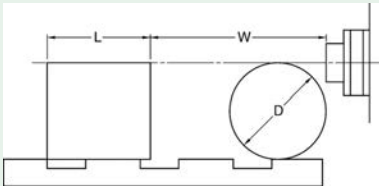


QM-Data 200



OPTOEYE 200

Specifications	
Range	200 x 100
Projected image	Inverted
Projector screen	Effective diameter : 356 mm Screen material : Fine-ground glass Screen rotation : $\pm 360^\circ$ , fine adjustment and clamp Angle reading : Vernier, graduation : 1' Resolution : 1' or 0,01° (switchable) Range : $\pm 370^\circ$ Reference lines : Cross-hairs
Projection lens	10X (172-11) Optional : 20X, 50X, 100X
Magnification accuracy	Contour illumination : $\pm 0,1\%$ or better Surface illumination : $\pm 0,15\%$ or better
Contour illumination	Light source : Halogen bulb (24V, 150W) Optical system : Telecentric Functions : Heat-absorbing filter, Cooling fan
Surface illumination	Light source : Halogen bulb (24V, 150W) Optical system : Vertical illumination Functions : Adjustable condenser lens, Heat-absorbing filter, Cooling fan
Focusing	Manual
Resolution	0,001 mm (using optional KA counter)
Power supply	220 - 240V AC, 50/60Hz
Mass	140 kg



L : Max. workpiece width  
W : Working distance  
D : Max. workpiece diameter

PH-A14		mm			
		Magnification			
		10X	20X	50X	100X
View field		35.6	17.3	7.12	3.56
L		235	235	80	109
W		93	40	14.6	9.5
D		130	116	30.4	19

# Measuring Projector PH-A14

## Series 172 - Accessories/Dimensions

### Specifications

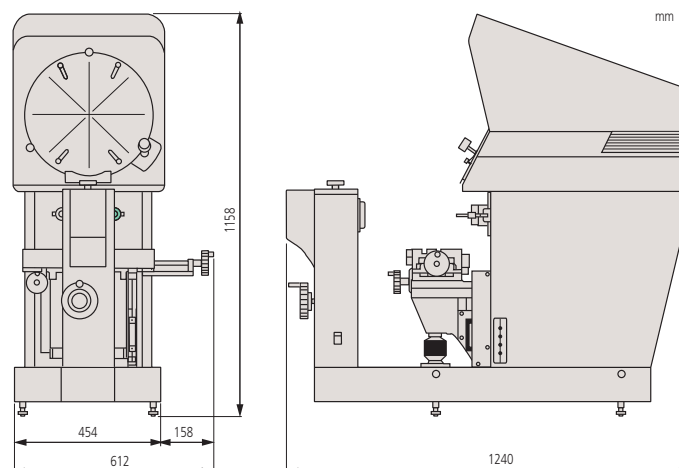
Range 200 x 100

### Standard accessories

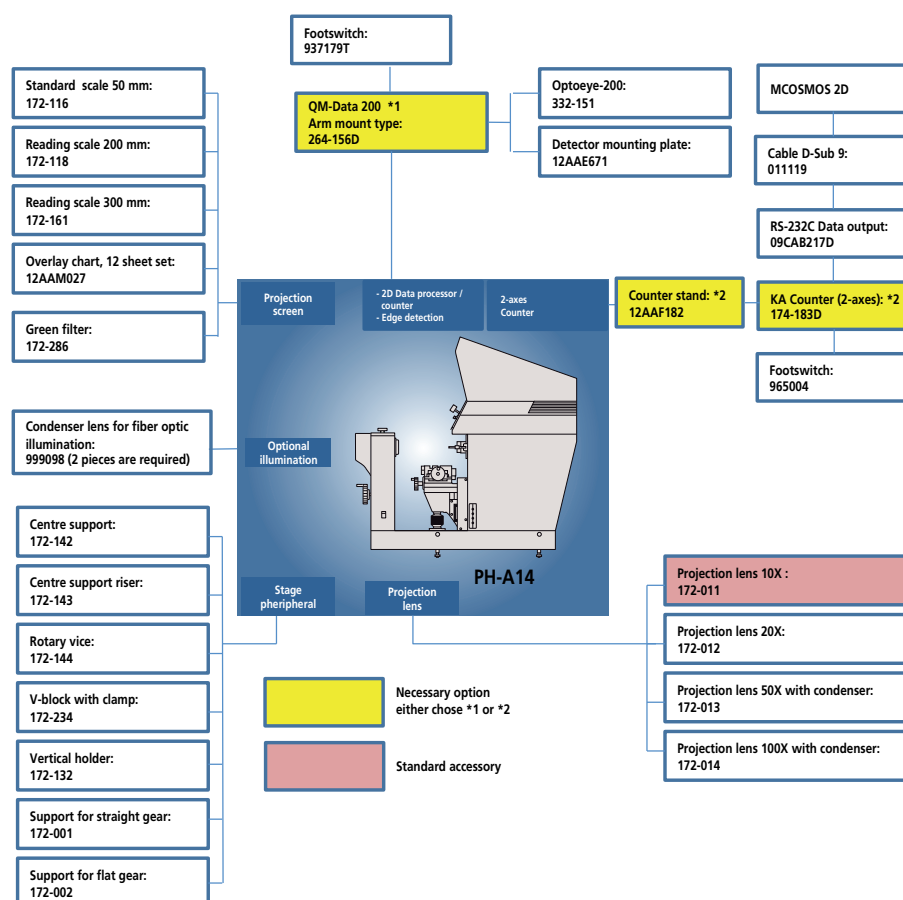
No.	Description
172-011	Projection lens set, 10X magnification for PH-A14
512305	Halogen Lamp for Measuring Projector, 24V/150W

### Optional accessories

No.	Description
174-183D	Linear Scale Counter KA-212
172-013	Projection lens set, 50X magnification for PH-A14
172-012	Projection lens set, 20X magnification for PH-A14
172-014	Projection lens set, 100X magnification for PH-A14
172-116	Inspection tool, Standard scale 50 mm/ 0,1 mm
172-118	Inspection tool, Reading scale 200 mm/ 0,5 mm
172-286	Filter, Colour filter
172-143	Fixture/clamping material, Riser for center stage
172-144	Fixture/clamping material, Rotary vise
172-234	Fixture/clamping material, V-block with clamp
172-132	Fixture/clamping material, Vertical workpiece holder
172-161	Inspection tool, Reading Scale 300 mm/ 0,5 mm
172-001	Fixture/clamping material, Support for straight gear
172-002	Fixture/clamping material, Support for flat gear
172-142	Fixture/clamping material, Center support
011534	MC Special Cleaner
332-151	Sensor, Optoeye-200 edge detection sensor
12AAE671	Attachment, Optoeye-200 Attachment A, 250-350 mm
264-156D	2D Data processor, QM-Data 200, arm mount type
12AAF182	Counter stand, For PV-5110 projector



Model No.	PH-A14
172-810-20D	
XY stage [mm]	203 x 102
Measuring method	Linear encoder
XY stage table top size [mm]	407 x 153
Max stage loading [kg]	45





# Measuring Projector PH-3515F

Series 172

## Measuring Projector PH-3515F

- Due to the PH-3515F's horizontal-beam illumination, you can easily measure larger and heavier workpieces including toothed racks and punching tools. You can use the projector for a wide range of applications due to its generous 254 x 152 mm stage travel and 45 kg allowable stage loading.

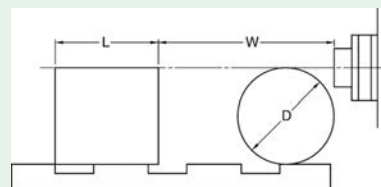
Model	PH-3515F
No.	172-868D
XY stage [mm]	254 x 152
Measuring method	Linear encoder
Quick-release mechanism	X axis
XY stage table top size [mm]	450 x 146
Table swiveling function	±10°
Max stage loading [kg]	45



172-868D

### Specifications

Range	254 x 152
Projected image	Erect
Projector screen	Effective diameter : 353 mm Screen material : Fine-ground glass Screen rotation : ±360°, fine feed and clamp Angle display : Digital counter (LED) Resolution : 1' or 0,01° (switchable) Range : ±370° ABS/INC mode switching, Zero Set Reference lines : Cross-hairs
Projection lens	10X (172-184) Optional : 5X, 20X, 50X, 100X
Magnification accuracy	Contour illumination : ±0,1% or better Surface illumination : ±0,15% or better
Contour illumination	Light source : Halogen bulb (24V, 150W) Optical system : Telecentric system Functions : 2-step (High/Low) brightness adjustment, Heat-absorbing filter, Cooling fan
Surface illumination	Light source : Halogen bulb (24V, 150W) Optical system : Vertical illumination Functions : Adjustable condenser lens, 2-step (High/Low) brightness adjustment, Heat-absorbing filter, Cooling fan
Focusing	Manual
Resolution	0,001 mm
Power supply	220 - 240V AC, 50/60Hz
Mass	150 kg



L : Max. workpiece width  
W : Working distance  
D : Max. workpiece diameter

PH-3515F		mm				
		Magnification				
		5X	10X	20X	50X	100X
View field		70.6	35.3	17.65	7.06	3.5
L		175	235	235	80	109
W		160 (64)	93 (35)	40	14.6	9.5
D		152.4	152.4	116	30.4	19

( ) When using surface illumination

# Measuring Projector PH-3515F

## Series 172 - Accessories/Dimensions

### Standard accessories

No.	Description
383228	Cover, Vinyl cover for PH3500 projector
172-184	Projection lens, 10X magnification for PH-3515F
512305	Halogen Lamp for Measuring Projector, 24V/150W
12BAA637	Bulb, Halogen 24V/200W for PH-3515F twin fiber

### Optional accessories

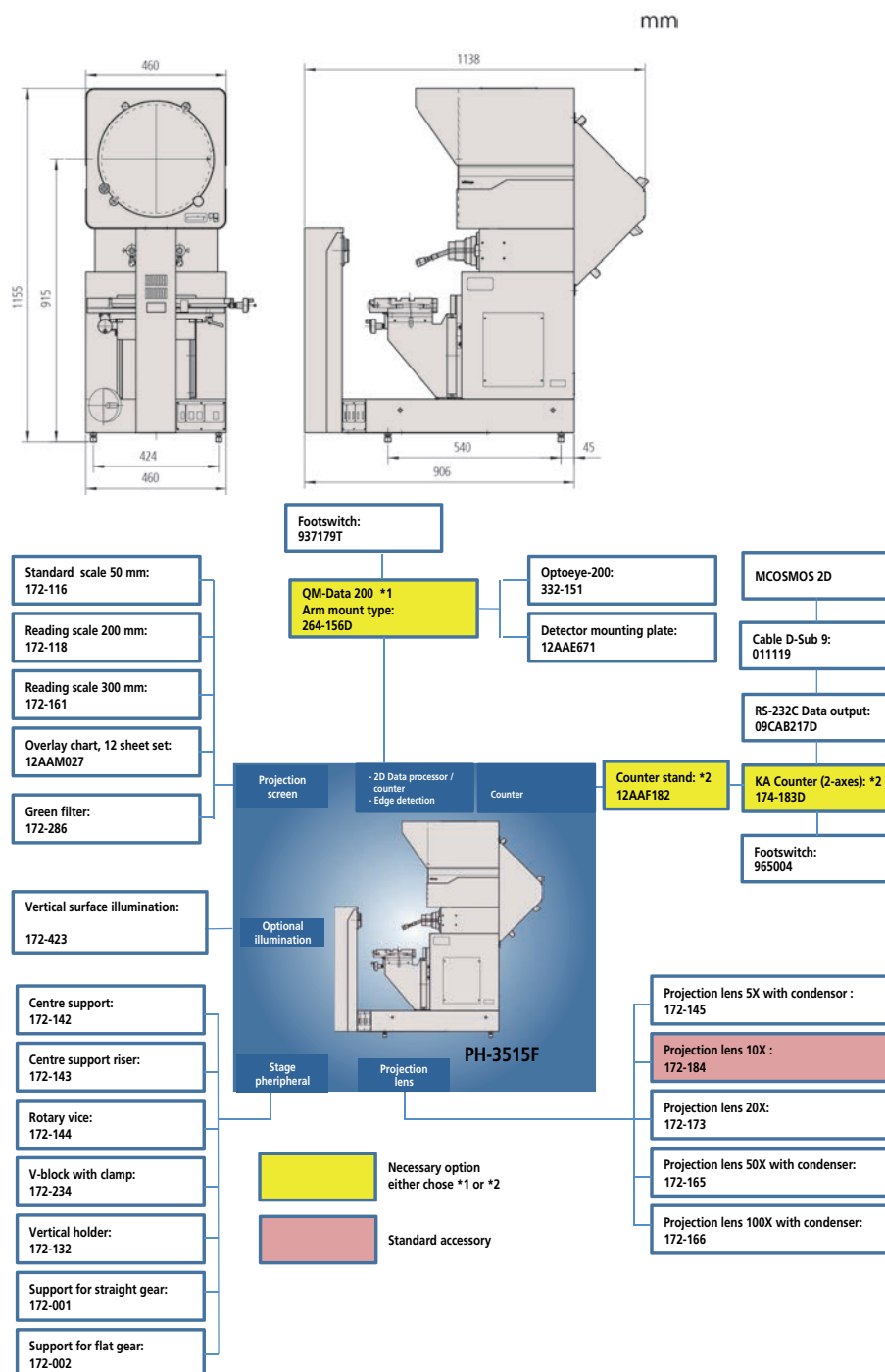
No.	Description
172-145	Projection lens set, 5X magnification
172-173	Projection lens, 20X magnification for PH-3515F
172-165	Projection lens set, 50X magnification for PH-3515F
172-166	Projection lens set, 100X magnification for PH-3515F
172-423	Illumination, Surface illumination unit PH-3515F
172-116	Inspection tool, Standard scale 50 mm/ 0,1 mm
172-118	Inspection tool, Reading scale 200 mm/ 0,5 mm
172-161	Inspection tool, Reading Scale 300 mm/ 0,5 mm
172-286	Filter, Colour filter
172-142	Fixture/clamping material, Center support
172-143	Fixture/clamping material, Riser for center stage
172-144	Fixture/clamping material, Rotary vise
172-234	Fixture/clamping material, V-block with clamp
172-132	Fixture/clamping material, Vertical workpiece holder
12AAM027	Overlay chart set, for Measuring Projector No. 11-22
12AAF182	Counter stand, For PV-5110 projector
011534	MC Special Cleaner
174-183D	Linear Scale Counter KA-212
332-151	Sensor, Optoeye-200 edge detection sensor
12AAE671	Attachment, Optoeye-200 Attachment A, 250-350 mm
264-156D	2D Data processor, QM-Data 200, arm mount type



KA Counter



QM-Data 200



# Data Processing Unit QM-Data 200

## Series 264

The Data Processing Unit QM 200 has been especially designed to process measurement data generated by a profile projector or measuring microscope.

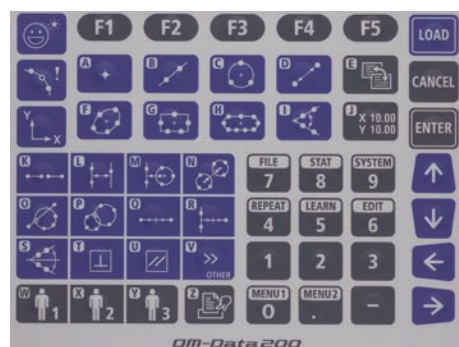
The QM-Data 200 offers you the following benefits:

- Measuring instructions, measuring values and calculation results for various operations are shown on the back-lit LCD in a clear, easy to understand style.
- You can also print measuring results, either on a small and convenient thermal printer (available as a special option) or on an ESC/P printer and continuous paper.
- By connecting an optional floppy disk drive newly created part programs, you can store and/or load measurement results as well as calculation results.

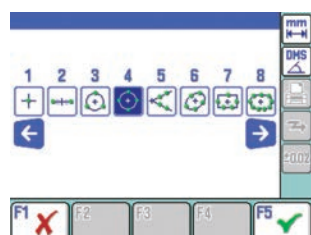


Arm-mount type

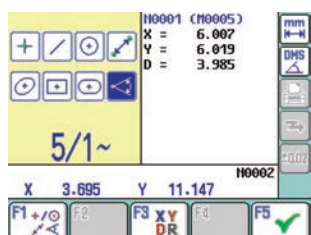
No.	Mass [kg]	Description
264-155D	2,9	Stand-mount type
264-156D	2,8	Arm-mount type
264-159D	2,9	Stand-mount type for Hyper MF / MF-U



Intuitive panel design



Clear function icons



Coloured LCD display with backlight



Guided measurements

## Specifications

Resolution	1 / 0,1 µm
Dimensions [mm]	260 x 242 x 310 : Stand-mount type 318 x 153 x 275 : Arm-mount type
Screen	Colour graphic TFT LCD (320 x 240 dots, with background lighting)
Power supply	100/240V AC, 50/60 Hz
Program functions	Part program creation, execution, editing
Statistical processing	Number of data, maximum value, minimum value, mean value, standard deviation, range, histogram
Data output	USB, RS-232C, Printer
Display language	Japanese/English/German/French/Italian/Spanish/Portuguese/Czech/Traditional Chinese/Simplified Chinese/Korean/Turkish/Swedish/Polish/Dutch/Hungarian
Measuring of Geometric Elements	Maximum of 1000 elements, point, line, circle, distance, ellipse, rectangular hole, slotted hole, intersection and intersecting angle and point & angle, plus a number of functions for evaluation, e.g. perpendicularity and parallelism are provided.
Measurement result file output	CSV format; MUX-10F format
Functions	<b>Mitutoyo's AI Function :</b> The AI function (AI=Artificial Intelligence) renders choosing the element type before measuring obsolete. Point measurements are analysed by the QM-Data and the results for basic elements calculated, thus accelerating the measuring procedure.  <b>Customized Operation :</b> Macro functions and the creation of part programs speed up single and repetition measurements. Additionally macro commands and part programs as well as frequently used standard operations can be stored as user menus.
Data input	USB, RS-232C, X/Y/Z-axis signal, Footswitch

## Optional accessories

No.	Description
12AAD033	Printer, Receipt printer QM-Data 200, 230V
908353-1	Printer paper, 1 roll
I-1525612	Cable FX-85 IBM
937179T	Footswitch for SPC
12AAA807D	Cable RS-232C 2m
63AAA108	RS-232C Signal Cable, D-Sub-25-D-Sub-9, 2m

# Edge Detection Sensor OPTOEYE 200

## Specifications

Image detection	Directivity : All directions
Min. diameter	2 mm on the screen
Min. width	1 mm on the screen
Applicable illumination	Type : Surface/Contour illumination Range : 30 to 2000 Lux on the screen Bright-Dark field difference : 20 Lux
Function	Automatic detection of feature edges for use in measurement

## Optional accessories

No.	Description
12AAE671	Attachment, Optoeye-200 Attachment A, 250-350 mm
12AAE672	Attachment, Optoeye-200 Attachment B, 500-600 mm



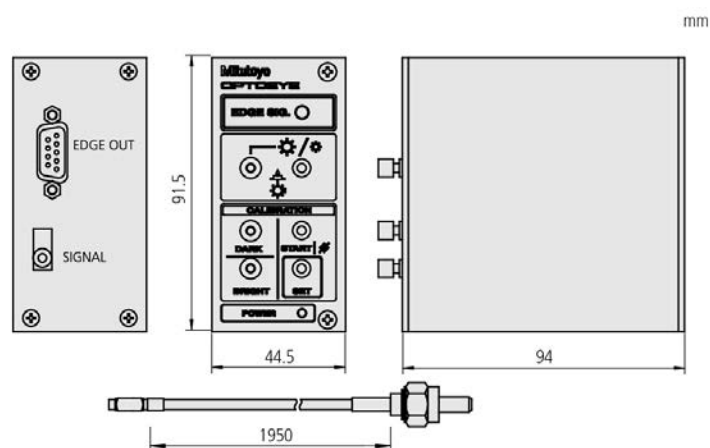
## Series 332

This edge sensor allows you to make accurate measurements whatever your skill level by automatically detecting edges used in measurement.

The Optoeye 200 offers you the following benefits:

- Optoeye 200 reduces the effect of operator skill level on accuracy by automatically detecting edges used in measurement.
- PJ-H30: You can use the Optoeye edge detector on models PJ-H30A (requires adapter plate 12AAG983). The PJ-H30D models have a built-in edge detector.
- PV-5110, PJ-3515F and PJ-A14: You can use the Optoeye edge detector in conjunction with the QM-Data 200.
- PJ-A3000: You can use the Optoeye edge detector on models 302-701/302-702/302-703 in conjunction with the QM-Data 200.
- When you are using the Optoeye all projector scales must be connected to QM-Data 200 directly and built-in counters can no longer be used (except PJ-H30D type).

No.	Description
332-151	Edge detection sensor OPTOEYE 200



# Accessories for Measuring Projectors

## Group 1

### For measuring projectors

These standard overlay charts increase the range of application and the efficiency of Mitutoyo profile projectors.

This chart set offers you the following benefits:

- The charts are supplied in sizes ø250, 300, 340, 500 and 600 mm to suit the screens of Mitutoyo projectors.
- A large range of scales and profiles is provided that enables you to test workpiece features quickly and easily. You can test length, height, parallelism, angle, radius, taper, bore position, diameter, as well as all standardized thread and tooth profiles.
- All charts are made of a distortion-free special plastics compound and are provided with a protective coating.

#### Combination chart

Angle : Divisions at 10° and 30' intervals at **178mm/7"** diameter increasing to **381mm/15"** intervals at **279mm/11"** diameter.

**Features :** All purpose chart for checking diameters, angles, radii and linear divisions

No.	Diameter [mm]
512651	250
512652	300
512653	340
512654	500
512655	600

#### Grid/protractor chart

Angle : 15° increments

**Features :** Ideal for checking diameters, concentricity of diameters, radii, angles and cams.

No.	Diameter [mm]
201380	250
201386	300
201392	340
512621	500
511843	600

#### Radius/protractor chart

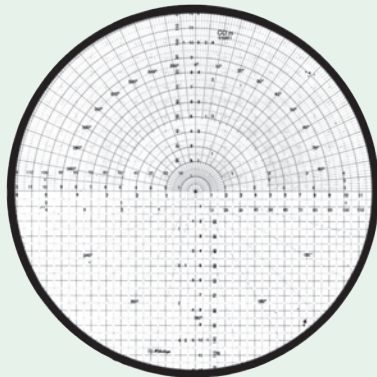
Angle : Divisions at 1° and 30' intervals at **178mm/7"** diameter increasing to **381mm/15"** intervals at **279mm/11"** diameter.

**Features :** Ideal for checking diameters, concentricity of diameters, radii, angles, radii and cams

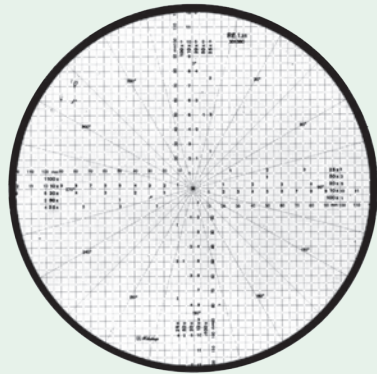
No.	Diameter [mm]
201383	250
201389	300
201395	340
512624	500
511846	600

#### Additional Specifications

Grid divisions	10X : 0,1 mm
	20X : 0,05 mm
	50X : 0,02 mm
	100X : 0,01 mm



Combination chart



Grid/protractor chart



Radius/protractor chart

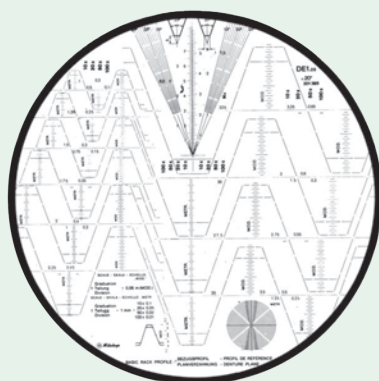


# Accessories for Measuring Projectors

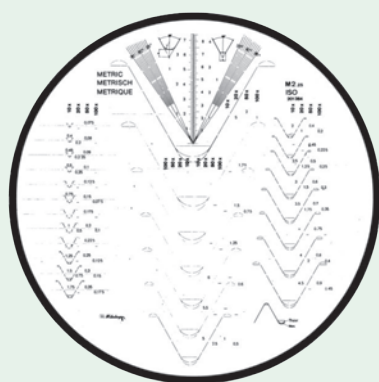
## Additional Specifications

Grid divisions

10X : 0,1 mm  
20X : 0,05 mm  
50X : 0,02 mm  
100X : 0,01 mm



Involute gear teeth



ISO Metric threads



Protractor chart



Radius chart

## Group 1

### For measuring projectors

These standard overlay charts increase the range of application and the efficiency of Mitutoyo profile projectors.

This chart set offers you the following benefits:

- The charts are supplied in sizes  $\varnothing 250$ , 300, 340, 500 and 600 mm to suit the screens of Mitutoyo projectors.
- A large range of scales and profiles is provided that enables you to test workpiece features quickly and easily. You can test length, height, parallelism, angle, radius, taper, bore position, diameter, as well as all standardized thread and tooth profiles.
- All charts are made of a distortion-free special plastics compound and are provided with a protective coating.

### Involute gear teeth

No.	Diameter [mm]
201385	250
201391	300
201397	340
512626	500
511848	600

### ISO Metric threads

No.	Diameter [mm]
201384	250
201390	300
201396	340
512625	500
511847	600

### Protractor chart

Angle : Divisions at  $1^\circ$  and  $30'$  intervals at  $178\text{mm}/7''$  diameter increasing to  $381\text{mm}/15''$  intervals at  $279\text{mm}/11''$  diameter.

**Features :** Dedicated chart especially designed for checking angles with exceptional clarity. Suitable for use at any magnification.

No.	Diameter [mm]
201381	250
201387	300
201393	340
512622	500
511844	600

### Radius chart

**Features :** Dedicated chart especially designed for checking radii, diameters and concentricity with exceptional clarity.

No.	Diameter [mm]
201382	250
201388	300
201394	340
512623	500
511845	600

# Accessories for Measuring Projectors

Group 2 - Makes inspection of projected images an easy process.

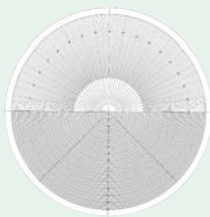


Metric

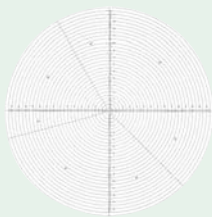
Description	ø 300 mm No.
Concentric circles 1 mm pitch	12AAM589
Concentric circles at 1 mm pitch with radial index 1° increments	12AAM596
Crossed lines with 0,5 mm pitch	12AAM592
Crossed lines with 1 mm graduation and concentric circles 5 mm pitch	12AAM588
Grid chart (10 x 10 mm)	12AAM591
Grid chart (1 mm pitch)	12AAM593
Horizontal for 20X, vertical for 50X with 1 mm graduations	12AAM590
Horizontal lines 1 mm pitch	12AAM595
Metric threads 0,075 - 0,225 mm, 100X involute gear teeth : 20° MOD 0,2-1, 14,5° MOD 0,2-1	12AAM598
Metric threads 0,2-2 mm, unified threads 28-12 TPI 20X Whitworth threads 20-10 TPI 20X	12AAM597
Radial index 1° increments	12AAM594
Radial index 1° increments (upper) concentric circle 1 mm pitch (lower)	12AAM587

## Optional accessories

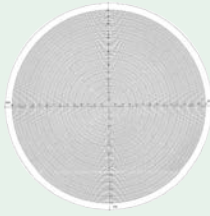
No.	Description
12AAM027	Overlay chart set, for Measuring Projector No. 11-22



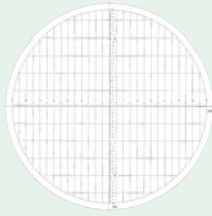
12AAM587



12AAM588



12AAM589



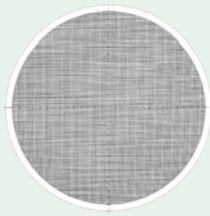
12AAM590



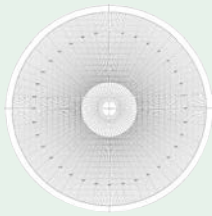
12AAM591



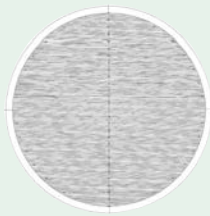
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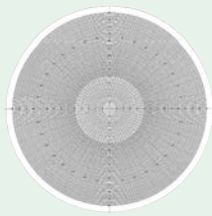
12AAM593



12AAM594



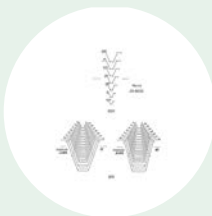
12AAM595



12AAM596



12AAM597



12AAM598

# Accessories for Measuring Projectors

## Workpiece Fixtures

For Profile Projectors and Measuring Microscopes



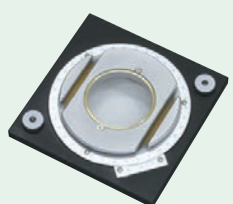
172-142



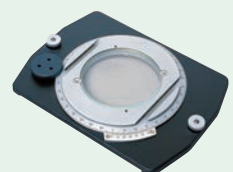
172-143



176-107



176-106



172-198



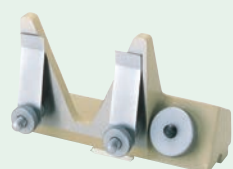
172-144



172-197



172-234 - 172-378



172-132

### Centre Support

No.	Max. workpiece height [mm]	Mass [kg]
172-142	120	3,3

### Centre Support Riser

No.	Max. workpiece height [mm]	Mass [kg]
172-143	240	3,3

### Holder with Clamp

No.	Max. workpiece height [mm]	Mass [kg]
176-107	35	0,42

### Rotary Tables

No.	Effective glass dia. [mm]	Angular resolution °	Fine feed	Mass [kg]
176-106	66	6		1,7
172-198	96	1	Available	2,4
172-196	100	1		2,5
176-305	182		Available	5,5
176-306	238		Available	6,5

### Rotary Vice

No.	Rotary range	Angle graduations °	Max. workpiece height [mm]	Mass [kg]
172-144	360°	5	60	2,8

### Swivel Centre Support

No.	Max workpiece dia. [mm]	Swivel range	Max. workpiece length [mm]	Mass [kg]
176-105	70 (45) when swiveled 10°	±10°	140	2,4
172-197	80 (65) when swiveled 10°	±10°	140	2,5

### V-Block with Clamp

No.	Max workpiece dia. [mm]	Width of block [mm]	Mass [kg]
172-378	25	41	0,8
172-234	50	60	1,24

### Vertical Holder

No.	Mass [kg]
172-132	1,3

**Surface Roughness Measuring Instruments**  
**Surftest**  
**Page 475**



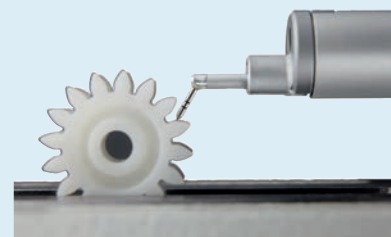
**Contour Measuring Instruments**  
**Contracer**  
**Page 491**



**Surface Roughness & Contour Measuring Instruments**  
**Formtracer**  
**Page 495**



**Accessories Surftest, Contracer, Formtracer**  
**Page 504**



**Form Measuring Instruments**  
**Roundtest**  
**Page 515**



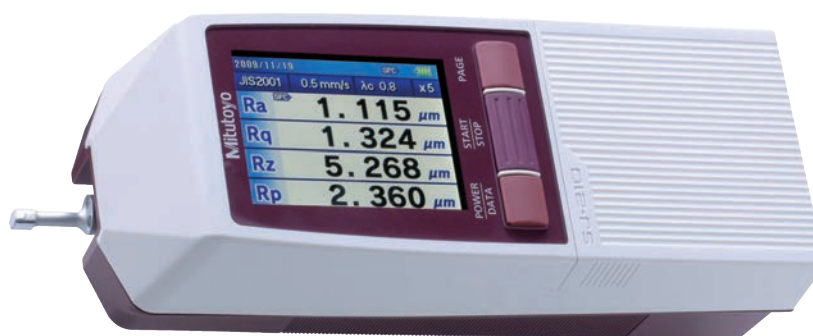
# Surftest SJ-210

## Series 178 - Portable Surface Roughness Measuring Instrument

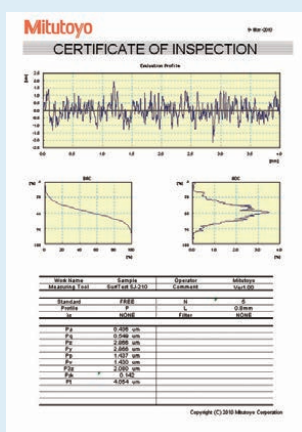
This is a portable measuring instrument that allows you to easily and accurately measure surface roughness.

### The Surftest SJ-210 offers you the following benefits:

- Skid system gives you user friendly and intuitive menu navigation.
- It works independently of mains power, allowing you to make on-site measurements.
- The 6 cm [2,4"] colour graphic, back-lit LCD gives you excellent readability.
- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- Different drivers expanding the range of applications.
- Calculation results, assessed profiles, bearing and amplitude curves can be displayed.
- Support of 21 languages.
- Operation by keys on the front and under the sliding cover.



SJ-210



Software  
USB COMMUNICATION TOOL  
as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)  
registration required  
(refer to page  
Optional Software USB Communication Tool)



Refer to Surftest SJ-210 brochure



Scan QR Code with your mobile device and watch  
our product videos on YouTube

**Metric** Switchable between 16 languages: Japanese, English, German, French, Italian, Spanish, Portuguese, Czech, Polish, Hungarian, Turkish, Swedish, Dutch, Korean, Traditional Chinese, Simplified Chinese

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [µm]	Description	Mass
178-560-01D	0,75	60°	2	SJ-210 model	500 g
178-562-01D	0,75	60°	2	SJ-210R model	500 g
178-564-01D	0,75	60°	2	SJ-210S model	500 g

**Metric** Switchable between 16 languages: Japanese, English, Russian, Slovenian, Rumanian, Bulgarian, Finnish, German, French, Italian, Spanish, Czech, Polish, Hungarian, Turkish, Swedish

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [µm]	Description	Mass
178-560-03D	0,75	60°	2	SJ-210 model	500 g



Standard



R-type



S-type



# Surftest SJ-210

## Series 178 - Portable Surface Roughness Measuring Instrument

The SJ-210R – Retract System is a portable measuring instrument for surface roughness that includes a safety system.

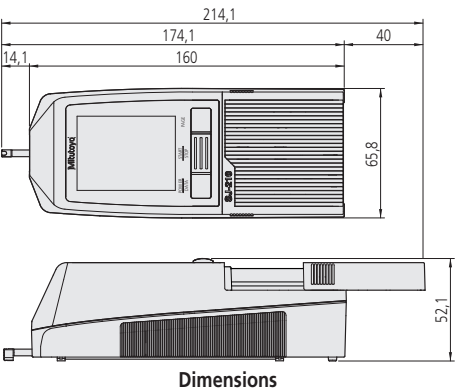
- The detector starts in a safety position, not in contact with the workpiece surface. When measurement starts, the detector is lowered onto the workpiece while the drive unit moves in X measuring direction. During the return movement, the detector lifts up from the workpiece surface before returning to the start position. This is useful for avoiding stylus damage in applications where you cannot easily see the test surface.

### SJ-210S (detailed information further on in this chapter)

- The SJ-210S model is a portable measuring instrument for surface roughness that has a transverse drive capability. This allows you to test shrouded surfaces in the transverse direction, such as crankshaft bearing surfaces, flanged features or deep grooves.



SJ-210



178-029 (displayed with SJ-210)

### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in this section.
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### Optional accessories

No.	Description
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
12AAA221	Adapter for magnetic stand; D8mm, for Surftest SJ-210 / SJ-310
12BAA303	Connection cable for extension 1 m, for Surftest SJ-210
178-029	Granite stand, for Surftest SJ-210 / SJ-310*
178-033	Device for cylindrical workpieces, for Surftest SJ-210 / SJ-310
178-034	Device as universal fixture
178-035	Device for measuring inside diameter
178-230-2	Standard drive unit 17,5mm, for SJ-210 / SJ-310 series
178-233-2	S-type drive unit 5,6mm, for SJ-210 / SJ-310 series
178-235	R-type drive unit 17,5mm, for SJ-210 / SJ-310 series
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m

\* 12AAA221 is needed for SJ-210 / SJ-310



Keyboard protective cover open



Back view

# Surftest SJ-310

## Series 178 - Portable Surface Roughness Measuring Instrument

This is a portable measuring instrument that allows you to easily and accurately measure surface roughness.

### The Surftest SJ-310 offers you the following benefits:

- Skid system with touch-screen functionality and built-in printer.
- It works independently of mains power, allowing you to make on-site measurements.
- Easy and intuitive menu navigation.
- The large **14,5 cm [5,7"]** colour LCD gives you high visibility.
- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- You can store up to 10 different measuring conditions inside the SJ-310, and up to 500 with an optional SD card.
- Statistical analysis and coloured tolerance judgement.
- 2 different evaluation conditions within 1 measurement adjustable.
- You can separately password protect many functions.
- It comes with support for 16 languages.



SJ-310

### Metric

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]	Description	Mass
178-570-01D	0,75	60°	2	SJ-310 model	1,7 kg
178-572-01D	0,75	60°	2	SJ-310R model	1,7 kg
178-574-01D	0,75	60°	2	SJ-310S model	1,7 kg



Standard



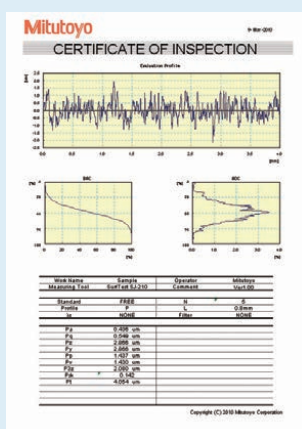
R-type



S-type

### Specifications

<b>Drive unit</b>	
Measuring range	16 mm 4,8 mm [S-type]
Traverse	17,5 mm 5,6 mm [S-type]
Measuring speed	0,25 mm/s; 0,5 mm/s; 0,75 mm/s
<b>Detector</b>	
Measuring method	Differential inductance
Range	360 μm
Stylus	Diamond Tip
Skid radius	40 mm
<b>Display unit</b>	
Profiles	Roughness Profile (R), R-Motif, DF-Profile and more
Roughness standard	EN ISO, VDA, JIS, ANSI and customize settings
Digital filter	Gauss, 2CR75, PC75
Cut-off length	λc : 0,08 mm; 0,25 mm; 0,8 mm; 2,5 mm; 8 mm λs : 2,5 μm; 8 μm
Printer	Thermal Printer
Tolerance	Coloured upper / lower limit
<b>Interface</b>	
	USB, Digimatic, RS-232C, Foot switch
Mass	1,7 kg
Power supply	AC adapter or rechargeable battery



**Software**  
USB COMMUNICATION TOOL  
as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)  
registration required  
(refer to page  
Optional Software USB Communication Tool)



Refer to Surftest SJ-310 brochure



Scan QR Code with your mobile device and watch  
our product videos on YouTube

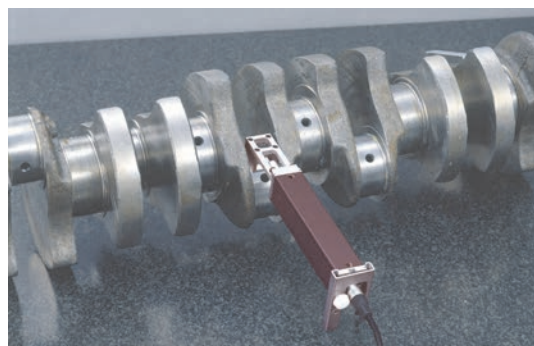
# Surftest SJ-210 and SJ-310 - S-Type

## Series 178 – Portable Transverse Measurement with S-Type Drive Unit

This is an S-Type drive unit for the Surftest SJ-210 and SJ-310 that provides portable transverse measurement.

### It offers you the following benefits:

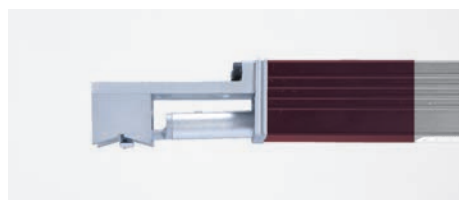
- It is compatible with the conventional drive units of the Surftest SJ-210 and SJ-310.
- You can simply connected it to the display unit.
- A typical application would be to position the S-Type unit on a crankshaft journal bearing, as shown in the photograph below. Once started the S-Type drive will track the stylus across the surface transversely to its own axis and reliably measure surface roughness in the direction of the crankshaft axis. Transverse tracking simplifies the measurement of surface roughness even in very confined situations, which has long been a problem with conventional instruments which allow only longitudinal measurement.



178-234-2 S-Type Drive Unit Set: [incl. 178-233-2 - 12AAE644 - 12AAE643]

### S - Type Drive Unit Set: [ incl. 178-233-2 - 12AAE644 - 12AAE643 ]

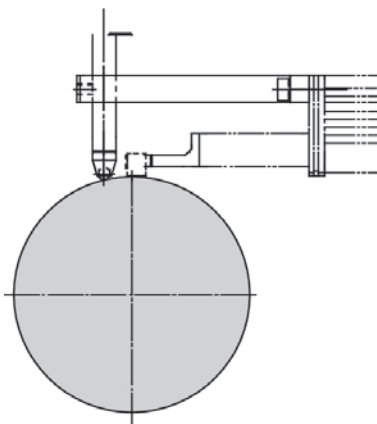
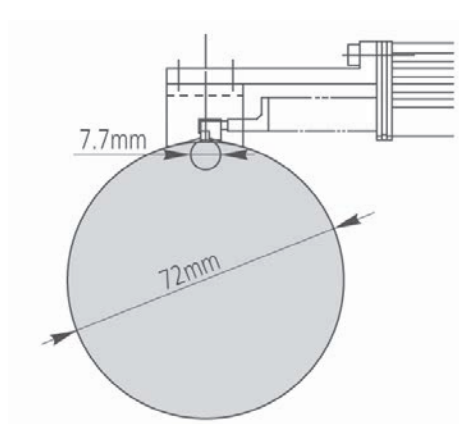
No.	Traverse	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-234-2	5,6 mm	0,75	60°	2



12AAE644  
V-type adapter



12AAE643  
Point - contact adapter



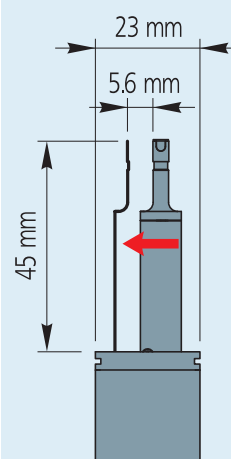
### Specifications

Traverse	5,6 mm
Measuring speed	0,25 mm/s; 0,5 mm/s; 0,75 mm/s

### Optional accessories

No.	Description
12AAA221	Adapter for magnetic stand; D8mm, for Surftest SJ-210 / SJ-310
178-029	Granite stand, for Surftest SJ-210 / SJ-310*
178-230-2	Standard drive unit 17,5mm, for SJ-210 / SJ-310 series
178-233-2	S-type drive unit 5,6mm, for SJ-210 / SJ-310 series
178-235	R-type drive unit 17,5mm, for SJ-210 / SJ-310 series

\*12AAA221 is needed for SJ-210 / SJ-310



Linear movement of S-Type

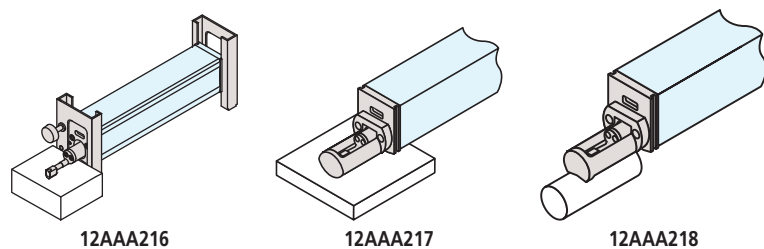
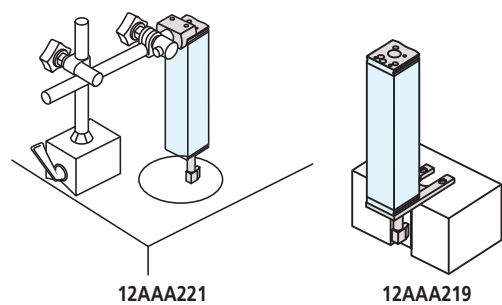
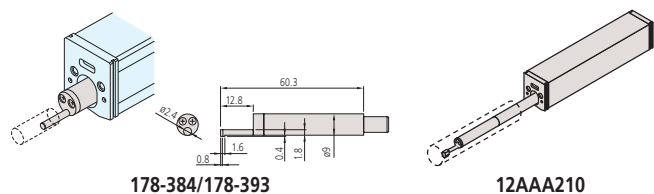
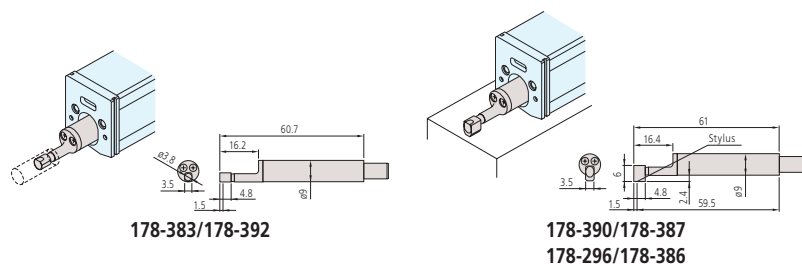
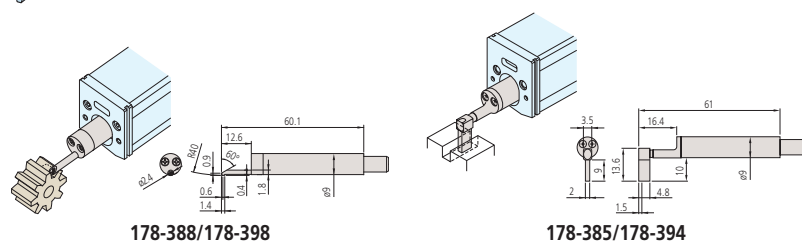
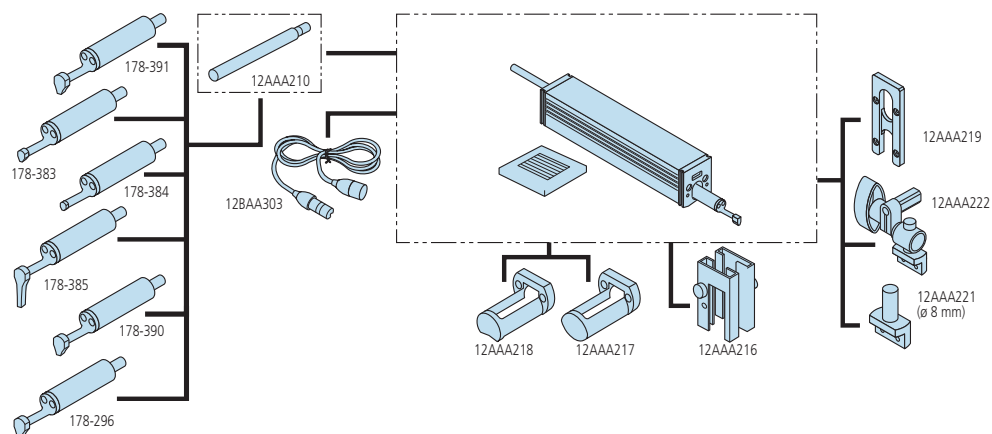
# Accessories for SJ-210 and SJ-310

Series 178 - Standard and Optional Accessories for Surftest SJ-210 / SJ-310

Model		Surftest SJ-210		Surftest SJ-210R		Surftest SJ-210S		Surftest SJ-310		Surftest SJ-310R		Surftest SJ-310S	
No.	Description	Std	Opt	Std	Opt	Std	Opt	Std	Opt	Std	Opt	Std	Opt
12AAA210	Extension rod length 50 mm		●		●				●		●		
12AAA216	Height adjustment feet		●		●			●					
12AAA217	Nosepiece (flat)		●		●			●		●			
12AAA218	Nosepiece (cylindrical)		●		●			●		●			
12AAA219	Adapter for vertical position		●		●				●		●		
12AAA221	Adapter for magnetic stand		●		●		●		●		●		●
12AAA222	Height gauge adapter		●		●		●		●		●		●
12AAA882D	RS-232C connection cable								●		●		●
12AAD510	USB cable for SJ-310 / SJ-410								●		●		●
12AAE643	Point - contact adapter					●						●	
12AAE644	V-type adapter					●						●	
12AAJ088	Footswitch		●		●		●		●		●		●
12AAL066	Protective sheets for display (5 sheets)		●		●		●						
12AAL067	RS-232C cable for printer		●		●		●						
12AAW452	Memory card		●		●		●		●		●		●
12AAN040	Protective film								●		●		●
12AAN046	Battery							●		●		●	
12BAA303	Connecting cable for extension 1 m	●		●		●			●		●		●
12BAG834	Touch pen							●		●		●	
12BAK700	Calibration table	●		●		●		●		●		●	
12BAK728	AC adapter 9V	●		●		●							
12BAL402	Touch Panel Protection							●		●		●	
178-029	Granite stand		●		●		●		●		●		●
178-230-2	Standard Drive unit 17,5 mm	●			●		●	●			●		●
178-233-2	S-Type drive unit 5,6 mm		●		●	●			●		●	●	
178-235	R-Type drive unit 17,5 mm		●	●			●		●	●			●
178-296	Standard detector 2 µm; 0,75 mN	●		●				●		●			
178-383	Detector for small holes Ø4,5 mm; 2 µm; 0,75 mN		●		●				●		●		
178-384	Detector for small holes Ø2,8mm		●		●				●		●		
178-385	Deep groove detector 2 µm; 0,75 mN		●		●				●		●		
178-386	Detector for S-drive 5 µm; 4 mN		●		●	●			●		●	●	
178-387	Detector for S-drive 2 µm; 0,75 mN		●		●	●			●		●	●	
178-388	Detector for gear tooth surface 2 µm; 0,75 mN		●		●				●		●		
178-390	Detector 5 µm; 4 mN		●		●				●		●		
178-391	Detector for soft materials 10 µm; 4 mN		●		●				●		●		
178-392	Detector for small holes Ø4,5 mm; 5 µm; 4 mN		●		●				●		●		
178-393	Detector for small holes Ø2,8 mm; 5 µm; 4 mN		●		●				●		●		
178-394	Deep groove detector 5 µm; 4 mN		●		●				●		●		
178-398	Detector for gear tooth surface 5 µm; 4 mN; 90°		●		●				●		●		
178-421DDS	Printer set for SJ-210		●		●		●						
178-601	Roughness specimen Ra 3 µm	●		●			●	●		●		●	
178-604	Roughness specimen Ra 0,4 µm /3 µm		●		●		●		●		●		●
178-605	Roughness specimen Ra 1 µm		●		●	●			●		●	●	
270732	Printer papers (5 rolls)		●		●		●	●		●		●	
357651	AC Adapter 12V							●		●		●	
63AAA211	USB cable for SJ-210		●		●		●						

# Accessories for SJ-210 and SJ-310

## Series 178

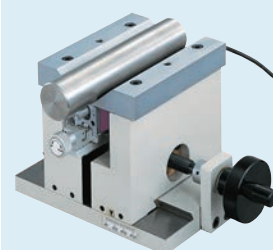


## Optional accessories

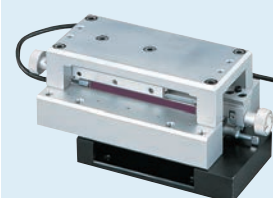
No.	Description
178-033	Device for cylindrical workpieces, for Surftest SJ-210 / SJ-310
178-034	Device as universal fixture
178-035	Device for measuring inside diameter



178-029  
(displayed with 12AAA221 + SJ-210)



178-033



178-034



178-035



# Surftest SJ-410

## Series 178 - Portable Surface Roughness Measuring Instrument

This is a portable measuring instrument that allows you to easily and accurately measure surface roughness.

### The Surftest SJ-410 offers you the following benefits:

- Skidless system with touch-screen functionality and built-in printer.
- It works independently of mains power, allowing you to make on-site measurements.
- Easy and intuitive menu navigation.
- The large **14,5 cm [5,7"]** colour LCD gives you high visibility.
- The skidless detector allows you to measure the primary profile (P), roughness profile (R), waviness profile (W) and more.
- Surface compensation of curved, radial and tilted surfaces.
- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- You can store up to 10 different measuring conditions inside the SJ-410, and up to 500 with an optional SD card.
- It allows two different evaluation conditions within one measurement adjustable.
- You can separately password protect many functions.
- It comes with support for 16 languages.
- Available options include an auto-set unit, X-axis fine adjustment and digital levelling unit.



SJ-410

### Surftest SJ-411

Traverse : 25 mm

Traverse straightness : 0,3 µm / 25 mm

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [µm]
178-580-01D	0,75	60°	2
178-580-02D	4	90°	5

### Surftest SJ-412

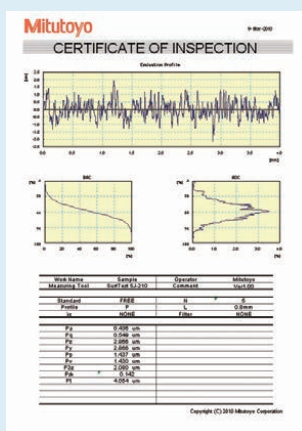
Traverse : 50 mm

Traverse straightness : 0,5 µm / 50 mm

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [µm]
178-582-01D	0,75	60°	2
178-582-02D	4	90°	5

### Specifications

<b>Drive unit</b>	
Traverse	SJ-411: 25 mm SJ-412: 50 mm
Measuring speed	0,05 mm/s; 0,1 mm/s; 0,2 mm/s; 0,5 mm/s; 1 mm/s
<b>Detector</b>	
Measuring method	Skidless - Differential inductance
Range	800 µm; 80 µm; 8 µm (up to 2,4 mm with an optional stylus)
Positioning	±1,5° (tilting), 10 mm (up/down)
<b>Display unit</b>	
Profiles	Primary Profile (P), Roughness Profile (R), Waviness (W), MOTIF (R, W) and more
Standard	EN ISO, VDA, JIS, ANSI and customize settings
Analysis graphs	BAC, ADC
Digital filter	Gauss, 2CR75, PC75
Cut-off length	λc : 0,08 mm; 0,25 mm; 0,8 mm; 2,5 mm; 8 mm λs : 2,5 µm; 8 µm; 25 µm
Printer	Thermal Printer
Tolerance	Coloured upper / lower limit
Interface	USB, Digimatic, RS-232C, Foot switch
Power supply	AC adapter or rechargeable battery



### Software

USB COMMUNICATION TOOL  
as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)  
registration required

(refer to page  
Optional Software USB Communication Tool)



Refer to Surftest SJ-410 brochure



Scan QR Code with your mobile device and watch  
our product videos on YouTube

# Surftest SJ-410

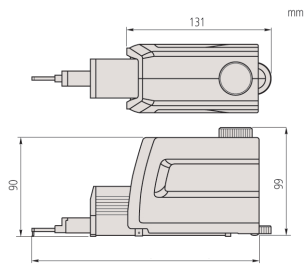
## Series 178 - Portable Surface Roughness Measuring Instrument



Deep groove measurement



R-surface measurement



SJ-411: 207,5 mm / SJ-412: 234 mm  
Drive unit



- Optional:
- Autoset unit 178-010
  - X-axis adjustment unit 178-020
  - Digital leveling unit 178-030



Scope of delivery



178-030  
(displayed with SJ-411)

### Additional Specifications

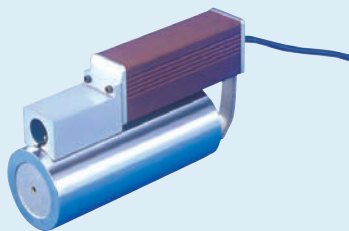
Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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### Optional accessories

No.	Description
02AZD790D	U-WAVE-T Connection Cable D, Flat 10-Pin Type
12AAB358	Cylinder attachment Ø15-60mm
12AAD510	USB cable for SJ-310 / SJ-410 series
12AAL069	Memory card 4GB, for Surftest SJ-210
178-019	Precision vise
178-042-1	Digital XY leveling table [mm], Leveling range +/- 1,5°; 25 x 25mm
178-043-1	XY leveling table [mm], Leveling range +/- 1,5°; 25 x 25mm
178-047	Digital three-axis adjustment table
178-048	Leveling table D.A.T
178-396-2	Detector, 0,75mN
178-397-2	Detector, 4mN
178-605	Roughness specimen Ra 1µm [mm], Ra 1µm
178-610	Step gauge, (1, 2, 5, 10)µm
178-611	Step gauge, mm, (2, 10)µm
936937	Digimatic Cable, Flat 10-Pin Type, 1m
965014	Digimatic Cable, Flat 10-Pin Type, 2m
Stands	
178-039	Granite stand, for SJ-410
178-093	Desktop vibration isolation stand

### Consumable spares

No.	Description
12AAB355	Nosepiece skidless type
12AAN046	Replacement battery, for Surftest SJ-310 / SJ-410
12BAG834	Touch pen, for Surftest SJ-310/410/500, SV-2100
12BAL402	Touch Panel Protecting Sheet
270732	Printer paper, 5 rolls, for SJ-301



12AAB358  
Cylinder attachment



178-048  
Leveling table D.A.T.

# Surftest SJ-500

## Series 178 - Surface Roughness Measuring Instrument

This is a measuring instrument that allows you to easily and accurately measure surface roughness.

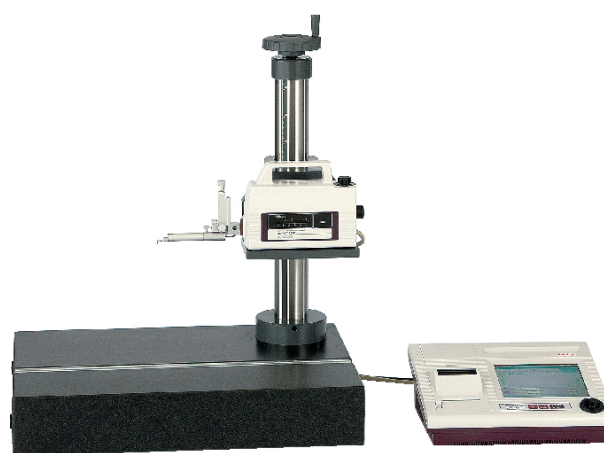
### The Surftest SJ-500 offers you the following benefits:

- The skidless detector allows you to measure the primary profile (P), roughness profile (R), waviness profile (W) and more.
- User friendly control unit for high precision surface roughness measurement.
- The large 19 cm [7,5"] colour TFT LCD with touch-screen functionality gives you high visibility and ease of use.
- The display menu is easy to read and simple to operate.
- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- The built-in joystick on the control unit enables quick and easy positioning. The manual adjustment knob allows you to finely position a small stylus to measure the inside surface of small holes.
- The detector unit allows a 90° displacement of the stylus, which is ideal for crankshaft and narrow space measurement.
- You can use the instrument stand-alone or mounted on a stand.



SJ-500

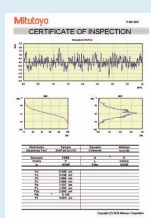
No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-532-01D	0,75	60°	2
178-532-02D	4	90°	5



SJ-500 with optional manual column stand



Preview

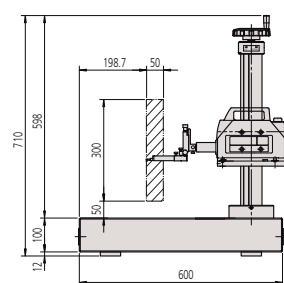


### Software

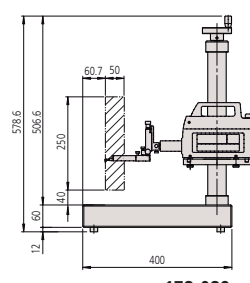
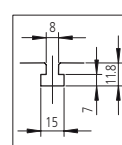
USB COMMUNICATION TOOL  
as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)  
registration required  
(refer to page  
Optional Software USB Communication Tool)



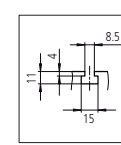
Refer to SURFACE MEASUREMENT brochure



178-085  
600x450x710 mm



178-089  
400x250x578 mm



# Surftest SV-2100

## Series 178 - Surface Roughness Measuring Instrument

This is a stationary measuring instrument that allows you to easily and accurately measure surface roughness.

### The Surftest SV-2100 offers you the following benefits:

- It is mounted on a granite base with a manual or power column.
- The large **19 cm [7,5"]** colour TFT LCD gives you high visibility and touch-screen functionality.
- It has a user friendly display unit for high precision surface roughness measurement.
- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- Designed for usage in workshop areas.



SV-2100S4



SV-2100M4

#### SV-2100H4 model

Vertical travel : 550 mm power column  
Granite base size (WxD) : 600 x 450 mm

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-682-01D	0,75	60°	2

#### SV-2100M4 model

Vertical travel : 350 mm manual column  
Granite base size (WxD) : 600 x 450 mm

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-636-01D	0,75	60°	2

#### SV-2100S4 model

Vertical travel : 350 mm power column  
Granite base size (WxD) : 600 x 450 mm

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-680-01D	0,75	60°	2

#### SV-2100W4 model

Vertical travel : 550 mm power column  
Granite base size (WxD) : 1000 x 450 mm

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-684-01D	0,75	60°	2

### Specifications

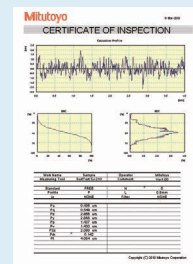
<b>Drive unit</b>	
Traverse	100 mm
Measuring speed	0,02 - 5 mm/s
Drive speed	X = 0-40 mm/s Z2 = 0-20 mm/s or joystick operation
Traverse straightness	0,15 μm / 100 mm
<b>Detector</b>	
Measuring method	Skidless - Differential inductance
Range	800 μm; 80 μm; 8 μm (up to 2,4 mm with an optional stylus)
<b>Display unit</b>	
Profiles	Primary Profile (P), Roughness Profile (R), Waviness (W), MOTIF (R, W) and more
Standard	EN ISO, VDA, JIS, ANSI and customize settings
Analysis graphs	BAC, ADC
Digital filter	Gauss, 2CR75, PC75, RobustSpline
Cut-off length	λc : 0,025 mm; 0,08 mm; 0,25 mm; 0,8 mm; 2,5 mm; 8 mm; 25 mm; 80 mm λs : 0,25 μm; 0,8 μm; 2,5 μm; 8 μm; 25 μm; 80 μm; 250 μm; none λf : 0,08 mm; 0,25 mm; 0,8 mm; 2,5 mm; 8 mm; 25 mm; 80 mm; none
Printer	Thermal printer

### Optional accessories

No.	Description
12AAG202	Extension rod, 50mm
12AAG203	Extension rod, 100mm
218-001	Cross-travel table [mm], 100 x 50mm XY travel
218-003	Rotary vise



### Preview



### Software

#### USB COMMUNICATION TOOL

as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)

registration required

(refer to page

Optional Software USB Communication Tool)



Refer to SURFACE MEASUREMENT brochure



# Surftest SJ-500P

## Series 178 - Surface Roughness Measuring Instruments with Software FORMTRACEPAK

These are surface roughness measuring instruments with software FORMTRACEPAK.

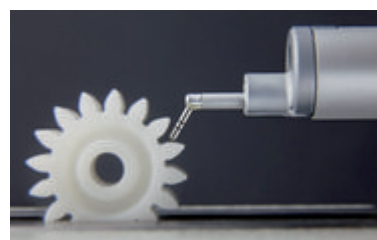
### Software FORMTRACEPAK offers you the following benefits:

- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- It can be used for several contour calculations within the measuring range.
- It offers total support for measurement system control, analysis and inspection report.
- All advantages of the SJ-500 also apply to the P Type.



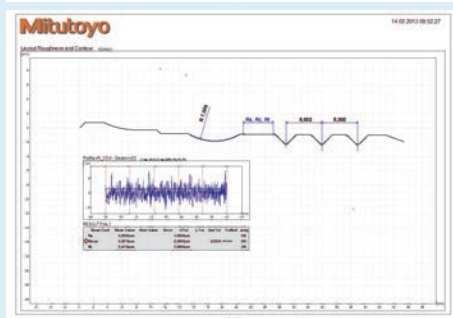
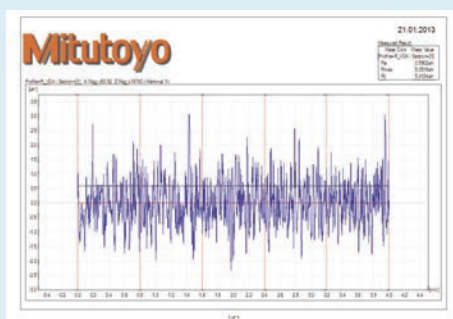
SJ-500P

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [μm]
178-530-01D	0,75	60°	2
178-530-02D	4	90°	5



### Specifications

<b>Drive unit</b>	
Traverse	50 mm
Measuring speed	0,02 - 5 mm/s
Drive speed	0-20 mm/s
Traverse straightness	0,2 μm / 50 mm
<b>Detector</b>	
Measuring method	Skidless - Differential inductance
Range	800 μm; 80 μm; 8 μm (up to 2,4 mm with an optional stylus)
Positioning	±1,5° (tilting) 30 mm (up/down)
<b>Software</b>	<b>FORMTRACEPAK</b>



Formtracepak layout



# Surftest SV-2100P

## Series 178 - Surface Roughness Measuring Instruments with Software FORMTRACEPAK

These are surface roughness measuring instruments with software FORMTRACEPAK.

### Software FORMTRACEPAK offers you the following benefits:

- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- It can be used for several contour calculations within the measuring range.
- It offers total support for measurement system control, analysis and inspection report.
- All advantages of the SV-2100 also apply to the P Type.

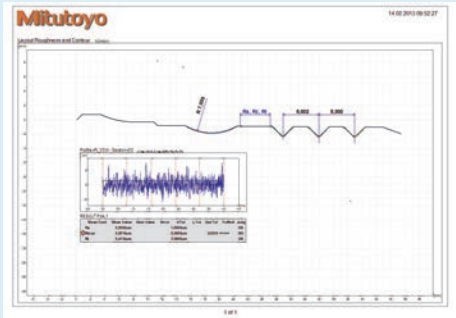
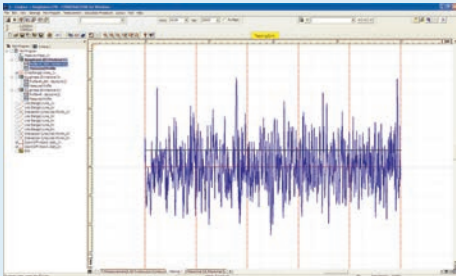


SV-2100P

No.	Detector measuring force [mN]	Stylus tip angle	Stylus tip radius [µm]
178-634-01D	0,75	60°	2
178-634-02D	4	90°	5

### Specifications

<b>Drive unit</b>	
Traverse	100 mm
Measuring speed	0,02 - 5 mm/s
Drive speed	X = 0-40 mm/s Z2 = 0-20 mm/s
Traverse straightness	0,15 µm / 100 mm
<b>Detector</b>	
Measuring method	Skidless - Differential inductance
Range	800 µm; 80 µm; 8 µm (up to 2,4 mm with an optional stylus)
<b>Software</b>	
FORMTRACEPAK	



Refer to SURFACE MEASUREMENT brochure

# Surftest SV-3200

## Series 178 - Surface Roughness Measuring Instrument

This is a stationary surface roughness measuring instrument with FORMTRACEPAK software that allows you to take highly accurate measurements.

### The Surftest SV-3200 offers you the following benefits:

- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS) and customized settings.
- It also supports contour calculation features within the measuring range of the styli software.
- Part programming as well as motorised axes give you many features of a CNC instrument.
- You can choose from a huge number of styli that are easy to replace.
- Detector holders for downward/upward measurement and crank position available as optional.
- Optional accessories like DAT unit and 3D/Y-axis table have been added to product line.

### Specifications

Traverse	100 mm / 200 mm
Range	800 µm; 80 µm; 8 µm (up to 2.4 mm with an optional stylus)
Drive speed	X = 0 - 80 mm/s Z2 = 0 - 30 mm/s
Measuring speed	0,02 - 20 mm/s
Inclining range	±45°
Profiles	Primary Profile (P), Roughness Profile (R), Waviness (W), MOTIF (R, W) and more
Standard	EN ISO, VDA, JIS, ANSI and customize setting

### Software

#### FORMTRACEPAK

- Enables control of all axes and rotary table for realizing efficient measurement automation.
- Perform contour evaluation that allows free analysis of level differences, angles, pitch, area and other characteristics as well as surface roughness evaluation.
- Able to create an original inspection certificate by setting the print format to suit particular requirements.



Detector holder S-3000C



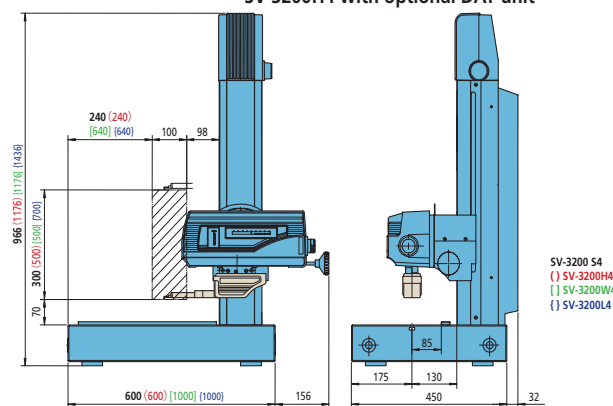
Detector holder S-3000CR



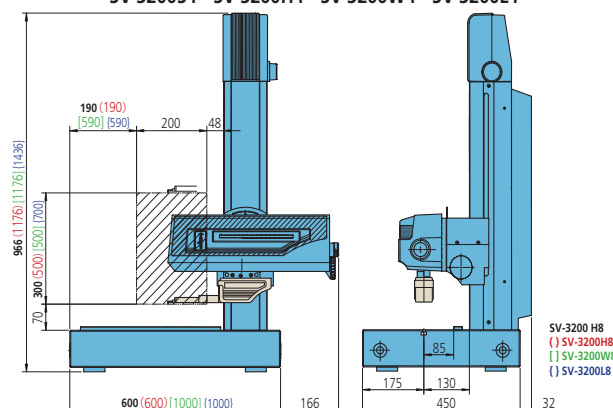
Detector holder S-3000MR



SV-3200H4 with optional DAT unit



SV-3200S4 - SV-3200H4 - SV-3200W4 - SV-3200L4



SV-3200S8 - SV-3200H8 - SV-3200W8 - SV-3200L8

# Surftest SV-3200

X-axis measuring range: 100 mm

X-axis traverse straightness: (0,05+0,001L) µm, L = Measurement length (mm)

Model No.	SV-3200S4 178-434-11D	SV-3200S4. 178-434-12D	SV-3200H4 178-435-11D	SV-3200H4. 178-435-12D
Detector measuring force [mN]	0,75	4	0,75	4
Stylus tip angle	60°	90°	60°	90°
Stylus tip radius [µm]	2	5	2	5
Vertical travel [mm]	300	300	500	500
Granite base size (WxD) [mm]	600 x 450	600 x 450	600 x 450	600 x 450

Model No.	SV-3200W4. 178-436-11D	SV-3200W4 178-436-12D	SV-3200L4 178-474-11D	SV-3200L4. 178-474-12D
Detector measuring force [mN]	0,75	4	0,75	4
Stylus tip angle	60°	90°	60°	90°
Stylus tip radius [µm]	2	5	2	5
Vertical travel [mm]	500	500	700	700
Granite base size (WxD) [mm]	1000 x 450	1000 x 450	1000 x 450	1000 x 450

X-axis measuring range: 200 mm

X-axis traverse straightness: (0,1+0,002L) µm, L = Measurement length (mm)

Model No.	SV-3200S8 178-437-11D	SV-3200S8. 178-437-12D	SV-3200H8 178-438-11D	SV-3200H8. 178-438-12D
Detector measuring force [mN]	0,75	4	0,75	4
Stylus tip angle	60°	90°	60°	90°
Stylus tip radius [µm]	2	5	2	5
Vertical travel [mm]	300	300	500	500
Granite base size (WxD) [mm]	600 x 450	600 x 450	600 x 450	600 x 450

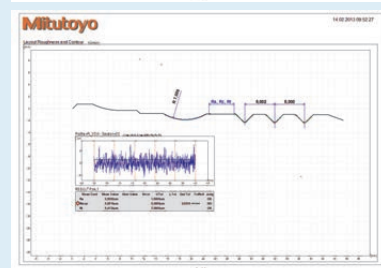
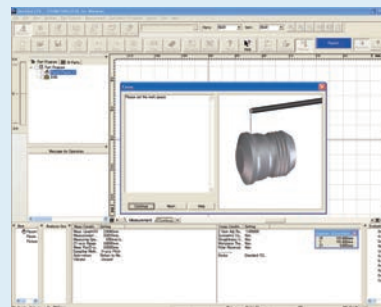
Model No.	SV-3200W8 178-439-11D	SV-3200W8. 178-439-12D	SV-3200L8 178-475-11D	SV-3200L8. 178-475-12D
Detector measuring force [mN]	0,75	4	0,75	4
Stylus tip angle	60°	90°	60°	90°
Stylus tip radius [µm]	2	5	2	5
Vertical travel [mm]	500	500	700	700
Granite base size (WxD) [mm]	1000 x 450	1000 x 450	1000 x 450	1000 x 450



SV-3200 with 178-096 and 178-077

## Optional accessories

No.	Description
12AAD975	Theta-1 axis, Rotary Axis
12AAG202	Extension rod, 50mm
12AAG203	Extension rod, 100mm
12AAR859	Detector stand
178-023	Manual vibration isolator
178-024	Stand for vibration isolator, for 178-023, 178-025
178-025	Automatically charged vibration isolator, with max loading mass 200kg
178-040	D.A.T unit
178-074	Detector holder S-3000C
178-075	Detector holder S-3000CR
178-076	Detector holder S-3000MR
178-077	3D leveling table, (for SV-3200 only with 178-096)
178-078	Theta-2 axis, Rotary Axis
178-087	2D auto-leveling table, for Surftest SV, Contracer, Formtracer
178-096	3 D/Y-axis table
178-097	Y-axis table, for Surftest SV, Contracer, Formtracer
178-396-2	Detector, 0,75mN
178-397-2	Detector, 4mN
178-611	Step gauge, mm, (2, 10)µm
218-001	Cross-travel table [mm], 100 x 50mm XY travel
218-003	Rotary vise



FORMTRACEPAK

# Surftest Extreme SV-3000CNC

## Series 178 – CNC Surface Roughness Measuring Instrument

These is a fully CNC surface roughness measuring instrument with powerful software FORMTRACEPAK.

### The Surftest Extreme SV-3000CNC offers you the following benefits:

- It is perfectly made for increased throughput of multiple profile and workpiece measurement tasks.
- Each axis has a drive speed of up to 200 mm/s.
- You can take continuous measurement over horizontal and inclined surfaces by power-tilting the drive unit.
- Within the measuring range of the styli software FORMTRACEPAK supports contour calculation features.
- 3D topography measurement as option available.
- Inclined plane measurement is possible through 2-axis simultaneous control in the X and Y directions.
- The detector unit incorporates an anti-collision safety device, causing it to automatically stop if its main body collides with a workpiece or jig.
- All models equipped with Y-axis.
- Z-axis tracking measurement for models without  $\alpha$ -axis.

### Specifications

Traverse	X = 200 mm Y = 200 mm
Range	800 $\mu$ m; 80 $\mu$ m; 8 $\mu$ m (up to 2,4 mm with an optional stylus)
Measuring speed	0,02 - 2 mm/s
Drive speed	CNC mode: max. 200 mm/s Joystick mode: 0 - 50 mm/s
Traverse straightness	0,5 $\mu$ m / 200 mm
Inclining range	-45° (CCW) to +10° (CW)
Profiles	Primary Profile (P), Roughness Profile (R), Waviness (W), MOTIF (R, W) and more
Standard	EN ISO, VDA, JIS, ANSI and customize setting
Software	<b>FORMTRACEPAK</b> <ul style="list-style-type: none"> <li>• Allows control of all axis, motor-driven Y-axis table and optional rotary table for efficient automated measurement.</li> <li>• Surface roughness analysis and contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.</li> <li>• An inspection certificate can be created by setting the print format as required.</li> </ul>

### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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### Optional accessories

No.	Description
12AAD975	Theta-1 axis, Rotary Axis
12AAE032	Special anti-vibration table
12AAE449	Cabin for H-type used with CNC series, for Z2=500mm
178-037	2D auto-leveling table, for CNC Surftest and Formtracer
178-077	3D leveling table, (for SV-3200 only with 178-096)
178-078	Theta-2 axis, Rotary Axis



Refer to **SURFACE MEASUREMENT** brochure



SV-3000CNC

Model No.	SV-3000CNC-S	SV-3000CNC-H	SV-3000CNC-S.	SV-3000CNC-H.
Z2-axis range [mm]	300	300	500	500
Y-axis table unit	Installed	Installed	Installed	Installed
$\alpha$ -axis unit	-	Installed	-	Installed



Automatic measurement



# Surftest Extreme SV-M3000CNC

## Series 178 - CNC Surface Roughness Measuring Instrument

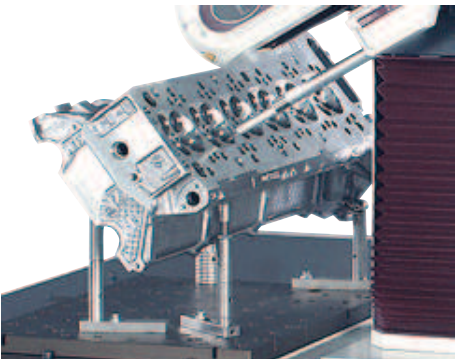
This is a top performance CNC surface roughness measuring instrument with powerful software FORMTRACEPAK.

### The Surftest Extreme SV-M3000CNC offers you the following benefits:

- You can measure large and heavy workpieces such as engine blocks and crankshafts.
- It has an 800mm moving column configuration to largely eliminate workpiece size restrictions.
- Each axis has a drive speed of up to 200 mm/s.
- When combined with the optional detector swivelling unit, continuous measurement over the bottom, top and side surface of a workpiece is possible.
- The huge load table has a self-contained structure ensuring that you can easily accommodate various size workpieces, standard and custom jigs, and auto-feed devices.



No.	Model	Detector hold type (Essential option)
178-549-2	178-071	Standard
	178-072	Long type
	178-073	Rotary type



Typical measurement task

Specifications	
Traverse	X = 200 mm Y = 800 mm Z2 = 500 mm
Range	800 µm; 80 µm; 8 µm (up to 2,4 mm with an optional stylus)
Measuring speed	0,02 - 2 mm/s
Drive speed	CNC mode: max. 200 mm/s Joystick mode: 0 - 50 mm/s
Traverse straightness	X = 0,5 µm / 200 mm (standard) X = 0,7 µm / 200 mm (long-type detector) X = 0,5 µm / 200 mm (rotary-type detector) Y = 0,5 µm / 50 mm; 2 µm / 800 mm (standard) Y = 0,7 µm / 50 mm; 3 µm / 800 mm (long-type detector) Y = 0,7 µm / 50 mm; 3 µm / 800 mm (rotary-type detector)
Inclining range	-45° (CCW) to +10° (CW)
Profiles	Primary Profile (P), Roughness Profile (R), Waviness (W), MOTIF (R, W) and more
Standard	EN ISO, VDA, JIS, ANSI and customize setting
Loading weight	300 kg
Software	<b>FORMTRACEPAK</b> <ul style="list-style-type: none"> <li>• Enables control of all axes for realizing efficient measurement automation.</li> <li>• Perform contour evaluation that allows free analysis of level differences, angles, pitch, area and other characteristics as well as surface roughness evaluation.</li> <li>• Able to create an original inspection certificate by setting the print format to suit particular requirements.</li> </ul>

### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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Refer to SURFACE MEASUREMENT brochure



# Contracer CV-2100

## Series 218 - Contour Measuring Instruments

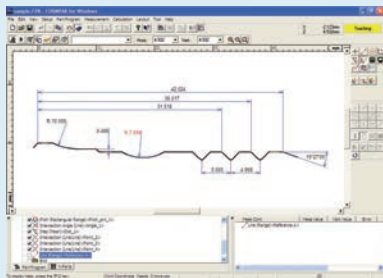
This contour measuring instrument is designed to support "easy to use" and "speedy" measurements.

**The Contracer CV-2100N4 and CV-2100M4 offer you the following benefits:**

- Extensive contour measurement quick and easy.
- Quick movement in Z2 because of an easy to use quick grip. [M4 type]
- Auto execution and multi point measurement with the new stylus up-and down function.
- X-axis drive up to 20 mm/s by jog shuttle.
- Easy part programming as well as single measurement with software FORMTRACEPAK.
- Automatic evaluation, best fit of contours, CAD comparison and many more features as standard.
- CV-2100 M4 mounted with quick grip stand on a granite base.
- CV-2100 N4 can be mounted on an optional granite base with a manual column.
- Centralized front control panel.

### Specifications

Measuring range	Z1 = 50 mm X = 100 mm
Measuring speed	0,02 - 5 mm/s
Drive speed	X = 0 - 20 mm/s
Accuracy	X = (2,5 + 0,02L) µm [L: drive length (mm)] Z1 = (2,5 + 10,1H) µm [H: Measurement height from the horizontal position (mm)]
Traverse straightness	2,5 µm / 100 mm
Column type	M4: 350 mm
Software	<b>FORMTRACEPAK</b> <ul style="list-style-type: none"> <li>• Allows control of measuring conditions for efficient automated measurement.</li> <li>• Contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.</li> <li>• An inspection certificate can be created by setting the print format as required.</li> </ul>



FORMTRACEPAK



Refer to CV-2100 brochure



Scan QR Code with your mobile device and watch our product videos on YouTube



CV-2100M4



CV-2100N4

# Contracer CV-2100

## Series 218 - Contour Measuring Instruments

### Specifications and accessories

Model No.	CV-2100N4 218-613D	CV-2100M4 218-633D
Z2-axis range [mm]	-	350
Z1-axis range [mm]	50	50
Z2-axis column type	Optional: Manual	Manual: Quick up-and-down motion, fine feed
X1-axis range [mm]	100	100



CV-2100 stylus up-and-down function



CV-2100M4 with column and quick grip



Easy and quick movement in Z2

### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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### Optional accessories

No.	Description
178-023	Manual vibration isolator
178-024	Stand for vibration isolator, for 178-023, 178-025
218-001	Cross-travel table [mm], 100 x 50mm XY travel
218-003	Rotary vise
218-042	Column Stand, for CV-2100N4



Optional column stand 218-042

# Contracer CV-3200 and CV-4500

## Series 218 - Contour Measuring Instruments

These are high accuracy semi-automatic contour measuring instruments equipped with powerful software FORMTRACEPAK.

### The Contracer CV-3200 offers you the following benefits:

- Huge measuring range of Z = 60 mm comes as standard.
- Easy exchange of magnetic stylus arm gives you excellent flexibility.
- The CV-3200 provides excellent accuracy and resolution in Z1-axis measurement.
- Its high positioning speed reduces the total measurement time.
- It has a fully automatic calibration routine.

### The Contracer CV-4500 offers you the following benefits:

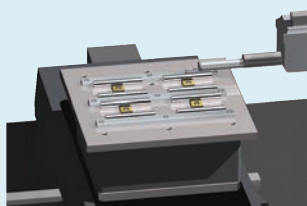
- It has a dual stylus system for upward/downward measurement at double sided contours.
- Variable measuring force is controlled by software FORMTRACEPAK.
- Easy exchange of magnetic stylus arm gives you excellent flexibility.
- The CV-4500 provides the highest accuracy and resolution possible.
- The motorised axes have a high positioning speed.
- The dual stylus system has a fully automatic calibration routine.

### Specifications

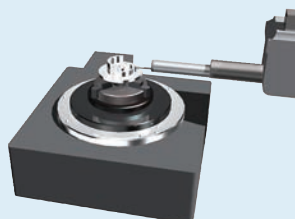
Traverse	Z2 = 300 mm / 500 mm / 700 mm
Measuring range	Z1 = 60 mm X = 100 mm / 200 mm
Measuring speed	0,02 - 20 mm/s
Drive speed	X = 0 - 80 mm/s Z2 = 0 - 30 mm/s
Accuracy	X = (0,8+0,01L) µm (S4, H4, W4, L4 model) X = (0,8+0,02L) µm (S8, H8, W8, L8 model) [ L : Drive length (mm) ] CV-3200 : Z1 = (1,4+12H/100) µm CV-4500 : Z1 = (0,8+12H/100) µm [ H : Measurement height from the horizontal position (mm) ]
Inclining range	±45°
Software	FORMTRACEPAK

### Additional Specifications

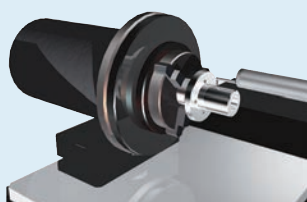
Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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Optional Y-axis - 178-097



Optional Rotary table 01 - 12AAD975



Optional Rotary table 02 - 178-078



Refer to CONTOUR MEASUREMENT brochure



Contracer CV-3200  
(CV-4500 equipped with dual stylus system)



Drive unit CV-3200

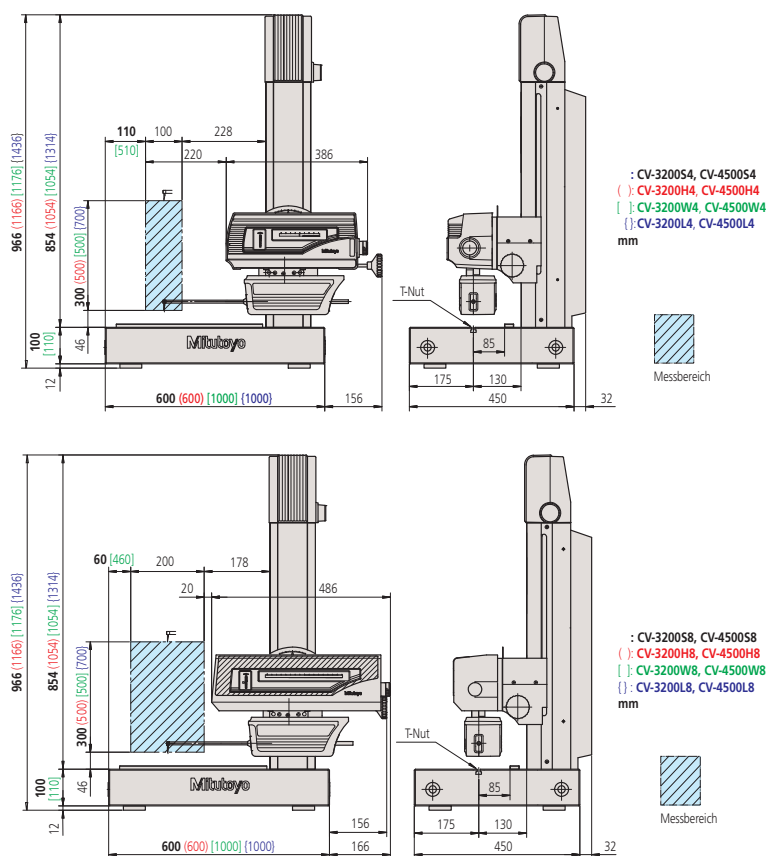


Drive unit CV-4500

# Contracer CV-3200 and CV-4500

## Series 218 - Contour Measuring Instruments

### Dimensions and specifications



#### CV-3200

Model	CV-3200S4	CV-3200H4	CV-3200W4	CV-3200L4
No.	218-481-10D	218-482-10D	218-483-10D	218-484-10D
X1-axis range [mm]	100	100	100	100
Vertical travel [mm]	300	500	500	700
Granite base size (WxD) [mm]	600x450	600x450	1000x450	1000x450

Model	CV-3200S8	CV-3200H8	CV-3200W8	CV-3200L8
No.	218-486-10D	218-487-10D	218-488-10D	218-489-10D
X1-axis range [mm]	200	200	200	200
Vertical travel [mm]	300	500	500	700
Granite base size (WxD) [mm]	600x450	600x450	1000x450	1000x450

#### CV-4500

Model	CV-4500S4	CV-4500H4	CV-4500W4	CV-4500L4
No.	218-441-10D	218-442-10D	218-443-10D	218-444-10D
X1-axis range [mm]	100	100	100	100
Vertical travel [mm]	300	500	500	700
Granite base size (WxD) [mm]	600x450	600x450	1000x450	1000x450

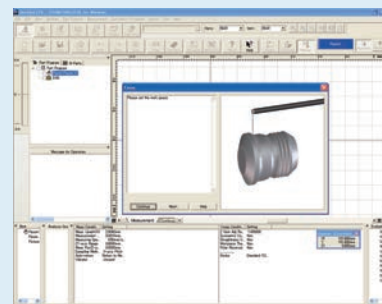
Model	CV-4500S8	CV-4500H8	CV-4500W8	CV-4500L8
No.	218-446-10D	218-447-10D	218-448-10D	218-449-10D
X1-axis range [mm]	200	200	200	200
Vertical travel [mm]	300	500	500	700
Granite base size (WxD) [mm]	600x450	600x450	1000x450	1000x450

### Specifications

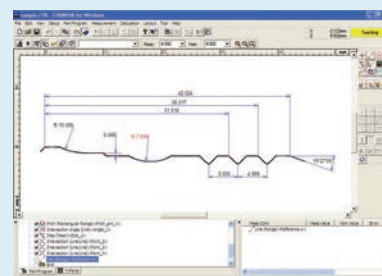
#### Software

#### FORMTRACEPAK

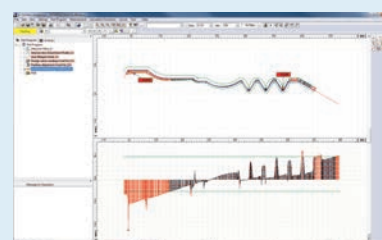
- Allows control of all axis, optional motor-driven Y-axis table and rotary table for efficient automated measurement.
- Contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.
- An inspection certificate can be created by setting the print format as required.



Measurement control screen



Contour analysis screen



Contour comparison

#### FORMTRACEPAK

# Formtracer SV-C3200 and SV-C4500

## Specifications

Traverse	ZZ = 300 mm / 500 mm / 700 mm
Measuring range	X = 100 mm / 200 mm <b>Contour:</b> Z1 = 60 mm <b>Roughness:</b> Z1 = 800 µm; 80 µm; 8 µm (up to 2,4 mm with an optional stylus)
Measuring speed	0,02 - 20 mm/s
Drive speed	X = 0 - 80 mm/s ZZ = 0 - 30 mm/s
Accuracy	X = (0,8+0,01L) µm (S4, H4, W4, L4 model) X = (0,8+0,02L) µm (S8, H8, W8, L8 model) [ L : Drive length (mm) ] <b>SV-C3200 :</b> Z1 = (1,4+12HI/100) µm <b>SV-C4500 :</b> Z1 = (0,8+12HI/100) µm [ H : Measurement height from the horizontal position (mm) ]
Inclining range	±45°
Measuring force	<b>SV-C3200 Contour :</b> 30 mN <b>SV-C4500 Contour :</b> 10, 20, 30, 40, 50 mN software controlled <b>Roughness :</b> 0,75 mN / 4 mN (dependent on model)
Software	FORMTRACEPAK

## Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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Refer to Formtracer SV-C3200 / 4500 brochure



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## Series 525 - Surface and Contour Measuring System

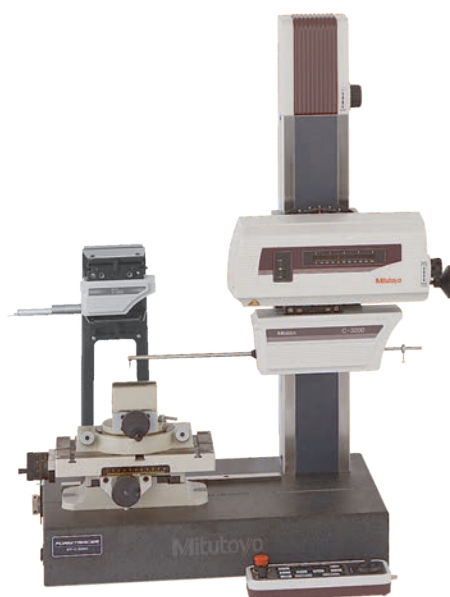
These are high accuracy semi-automatic contour and roughness measuring instruments equipped with powerful software FORMTRACEPAK.

### The Formtracer SV-C3200 offers you the following benefits:

- It is as powerful as two separate, specialised instruments.
- It economically combines roughness & contour measurement into a single device.
- You have access to a huge contour measuring range of Z = 60 mm as standard, and a roughness measurement range of 800 µm as standard.
- Easy exchange of the magnetic contour stylus arm gives you excellent flexibility.
- The SV-C3200 provides you with excellent accuracy and resolution in Z1-axis measurement.

### The Formtracer SV-C4500 offers you the following benefits:

- It economically combines roughness & dual stylus upward/downward contour measurement into a single device.
- You have access to a huge contour measuring range of Z = 60 mm as standard, and a roughness measurement range of 800 µm as standard.
- Its variable measuring force is controlled by software FORMTRACEPAK.
- Easy exchange of the magnetic contour stylus arm gives you excellent flexibility.
- The SV-C4500 provides you with high accuracy and resolution.



Formtracer SV-C3200



Surface roughness drive unit

[Surface roughness measurement : Complies with EN ISO, VDA, JIS, ANSI and other international surface roughness standards.]



Contour drive unit SV-C3200



Contour drive unit SV-C4500

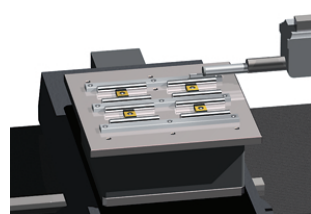


# Formtracer SV-C3200 and SV-C4500

## Series 525 - Surface and Contour Measuring System

Metric SV-C3200									
No.	Model	Detector 0,75 mN	Detector 4 mN	X-axis 100 mm	X-axis 200 mm	Z2-axis 300 mm	Z2-axis 500 mm	Z2-axis 700 mm	Granite size (WxD) [mm]
525-481-11D	SV-C3200S4	●		●		●			600 x 450
525-481-12D	"		●	●		●			600 x 450
525-482-11D	SV-C3200H4	●		●			●		600 x 450
525-482-12D	"		●	●			●		600 x 450
525-483-11D	SV-C3200W4	●		●			●		1000 x 450
525-483-12D	"		●	●			●		1000 x 450
525-484-11D	SV-C3200L4	●		●				●	1000 x 450
525-484-12D	"		●	●				●	1000 x 450
525-486-11D	SV-C3200S8	●			●	●			600 x 450
525-486-12D	"		●		●	●			600 x 450
525-487-11D	SV-C3200H8	●			●		●		600 x 450
525-487-12D	"		●		●		●		600 x 450
525-488-11D	SV-C3200W8	●			●		●		1000 x 450
525-488-12D	"		●		●		●		1000 x 450
525-489-11D	SV-C3200L8	●			●			●	1000 x 450
525-489-12D	"		●		●			●	1000 x 450

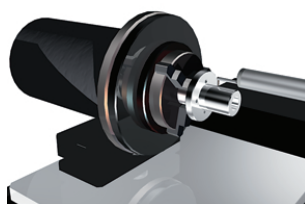
Metric SV-C4500									
No.	Model	Detector 0,75 mN	Detector 4 mN	X-axis 100 mm	X-axis 200 mm	Z2-axis 300 mm	Z2-axis 500 mm	Z2-axis 700 mm	Granite size (WxD) [mm]
525-441-11D	SV-C4500S4	●		●		●			600 x 450
525-441-12D	"		●	●		●			600 x 450
525-442-11D	SV-C4500H4	●		●			●		600 x 450
525-442-12D	"		●	●			●		600 x 450
525-443-11D	SV-C4500W4	●		●			●		1000 x 450
525-443-12D	"		●	●			●		1000 x 450
525-444-11D	SV-C4500L4	●		●				●	1000 x 450
525-444-12D	"		●	●				●	1000 x 450
525-446-11D	SV-C4500S8	●			●	●			600 x 450
525-446-12D	"		●		●	●			600 x 450
525-447-11D	SV-C4500H8	●			●		●		600 x 450
525-447-12D	"		●		●		●		600 x 450
525-448-11D	SV-C4500W8	●			●		●		1000 x 450
525-448-12D	"		●		●		●		1000 x 450
525-449-11D	SV-C4500L8	●			●			●	1000 x 450
525-449-12D	"		●		●			●	1000 x 450



Using Y-axis table



Using rotary table 01



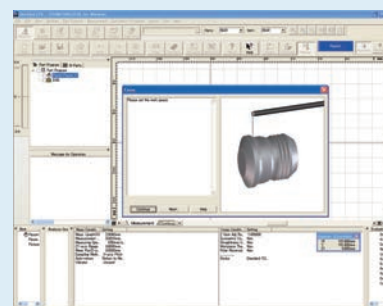
Using rotary table 02

## Specifications

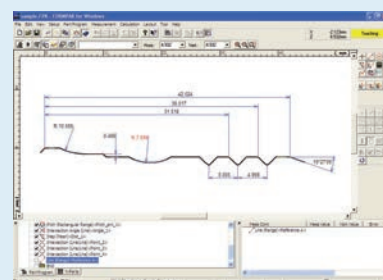
### Software

### FORMTRACEPAK

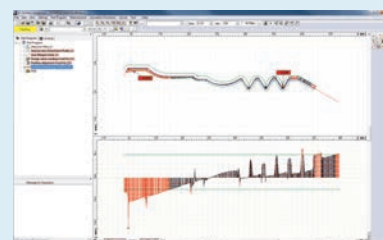
- Allows control of all axis, optional motor-driven Y-axis table and rotary table for efficient automated measurement.
- Contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.
- An inspection certificate can be created by setting the print format as required.



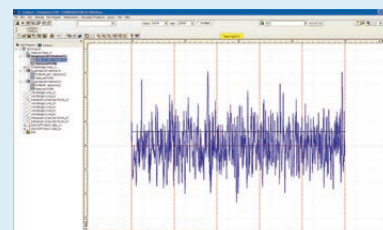
Measurement control screen



Contour analysis screen



Contour comparison



Roughness analysis

# Formtracer CS-3200

## Series 525 - Surface and Contour Measuring System

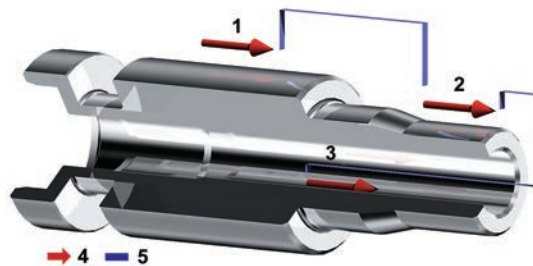
This provides all-in-one surface roughness and contour measurement within one drive unit.

### The Formtracer CS-3200 offers you the following benefits:

- You can carry out simultaneous analysis of roughness and contour with one measurement.
- It performs roughness analyses conform to various international standards (EN ISO, VDA, ANSI, JIS and customized settings).
- It gives you the best measuring condition with a vibration stand as standard.
- The high drive speed reduces the total measurement time.
- The detector unit can be extended to avoid interference between the drive unit and workpiece.



CS-3200S4  
(with optional Y-axis 178-097)



- 1: Outside diameter
- 2: Outside diameter
- 3: Inside diameter
- 4: Measurement element
- 5: Positioning element

### Continuous measurement example:

The drive unit (X-axis) and column (Z2-axis) are equipped with high-accuracy linear scales (ABS type) enabling fully automatic measurement combining vertical and horizontal movement. This improves reproducibility of continuous automatic measurement of small holes in the vertical direction and repeated measurements of parts which are difficult to position

### Specifications

Traverse	Z2 = 300 mm
Measuring range	X = 100 mm Z1 = 5 mm (up to 10 mm with an optional stylus)
Measuring speed	Roughness measurement: 0,02 / 0,05 / 0,1 / 0,2 mm/s Contour measurement: 0,02 / 0,05 / 0,1 / 0,2 / 0,5 / 1 / 2 mm/s
Drive speed	X = 0 - 80 mm/s Z2 = 0 - 20 mm/s
Accuracy	X = (0,8+0,01L) μm [ L : Drive length (mm) ] Z1 = (1,5+I2HI/100) μm H : Measurement height from the horizontal position (mm)
Inclining range	±45°
Traverse straightness	X = 0,2 μm / 100 mm
Software	<b>FORMTRACEPAK</b> <ul style="list-style-type: none"> <li>• Allows control of all axis, optional motor-driven Y-axis table and rotary table for efficient automated measurement.</li> <li>• Surface roughness analysis and contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.</li> <li>• An inspection certificate can be created by setting the print format as required.</li> </ul>



Refer to Formtracer CS-3200 brochure



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## Specifications and Styli

# Formtracer Extreme SV-C4500CNC

## Series 525 - Surface and Contour Measuring Instrument

High accurate fully CNC surface and contour measuring instrument.

The Formtracer Extreme SV-C4500CNC offers you the following benefits:

- Powerful as two separate, fully CNC instruments.
- Measurement of long distances in Z2-axis for models without  $\alpha$ -axis.
- Each axis has a drive speed up to 200 mm/s.
- Dual stylus system for upward and downward contour measurement at doubled sided contours.
- It's variable contour measuring force is controlled by software FORMTRACEPAK.
- The contour drive unit is equipped with an arc encoder detector giving excellent accuracy and resolution in Z1-axis.
- Perfectly made for increased throughput of multiple profile and workpiece measurement tasks.
- The detector unit incorporates an anti-collision safety device, causing it to stop automatically if its main body collides with a workpiece or jig.

### Specifications

Traverse	Z2= 300 mm / 500 mm
Measuring range	X= 200 mm Y= 200 mm <b>Contour:</b> Z1= 60 mm Z2= 300 / 500 mm <b>Roughness:</b> Z1= 800 $\mu$ m; 80 $\mu$ m; 8 $\mu$ m (up to 2,4 mm with an optional stylus)
Measuring speed	0,02 - 2 mm/s
Drive speed	CNC mode: max. 200 mm/s Joystick mode: 0-50 mm/s
Accuracy	X= (0,8 + 4L/200) $\mu$ m [ L: Drive length (mm)] Z1= (0,8 + 12HI/100) $\mu$ m [ H: Measurement height from the horizontal position (mm)] Model without $\alpha$ -axis: Z2= (1,5 + 10HI/1000) $\mu$ m
Inclining range	-45° (CCW) to +10° (CW)
Measuring force	0,75 mN
Software	<b>FORMTRACEPAK</b> <ul style="list-style-type: none"> <li>• Allows control of all axis, motor-driven Y-axis table and rotary table for efficient automated measurement.</li> <li>• Contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.</li> <li>• An inspection certificate can be created by setting the print format as required.</li> </ul>



Refer to CONTOUR AND SURFACE MEASUREMENT brochure



SV-C4500CNC equipped with two powerful exchangeable drive units



Surface roughness drive unit



Contour drive unit



# Formtracer Extreme SV-C4500CNC

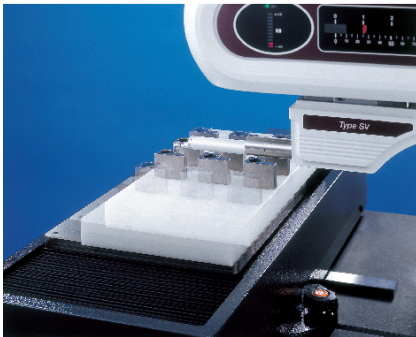
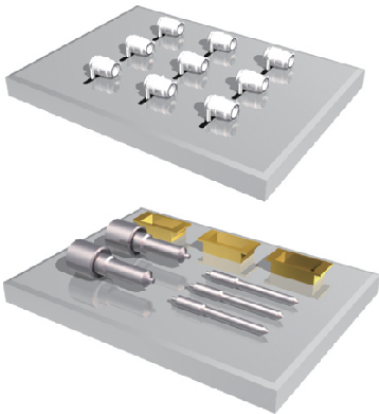
## Series 525 - Surface and Contour Measuring Instrument

SV-C4500CNC-H

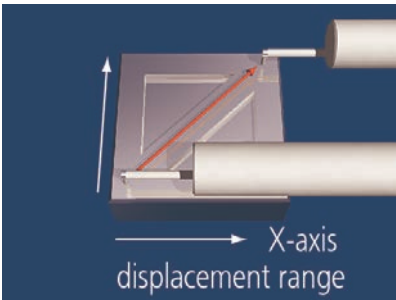
No.	Z2-axis range [mm]	Y-axis table unit	$\alpha$ -axis unit
525-681-1D	500	-	-
525-682-1D	500	-	Installed
525-683-1D	500	Installed	-
525-684-1D	500	Installed	Installed

SV-C4500CNC-S

No.	Z2-axis range [mm]	Y-axis table unit	$\alpha$ -axis unit
525-661-1D	300	-	-
525-662-1D	300	-	Installed
525-663-1D	300	Installed	-
525-664-1D	300	Installed	Installed



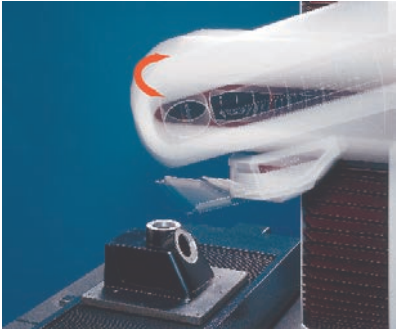
Multiple measurements



Through 2-axis simultaneous control in the X and Y directions



Y-axis



$\alpha$ -axis

### Specifications

Optional accessories	Other optional and standard accessories are listed later in different sections for accessories and styli.
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### Optional accessories

No.	Description
12AAD975	Theta-1 axis, Rotary Axis
12AAE287	Cabin for S-type used with CNC series, For Z2=300mm
12AAE449	Cabin for H-type used with CNC series, for Z2=500mm
178-037	2D auto-leveling table, for CNC Surftest and Formtracer
178-077	3D leveling table, (for SV-3200 only with 178-096)
178-078	Theta-2 axis, Rotary Axis
178-397-2	Detector, 4mN



# Formtracer Extreme SV-C4500CNC HYBRID Type 1

## Series 525 - Surface and Contour Measuring Instrument

This measuring system is equipped with a surface roughness detector, a contour detector and a confocal chromatic point sensor (CPS) employing axial chromatic aberration. It performs non-contact contour and roughness measurement on parts with steeply inclined surfaces and soft materials.

### The Formtracer Extreme SV-C4500CNC Hybrid Type 1 offers you the following benefits:

- Powerful as three separate fully CNC instruments.
- High accurate fully CNC surface and contour measuring instrument.
- Non-contact and contact measurement combined in one instrument.
- Two machine types with different CPS sensors available, depending on measuring range and resolution.
- Drive speed of up to 200 mm/s in all axes.
- Vibration isolator as standard.



Surface roughness drive unit



Contour drive unit



CPS sensor drive unit

No.	Model	Roughness	Contour	Non-contact
525-686-1D	Type 1A	0,75 mN	Dual contour stylus	CPS2525
525-687-1D	Type 1B	0,75 mN	Dual contour stylus	CPS0517

### Specifications

Traverse	Z2 = 500 mm
Measuring range	X= 200 mm Y= 200 mm <b>Contour:</b> Z1= 60 mm Z2= 300 / 500 mm <b>Roughness:</b> Z1= 800 µm; 80 µm; 8 µm (up to 2,4 mm with an optional stylus)
Measuring speed	0,02 - 2 mm/s
Accuracy	X= (0,8 + 4L/200) µm [ L: Drive length (mm)] Z1= (0,8 + 12HI/100) µm [ H: Measurement height from the horizontal position (mm)] Model without α-axis: Z2= (1,5 + 10HI/1000) µm
Software	<b>FORMTRACEPAK</b> <ul style="list-style-type: none"> <li>• Allows control of all axis, motor-driven Y-axis table and rotary table for efficient automated measurement.</li> <li>• Contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.</li> <li>• An inspection certificate can be created by setting the print format as required.</li> </ul>

### Additional Specifications

Non-contact detector	
Measuring range	CPS0517 = 100 µm CPS2525 = 1200 µm
Working distance	CPS0517 = 12 mm CPS2525 = 21 mm
Resolution	CPS0517 = 5 nm CPS2525 = 25 nm

# Formtracer Extreme CS-5000CNC and CS-H5000CNC

## Series 525 - CNC Surface and Contour Measuring Instruments

This is the highest-accuracy stylus type CNC surface roughness and contour measuring instrument.

### The Formtracer Extreme CS-5000CNC / CS-H5000CNC offers you the following benefits:

- It meets the highest demands of accuracy and repeatability.
- You can carry out simultaneous analysis of roughness and contour within one measurement.
- It includes a cabin and a vibration stand as standard to avoid external influences.
- High resolution in X1-axis: 5 nm and Z1-axis: 0,8 nm/1,6 nm.
- The X1 and Z2-axis have maximum drive speeds of 40 mm/s and 200 mm/s respectively.



CS-H5000CNC



Specifications	
Traverse	Z2 = 300 mm / 500 mm
Measuring range	X = 200 mm Z1 = 12 mm [standard lenght stylus ] Z1 = 24 mm [double lenght stylus ]
Measuring speed	Roughness measurement: 0,02 - 0,2 mm/s Contour measurement: 0,02 - 2 mm/s
Drive speed	CNC mode: max. 200 mm/s Joystick mode 0 - 50 mm/s
Accuracy	<b>CS-5000CNC:</b> X = (0,3+0,002L) µm Z1 = (0,3+10,02HI) µm <b>CS-H5000CNC:</b> X = (0,16+0,001L) µm Z1 = (0,07+10,02HI) µm [ L : Drive length (mm) ] [ H : Measurement height from the horizontal position (mm) ]
Traverse straightness	<b>CS-5000CNC:</b> X = (0,1+0,0015L) µm [ standard stylus ] X = (0,2+0,0015L) µm [ double length stylus ] <b>CS-H5000CNC:</b> X = (0,05+0,0003L) µm [ standard stylus ] X = (0,1+0,0015L) µm [ double length stylus ]
Resolution	X = 0,005 µm Z1 = 0,0008 µm [ standard stylus ] Z1 = 0,0016 µm [ double length stylus ]
Software	FORMTRACEPAK



Refer to CONTOUR AND SURFACE MEASUREMENT brochure

# Formtracer Extreme CS-5000CNC and CS-H5000CNC

## Series 525 - CNC Surface and Contour Measuring Instruments

### Specifications and Styli

#### CS-5000CNC

Model	CS-5000CNC S	CS-5000CNC S + Y-axis	CS-5000CNC H	CS-5000CNC H + Y-axis
No.	525-727-12	525-729-12	525-747-12	525-749-12
Z2-axis range [mm]	300	300	500	500
Y-axis table unit	-	Installed	-	Installed
$\alpha$ -axis unit	Installed	Installed	Installed	Installed

#### CS-H5000CNC

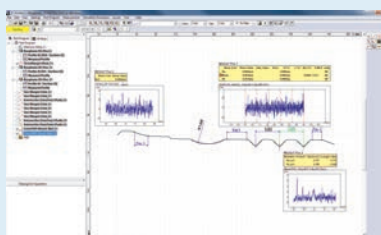
Model	CS-H5000CNC H	CS-H5000CNC H + Y-axis	CS-H5000CNC S	CS-H5000CNC S + Y-axis
No.	525-706-12	525-707-12	525-776-12	525-777-12
Z2-axis range [mm]	500	500	300	300
Y-axis table unit	-	Installed	-	Installed
$\alpha$ -axis unit	-	-	-	-

### Specifications

#### Software

#### FORMTRACEPAK

- Allows control of all axis, optional motor-driven Y-axis table and rotary table for efficient automated measurement.
- Contour evaluation can be performed using analysis of level differences, angle, pitch, area and contour tolerancing as standard.
- An inspection certificate can be created by setting the print format as required.

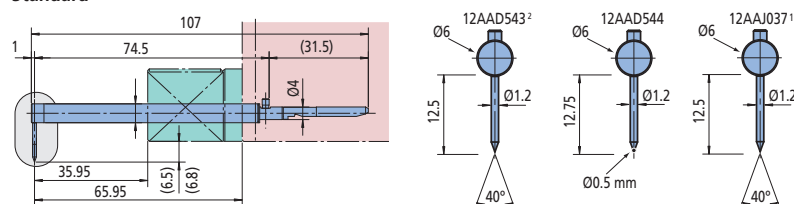


Contour and roughness analysis

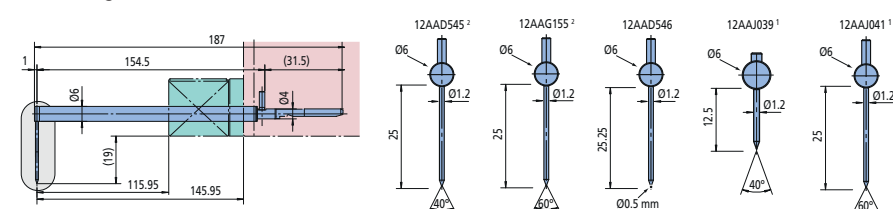


Optional:  
Aspherical lens analysis program  
ASLPAK

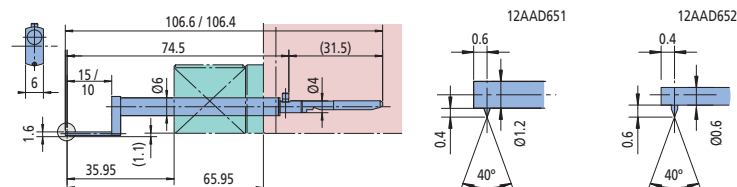
#### Standard



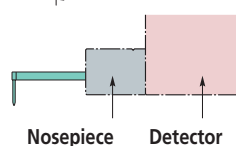
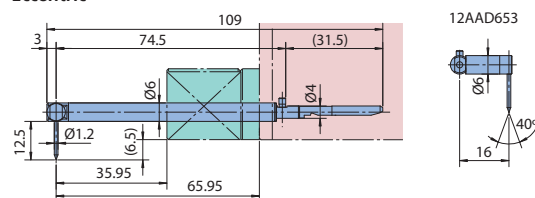
#### Double length



#### For small holes



#### Eccentric



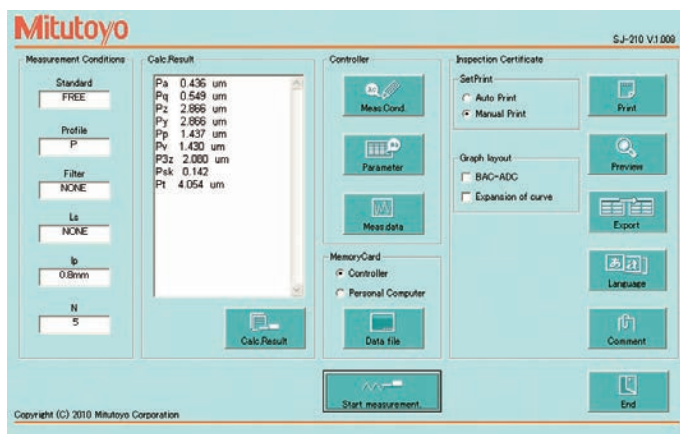
1 = only for CS-H5000CNC  
2 = only for CS-5000CNC

# Optional Software USB Communication Tool

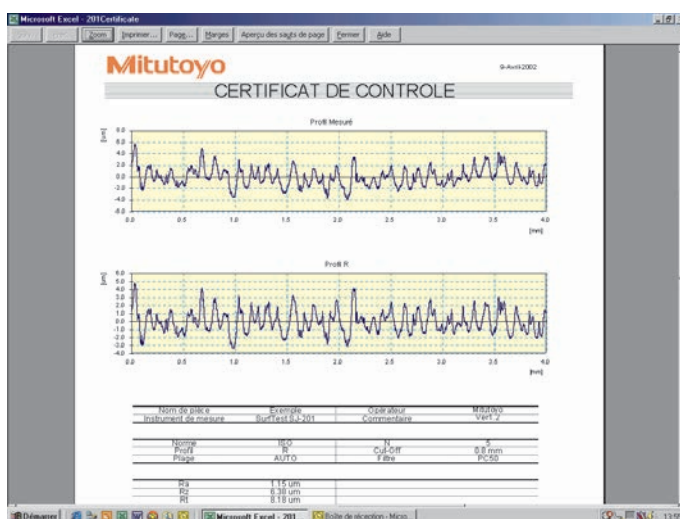
## Series 178 - Control Software for SJ series, SV-2100

This is a control software for Surftest SJ-210 / SJ-310 / SJ-410 / SJ-500 and SV-2100 which offers you the following benefits:

- It is available as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu) (registration is required).
- Output software is based on Microsoft® Excel® for controlling the devices, reproducing and storing measurement data.
- Measurement device control.
- It provides definition of measurement variables.
- Graphic representation of the profile.
- Storage of measurement records.
- Documentation of measurements result.
- A USB connecting cable is necessary.



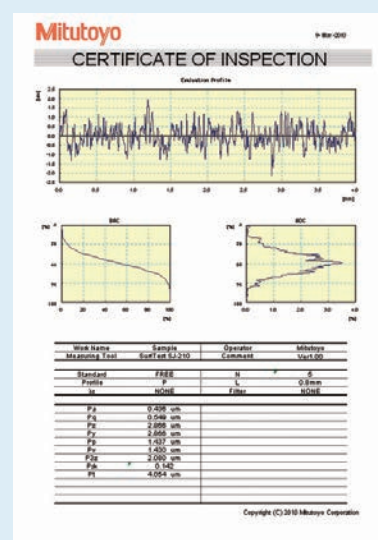
Input mask for Surftest SJ series



Output record from Microsoft® Excel® in 18 languages as standard.

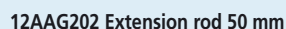
## Optional accessories

No.	Description
12AAD510	USB cable for SJ-310 / SJ-410 series
12AAH490	USB Cable for SJ-500 / SV-2100
63AAA211	USB communication cable for SJ-210, Length 1800mm

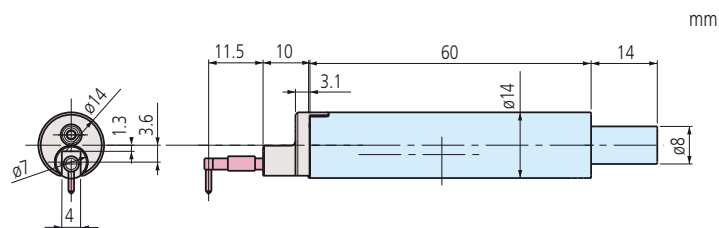


Output record from Microsoft® Excel®

## Detectors

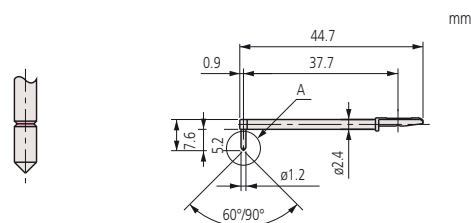


12AAG203 Extension rod 100 mm



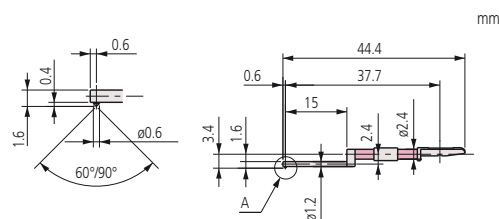
Order No	Measuring force		Inclusive stylus
178-396-2	0,75 mN	R2 µm, 60°	12AAC731
178-397-2	4 mN	R5 µm, 90°	12AAB403

No.	Radius	Angle
12AAE882	1 $\mu\text{m}$	60°
12AAE924	1 $\mu\text{m}$	90°
12AAC731	2 $\mu\text{m}$	60°
12AAB403	5 $\mu\text{m}$	90°
12AAB415	10 $\mu\text{m}$	90°
12AAE883	250 $\mu\text{m}$	60°



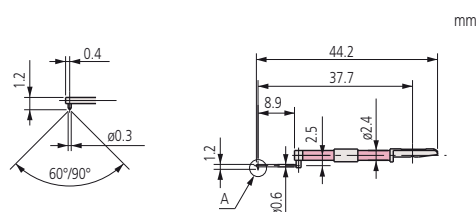
### Standard

No.	Radius	Angle
12AAC732	2 $\mu\text{m}$	60°
12AAB404	5 $\mu\text{m}$	90°
12AAB416	10 $\mu\text{m}$	90°



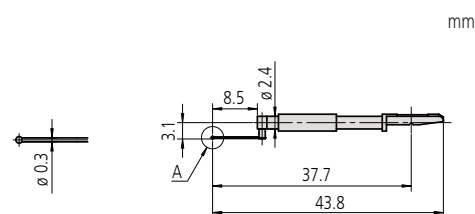
For small hole

No.	Radius	Angle
12AAC733	2 $\mu\text{m}$	60°
12AAB405	5 $\mu\text{m}$	90°
12AAB417	10 $\mu\text{m}$	90°



For extra-small hole

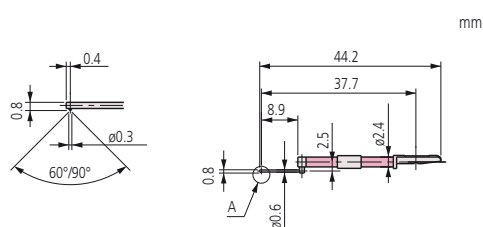
No.	Radius	Angle
12AAJ662	250 $\mu\text{m}$	-



For ultra-small hole

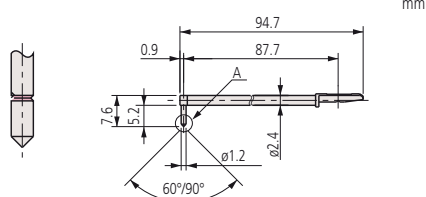


# Optional Styli for Surftest and Formtracer SV-C series



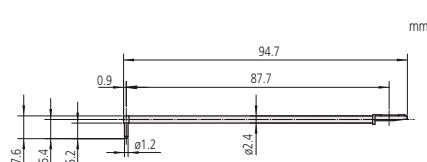
For ultra-small hole

No.	Radius	Angle
12AAC734	2 $\mu\text{m}$	60°
12AAB406	5 $\mu\text{m}$	90°
12AAB418	10 $\mu\text{m}$	90°



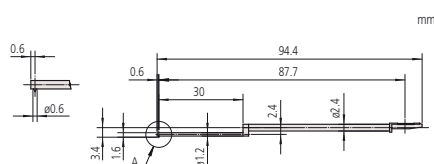
For deep hole [double-length]

No.	Radius	Angle
12AAC740	2 $\mu\text{m}$	60°
12AAB413	5 $\mu\text{m}$	90°
12AAB425	10 $\mu\text{m}$	90°



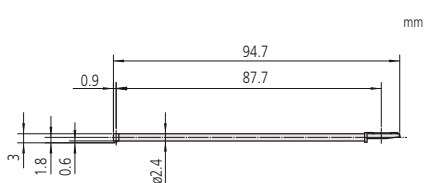
For rolling circle waviness [double-length]

No.	Radius	Angle
12AAE886	250 $\mu\text{m}$	60°



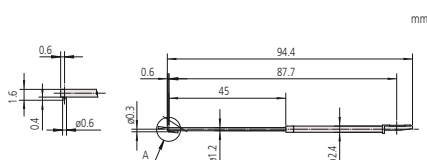
For small deep hole [double-length]

No.	Radius	Angle
12AAE892	2 $\mu\text{m}$	60°
12AAE908	5 $\mu\text{m}$	90°



For deep hole [double-length]

No.	Radius	Angle
12AAE898	2 $\mu\text{m}$	60°
12AAE914	5 $\mu\text{m}$	90°

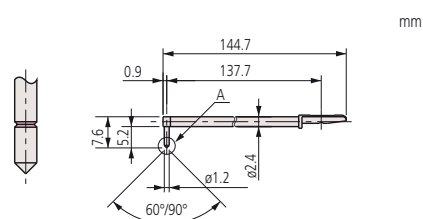


For small slotted hole [double-length]

No.	Radius	Angle
12AAE938	2 $\mu\text{m}$	60°
12AAE940	5 $\mu\text{m}$	90°

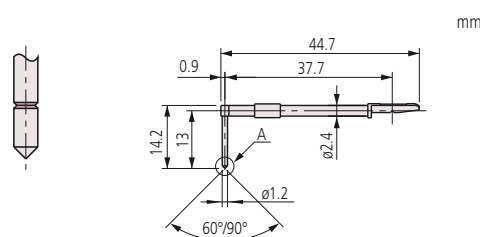
## Optional Styli for Surftest and Formtracer SV-C series

No.	Radius	Angle
12AAC741	2 $\mu\text{m}$	60°
12AAB414	5 $\mu\text{m}$	90°
12AAB426	10 $\mu\text{m}$	90°



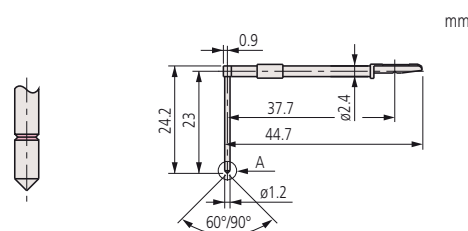
For deep hole [triple-length]

No.	Radius	Angle
12AAC735	2 $\mu\text{m}$	60°
12AAB409	5 $\mu\text{m}$	90°
12AAB421	10 $\mu\text{m}$	90°



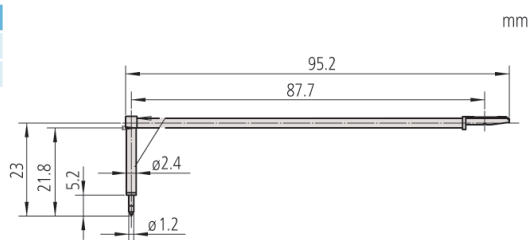
For deep groove 10 mm

No.	Radius	Angle
12AAC736	2 $\mu\text{m}$	60°
12AAB408	5 $\mu\text{m}$	90°
12AAB420	10 $\mu\text{m}$	90°



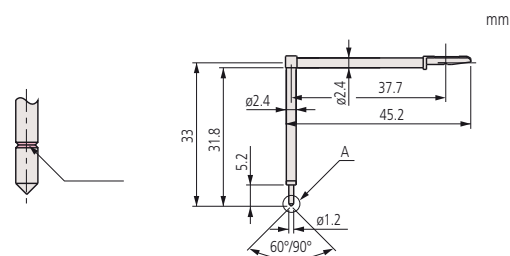
For deep groove 20 mm

No.	Radius	Angle
12AAE893	2 $\mu\text{m}$	60°
12AAE909	5 $\mu\text{m}$	90°



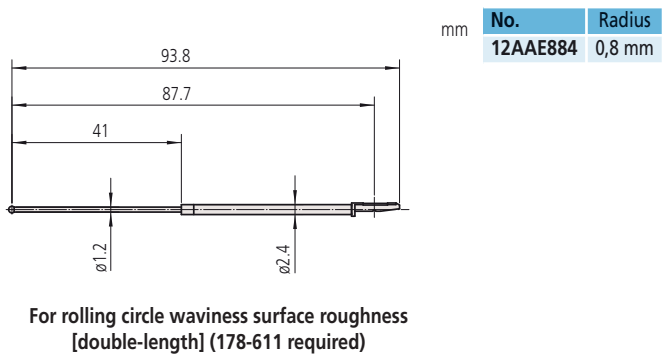
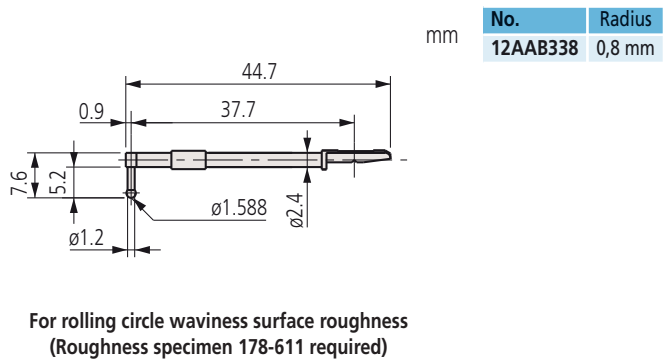
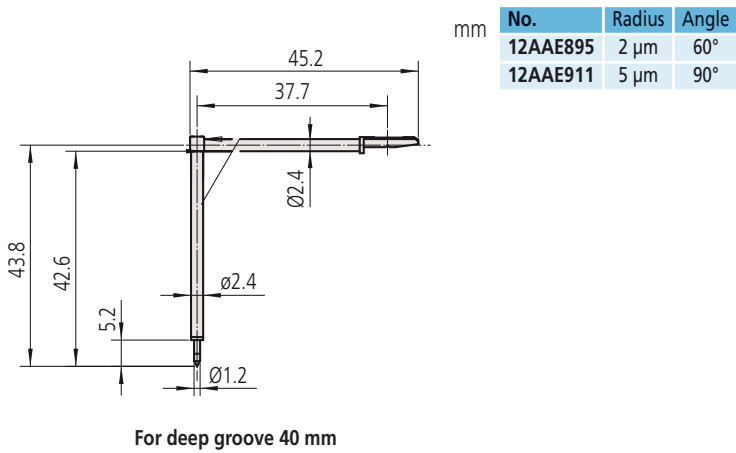
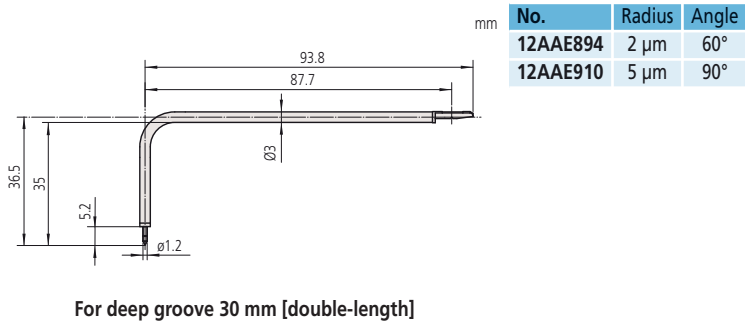
For deep groove 20 mm [double-length]

No.	Radius	Angle
12AAC737	2 $\mu\text{m}$	60°
12AAB407	5 $\mu\text{m}$	90°
12AAB419	10 $\mu\text{m}$	90°



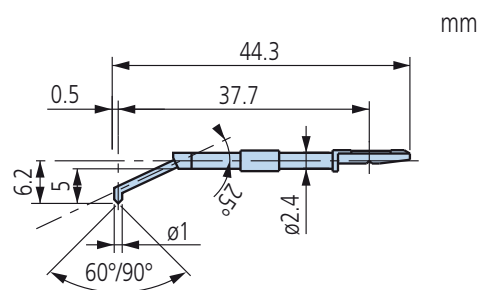
For deep groove 30 mm

# Optional Styli for Surftest and Formtracer SV-C series



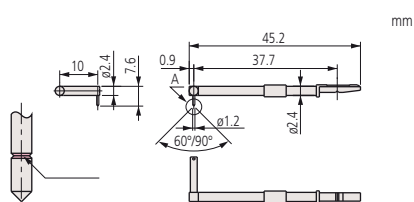
## Optional Styli for Surftest and Formtracer SV-C series

No.	Radius	Angle
12AAE899	2 $\mu\text{m}$	60°
12AAE915	5 $\mu\text{m}$	90°



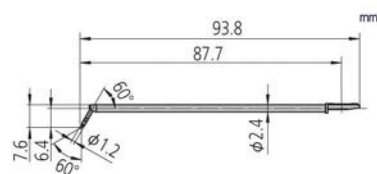
For hole bottom

No.	Radius	Angle
12AAC739	2 $\mu\text{m}$	60°
12AAB412	5 $\mu\text{m}$	90°
12AAB424	10 $\mu\text{m}$	90°

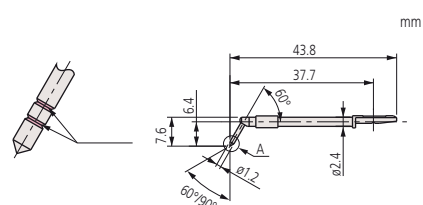


For eccentric arm

No.	Radius	Angle
12AAM601	2 $\mu\text{m}$	60°
12AAM603	5 $\mu\text{m}$	60°

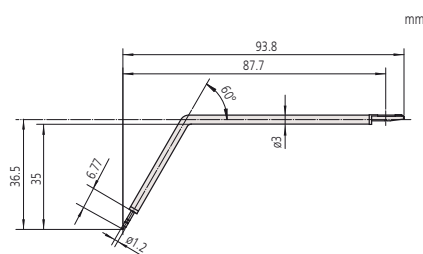


No.	Radius	Angle
12AAB339	2 $\mu\text{m}$	60°
12AAB410	5 $\mu\text{m}$	90°
12AAB422	10 $\mu\text{m}$	90°



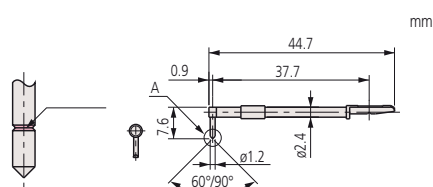
For gear tooth

No.	Radius	Angle
12AAE896	2 $\mu\text{m}$	60°
12AAE912	5 $\mu\text{m}$	90°



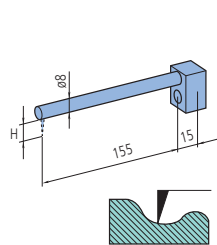
For gear tooth [double-length]

No.	Radius	Angle
12AAC738	2 $\mu\text{m}$	60°
12AAB411	5 $\mu\text{m}$	90°
12AAB423	10 $\mu\text{m}$	90°

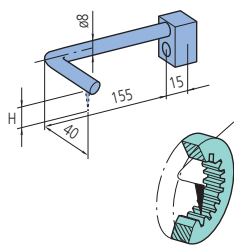


For knife-edge

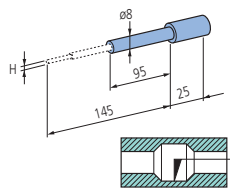
# Optional Styli and Arms for Contracer and Formtracer SV-C Series



Arm straight type  
CV-2100



Arm eccentric type  
CV-2100



Arm for small-hole stylus  
CV-2100

## Applicable arms for CV-2100

No.	Arm	Arm No.	Compatible stylus height (H) [mm]
935110	Small hole	AB-11	0,4 / 1 / 2,5
935111	Straight type	AB-51	6
935112	Straight type	AB-61	12
935113	Straight type	AB-71	20
935114	Straight type	AB-81	30
935115	Straight type	AB-91	42
935116	Eccentric type	AB-52	6
935117	Eccentric type	AB-62	12
935118	Eccentric type	AB-72	20
935119	Eccentric type	AB-82	30
935120	Eccentric type	AB-92	42

## Applicable arms for CV-3200 / CV-4500 / SV-C3200 / SV-C4500 / SV-C4500CNC

No.	Arm	Arm No.	Compatible stylus height (H) [mm]
12AAQ762	Eccentric arm	AB-37	SPH-5*, 6*, 7*, 8*, 9*
12AAM101	Straight type	AB-31	SPH-5*, 6*, 7*, 8*, 9*
12AAM103	Small hole	AB-33	SPH-41, SPH-42, SPH-43

## Applicable styli for CV-2100

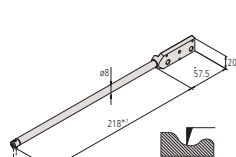
No.	Stylus	Stylus No.	Stylus height (H) [mm]
932693	Small hole, carbide-tipped one-sided cut	SP-11	0,4
932694	Small hole, carbide-tipped one-sided cut	SP-12	1
932695	Small hole, carbide-tipped one-sided cut	SP-13	2,5
12AAE873	Small hole, carbide-tipped cone	SP-31	0,4
12AAE874	Small hole, carbide-tipped cone	SP-32	1
12AAE875	Small hole, carbide-tipped cone	SP-33	2,5

## Applicable styli for CV-3200 / CV-4500 / SV-C3200 / SV-C4500 / SV-C4500CNC

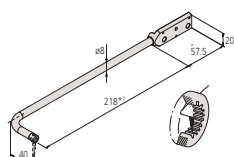
No.	Stylus	Stylus No.	Stylus height (H) [mm]
12AAM104	Small hole, carbide tipped one sided cut	SPH-41	2
12AAM105	Small hole, carbide tipped one sided cut	SPH-42	4
12AAM106	Small hole, carbide tipped one sided cut	SPH-43	6,5

## Arm and stylus set

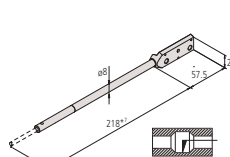
No.	Applicable models	Included arms	Included styli	Included arm stylus
12AAR587	CV-3200, CV-4500, SV-C3200, SV-C4500, SV-C4500CNC	AB-33, AB-37	SPH-41, -43, -51, -72, -76	
12AAR588	CV-4500, SV-C4500, SV-C4500CNC	AB-33, AB-37	SPH-41, -43, -51, -72, -76, SPHW-66, -76	SPHW-32



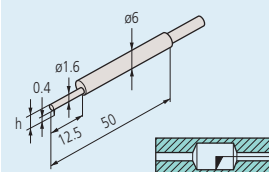
Arm straight type  
CV-3200/CV-4500  
SV-C3200/SV-C4500  
SV-C4500CNC



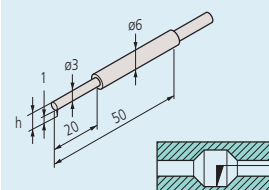
Arm eccentric type  
CV-3200/CV-4500  
SV-C3200/SV-C4500  
SV-C4500CNC



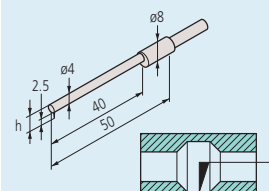
Arm for small-hole stylus  
CV-3200/CV-4500  
SV-C3200/SV-C4500  
SV-C4500CNC



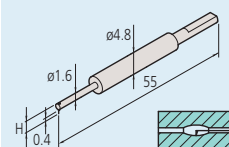
Small hole: 932693 / 12AAE873  
Tip shape: Single bevel / Cone  
Tip angle: 20° / 30°  
Tip radius: 25 µm / 25 µm  
Tip material: Carbide / Carbide



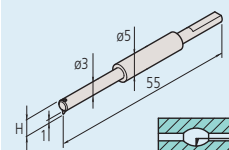
Small hole: 932694 / 12AAE874  
Tip shape: Single bevel / Cone  
Tip angle: 20° / 30°  
Tip radius: 25 µm / 25 µm  
Tip material: Carbide / Carbide



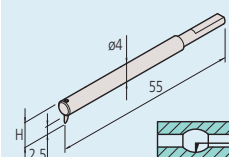
Small hole: 932695 / 12AAE875  
Tip shape: Single bevel / Cone  
Tip angle: 20° / 30°  
Tip radius: 25 µm / 25 µm  
Tip material: Carbide / Carbide



Small hole: 12AAM104  
Tip shape: One-sided cut  
Tip angle: 20°  
Tip radius: 25 µm  
Tip material: Carbide



Small hole: 12AAM105  
Tip shape: One-sided cut  
Tip angle: 20°  
Tip radius: 25 µm  
Tip material: Carbide



Small hole: 12AAM106  
Tip shape: One-sided cut  
Tip angle: 20°  
Tip radius: 25 µm  
Tip material: Carbide



# Optional Styli and Arms for Contracer and Formtracer SV-C Series

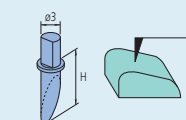
## Styli

Applicable styli for  
CV-2100 / CV-3200/ CV-4500 / SV-C3200 / SV-C4500 / SV-C4500CNC

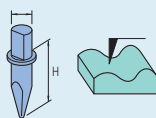
No.	Stylus	Stylus No.	Stylus height (H) [mm]
354882	Single bevel, carbide tipped	SPH-51	6
354883	Single bevel, carbide tipped	SPH-61	12
354884	Single bevel, carbide tipped	SPH-71	20
354885	Single bevel, carbide tipped	SPH-81	30
354886	Single bevel, carbide tipped	SPH-91	42
354887	Cross ground, carbide tipped	SPH-52	6
354888	Cross ground, carbide tipped	SPH-62	12
354889	Cross ground, carbide tipped	SPH-72	20
354890	Cross ground, carbide tipped	SPH-82	30
354891	Cross ground, carbide tipped	SPH-92	42
12AAE865	Cone, carbide-tipped angle 20°	SPH-57	6
12AAE866	Cone, carbide-tipped angle 20°	SPH-67	12
12AAE867	Cone, carbide-tipped angle 20°	SPH-77	20
12AAE868	Cone, carbide-tipped angle 20°	SPH-87	30
12AAE869	Cone, carbide-tipped angle 20°	SPH-97	42
354892	Cone, sapphire-tipped angle 30°	SPH-53	6
354893	Cone, sapphire-tipped angle 30°	SPH-63	12
354894	Cone, sapphire-tipped angle 30°	SPH-73	20
355129	Cone, diamond-tipped angle 50°	SPH-79	20
354895	Cone, sapphire-tipped angle 30°	SPH-83	30
354896	Cone, sapphire-tipped angle 30°	SPH-93	42
12AAA566	Cone, carbide-tipped angle 30°	SPH-56	6
12AAA567	Cone, carbide-tipped angle 30°	SPH-66	12
12AAA568	Cone, carbide-tipped angle 30°	SPH-76	20
12AAA569	Cone, carbide-tipped angle 30°	SPH-86	30
12AAA570	Cone, carbide-tipped angle 30°	SPH-96	42
354897	Knife edge, carbide tipped	SPH-54	6
354898	Knife edge, carbide tipped	SPH-64	12
354899	Knife edge, carbide tipped	SPH-74	20
354900	Knife edge, carbide tipped	SPH-84	30
354901	Knife edge, carbide tipped	SPH-94	42
354902	Ball, carbide tipped	SPH-55	6
354903	Ball, carbide tipped	SPH-65	12
354904	Ball, carbide tipped	SPH-75	20
354905	Ball, carbide tipped	SPH-85	30
354906	Ball, carbide tipped	SPH-95	42

Applicable styli for only CV-4500 /SV-C4500 / SV-C4500CNC

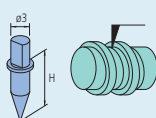
No.	Stylus	Stylus No.	Stylus height (H) [mm]
12AAT469	Both sides small hole arm stylus 20°	SPHW-21	2,4
12AAT470	Both sides small hole arm stylus 20°	SPHW-22	5
12AAM095	Both sides conical stylus	SPHW-56	20
12AAM096	Both sides conical stylus	SPHW-66	32
12AAM097	Both sides conical stylus	SPHW-76	48
12AAM108	Both sides small hole arm stylus	SPHW-31	2,4
12AAM109	Both sides small hole arm stylus	SPHW-32	5
12AAM110	Both sides small hole arm stylus	SPHW-33	9



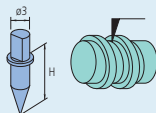
Single bevel  
Tip angle: 12°  
Tip radius: 25 µm  
Tip material: Carbide



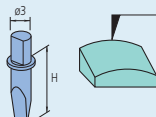
Cross ground  
Tip angle: 20°  
Tip radius: 25 µm  
Tip material: Carbide



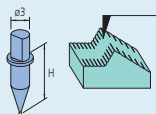
Cone  
Tip angle: 30°/50°  
Tip radius: 25 µm  
Tip material: Carbide / Sapphire / Diamond  
(355129: 50°, Diamond)



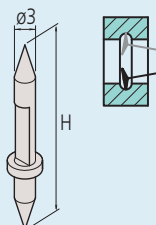
Cone  
Tip angle: 20°  
Tip radius: 25 µm  
Tip material: Carbide



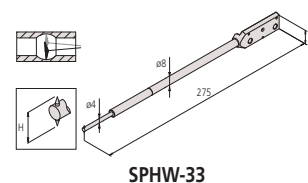
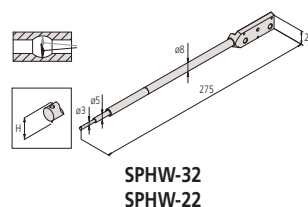
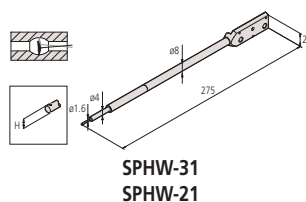
Knife edge  
Tip angle: 20°  
Edge width: 3 mm  
Tip radius: 25 µm  
Tip material: Carbide



Ball  
Ball: 1 mm  
Tip material: Carbide



Both sides conical stylus  
Tip angle: 30°  
Tip radius: 25 µm  
Tip material: Carbide



# Optional Accessories for Surftest, Contracer and Formtracer

For SV series, SV-C series, CV series, CS series and CNC models

**Automatic-leveling table : 178-087 (for SV, CV, SV-C, CS)**

**Automatic-leveling table : 178-037 (for CNC models)**

This is a stage that performs fully automatic leveling as measurement starts, freeing the user from this troublesome operation. Fully automatic leveling can be done quickly by anyone. In addition, the operation is easy and reliable.

No.	Inclination adjustment angle	Maximum load [kg]	Effective table dimensions [mm]
178-087	± 2°	7	130 x 112

**Automatic-leveling table : 178-087 (for SV, CV, SV-C, CS)**

**Automatic-leveling table : 178-037 (for CNC Models)**

This is a stage that performs fully automatic leveling as measurement starts, freeing the user from this troublesome operation. Fully automatic leveling can be done quickly by anyone. In addition, the operation is easy and reliable.

No.	Inclination adjustment angle	Maximum load [kg]	Effective table dimensions [mm]
178-037	± 2°	7	130 x 112

**Micro-chuck**

This chuck is suitable for clamping extra-small diameter workpieces (ø1.5 mm or less), which cannot be retained with the centering chuck.

No.	Dimensions [mm]	Retention range [mm]
211-031	ø118 x 48,5	OD: Ø 0,1 - Ø 1,5

**Quick chuck**

This chuck is useful when measuring small workpieces. You can easily clamp them with its knurled ring.

No.	Dimensions [mm]	Retention range [mm]
211-032	ø118 x 41	Inner latch : OD ø1 - ø36 Inner latch : ID ø16 - ø69 Outer latch : OD ø25 - ø79

**Y-axis table**

for SV-3200, SV-C, CS and CV models (not CNC models)

Enables efficient, automatic measurement of multiple aligned workpieces and multiple points on a single measurement surface. It allows semi-automatic measurement with a semi-automatic with non CNC models by using these items.

No.	Travel range [mm]	Resolution	Positioning accuracy [μm]	Maximum load [kg]	Drive speed
178-097	200	0,05	±3	50	Max. 80 mm/s

**θ1-axis:\*1**

For efficient measurement in the axial / transverse directions. When measuring a cylindrical workpiece, automatic alignment can be performed in combination with the Y-axis table.

\*1 = 12AAE630 mounting plate is required when directly installing on the base of the machine.

No.	Resolution	Rotational speed	Displacement	Maximum load [kg]
12AAD975	0,004°	Max. 10°/s	360°	12

**θ2-axis:\*1**

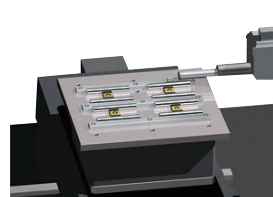
For efficient measurement of multiple points on a cylindrical workpiece and automate front/rear-side measurement.

\*1 = 12AAE718 mounting plate is required when directly installing on the base of the machine.

\*1 = 12AAE705 attachment plate is required when installing on θ1-axis table.

\*1 = 12AAE707 mounting plate is required when directly installing on Y-axis table with automatic leveling table.

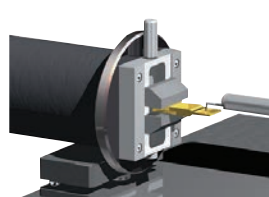
No.	Resolution	Rotational speed	Displacement	Maximum load [kg]
178-078	0,0072°	Max. 18°/s	360°	4



178-097  
using Y-axis



12AAD975  
using θ1-axis



178-078  
using θ2-axis



178-087



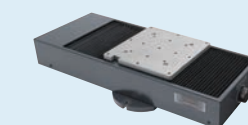
Using 178-087



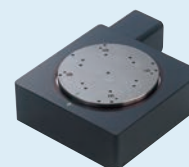
211-031



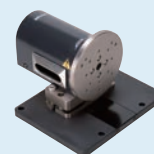
211-032



178-097

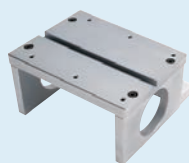


12AAD975



178-078

# Optional Accessories for Surftest, Contracer and Formtracer



12AAG175



218-001



218-041



178-047



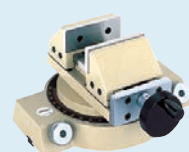
178-042-1



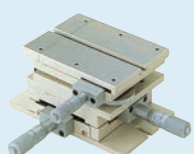
998291



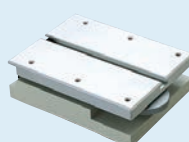
178-019



218-003



178-043-1



178-016

## Calibration stage

No.	Description
12AAG175	For mounting a roughness specimen or step gauge during calibration

## Cross-travel table

No.	Table top [mm]	XY travel [mm]
218-001	280 x 180	100 x 50
218-041	280 x 152	50 x 25

## Digital three-axis adjustment table

No.	Description
178-047	This table helps to make the alignment adjustments required when measuring cylindrical surfaces. The corrections for the pitch angle and the swivel angle are determined from a preliminary measurement and the Digital micrometers are adjusted accordingly. A flat-surfaced workpiece can also be leveled with this table.

## Digital XY leveling table

No.	Leveling range	Table top [mm]	XY travel [mm]
178-042-1	±1,5°	130 x 100	± 12,5

## Precision V-Block

No.	Description
998291	Workpiece diameter : 1 mm to 160 mm Can be mounted on a leveling table

## Precision vise

No.	Description
178-019	Max. workpiece size : 36 mm Can be mounted on a leveling table

## Rotary vise

No.	Description
218-003	Two-slide jaw type Max. workpiece size : ø60 mm Minimum reading : 1°

## Vibration isolator

No.	Packing size	Description
178-119	1000 x 1340 x 880 mm	For SV-2100/3200 series (wide base) For CV-3200/4500 series (wide base) For SV-C3200/4500 series (wide base)
12AAK110.	830 x 800 x 700 mm	For SV-2100/3200 series (standard base) For CV-3200/4500 series (standard base) For SV-C3200/4500 series (standard base)
178-115	600 x 1050 x 260 mm	Desktop type For SV-2100/3200 series (wide base) For CV-3200/4500 series (wide base) For SV-C3200/4500 series (wide base)

## XY leveling table

No.	Leveling range	Table top [mm]	XY travel [mm]
178-043-1	±1,5°	130 x 100	± 12,5
178-016	±1,5°	130 x 100	

# eco-fix Fixtures Form

## eco-fix Kit Form S

Adapter plate Ø150 mm usable with:

- Roundtest RA-10
- Roundtest RA-120
- Roundtest RA-120P
- Roundtest RA-1600
- THETA 1 for CV, SV, SV-C and CS types



No.  
K551133

## eco-fix Kit Form L

Adapter plate Ø200 mm usable with:

- Roundtest RA-2200
- Roundtest RA-H5200
- Roundtest RA-2200CNC
- Roundtest RA-H5200CNC
- THETA 1 for CV, SV, SV-C and CS types



No.  
K551134

# Roundtest RA-10

## Series 211 - Form Measuring Instrument

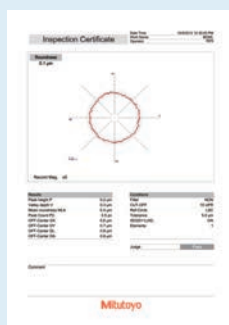
This is a compact and affordable form measuring instrument.

### The Roundtest RA-10 offers you the following benefits:

- It combines outstanding cost and performance with full measurement capabilities.
- The machine has a compact body with integrated electronics and printer, making it ideal for installation in space-restricted locations.
- You can easily view measurement results and recorded profiles on the large coloured LCD panel display.
- Despite being a low-priced model, the turntable with air bearings gives you rotational accuracy as high as  $(0,04+0,0006H) \mu\text{m}$ , assuring a precision that compares well with that of higher priced models.
- The control panel has large keys and an intuitive layout for easy operation.
- One-key calling function.
- One-key zero-set function.
- Support of 16 languages.
- It complies with EN ISO standard like 12181-1, 12181-2, 12781-1 and 12781-2.
- USB Communication Program – Microsoft® Excel® based – to import results and create, save and print out inspection certificates on PC.

### Specifications

Range	$\pm 1000 \mu\text{m}$
<b>Turntable</b>	
Rotational accuracy	Radial: $(0,04+0,0006H) \mu\text{m}$ H: Measuring height from turntable surface (mm) Axial: $(0,04+0,0006X) \mu\text{m}$ X: Radial distance from center (mm)
Max. probing $\varnothing$	100 mm
Max. workpiece $\varnothing$	320 mm
Max. turntable loading	10 kg
<b>Vertical column</b>	
Vertical travel	117 mm
Max. probing height	152 mm
<b>Display unit</b>	
Data analysis items	Roundness, Coaxiality, Concentricity, Flatness, Runout radial
Printer	Built-in thermal line printer



Software  
USB Communication Program  
as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)  
(registration required)



Refer to FORM MEASUREMENT brochure



RA-10 with optional collet



Z-axis scale unit



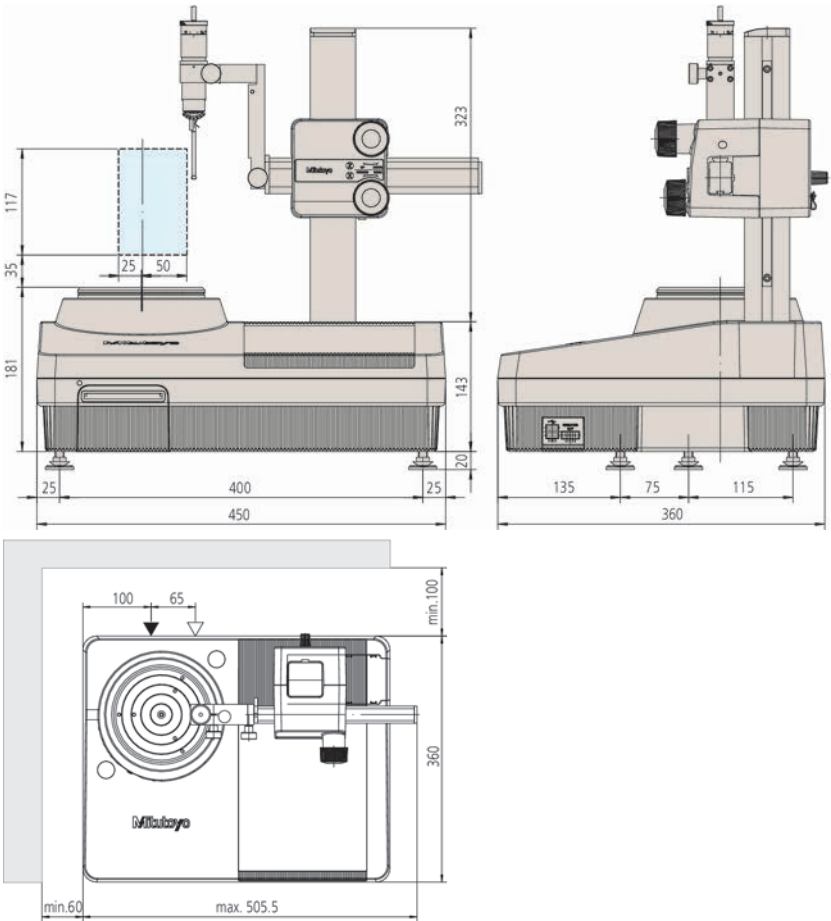
X-axis stop



# Roundtest RA-10

## Series 211 - Form Measuring Instrument

### Dimensions and accessories



No.	Model	Max. workpiece $\phi$ [mm]	Max. probing $\phi$ [mm]	Max. turntable loading [kg]
211-541D	RA-10	320	100	10

### Specifications

Max. turntable loading	10 kg
------------------------	-------

### Optional accessories

No.	Description
12AAH318	Z-axis scale unit
12AAH320	X-axis stopper
12AAH402	Collet ( $\phi$ 0,5-1,0mm)*
12AAH403	Collet ( $\phi$ 1,0-1,5mm)*
12AAH404	Collet ( $\phi$ 1,5-2,0mm)*
12AAH405	Collet ( $\phi$ 2,0-2,5mm)*
12AAH406	Collet ( $\phi$ 2,5-3,0mm)*
12AAH407	Collet ( $\phi$ 3,0-3,5mm)*
12AAH408	Collet ( $\phi$ 3,5-4,0mm)*
12AAH409	Collet ( $\phi$ 4,5-5,0mm)*
12AAH410	Collet ( $\phi$ 5,0-6,0mm)*
12AAH411	Collet ( $\phi$ 6,0-7,0mm)*
12AAH412	Collet ( $\phi$ 7,0-8,0mm)*
12AAH413	Collet ( $\phi$ 8,0-9,0mm)*
12AAH414	Collet ( $\phi$ 9,0-10,0mm)*
12AAH420	Spacer for reference hemisphere
12AAH425	Alignment table with D.A.T (mm)
211-013	Micro vibration isolator
211-016	Reference hemisphere
211-031	Micro chuck, OD: 0,1-1,5mm
211-032	Quick chuck, OD: 1-79mm, ID: 16-69 mm
211-045	Magnification calibration gauge, for Roundtest
211-051	Collet chuck holder (OD: 0,5-10mm)*
211-052	Quick chuck
211-053	V-block A (Screw clamp)
211-054	V-block B (spring clamp)
356038	Auxiliary stage for low height workpiece, for Roundtest
997090	Gauge block set for calibration, for Roundtest

\* Individual collet for collet chuck holder should be ordered separately.

### Consumable spares

No.	Description
12AAH181	Printer paper (10 rolls)

# Roundtest RA-120 and RA-120P

## Series 211 - Form Measuring Instrument

These are compact, affordable and simple-to-use instruments for measuring roundform geometry.

### The Roundtest RA-120 and RA-120P offer you the following benefits:

- The turntable accuracy of (0,04+0,0006H)  $\mu\text{m}$  provides high level form analysis.

#### RA-120

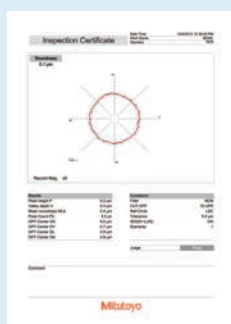
- The RA-120 has a compact body with integrated electronics and printer, making it ideal for installation in space-restricted locations.
- You can easily view measurement results and recorded profiles on the large coloured LCD panel display.
- One-key operations.
- Support of 16 languages.
- It complies with EN ISO standard like 12181-1, 12181-2, 12781-1 and 12781-2
- USB Communication Program – Microsoft® Excel® based – to import results and create, save and print out inspection certificates on PC.

#### RA-120P

- The RA-120P is a PC based model with all operations controlled via powerful ROUNDPAK software.
- Software ROUNDPAK gives you excellent possibilities for single measurement and part programming.

### Specifications

<b>Turntable</b>	
Rotational accuracy	<b>Radial:</b> (0,04+0,0006H) $\mu\text{m}$ H: Measuring height from turntable surface (mm) <b>Axial:</b> (0,04+0,0006X) $\mu\text{m}$ X: Radial distance from center (mm)
Max. probing $\varnothing$	280 mm 380 mm in reverse position
Max. workpiece $\varnothing$	440 mm
Max. turntable loading	25 kg
Centering range	$\pm 3$ mm
Leveling range	$\pm 1^\circ$
<b>Vertical column</b>	
Vertical travel	280 mm
Max. probing height	280 mm above turntable surface 480 mm in reverse position
Max. probing depth	100 mm (minimum ID: 30 mm)
<b>Display unit</b>	
Data analysis items	Roundness, Coaxiality, Flatness, Runout (radial), Runout (axial), Thickness deviation, Parallelism, Perpendicularity
Printer	Built-in thermal line printer (RA-120)
Software	<b>ROUNDPAK</b> (only RA-120P)



Software  
USB Communication Program  
as a free download on [www.mitutoyo.eu](http://www.mitutoyo.eu)  
(registration required)  
(only RA-120)



Refer to ROUNDTTEST RA-120 brochure



Scan QR Code with your mobile device to watch the product lines video on YouTube



RA-120



RA-120P

# Roundtest RA-120 and RA-120P

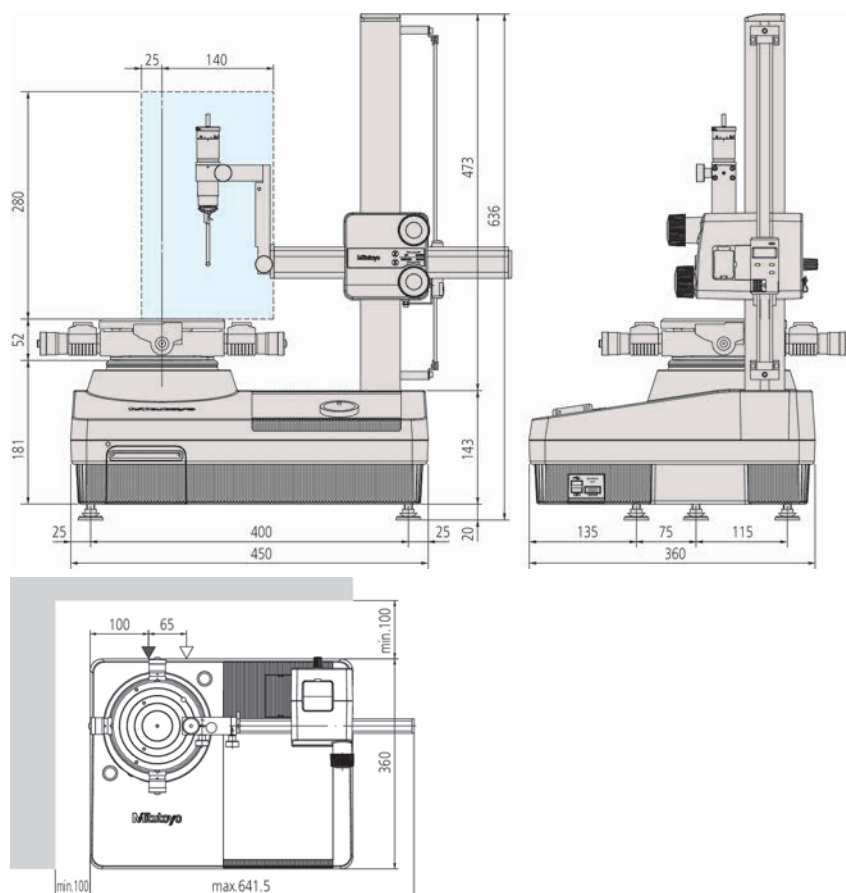
## Series 211 - Form Measuring Instrument

This is a compact roundness tester with D.A.T. (Digital Adjustment Table) function.

### The D.A.T. gives you the following benefits:

- The turntable displays centering and leveling adjustments digitally, making this challenging task easy enough for even an untrained operator to perform, through these four simple steps:

1. Preliminary measurement of two cross sections on the workpiece.
2. The centering and leveling adjustment values are displayed.
3. The digital micrometer heads on the rotary table are adjusted to match the values displayed.
4. Centering and leveling is complete. [Centering range :  $\pm 3$  mm - Leveling range :  $\pm 1^\circ$ ]



No.	Model	Max. workpiece $\phi$ [mm]	Max. probing $\phi$ [mm]	Max. turntable loading [kg]
211-542D	RA-120 with D.A.T. function	440	280	25
211-544D	RA-120 with mechanical turntable	440	280	25
211-545D	RA-120P with D.A.T. function	440	280	25
211-547D	RA-120P with mechanical turntable	440	280	25

### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in this section for accessories and styli.
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### Optional accessories

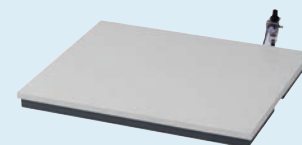
No.	Description
12AAH320	X-axis stopper
211-013	Micro vibration isolator
211-014	Three-jaw chuck, OD: 2-78mm, ID: 25-68mm
211-016	Reference hemisphere
211-031	Micro chuck, OD: 0,1-1,5mm
211-032	Quick chuck, OD: 1-79mm, ID: 16-69 mm
211-045	Magnification calibration gauge, for Roundtest
211-061	Collect chuck holder
356038	Auxiliary stage for low height workpiece, for Roundtest
997090	Gauge block set for calibration, for Roundtest

### Consumable spares

No.	Description
12AAH181	Printer paper (10 rolls)



211-016



211-013



Z-axis scale unit (optional)



X-axis stop



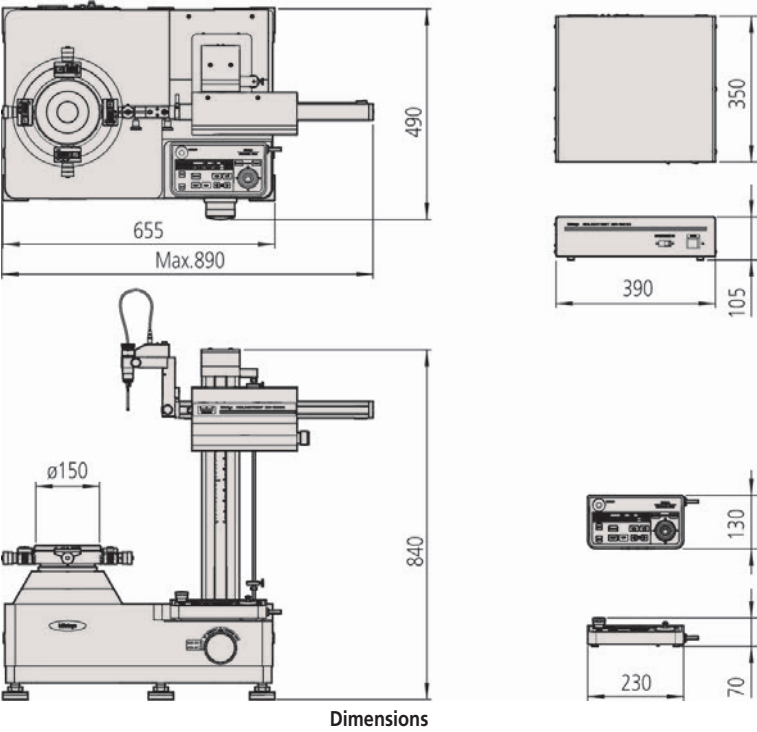
Scan QR Code with your mobile device and watch our product videos on YouTube



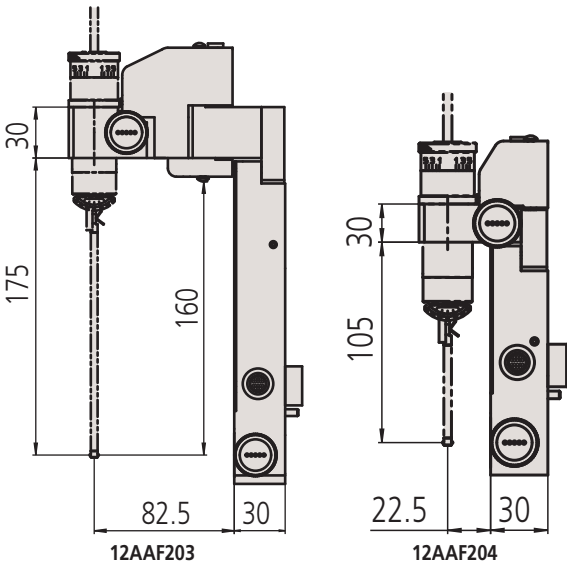


# Roundtest RA-1600

## Series 211 - Roundness Measuring System



No.	Model	Max. workpiece $\varnothing$ [mm]	Max. probing $\varnothing$ [mm]	Max. turntable loading [kg]
211-723D	RA-1600	560	280	25



### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in this section for accessories and styli.
----------------------	---

### Optional accessories

No.	Description
12AAF203	Double length detector holder
12AAF204	Large diameter detector holder
12AAK110	Vibration isolator, for Surftest SV, Contracer, Formtracer, Roundtest
12AAK120	Monitor arm, for vibration isolator 12AAK120
12AAL019	Side table
12AAL090	Sliding detector holder
211-014	Three-jaw chuck, OD: 2-78mm, ID: 25-68mm
211-031	Micro chuck, OD: 0,1-1,5mm
211-032	Quick chuck, OD: 1-79mm, ID: 16-69 mm
211-045	Magnification calibration gauge, for Roundtest
211-061	Collect chuck holder
356038	Auxiliary stage for low height workpiece, for Roundtest
997090	Gauge block set for calibration, for Roundtest



Refer to ROUNDTTEST RA-1600 brochure



## Series 211 - Form Measuring Instrument

## Turntable

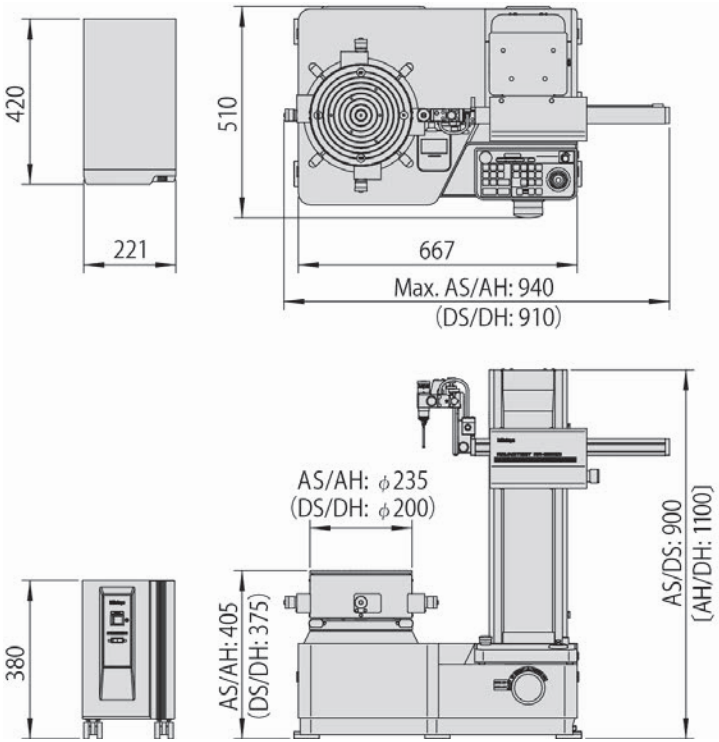
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## Mitutoyo

# Roundtest RA-2200

## Series 211 - Roundness/Cylindricity Measuring System

### Accessories and dimensions



No.	Model	Centering/leveling adjustment 1*	Vertical travel [mm]	Max. workpiece $\phi$ [mm]	Max. probing $\phi$ [mm]	Max. turntable loading [kg]
211-511D	RA-2200AS	AAT	300	580	300	30
211-512D	RA-2200AH	AAT	500	580	300	30
211-513D	RA-2200DS	DAT	300	580	300	30
211-515D	RA-2200DH	DAT	500	580	300	30

1\* AAT : Automatic Adjustment Table  
DAT : Digital Adjustment Table

### Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in this section for accessories and styli.
----------------------	---

### Optional accessories

No.	Description
12AAF203	Double length detector holder
12AAF204	Large diameter detector holder
12AAF353	Roughness detection unit
12AAK110	Vibration isolator, for Surftest SV, Contracer, Formtracer, Roundtest
12AAK120	Monitor arm, for vibration isolator 12AAK120
12AAL019	Side table
211-014	Three-jaw chuck, OD: 2-78mm, ID: 25-68mm
211-031	Micro chuck, OD: 0,1-1,5mm
211-032	Quick chuck, OD: 1-79mm, ID: 16-69 mm
211-045	Magnification calibration gauge, for Roundtest
356038	Auxiliary stage for low height workpiece, for Roundtest



Refer to ROUNDTTEST RA-2200 brochure

## Series 211 - High-precision Form Measuring Instrument

This is a highly accurate, precision form measuring system developed to give you the highest accuracy as well as high flexibility and analytical capability.

- Its integrated vibration isolator helps you to measure within the best conditions.
- It has a high measuring range and loading mass.
- The user friendly software, ROUNDPAK, gives you easy drag and drop usage and a wide range of parameters.
- ROUNDPAK also has easy-to-use part programming and single measurement functions.
- A.A.T. (Automatic Adjustment Table) gives you fully automatic centering and leveling.
- There is an auto follow function for easy and quick pre-centering of the workpiece.



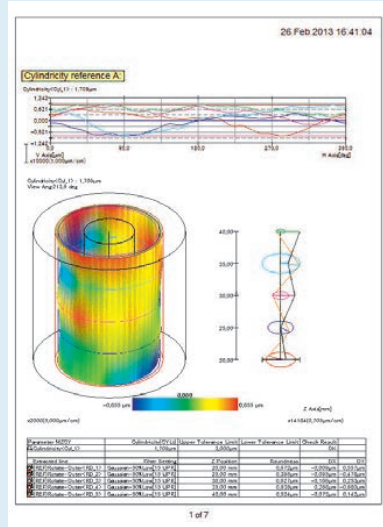
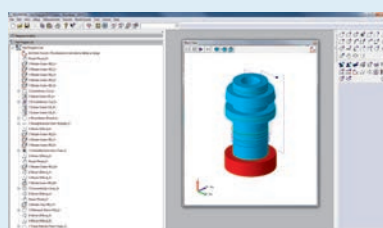
The performance of this turntable has been achieved through exceptional manufacturing accuracy of the critical components, in addition to a high-accuracy air-bearing that provides superior rigidity. The resulting rotational accuracy, the heart of a Roundtest measuring system, is world-class at  $0.02+0.00035H \mu\text{m}$ .



The detector-unit holder is equipped with a sliding mechanism, enabling one-touch measurement of a workpiece with a deep hole having a thick wall, which has been difficult with the conventional standard arm. Sliding distance : 112 mm.

## Turntable

Rotational accuracy	<b>Radial:</b> (0,02+0,00035H) µm H: Measuring height from turntable surface (mm) <b>Axial:</b> (0,02+0,00035X) µm X: Radial distance from center (mm)
Rotational speed	2, 4, 6, 10 rpm
Max. probing Ø	400 mm
Max. workpiece Ø	680 mm
Max. turntable loading	80 kg without auto centering 65 kg
Centering range	±5 mm
Leveling range	±1°
<b>Vertical column</b>	
Max. probing height	<b>AS</b> : 350 mm <b>AH</b> : 550 mm above turntable surface
Max. probing depth	85 mm (minimum ID : ø32 mm) 50 mm (minimum ID : ø7 mm)
Straightness	<b>AS</b> / <b>AH</b> : 0,05 µm / 100 mm <b>AS</b> : 0,14 µm / 350 mm <b>AH</b> : 0,2 µm / 550 mm
Parallelism with rotation center	<b>AS</b> : 0,2 µm / 350 mm <b>AH</b> : 0,32 µm / 550 mm
<b>Horizontal axis</b>	
Straightness	0,4 µm / 200 mm
Perpendicularity to rotation center	0,5 µm / 200 mm
Software	<b>ROUNDPAK</b>  FORMTRACEPAK-AP (optional for roughness detection unit)

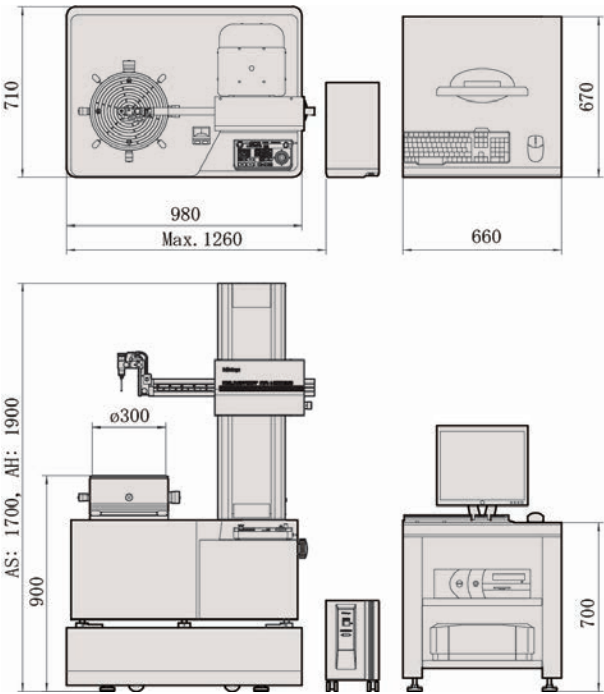


Simple to operate even with a full set of parameters and analysis functions.

# Roundtest RA-H5200

Series 211

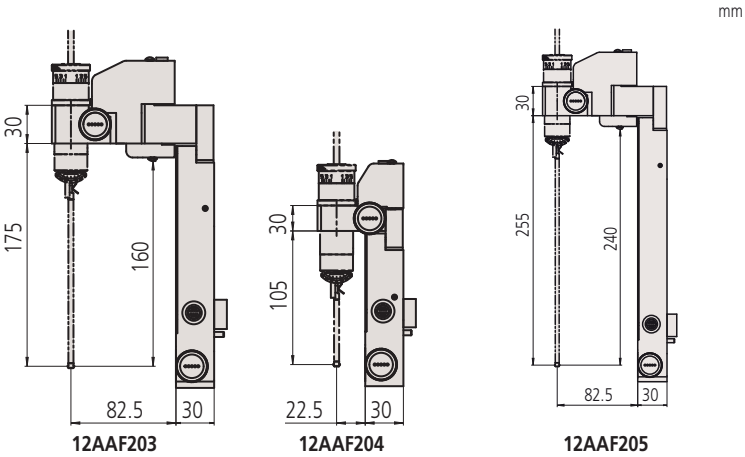
Dimensions and accessories



Dimensions

No.	Model	Centering/leveling adjustment 1*	Vertical travel [mm]	Max. workpiece ø [mm]	Max. probing Ø [mm]	Max. turntable loading [kg]
211-531D	RA-H5200AS	AAT	350	680	400	65
211-532D	RA-H5200AH	AAT	550	680	400	65

1\* AAT : Automatic Adjustment Table



## Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in this section for accessories and styli.
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### Optional accessories

No.	Description
12AAF203	Double length detector holder
12AAF204	Large diameter detector holder
12AAF205	Triple length holder for extra-deep holes
12AAF353	Roughness detection unit
12AAL019	Side table
211-014	Three-jaw chuck, OD: 2-78mm, ID: 25-68mm
211-031	Micro chuck, OD: 0,1-1,5mm
211-032	Quick chuck, OD: 1-79mm, ID: 16-69 mm
211-045	Magnification calibration gauge, for Roundtest



Refer to ROUNDTTEST RA-H5200 brochure



# Roundtest Extreme RA-2200CNC

## Series 211 - High-precision Form Measuring Instrument

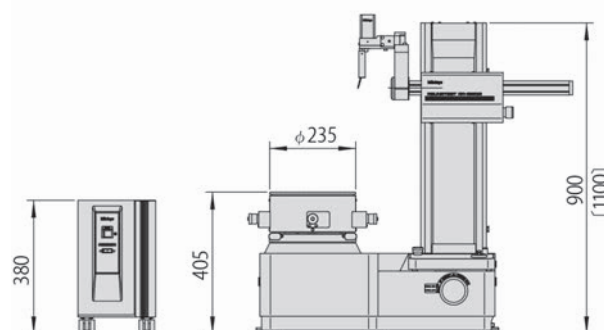
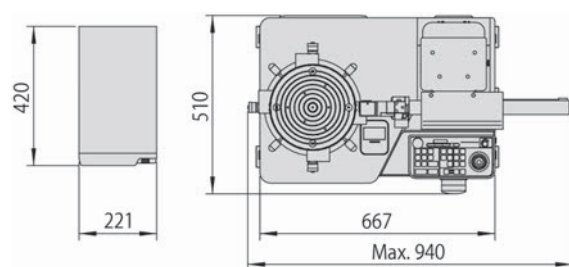
This is a fully automatic CNC form measuring instrument that gives highly accurate results.

### The Roundtest Extreme RA-2200CNC offers you the following benefits:

- It has a CNC controlled measuring system with orientation steps of 1°.
- The extremely high turntable accuracy of (0,02+0,00035H) µm gives you highly accurate form analysis.
- The user friendly software, ROUNDPAK, gives you easy drag and drop usage and a wide range of parameters.
- ROUNDPAK also has easy-to-use part programming and single measurement functions.
- An automatic centering and leveling turntable A.A.T. (Automatic Adjustment Table) is supplied as standard, freeing you from the centering and leveling task.



RA-2200 CNC  
+ optional vibration isolator [12AAK110]  
and side table [12AAL019]

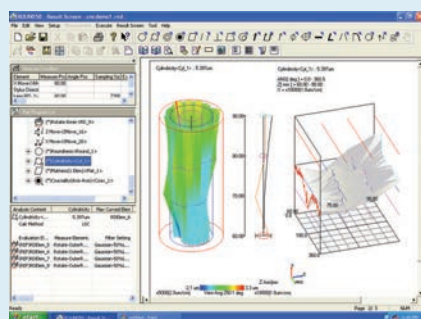


### Specifications

<b>Turntable</b>	
Rotational accuracy	<b>Radial:</b> (0,02+0,00035H) µm H: Measuring height from turntable surface (mm) <b>Axial:</b> (0,02+0,00035X) µm X: Radial distance from center (mm)
Rotational speed	2, 4, 6, 10 rpm
Max. probing Ø	256 mm
Max. workpiece Ø	580 mm
Max. turntable loading	30 kg
Centering range	±3 mm
Leveling range	±1°
<b>Vertical column</b>	
Max. probing height	<b>AS</b> : 300 mm <b>AH</b> : 500 mm above turntable surface
Max. probing depth	104 mm (minimum ID : ø32 mm) 26 mm (minimum ID : ø12,7 mm)
Straightness	<b>AS / AH</b> : 0,1 µm / 100 mm <b>AS</b> : 0,15 µm / 300 mm <b>AH</b> : 0,25 µm / 500 mm
Parallelism with rotation center	<b>AS</b> : 0,7 µm / 300 mm <b>AH</b> : 1,2 µm / 500 mm
<b>Horizontal axis</b>	
Straightness	0,7 µm / 150 mm
Perpendicularity to rotation center	1 µm / 150 mm
Software	<b>ROUNDPAK</b>  FORMTRACEPAK-AP (optional for roughness detection unit)

### Optional accessories

No.	Description
12AAG419	Roughness detection unit CNC, 0,75mN
12AAK110	Vibration isolator, for Surftest SV, Contracer, Formtracer, Roundtest
12AAK120	Monitor arm, for vibration isolator 12AAK120
12AAL019	Side table



### ROUNDPAK

Simple to operate even with a full set of parameters and analysis functions.



Refer to ROUNDTTEST RA-2200 brochure

No.	Model	Centering/leveling adjustment 1*	Vertical travel [mm]	Max. work-piece ø [mm]	Max. probing Ø [mm]	Max. turntable loading [kg]
211-517D	RA-2200CNC AS	AAT	300	580	256	30
211-518D	RA-2200CNC AH	AAT	500	580	256	30

1\* AAT : Automatic Adjustment Table



# Roundtest Extreme RA-H5200CNC

## Series 211 - High-precision Roundness/Cylindricity Measuring System

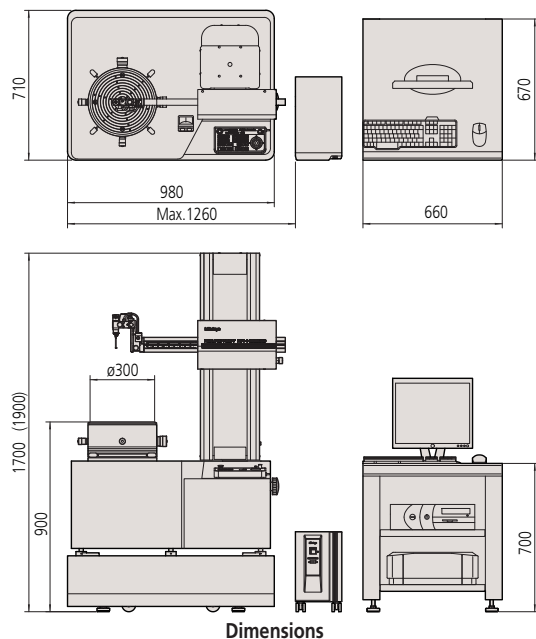
This is a CNC form measuring instrument that combines high accuracy with automatic CNC measurements.

### The Roundtest Extreme RA-H5200CNC offers you the following benefits:

- An integrated vibration isolator helps you to measure within best conditions.
- It will greatly improve your productivity and efficiency.
- You can take highly accurate, fast and operator-free measurements.
- The user friendly software, ROUNDPAK, gives you easy drag and drop usage and a wide range of parameters.
- ROUNDPAK also has easy-to-use part programming and single measurement functions.
- An automatic centering and leveling turntable A.A.T. (Automatic Adjustment Table) is supplied as standard, freeing you from the centering and leveling task.



RA-H5200CNC + side table [12AAL019]



Dimensions

No.	Model	Centering/leveling adjustment 1*	Vertical travel [mm]	Max. workpiece ø [mm]	Max. probing Ø [mm]
211-533D	RA-H5200CNC AS	AAT	350	680	356
211-534D	RA-H5200CNC AH	AAT	550	680	356

1\* AAT : Automatic Adjustment Table

## Specifications

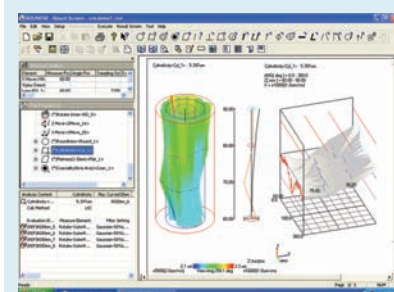
<b>Turntable</b>	
Rotational accuracy	<b>Radial:</b> (0,02+0,00035H) µm H: Measuring height from turntable surface (mm) <b>Axial:</b> (0,02+0,00035X) µm X: Radial distance from center (mm)
Rotational speed	2, 4, 6, 10 rpm Auto centering: 20 rpm
Max. probing Ø	356 mm
Max. workpiece Ø	680 mm
Max. turntable loading	80 kg without auto centering 65 kg
Centering range	±5 mm
Leveling range	±1°
<b>Vertical column</b>	
Max. probing height	<b>AS :</b> 350 mm <b>AH:</b> 550 mm above turntable surface
Max. probing depth	104 mm (minimum ID : ø32 mm) 26 mm (minimum ID : ø12,7 mm)
Parallelism with rotation center	<b>AS :</b> 0,2 µm / 350 mm <b>AH :</b> 0,32 µm / 550 mm
<b>Horizontal axis</b>	
Straightness	0,4 µm / 200 mm
Perpendicularity to rotation center	0,5 µm / 200 mm
Software	<b>ROUNDPAK</b>  FORMTRACEPAK-AP (optional for roughness detection unit)

## Additional Specifications

Optional accessories	Other optional and standard accessories are listed later in this section for accessories and styli.
----------------------	---

## Optional accessories

No.	Description
12AAG419	Roughness detection unit CNC, 0,75mN
12AAL019	Side table



## ROUNDPAK

Simple to operate even with a full set of parameters

# Roundtest Extreme RA-6000CNC

## Series 211 – Large size Form Measuring Instrument

This is a fully automatic CNC form measuring instrument for heavy and accurate workpieces.

### The Roundtest Extreme RA-6000CNC bears the following benefits:

- Huge measuring range of 1050 mm in height for long workpieces
- Wide probing range enables measurements of form parameters of huge-diameter workpieces
- Maximum loading capacity of 350 kg for heavy and big size workpieces
- Highly-accurate measurements of large workpieces
- Fully automatic measurement provides fast and accurate processing
- ROUNDPAK software also comprises easy-to use part programing and single measurement functions
- A highly accurate automatic centering and leveling turntable A.A.T. (Automatic Adjustment Table) is supplied as standard, rendering manual centering and leveling redundant

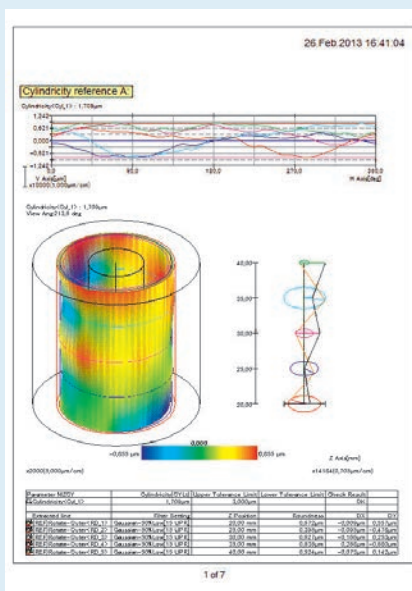
### Specifications

#### Turntable

Rotational accuracy	Radial: (0,05+0,0006H) $\mu\text{m}$ H: Measuring height from turntable surface (mm) Axial: (0,05+0,0006X) $\mu\text{m}$ X: Radial distance from center (mm)
Rotational speed	2, 4, 6 rpm
Max. turntable loading	350 kg
Centering range	$\pm 5$ mm
Leveling range	$\pm 1^\circ$

#### Vertical column

Max. probing height	1050 mm
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### ROUNDPAK

Simple to operate even with a full set of parameters and analysis functions






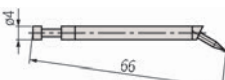

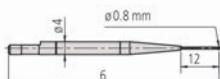
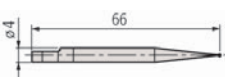
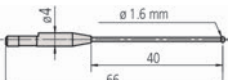

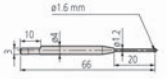




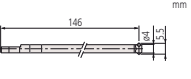




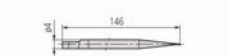


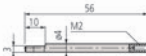


RA-6000CNC

No.	Model	Centering/leveling adjustment 1*	Vertical travel [mm]	Max. workpiece $\phi$ [mm]	Max. probing $\phi$ [mm]	Max. turntable loading [kg]
211-591D	RA-6000CNC	AAT	1050	900	880	350

1\* AAT : Automatic Adjustment Table

# Optional Styli for Roundtest

Interchangeable styli for RA-10, RA-120, RA-120P, RA-1600, RA-2200, RA-H5200

 <p><b>12AAL021 - Standard</b> ø 1,6 mm tungsten carbide</p>	 <p><b>12AAL022 - Notch</b> ø 3 mm tungsten carbide</p>	 <p><b>12AAL023 - Deep groove</b> R 0,25 mm sapphire</p>
 <p><b>12AAL024 - Corner</b> R 0,25 mm sapphire</p>	 <p><b>12AAL025 - Cutter mark</b> R 15 mm tungsten carbide</p>	 <p><b>12AAL026 - Small hole</b> ø 0,8 mm tungsten carbide</p>
 <p><b>12AAL027 - Small hole</b> ø 1 mm tungsten carbide</p>	 <p><b>12AAL028 - Small hole</b> ø 1,6 mm tungsten carbide</p>	 <p><b>12AAL029 - Extra small hole</b> ø 0,5 mm tungsten carbide</p>
 <p><b>12AAL030 - ø 1,6 mm ball</b> ø 1,6 mm tungsten carbide</p>	 <p><b>12AAL031 - Disc</b> ø 12 mm</p>	 <p><b>12AAL032 - Crank</b> ø 0,5 mm tungsten carbide</p>
 <p><b>12AAL033 - Crank</b> ø 1 mm tungsten carbide</p>	 <p><b>12AAL034 - Flat surface</b> Tungsten carbide</p>	 <p><b>12AAL035 - 2X-long standard</b> ø 1,6 mm tungsten carbide</p>
 <p><b>12AAL036 - 2X-long notch</b> ø 3 mm tungsten carbide</p>	 <p><b>12AAL037 - 2X-long deep groove</b> R 0,25 mm sapphire</p>	 <p><b>12AAL038 - 2X-long corner</b> R 0,25 mm sapphire</p>
 <p><b>12AAL039 - 2X-long type cutter mark</b> R 15 mm tungsten carbide</p>	 <p><b>12AAL040 - 2X-long small hole</b> ø 1 mm tungsten carbide</p>	 <p><b>12AAL041 - 3X-long standard</b> ø 1,6 mm tungsten carbide</p>
 <p><b>12AAL042 - 3X-long deep groove</b> R 0,25 mm sapphire</p>	 <p><b>12AAL043 - Stylus shank</b> for mounting M2 - CMM stylus</p>	 <p><b>12AAL044 - Stylus shank groove</b> for mounting M2 - CMM stylus</p>
 <p><b>12AAL045 - Stylus shank 2X groove</b> for mounting M2 - CMM stylus</p>		

## Standard accessories

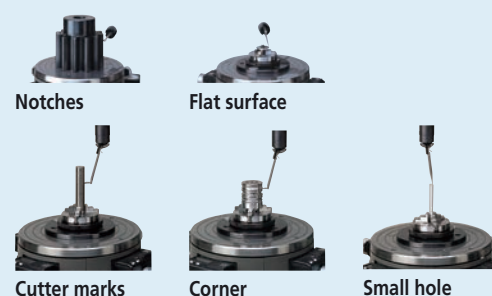
No.	Description
12AAL021	Standard stylus

## Optional accessories

No.	Description
12AAL022	Stylus for notches, Ø3 mm, tungsten carbide
12AAL023	Stylus for deep groove, R 0,25 mm, Sapphire
12AAL024	Stylus for corner, R 0,25 mm, Sapphire
12AAL025	Stylus for cutter marks, R 15 mm, tungsten carbide
12AAL026	Stylus for small holes, Ø0,8 mm, tungsten carbide
12AAL027	Stylus for small holes, Ø1 mm, tungsten carbide
12AAL028	Stylus for small holes, Ø1,6 mm, tungsten carbide
12AAL029	Stylus for extra small hole, Ø0,5 mm, tungsten carbide
12AAL030	Stylus ball type, Ø1,6 mm, tungsten carbide
12AAL031	Stylus disc type, Ø12 mm
12AAL032	Stylus for cranks, Ø0,5 mm, tungsten carbide
12AAL033	Stylus for cranks, Ø1 mm, tungsten carbide
12AAL034	Stylus for flat surface, tungsten carbide
12AAL035	Stylus 2X-long standard type, Ø1,6 mm, tungsten carbide*1
12AAL036	Stylus 2X-long type for notches, Ø3 mm, tungsten carbide*1
12AAL037	Stylus 2X-long type for deep grooves, R 0,25 mm, Sapphire*1
12AAL038	Stylus 2X-long type for corners, R 0,25 mm, Sapphire*1
12AAL039	Stylus 2X-long type for cutter marks, R 15 mm, tungsten carbide*1
12AAL040	Stylus 2X-long type for small hole, Ø1 mm, tungsten carbide*1
12AAL041	Stylus 3X-long standard type, Ø1,6 mm, tungsten carbide*2
12AAL042	Stylus 3X-long type for deep grooves, R 0,25 mm, Sapphire*2
12AAL043	Stylus shank, for mounting M2-CMM stylus
12AAL044	Stylus shank for grooves, for mounting M2-CMM stylus
12AAL045	Stylus shank 2X-long type for grooves, for mounting M2-CMM stylus*1

\*1 Not available for RA-10, RA-120, RA-120P

\*2 Measuring is only possible in the vertical direction



# Optional Styli for Roundtest

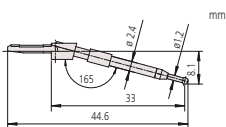
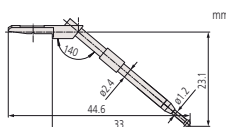
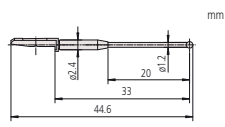
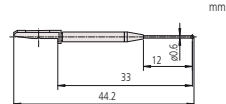
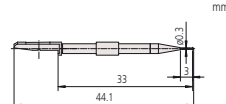
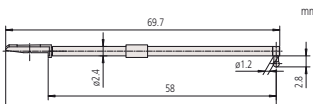
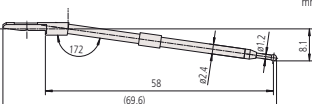
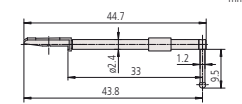
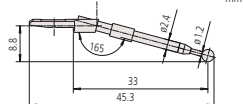
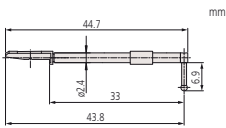
Interchangeable styli for RA-2200CNC, RA-H5200CNC, RA-6000CNC

## Standard accessories

No.	Description
12AAE301	Stylus standard type for CNC, Ø1,6 mm, tungsten carbide
12AAE302	Stylus for flat surfaces for CNC, Ø1,6 mm, tungsten carbide

## Optional accessories

No.	Description
12AAE303	Ball stylus for CNC, Ø1,6 mm, tungsten carbide
12AAE304	Ball stylus for CNC, Ø0,8 mm, tungsten carbide
12AAE305	Ball stylus for CNC, Ø0,5 mm, tungsten carbide
12AAE306	Stylus for deep holes, Ø1,6 mm, tungsten carbide
12AAE307	Stylus for deep holes, Ø1,6 mm, tungsten carbide
12AAE308	Stylus for deep grooves, Ø1,6 mm, tungsten carbide
12AAE309	Stylus for notches, Ø3,0 mm, tungsten carbide
12AAE310	Stylus for grooves, Ø1,6 mm, tungsten carbide

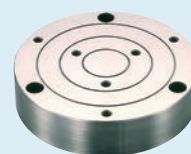
 <p><b>12AAE301 - Standard Ø 1,6 mm tungsten carbide</b></p>	 <p><b>12AAE302 - Flat surface Ø 1,6 mm tungsten carbide</b></p>	 <p><b>12AAE303 - Ø 1,6 mm ball Ø 1,6 mm tungsten carbide</b></p>
 <p><b>12AAE304 - Ø 0,8 mm ball Ø 0,8 mm tungsten carbide</b></p>	 <p><b>12AAE305 - Ø 0,5 mm ball Ø 0,5 mm tungsten carbide</b></p>	 <p><b>12AAE306 - Deep hole Ø 1,6 mm tungsten carbide</b></p>
 <p><b>12AAE307 - Deep hole Ø 1,6 mm tungsten carbide</b></p>	 <p><b>12AAE308 - Deep groove Ø 1,6 mm tungsten carbide</b></p>	 <p><b>12AAE309 - Notch Ø 3 mm tungsten carbide</b></p>
 <p><b>12AAE310 - Groove Ø 1,6 mm tungsten carbide</b></p>		

# Optional Accessories for Roundtest

## Optional accessories for Roundtest and Roundtest Extreme

### Auxiliary stage for a low-height workpiece

No.	Description
356038	Used for measuring a workpiece whose diameter is 40 mm or less and whose height is 20 mm or less



356038

### Chuck - Quick chuck

This chuck is useful when measuring small workpieces. You can easily clamp them with its knurled ring.

No.	Holding capacity [mm]	External dimensions [mm]
211-032	Internal jaw: ID = $\varnothing$ 16 - 69 External jaw: OD = $\varnothing$ 1 - 79	$\varnothing$ 118 x 41



211-032



211-031

### Chuck - Quick chuck

This Chuck is useful when measuring small workpieces. You can easily clamp them with its knurled ring.

No.	Holding capacity [mm]	External dimensions [mm]
211-031	Internal jaw: $\varnothing$ 0,1 - 1,5	$\varnothing$ 118 x 48,5



211-014

### Chuck - Three jaw chuck (key operated)

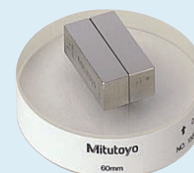
No.	Holding capacity [mm]	External dimensions [mm]
211-014	Internal jaw: ID = $\varnothing$ 25 - 68 Internal jaw: OD = $\varnothing$ 2 - 35 External jaw: OD = $\varnothing$ 35 - 78	$\varnothing$ 157 x 70,6

### Cylindric square

No.	Cylindricity [ $\mu$ m]	Perpendicularity [ $\mu$ m]	Straightness [ $\mu$ m]
350850	2	3	1



350850



997090

### Gauge block set for calibration

No.	Description
997090	Standard accessory for RA-2200, RA-2200CNC Standard accessory for RA-H5200 and RA-H5200CNC

### Magnification checking gauge

No.	Graduation [ $\mu$ m]
211-045	0,2



211-045

### Origin point gauge

No.	Description
998382	Standard accessory for RA-1600, RA-2200 and RA-H5200



998382

### Vibrator isolator and accessories

No.	External dimensions [mm]	Vibration isolation method	Description
178-025	(WxDxH) 750 x 550 x 59	Air suspension Diaphragm isolation system	For RA-2200 and RA-2200CNC
178-024	640 x 470 x 660		Stand for RA-2200 and RA-2200CNC
12AAL019	660 x 670 x 700		Side table
12AAK110	830 x 800 x 700		Vibration isolator
12AAK120			Monitor arm



178-025



12AAK110 + 12AAK120



12AAK110 + 12AAL019





**Micro-Vickers Hardness HM-Series**  
Page 532



**Vickers Hardness HV-Series**  
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**Rockwell, Rockwell Superficial, Brinell**  
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**Portable Hardness Tester**  
Page 547



**Reference Material Blocks**  
Page 551

# Micro-Vickers Hardness Testing Machines

## HM-210/220

### Series 810

This is a high performance hardness testing machine that uses advanced technology and is ideal for quality control.

The manual line up of the HM-200 Series has the following benefits:

- 144 mm (5,7 inch) colored touchscreen display (Type A) with higher visibility, easy to operate user interface
- Digimatic output for report creation.
- USB stick data export
- Electromagnetic test force generation system for higher accuracy.
- A high performance optical system provides a high quality image of the indentation load.
- A long working distance greatly reduces the possibility of collision.
- A range of six different objectives: 2x, 5x, 10X, 20X, 50X and 100X for measuring the indentation images.
- LED lighting gives you an observation image in natural colour, with better contrast, as well as longer operation.
- You can set different kinds of conditions on a touch panel, and display test results for easy operation.
- Vickers, Knoop and KC fracture toughness measurement.
- Test force ranges from 0,05g to 2kg.



Touchscreen type

Software type

HM-210 Testforce range

No.	Test force									
HM-210	V.S.*	HV0,01	HV0,02	HV0,03	HV0,05	HV0,1	HV0,2	HV0,3	HV0,5	HV1
	mN	98,07	196,1	294,2	490,3	980,7	1.961	2.942	4.903	9.807
	(gf)	10	20	30	50	100	200	300	500	1.000

\*V.S. = Vickers scale

HM-220 Testforce range

No.	Test force										
HM-220	V.S.*	HV0,00005	HV0,0001	HV0,0002	HV0,0003	HV0,0005	HV0,001	HV0,002	HV0,003	HV0,005	HV0,01
	mN	0,4903	0,9807	1.961	2.942	4,903	9,807	19,61	29,42	49,03	98,07
	(gf)	(0,05)	(0,1)	(0,2)	(0,3)	(0,5)	1	2	3	5	10
	V.S.*	HV0,02	HV0,03	HV0,05	HV0,1	HV0,2	HV0,3	HV0,5	HV1	HV2	
	mN	196,1	294,2	490,3	980,7	1.961	2.942	4.903	9.807	19.610	
	(gf)	20	30	50	100	200	300	500	1.000	2.000	

\*V.S. = Vickers Scale

### Specifications

Indenter / Objective turret	Motor driven and manual operation
Data output	RS-232C, Digimatic, USB 2 interface
Standard	ISO 6507-2, JIS B 7725
XY stage [mm]	<b>Travel range system A + B:</b> 25 x 25 / 50 x 50 manual <b>Travel range system C + D :</b> 50 x 50 / 100 x 100 motorized
Arbitrary test force	1 type [Default: 245,2mN (25gf)]
Control panel	Built-in touch panel, 5,7" Color LCD (HM-210A/220A for System A), Control software (PC for System B/C/D)
External dimensions	System A: 315(W)×671(D)×595(H)mm/38,5kg System B/C/D: 315(W)×586(D)×741(H)mm/37,4kg
Main unit mass	
Functions	Calculation of Vickers / Knoop*2 hardness, and ceramic fracture toughness based on IF method (JIS R1.697), 3 display format (standard, list, simple), GO/NG judgment, test condition guide, curve and user correction, hardness corresponding value, statistics calculation
Objective lens unit	Up to 4 pcs. mountable (one mounted 50X as standard)
Output	Digimatic, serial, USB2 series A (for memory)*1, USB2 B Type (for system communication)
Resolution of diagonal length of an indentation	Objective lens less than 50X: 0,1μm (Objective lens more than 50X: 0,01μm)
Specimen dimensions	System A/B: height 133mm, depth 160mm (when using manual XY stage 25X25) System C: height 112mm, depth 160mm, System D: height 72mm, depth 160mm
Test force control	Electromagnetic generation of force (force motor) and automatic control (load, duration, unload)
Turret drive	Motor-driven and manual operation



Power turret with 2 indenter mounts and 4 objective mounts



Hardness Testing Machines brochure on request

For a list of optional accessories, refer to the following page.  
Hardness test blocks can be found in the Hardness Testing Machines brochure.

# Micro-Vickers Hardness Testing Machines

## HM-210/220

### Optional accessories

No.	Description
63ETB601	500HV0,1 HTB Vickers ASTM E-92, with DAKK5 certificate 30x30x6mm steel
63ETB606	750HV0,1 HTB Vickers ASTM E-92, with DAKK5 certificate 30x30x6mm steel
63ETB635	500HV0,3 HTB Vickers ISO 6507-3, with DAKK5 certificate 30x30x6mm steel
63ETB640	750HV0,3 HTB Vickers ISO 6507-3, with DAKK5 certificate 30x30x6mm steel
63ETB670	500HV1 HTB Vickers ISO 6507-3, with DAKK5 certificate 30x30x6mm steel
63ETB675	750HV1 HTB Vickers ISO 6507-3, with DAKK5 certificate 30x30x6mm steel
810-017	Special vise, (opening width 100mm)
810-013	Sheet specimen table
810-014	Thin specimen table, (horizontal type)
810-015	Thin specimen table, (vertical type)
810-019	Tilting specimen table
810-020	Adjustable specimen holder, Ø15-30mm
810-018	Rotary table, 360°
810-084	Rotatable adjustable specimen table, Ø15-30mm / 360°
810-085	Sheet specimen table
810-095	Rotary tilting specimen table, vise Ø15-50mm
375-056	Calibration Micro Scale
810-650-1	Resin mold specimen table, Ø25.4 mm
810-650-2	Resin mold specimen table, Ø30 mm
810-650-3	Resin mold specimen table, Ø31.75 mm
810-650-4	Resin mold specimen table, Ø38.1 mm
810-650-5	Specimen holder f. resin molded specimen, 1 specimen Ø40 mm
02ATE760	Table, QV-E/QS
810-641	Vibration Isolator, (for testing machine)

### Manual or complete automatic testing



System A

HM-210A/HM-220A

#### Features:

- Touch-panel operation
- Measurement of indentation dimensions using a measuring microscope
- Positioning using a manual XY stage



System C

HM-210C/HM-220C

#### Features:

- Operated using AVPAK-20
- Automatic indentation reading
- Automatic positioning with motorized XY stage



System B

HM-210B/HM-220B

Automatic measurement by AVPAK-20 eliminates operator measurement errors.

#### Features:

- Operation using AVPAK-20
- Automatic measurement of indentations
- Positioning using a manual XY stage



System D

HM-210D/HM-220D

Top-end model with autofocus

#### Features:

- Operated using AVPAK-20
- Automatic indentation reading
- Automatic positioning with motorized XY stage
- Autofocusing

Code number	Description
63AAA356	HDMI camera
11AAC729	C-mount
NEC EA241WM	24" monitor

### Vickers HDMI camera system

(To be used with manual Vickers testing machines)

The 1/3" 1.2 Mpixel HDMI camera and a 24" standard monitor enables observation and measurement of indentations at high magnification, thereby reducing operator error. Additionally, images can be stored on the included 16GB SD card. No PC needed due to built in processor. Scope of delivery includes HDMI cable and wireless mouse. Please order 63AAA356, 11AAC729 and NEC EA21N for complete set.



AVPAK-20 software 11AAC666 for automatic hardness testing systems. Software that supports control, testing and report creation related to hardness testing. Supports parameter setting and automatic measurement.

High-functionality PC and TFT monitor Compatible with Windows® 10 Professional. Supports a wide-screen TFT and provides improved operability. \*depending the version

# Micro-Vickers Hardness Testing Machines

## HM-210/220

### Configuration

Up to three additional objective lenses can be added



Observation image of the indentation (50X)  
Stray light reduction around the indentation



Wide range of lenses available for different magnifications

Objectives	Vickers-Scale		
	HV 0,00005 - 0,02	HV 0,2 - 1	HV 1-2
2x	Use this objectives only for probe overview		
5x	Use this objectives only for probe overview		
10x			
20x			
50x			
100x			
10x objective for easy focus			
Use this table for first orientation			

		Minimum system configuration		In addition selectable FACTORY OPTIONS		Remarks
TOUCH SCREEN MODELS	SYSTEM A	HM-210 SYSTEM A	Main unit standard test force	810-401D	Video camera unit	810-454D
			Manual XY stage 25 x 25mm	810-420	Objective lens 2X	11AAC104
		HM-210 SYSTEM A	Main unit standard test force	810-401D	Objective lens 5X	11AAC105
			Manual XY stage 50 x 50mm	810-423	Objective lens 10X	11AAC106
		HM-220 SYSTEM A	Main unit low test force	810-406D	Objective lens 20X	11AAC107
			Manual XY stage 25 x 25mm	810-420	Objective lens 100X	11AAC108
		HM-220 SYSTEM A	Main unit low test force	810-406D	Indenter shaft unit	11AAC109
			Manual XY stage 50 x 50mm	810-423	with 19BAA061 Knoop indenter	
		HM-220 SYSTEM A	Main unit low test force	810-406D	Measuring microscope	11AAC129
			Manual XY stage 50 x 50mm	810-423	with 19BAA062 Knoop indenter	

		Minimum system configuration		In addition selectable FACTORY OPTIONS		Remarks
SOFTWARE MODELS	SYSTEM B	HM-210 SYSTEM B	Main unit standard test force	810-404D	Objective lens 2X	11AAC104
			Manual XY stage 25 x 25mm	810-420	Objective lens 5X	11AAC105
		HM-210 SYSTEM B	AVPAK-20*	11AAC666	Objective lens 10X	11AAC106
			Main unit standard test force	810-404D	Objective lens 20X	11AAC107
		HM-220 SYSTEM B	Manual XY stage 50 x 50mm	810-423	Objective lens 100X	11AAC108
			AVPAK-20*	11AAC666	Indenter shaft unit	11AAC109
		HM-220 SYSTEM B	Main unit low test force	810-409D	Measuring microscope	11AAC129
			Manual XY stage 25 x 25mm	810-420	with 19BAA061 Knoop indenter	
		HM-220 SYSTEM B	AVPAK-20*	11AAC666	Objective lens 2X	11AAC104
			Main unit low test force	810-409D	Objective lens 5X	11AAC105

		Minimum system configuration		In addition selectable FACTORY OPTIONS		Remarks
SOFTWARE MODELS	SYSTEM C	HM-210 SYSTEM C	Main unit standard test force	810-404D	Objective lens 2X	11AAC104
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105
		HM-210 SYSTEM C	AVPAK-20*	11AAC666	Objective lens 10X	11AAC106
			Main unit standard test force	810-404D	Objective lens 20X	11AAC107
		HM-220 SYSTEM C	Motorized XY stage 100 x 100mm	810-462D	Objective lens 100X	11AAC108
			AVPAK-20*	11AAC666	Indenter shaft unit	11AAC109
		HM-220 SYSTEM C	Main unit low test force	810-409D	Measuring microscope	11AAC129
			Motorized XY stage 50 x 50mm	810-461D	with 19BAA061 Knoop indenter	
		HM-220 SYSTEM C	AVPAK-20*	11AAC666	Objective lens 2X	11AAC104
			Main unit low test force	810-409D	Objective lens 5X	11AAC105

		Minimum system configuration		In addition selectable FACTORY OPTIONS		Remarks
SOFTWARE MODELS	SYSTEM D	HM-210 SYSTEM D	Main unit standard test force	810-404D	Objective lens 2X	11AAC104
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105
		HM-210 SYSTEM D	Auto Focus stage unit	810-465	Objective lens 10X	11AAC106
			AVPAK-20*	11AAC666	Objective lens 20X	11AAC107
		HM-220 SYSTEM D	Main unit standard test force	810-404D	Objective lens 100X	11AAC108
			Motorized XY stage 100 x 100mm	810-462D	Indenter shaft unit	11AAC109
		HM-220 SYSTEM D	Auto Focus stage unit	810-465	Measuring microscope	11AAC129
			AVPAK-20*	11AAC666	with 19BAA061 Knoop indenter	
		HM-220 SYSTEM D	Main unit low test force	810-409D	Objective lens 2X	11AAC104
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105

\* The above set does not include PC.

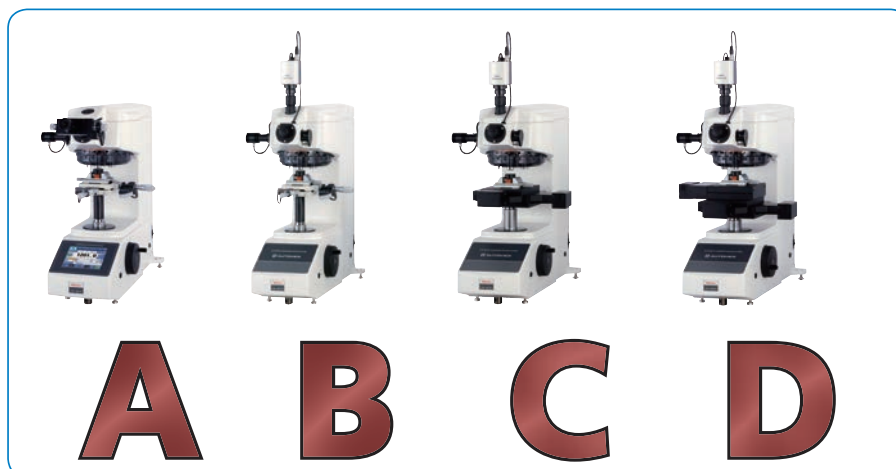
For all systems: 50 x objective as standard.

# Micro-Vickers Hardness Testing Machines HM-210/220

Please order AVPAK-20 Software 11AAC666  
and the PC additionally!

All items listed below the set code number are included  
in the scope of delivery.

## Configuration



### Single indenter configuration HM-200 A-Type sets

Contains:	<b>810-401D-ASET HM-210A</b>
<b>810-401D</b>	Manual main unit HM-210
<b>11AAC106</b>	10x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-420</b>	Manual XY stage 25x25mm

810-016 vise not included

Contains:	<b>810-406D-ASET HM-220A</b>
<b>810-406D</b>	Manual main unit HM-220
<b>11AAC106</b>	10x Objective lens
<b>11AAC108</b>	100x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-420</b>	Manual XY stage 25x25mm

810-016 vise not included

### Single indenter configuration HM-200 B-Type sets

Contains:	<b>810-404D-BSET1 HM-210B</b>
<b>810-404D</b>	System main unit HM-210
<b>11AAC106</b>	10x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-420</b>	Manual XY stage 25x25mm

810-016 vise not included

Contains:	<b>810-409D-BSET1 HM-220B</b>
<b>810-409D</b>	System main unit HM-220
<b>11AAC106</b>	10x Objective lens
<b>11AAC108</b>	100x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-420</b>	Manual XY stage 25x25mm

810-016 vise not included

### Double indenter configuration HM-200 B-Type sets

Contains:	<b>810-404D-BSET2 HM-210B</b>
<b>810-404D</b>	System main unit HM-210
<b>11AAC109</b>	Second indenter shaft unit for Knoop test
<b>11AAC106</b>	10x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-420</b>	Manual XY stage 25x25mm

810-016 vise not included

Contains:	<b>810-409D-BSET2 HM-220B</b>
<b>810-409D</b>	System main unit HM-220
<b>11AAC110</b>	Second indenter shaft unit for Knoop test
<b>11AAC106</b>	10x Objective lens
<b>11AAC108</b>	100x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-420</b>	Manual XY stage 25x25mm

810-016 vise not included

### Single indenter configuration HM-200 C-Type sets

Contains:	<b>810-404D-CSET HM-210C</b>
<b>810-404D</b>	System main unit HM-210
<b>11AAC104</b>	2x Objective lens
<b>11AAC106</b>	10x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-462D</b>	Motorized XY stage 100x100mm

810-016 vise not included

Contains:	<b>810-409D-CSET HM-220C</b>
<b>810-409D</b>	System main unit HM-220
<b>11AAC104</b>	2x Objective lens
<b>11AAC106</b>	10x Objective lens
<b>11AAC108</b>	100x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-462D</b>	Motorized XY stage 100x100mm

810-016 vise not included

### Single indenter configuration HM-200 D-Type sets

Contains:	<b>810-404D-DSET HM-210D</b>
<b>810-404D</b>	System main unit HM-210
<b>11AAC104</b>	2x Objective lens
<b>11AAC106</b>	10x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-462D</b>	Motorized XY stage 100x100mm
<b>810-465</b>	Autofocus unit

Contains:	<b>810-409D-DSET HM-220D</b>
<b>810-409D</b>	System main unit HM-220
<b>11AAC104</b>	2x Objective lens
<b>11AAC106</b>	10x Objective lens
<b>11AAC108</b>	100x Objective lens
<b>Standard lens</b>	50x Objective lens
<b>810-462D</b>	Motorized XY stage 100x100mm
<b>810-465</b>	Autofocus unit

810-016 vise not included

All products to be sold to commercial customers. Product illustrations are without obligation. Product descriptions, in particular any and all technical specifications, are only binding when explicitly agreed upon. For suggested retail prices, please refer to the separate price list.



# Vickers Hardness Testing Machine HV-110/120

## Series 810

The manual line up of the HV-100 Series has the following benefits:

- 144 mm (5,7 inch) colored touchscreen display (Type A) with higher visibility, easy to operate user interface
- Digimatic output for report creation.
- USB stick data export
- Electronic test force change.
- Max. specimen height up to 210mm
- LED illumination for best image.
- High number of accessories
- Vickers, Knoop, Brinell and KC fracture toughness measurement.
- Supports Brinelltest up to 62,5KG with an optional test force weight.



Manual type A

Software type D

### HV-110 Testing force range

No.	Test force								
HV-110	V.S.*	HV1	HV2	HV3	HV5	HV10	HV20	HV30	HV50
	N	9,807	19,61	29,42	49,03	98,07	196,1	294,2	490,3
	(kgf)	1	2	3	5	10	20	30	50

\*V.S. = Vickers Scale

### HV-120 Testing force range

No.	Test force								
HV-120	V.S.*	HV0,3	HV0,5	HV1	HV2,5	HV5	HV10	HV20	HV30
	N	2,942	4,903	9,807	24,51	49,03	98,07	196,1	294,2
	(kgf)	0,3	0,5	1	2,5	5	10	20	30

\*V.S. = Vickers Scale



Scan QR Code with your mobile device and watch our product videos on YouTube

## Specifications

External dimensions [mm]	System A: 307(W)×696(D) ×786(H)mm System B/C/D: 307(W) ×627(D)×875(H)mm
Objective lens	Up to 3 pcs. mountable (one standard lens 10X mounted as standard)
Load control	Automatic (load, dwell, unload)
Force dwell time	5-999 sec (selectable)
Optical system	Infinity corrected optical system
Illumination unit	LED light
Standard	JIS B 7725, ISO 6507-2
Data output	RS-232C, Digimatic, USB 2. 0 interface
Indenter approach speed	60 μm/s, 150 μm/s selectable
Working distance	50X = 2,5 mm (other objectives available)
Mass	43 kg
Control panel	Built-in touch panel, 5,7" Color LCD (HM-110A/120A for System A), Control software (PC for System B/C/D)
Functions	Calculation of Vickers / Knoop*2 / Brinell*3 hardness, and ceramic fracture toughness based on IF method (JIS R1.697), 3 display format (standard, list, simple), GO/NG judgment, test condition guide, curve and user correction, hardness corresponding value, statistics calculation
Main unit mass	HV-110: Approx. 60kg, HV-120: Approx. 58kg
Output	Digimatic, serial, USB2 series A (for memory)*1, USB2 B Type (for system communication)
Resolution of diagonal length of an indentation	Objective lens less than 50X: 0,1μm (Objective lens more than 50X: 0,01μm)
Specimen dimensions	System A: height 210mm, depth 170mm (when using flat anvil) System B: height 181mm, depth 170mm (when using manual XY stage 50X50mm) System C: height 172mm, depth 170mm, System D: height 132mm, depth 170mm
Test force control	Lever method and automatic control (load, duration, unload)
Turret drive	Motor driven and manual operation

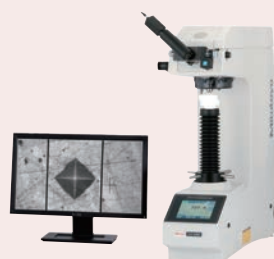


Hardness Testing Machines brochure on request

# Vickers Hardness Testing Machine HV-110/120

## Optional accessories

No.	Description
63DIA011	Diamond Indenter Vickers HV 0,2, DIN EN ISO 6507-2 with DAkkS certificate, HV-100 Series, HV-112, HV-114, AVK Series
63ETB775	750HV1 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
63ETB749	500HV10 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
63ETB754	750HV10 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
63ETB875	500HV20 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
63ETB880	750HV20 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
63ETB897	500HV30 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
63ETB902	750HV30 HTB Vickers ISO 6507-3, with DAkkS certificate 60x60x16mm steel
810-038	Round table, Ø250 mm
810-040	V-anvil, groove length 40 mm, Ø15 mm-Ø60 mm
810-041	V-anvil, groove length 40 mm, Ø3 mm-Ø9 mm
810-423	Manual XY stage w. digital micrometers, 50x50mm HM-200 and HV-100 Series
11AAC702	Vickers hardness testing machines, Steel stand for HV-100 Series machine
11AAC719	Vickers hardness testing machines, Vibration isolator stand HV-100 Series
810-644	Additional rack for 11AAC719



Vickers HDMI camera system

Code number	Description
63AAA356	HDMI camera
11AAC729	C-mount
NEC EA241WM	24" monitor

## Manual or complete automatic testing



System A

HV-110A/HV-120A

### Features:

- 144 mm (5.7 inch) color LCD display
- 3 types of display styles settable
- Equipped measuring microscope allows diagonal length measurement by visual observation
- Positioning using a manual XY stage



System B

HV-110B/HV-120B

### Features:

- Operation using highly functional AVPAK-20 software
- Light intensity of LED illumination adjusted with aperture or AVPAK-20
- Positioning using a manual XY stage



System C

HV-110C/HV-120C

### Features:

- Operation using highly functional AVPAK-20 software
- Light intensity of the LED illumination adjusted with aperture diaphragm or through AVPAK-20
- Automatic indentation reading
- Automatic positioning using motorized XY stage



System D

HV-110D/HV-120D

### Features:

- Operation using highly functional AVPAK-20 software
- Light intensity of the LED illumination adjusted with aperture diaphragm or through AVPAK-20
- Automatic positioning with motorized XY stage
- Auto focussing

# Vickers Hardness Testing Machine HV-110/120

## Configuration

Two additional objective lenses can be selected

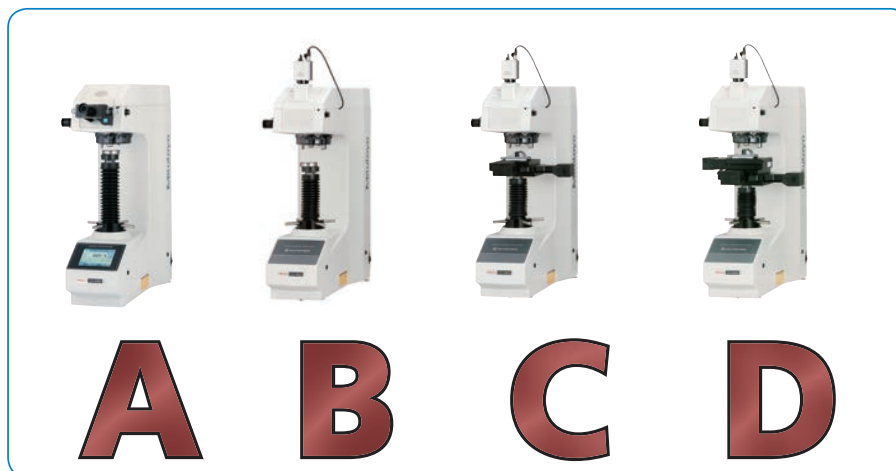
		Minimum system configuration				In addition selectable FACTORY OPTIONS				Remarks	
TOUCH SCREEN MODELS	SYSTEM A	HV-110 SYSTEM A	Main unit standard test force		810-440D		Video camera unit		810-454D		
			Manual XY stage 50 x 50mm		810-423		Objective lens 2X		11AAC712		
						Objective lens 5X		11AAC713			
						Objective lens 20X		11AAC714			
						Objective lens 50X		11AAC715			
			HV-120 SYSTEM A	Main unit low test force		810-445D	Video camera unit		810-454D		
Manual XY stage 50X50 mm		810-423		Objective lens 2X		11AAC712					
					Objective lens 5X		11AAC713				
					Objective lens 20X		11AAC714				
					Objective lens 50X		11AAC715				
		Minimum system configuration				In addition selectable FACTORY OPTIONS				Remarks	
SOFTWARE MODELS	SYSTEM B	HV-110 SYSTEM B	Main unit standard test force		810-443D		Measuring microscope		11AAC718	Cannot be used simultaneously with the vision unit	
			Manual XY stage 50 x 50mm		810-423		Objective lens 2X		11AAC712		
			AVPAK-20*		11AAC666		Objective lens 5X		11AAC713		
						Objective lens 20X		11AAC714			
						Objective lens 50X		11AAC715			
			HV-120 SYSTEM B	Main unit low test force		810-448D	Measuring microscope		11AAC718		
Manual XY stage 50 x 50mm		810-423		Objective lens 2X		11AAC712					
AVPAK-20*		11AAC666		Objective lens 5X		11AAC713					
					Objective lens 20X		11AAC714	Cannot be used simultaneously with the vision unit			
					Objective lens 50X		11AAC715				
		Minimum system configuration				In addition selectable FACTORY OPTIONS				Remarks	
SOFTWARE MODELS	SYSTEM C	HV-110 SYSTEM C	Main unit standard test force		810-443D		Measuring microscope		11AAC718	Cannot be used simultaneously with the vision unit	
			Motorized XY stage 50 x 50mm		810-451		Objective lens 2X		11AAC712		
			AVPAK-20*		11AAC666		Objective lens 5X		11AAC713		
		HV-110 SYSTEM C	Main unit standard test force		810-433D	Objective lens 20X		11AAC714			
			Motorized XY stage 100 x 100mm		810-452D	Objective lens 50X		11AAC715			
			AVPAK-20*		11AAC666						
		HV-120 SYSTEM C	Main unit low test force		810-448D	Measuring microscope		11AAC718			
			Motorized XY stage 50 x 50mm		810-451D	Objective lens 2X		11AAC712			
			AVPAK-20*		11AAC666	Objective lens 5X		11AAC713			
						Objective lens 20X		11AAC714	Cannot be used simultaneously with the vision unit		
				Objective lens 50X		11AAC715					
HV-120 SYSTEM C	Main unit standard test force		810-433D								
	Motorized XY stage 100 x 100mm		810-452D								
	AVPAK-20*		11AAC666								
		Minimum system configuration				In addition selectable FACTORY OPTIONS				Remarks	
SOFTWARE MODELS	SYSTEM D	HV-110 SYSTEM D	Main unit standard test force		810-443D		Video camera unit		810-454D		
			Motorized XY stage 50 x 50mm		810-451D		Objective lens 2X		11AAC712		
			Auto Focus stage unit		810-465		Objective lens 5X		11AAC713		
			AVPAK-20*		11AAC666		Objective lens 20X		11AAC714		
						Objective lens 50X		11AAC715			
						Objective lens 100X		11AAC716			
			HV-110 SYSTEM D	Main unit standard test force		810-443D	Measuring microscope		11AAC718		
				Motorized XY stage 100 x 100mm		810-452D					
		Auto Focus stage unit		810-465							
		AVPAK-20*		11AAC666							
HV-120 SYSTEM D	Main unit low test force		810-448D	Video camera unit		810-454D					
	Motorized XY stage 50 x 50mm		810-451D	Objective lens 2X		11AAC712					
	Auto Focus stage unit		810-465	Objective lens 5X		11AAC713					
	AVPAK-20*		11AAC666	Objective lens 20X		11AAC714					
					Objective lens 50X		11AAC715	Cannot be used simultaneously with the vision unit			
					Objective lens 100X		11AAC716				
HV-120 SYSTEM D	Main unit low test force		810-448D	Measuring microscope		11AAC718					
	Motorized XY stage 100 x 100mm		810-452D								
		Auto Focus stage unit		810-465							
		AVPAK-20*		11AAC666							
						* The above set does not include PC.					
						For all systems: 10 x objective as standard.					

# Micro-Vickers and Vickers Set

Please order AVPAK-20 Software 11AAC666 and the PC additionally!

All items listed below the set code number are included in the scope of delivery.

## Configuration



### Configuration HV-100 A-Type Sets

Contains:	810-440D-ASET HV-110A
810-440D	Manual main unit HV-110
11AAC714	20x Objective lens
Standard lens	10x Objective lens

Contains:	810-445D-ASET HV-120A
810-445D	Manual main unit HV-120
11AAC714	20x Objective lens
Standard lens	10x Objective lens

### Configuration HV-100 B-Type Sets

Contains:	810-443D-BSET HV-110B
810-443D	System main unit HV-110
11AAC714	20x Objective lens
Standard lens	10x Objective lens

Contains:	810-448D-BSET HV-120B
810-448D	System main unit HV-120
11AAC714	20x Objective lens
Standard lens	10x Objective lens

### Configuration HV-100 C-Type Sets

Contains:	810-443D-CSET HV-110C
810-443D	System main unit HV-110
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm
810-016 vise not included	

Contains:	810-448D-CSET HV-120C
810-448D	System main unit HV-120
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm
810-016 vise not included	

### Configuration HV-100 D-Type Sets

Contains:	810-443D-DSET HV-110D
810-443D	System main unit HV-110
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm
810-465	Autofocus unit
810-016 vise not included	

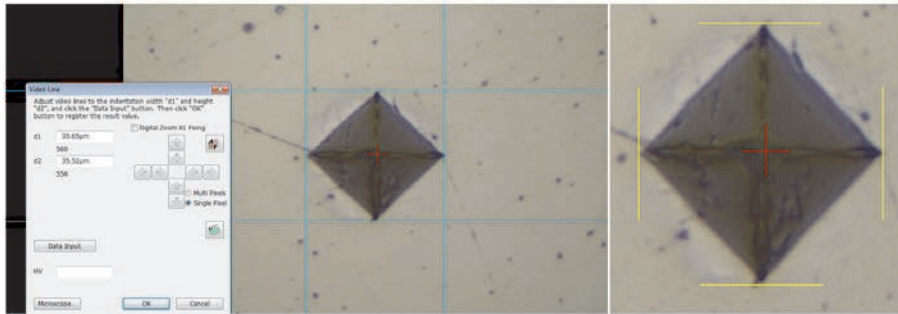
  

Contains:	810-448D-DSET HV-120D
810-448D	System main unit HV-120
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm
810-465	Autofocus unit
810-016 vise not included	

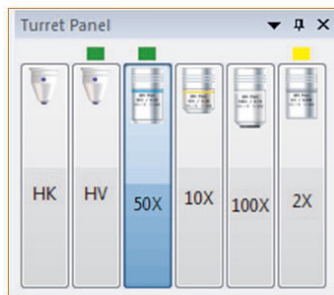
# Vickers Hardness Testing Software

Software AVPAK-20 for System B,C and D No. 11AAC666

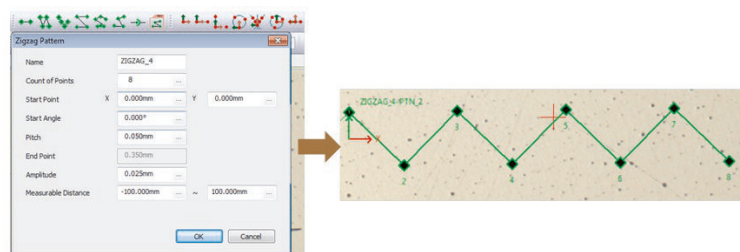
Software to control test sequence, evaluate hardness and make report  
Supports Windows® 10, 64 bit operating system



Automatic and manual video line measurement of indentation diagonals



Turret control function with color indicator



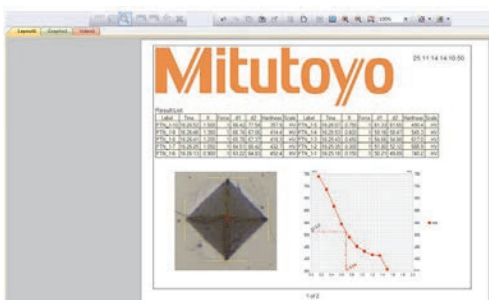
## Test pattern function

Operator friendly presets of test patterns (line, zigzag, grid or circle/ arc) with adjustable indentation spacings. Additionally patterns can be combined or test points can be set freely as a teach in pattern.



## Coordinate alignment function

Several test pattern alignment methods (1-point, 2-points, 3-points, arc, and centre of circle, bisector, midpoint) are available to place the pattern in the correct position. The automatic contour recognition allows to place indentations in accordance with the obtained contour or a specified excerpt from the contour. Therefore lines, patterns or a matrix of indentations can be placed accordingly.

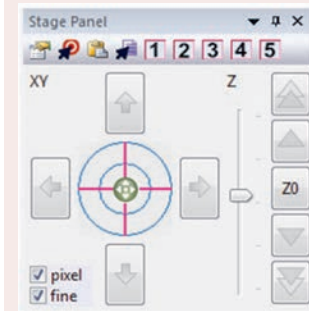


## Analysis and report function

Provides to display several types of graph (carbure transition, carbure distribution, X-R control chart) and layouts. It is possible to edit these graphs on the report. Traceability comments, indentation images and tables of test data can be inserted as well.



Overview image generation



Stage control function

## Functions

### Stitching

Generates specimen overview images by stitching several images together. Indentation patterns can be placed on the overview image precisely and easily. (motorized XY stage is required)

### Automatic indentation measurement

Automatically measure the indentation's diagonal lengths according to EN ISO 6507-1

### Illumination control

Set the illumination level manually or automatically according to the specimen surface. Additionally display the saturation on the camera image

### Stage control function

Control the motorized XY stage unit (for C- and D-Types) and the autofocus stage unit (type D) by the virtual joystick on the AVPAK-20 window. (Hardware joystick box is always included in the motorized XY stage's scope of delivery) Insert XY positioning steps in your part program and store 5 setttable postions.

### Turret control function

Choose and change the Objective lens on the turret panel. Green colour marks indicate the indenter and objective lenses that are set for measurement in the software. The objective lens set for overview image stitching is marked in yellow.

### Automatic execution function

Record any kind of operation, store and rerun as part programs.



# Vickers Hardness Testing Software

Software AVPAK-20 for System B, C and D



**Graphic view (of stored images)**  
For displaying the specimen overview images and checking the pattern positioning. The digital zoom function can be used to easily magnify and check the indentation site.

## FUNCTIONS

### Layout view

Indentation images, graphs, tables, etc., can be laid out freely to create the report in need.

### Stitching

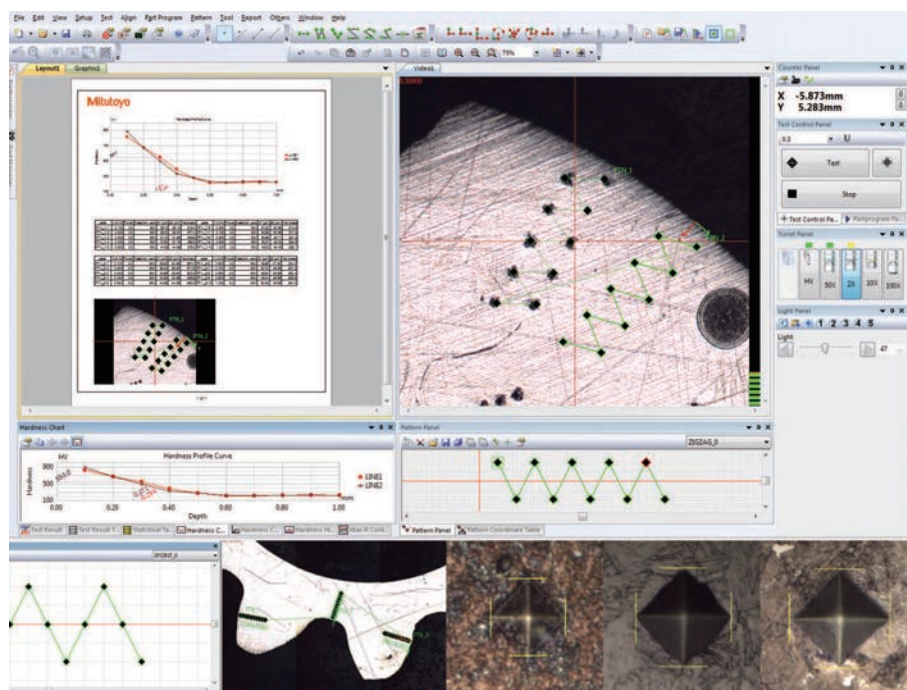
Takes images of an entire rectangular field from the moving stage then combines the images. Use stitching for a complete overview of sample.

### Auto trace

Automatically traces the shape of the sample. Take images as the stage moves along the outer contours of the specimen, then combines the images.

### Navigation function for the manual XY stage (System B)

When the test position is to be moved during multipoint testing (CHD etc.), this function guides the positioning of the manual XY fine adjustment stage to the next position by pop up on screen menu. User positioning errors are reduced drastically.



Screen layout for control, testing status, result display and reporting can be changed freely.



### Handling of multiple specimens

Part program and Part Manager function support testing of multiple and irregular specimens.

### Multi-specimen testing

Executes different part programs for each irregular specimen.

### Parts Manager:

Executes a common part program for specimens having the same shape. parts can be arranged in grid positions.



### Pattern creation:

This tool supports the creation of test patterns such as straight lines, zigzag lines and teaching patterns.



### Pattern pasting :

This tool supports the pasting of created test patterns by applying a coordinate system. It adjusts the origin, direction, etc. of the before created pattern. Works coordinate systems for complex applications can be generated.

# Rockwell HR-100/200/300/400

## Series 963

These are five economical Rockwell hardness testing machines to suit practically every application you need.

The Rockwell HR-100/200/300/400 offers you the following benefits:

- The newly designed frame provides maximum clearance for positioning the work piece, all you need is a flat table for mounting these testing machines.
- They are very simple to operate: the analogue types HR-110/HR-210 use an automatic presetting dial gauge.
- HR-110MR does not require a power source, and is considered to be environmentally friendly.
- Digital models HR-430MR/MS use automatic steering wheel braking and load sequencing for easy handling.
- Digital models HR-320MS and HR-430MR/MS can use our Digimatic Mini-processor (DP-1VR) for printing results, and you can use an input tool (USB-ITN-E) to connect to a PC for data transfer, analysis and storage.
- You can perform Brinell hardness tests by using the following optional accessories:  
a Brinell indenter, a weight set and a measurement microscope.

### Analog

Model	HR-110MR	HR-210MR
No.	963-210-20	963-220D
Preliminary test force (N)	98,07	98,07
Test force Superficial (N)	-	-
Test force Rockwell (N)	588,4; 980,7; 1471	588,4; 980,7; 1471
Display	Analog	Analog
Preliminary test force setting	-	-
Resolution	0,5 HR graduation	0,5 HR graduation
Test force selection	Weight exchange	Weight exchange
Test force application	Manual	Semi-automatic
Test force duration	Manual	Fixed 3-5-5 sec. or manual

### Digital

Model	HR-320MS	HR-430MR	HR-430MS
No.	963-231D	963-240D	963-241D
Preliminary test force (N)	29,42; 98,07	98,07	29,42; 98,07
Test force Superficial (N)	147,1; 294,2; 441,3	-	147,1; 294,2; 441,3
Test force Rockwell (N)	588,4; 980,7; 1471	588,4; 980,7; 1471	588,4; 980,7; 1471
Display	Digital	Digital	Digital
Preliminary test force setting	-	Dial switching	Dial switching
Resolution	0,1 HR indication	0,1 HR indication	0,1 HR indication
Test force selection	Weight exchange	Dial switching	Dial switching
Test force application	Semi-Automatic	Automatic	Automatic
Test force duration	Fixed 3-5-5 sec. or manual	1-99 sec or manual	1-99 sec or manual
Data output	Digimatic (SPC), RS-232C	Digimatic (SPC), RS-232C	Digimatic (SPC), RS-232C

## Specifications

Standard	ISO 6508-2; ASTM E18; JIS B 7726;
Height	Max. 180 mm (100 if cover is attached) mm
Measuring depth	Max. 165 mm (from the center of the endenter axis)
Functions	HR-320MS, HR-430MR, HR-430MS : GO/NG, Compensation fubction, Hardness conversion

## Optional accessories

No.	Description
56AAK286B	Brinell weight set, HR-110MR HR-210MR 3pcs.
56AAK287B	Brinell weight set, HR-320MS 4pcs.
56AAK288B	Brinell weight set, HR-430MR 3pcs.
56AAK289B	Brinell weight set, HR-430MS 4pcs.
810-037	Round table, Ø180 mm
810-038	Round table, Ø250 mm
19BAA161D	Portable Microscope, 20x for Brinell measurement

## Anvils

810-030	Diamond spot anvil, for Rockwell Superficial scales Ø3.5 mm
810-027	Hardness testing machines, Adjustable support for long workpieces
810-029	V-anvil, groove length 400 mm, Ø50 mm- Ø100 mm
810-026	Fine feed adjustment stage, for Jominy test(end quench test)specimen
810-028	Hardness testing machines, Height adjustable jack rest
810-040	V-anvil, groove length 40 mm, Ø15 mm- Ø60 mm
810-043	Spot Anvil, Spot Ø12 mm
810-041	V-anvil, groove length 40 mm, Ø3 mm- Ø9 mm
810-044	Stepped spot Anvil, Spot Ø5.5 mm, step height 13 mm
810-042	Stepped V-anvil, step height 13 mm, groove length 10 mm, Ø4mm- Ø16 mm
810-048	Steel table, for Rockwell hardness testing machines

## Computer accessories (not HR-110, HR-210)

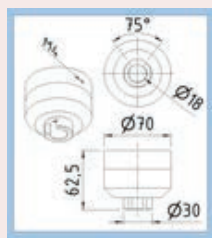
06AFM380E	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Round 6-Pin Type
937387	Digimatic Cable, Round 6-Pin Type, 1m
965013	Digimatic Cable, Round 6-Pin Type, 2m

For indenters and Hardness test blocks see chapter Hardness Test Blocks

# Rockwell HR-100/200/300/400



**K543817**  
Workpiece clamping  
device for:  
HR-110MR  
HR-210MR  
HR-430MR



Scan QR Code with your mobile device and watch  
our product videos on YouTube



**HR-110MR**  
Rockwell hardness testing machine

An environmentally friendly energy-saving model.  
The basic operation is all manual, including weight-changing (total test force selection).



**HR-210MR**  
Rockwell hardness testing machine

Manual weight changing (with total test force selected) and handling of preload force. Motor drive controls loading sequence.



**HR-110MR and  
HR-210MR dial gauge**



**HR-320MS**

Dual type (Rockwell / Rockwell Superficial) hardness testing machine:

Manually handles test force and preload force selection. Motor drive controls loading sequence.



**HR-430MR**

Rockwell hardness testing machine:

Economy type, but supports dial switching, power steering and support of all test standards and is equipped with automatic brake handle auto start feature. Motor drive controls loading sequence.



**HR-430MS**

Dual type (Rockwell / Rockwell Superficial) hardness testing machine:

Economy type, but supports dial switching, power steering and support of all test standards and is equipped with automatic brake handle auto start feature. Motor drive controls loading sequence.



**HR-300-400 digital display**



**HR-400 Automatic preliminary test force brake**



**SPC Digimatic and RS-232C interface**

# Rockwell HR-100/200/300/400

Series 963

Additional product description and accessories for HR-100/200/300/400 Series

## 810-038 Round table OD Ø250 mm

For large probes  
like profiles



## 810-037 Round table OD Ø180 mm

For large probes  
like profiles



## 810-040 V-anvil (large) (OD Ø40 mm, groove width 30 mm) For shaft material (max Ø60 mm)



## 810-043 Spot anvil

(OD Ø12 mm)



## 810-041 V-anvil (small) (OD Ø40 mm, groove width 6 mm) For shaft material (max. Ø8.4 mm)

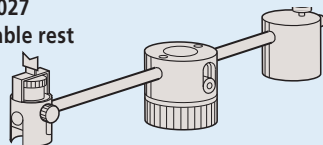


## 810-044 Spot anvil (OD Ø5.5 mm) For plate material



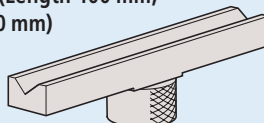
## 810-027 Variable rest

Test of long object probes (used together with anvil)



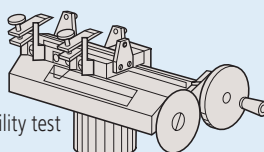
## 810-029 Special V-anvil (Length 400 mm, groove width 50 mm)

For shaft material  
(max. Ø100 mm)



## 810-026 Micromovement table for Jominy test

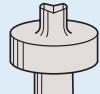
JIS G 0561  
Steel hardenability test



## 810-030 Diamond spot anvil (OD Ø10 mm) For plate material Exclusive use for Rockwell superficial hardness test

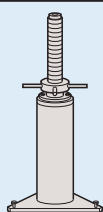


## 810-042 Small V-anvil (OD Ø10 mm) For shaft material (max. Ø16 mm)

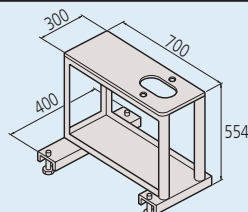


## 810-028 Jack rest

Testing of long object probes  
(used together with anvil  
or round table)



## 810-048 Mount for testing machine



## 264-504-5 Digimatic miniprocessor DP-1VR Connecting cable not included (sold separately), please order separately. Connecting cable (1 m), part No. 937387



## 06AFM380E USB input tool Direct USB-ITN Easy data input to PC



# Rockwell, Rockwell Superficial, Brinell Hardness Tester HR-530

## Specifications

Functions	<ul style="list-style-type: none"> <li>Conversion function [HV, HK, HR (Rockwell hardness A, B, C, D, F, G / Rockwell Superficial 15T, 30T, 45T, 15N, 30N, 45N), HS, HB, tensile strength]</li> <li>GO/NG judgment function Serial test function (for specimens of the same thickness)</li> <li>Cylindrical correction, spherical correction, offset correction, multi-point correction functions</li> <li>Statistical calculation function</li> <li>Graph generation function (X-R control charts)</li> </ul>
Preliminary test force	29,42; 98,07 N
Power supply	AC100V, 120V, 220V, 240V Auto-selection
Statistic function	Maximum value, minimum value, mean value, standard deviation, upper limit, lower limit, GO count, range, NG count
Test force setting	By software setting
Table lifting	Manual (automatic breaking and load sequencing)
Standard	ISO 6508; JIS 7726; ISO 6506, JIS 7726; ISO 2039-2, ASTM D785, JIS K 7202; VDI/VDE 2616-1
Load control	Automatic (load/hold/unload)
Max. specimen depth	150 mm
Brinell Scale [N]	61,29; 98,07; 153,2; 245,2; 294,2; 306,5; 612,9; 980,7; 1226; 1839 N
Data output	RS-232C Digimatic, USB2
Force dwell time	1-120s (Selectable in units of 1s)

## Standard accessories

No.	Description
19BAA073	Rockwell diamond indenter, HRC HRA
11AAD465	Rockwell carbide ball indenter $\phi 1,5875$ mm, for Rockwell test method, Marked with Serial No., w/o certificate
810-039	Flat anvil, $\phi 64$ mm
810-042	Stepped V-anvil, step height 13 mm, groove length 10 mm, $\phi 4$ mm- $\phi 16$ mm
383876	Cover, Vinyl cover for PJ-3010F projector

## Series 810

The HR-530 series offers five different hardness testing methods: Rockwell, Rockwell Superficial, Brinell, Brinell Depth Measurement and Plastic Testing in a single unit.

This makes it a versatile tool ready to tackle tasks in production, goods inwards inspection and quality control in general.

- A real time unique electronic test force control system is built into the compact body along with an electronic force gage. The test force control prevents the system from applying too much test force at the point of reaching total testforce.
- Real time force control provides accurate test force generation and stable time cycle sequences conform to ISO standards.
- The serial measurement mode enables fast execution of a high numbers of tests on identical workpieces.
- A magnet brake system stops the spindle movement immediately at sensing of workpiece contact. This enables the HR-530 to perform semi automatic test sequences, eliminating the user influence.
- The lever indenter arm design enables not only interior and exterior measurements but also an excellent specimen surface overview. The functionality is furthermore enhanced by an LED work-room illumination.
- The unique lever arm design allows testing at inside positions without cutting the specimen. The minimum diameter that can be entered by the lever arm with the standard diamond indenter supplied with the machine is 35 mm.
- The optional short type diamond indenter (Part No. 63DIA007) additionally enables inside testing from  $\phi 22$  mm.
- HR-530L long type with an optional max. specimen height of 395 mm.



HR-530 (No. 810-236)

Maximum workpiece size:  
Height 250 mm  
Depth 150 mm

HR-530L (No. 810-336)

Maximum workpiece size:  
Height 395 mm  
Depth 150 mm



# Rockwell, Rockwell Superficial, Brinell Hardness Tester HR-530

Metric HR-530

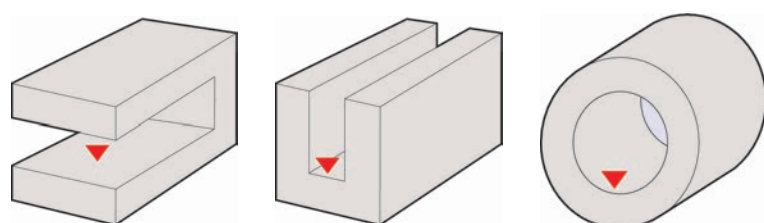
No.	Rockwell Scale Diamond	Rockwell Scale Ball 1,5875 mm	Rockwell Scale Ball 3,175 mm	Rockwell Scale Ball 6,35 mm	Rockwell Scale Ball 12,7 mm	Rockwell Superficial Scale Diamond	Rockwell Superficial Scale Ball 1,5875 mm	Rockwell Superficial Scale Ball 3,175 mm	Rockwell Superficial Scale Ball 6,35 mm	Rockwell Superficial Scale Ball 12,7 mm	Rockwell Plastic Test Scales Ball 3,175 mm
810-236	HRA; HRD; HRC	HRF; HRB; HRG	HRH; HRE; HRK	HRL; HRM; HRP	HRR; HRS; HRV	HR15N; HR39N; HR45N	HR15T; HR20T; HR45T	HR15W; HR30W; HR45W	HR15X; HR30X; HR54X	HR15Y; HR30Y; HR45Y	HRE; HRK

No.	Rockwell Plastic Test Scales Ball 6,35 mm	Rockwell Plastic Test Scales Ball 12,7 mm	Rockwell $\alpha$ Test Ball 12,5 mm	Max. specimen height	Brinell Scales indentation only Ball 1,0 mm	Brinell Scales indentation only Ball 2,5 mm	Brinell Scales indentation only Ball 5,0 mm	Brinell Scales indentation only Ball 10,0 mm	Brinell depth measurement Ball 2,5 mm
810-236	HRL; HRM	HRR	(HRR)	250 mm	HBW 1/10; HBW 1/30	HBW 2,5/6,25; HBW2,5/31,25; HBW 2,5/62,5; HBW 2,5/187,5	HBW 5/25; HBW 5/62,5; HBW 5/125	HBW 10/100	HBD 2,5/62,5; HBD 2,5/187,5

Metric HR-530L

No.	Rockwell Scale Diamond	Rockwell Scale Ball 1,5875 mm	Rockwell Scale Ball 3,175 mm	Rockwell Scale Ball 6,35 mm	Rockwell Scale Ball 12,7 mm	Rockwell Superficial Scale Diamond	Rockwell Superficial Scale Ball 1,5875 mm	Rockwell Superficial Scale Ball 3,175 mm	Rockwell Superficial Scale Ball 6,35 mm	Rockwell Superficial Scale Ball 12,7 mm	Rockwell Plastic Test Scales Ball 3,175 mm
810-336	HRA; HRD; HRC	HRF; HRB; HRG	HRH; HRE; HRK	HRL; HRM; HRP	HRR; HRS; HRV	HR15N; HR39N; HR45N	HR15T; HR20T; HR45T	HR15W; HR30W; HR45W	HR15X; HR30X; HR54X	HR15Y; HR30Y; HR45Y	HRE; HRK

No.	Rockwell Plastic Test Scales Ball 6,35 mm	Rockwell Plastic Test Scales Ball 12,7 mm	Rockwell $\alpha$ Test Ball 12,5 mm	Max. specimen height	Brinell Scales indentation only Ball 1,0 mm	Brinell Scales indentation only Ball 2,5 mm	Brinell Scales indentation only Ball 5,0 mm	Brinell Scales indentation only Ball 10,0 mm	Brinell depth measurement Ball 2,5 mm
810-336	HRL; HRM	HRR	(HRR)	395 mm	HBW 1/10; HBW 1/30	HBW 2,5/6,25; HBW2,5/31,25; HBW 2,5/62,5; HBW 2,5/187,5	HBW 5/25; HBW 5/62,5; HBW 5/125	HBW 10/100	HBD 2,5/62,5; HBD 2,5/187,5



## Optional accessories

No.	Description
810-038	Round table, Ø250 mm
810-027	Hardness testing machines, Adjustable support for long workpieces
810-037	Round table, Ø180 mm
810-029	V-anvil, groove length 400 mm, Ø50 mm- Ø100 mm
810-040	V-anvil, groove length 40 mm, Ø15 mm- Ø60 mm
810-041	V-anvil, groove length 40 mm, Ø3 mm- Ø9 mm
810-043	Spot Anvil, Spot Ø12 mm
810-030	Diamond spot anvil, for Rockwell Superficial scales Ø3.5 mm
810-044	Stepped spot Anvil, Spot Ø5.5 mm, step height 13 mm
810-042	Stepped V-anvil, step height 13 mm, groove length 10 mm, Ø4mm- Ø16 mm
810-028	Hardness testing machines, Height adjustable jack rest
810-643	Vibration damping stand
11AAD186	Steel table for HR-530, Rockwell hardness testing machines
264-505D	Statistic Processing Printer DP-1VA, Data Printer and Logger CEE Type
06AFM380D	USB Input Tool Direct (Digimatic USB), Digi/Digi2, Flat 10-Pin Type
11AAD537	Foot switch with aluminum housing, Hardness testing machines
11AAD745	Printer cable DP-414 HR-530, Rockwell Hardness testing machines
02ZAA020	AC Cable
02ZAA030	Mains Power Lead (2m), (IEC/CEE22 Cord set)

Additional accessories are available for Brinell hardness testing. Refer to the Hardness Testing Machines brochure.

# Impact Type Hardness Testing Unit HARDMATIC HH-411

## Specifications

Impact device	Impact hammer with integrated carbide-ball tip, D scale (ASTM A 956)
Functions	Auto angle compensation, Offset, OK/NG judgement, Hardness scale conversion, Data storage (1.800 data entries), Statistical analysis (Average value, Max. value, Min. value, Dispersion), Auto sleep function, Impact counter display function
Power supply	Battery LR6 (2 pcs.) or AC adapter (optional)
Data output	RS-232C, SPC

## Standard accessories

No.	Description
19BAA457	Replacement carbide ball, HH-411
19BAA460	Detector Cable f. UD-41X
19BAA258	Cleaning brush, HH-411

## Optional accessories

No.	Description
19BAA458	Impact hammer, DL impact device
06AEG302D	AC-Adapter, 9V 500mA, CEE Type
11AAC238	EXPAK-08 data processing program, HH-411
19BAA238	Leeb rebound hardness testing device, RS232C cable HH-411

## Computer accessories

937387	Digimatic Cable, Round 6-Pin Type, 1m
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## Indenters

810-288-10	Leeb impact device, HLDC impact device UD-412
810-289-10	Leeb impact device, HLD+15 impact device UD-413
810-290-10	Leeb impact device, HLDL impact device UD-414

## Support rings for D/DC type impact devices

19BAA248	Support ring cylindrical specimen, R10-20 HH-411
19BAA249	Support ring hollow cylindrical specimen, R14-20 HH-411
19BAA250	Support ring spherical specimen, R10-27.5 HH-411
19BAA251	Support ring hollow spherical specimen, R13.5-20 HH-411 (D/DC impact devices)

## Series 810

This is a lightweight, digital-reading portable hardness testing instrument for metal workpieces. The Hardmatic HH-411 offers you the following benefits:

- It operates on the rebound hardness principle (standardised according to ASTM A 956).
- Measurement is conducted with hardness value L (Leeb-value) but you can convert to any desired hardness scale.
- The display automatically shows GO/±NO GO with the tolerance function set and selected.
- It has a memory function for 1800 measured values, and automatic measuring direction angle-compensation.
- Expak software gives you simple data collection 11AAC238



Sample application

Model	HH-411
No.	810-298-10
Accuracy	±12 HL (800 HL ±1.5%)
Display unit	7-segment LCD
Hardness Display range	Leeb hardness: 1 to 999HL
	<b>Conversion range / Increment</b>
Vickers	43-950HV / 1 HV
Brinell	20-894 HB / 1 HB
Rockwell C	19,3-68,2 HRC / 0,1 HRC
Rockwell B	13,5-101,7 HRB / 0,1 HRB
Shore	13,2-99,3 HS / 0,1 HS
Tensile strength	499-1.996 MPa / 1 MPa
Specimen Thickness	Min. 5 mm
Specimen Mass	5 kg or more
<b>Dimensions</b>	
Measuring/Display unit	ø28 x 175 mm / 70 x 110 x 35 mm
Specimen requirements	Min. specimen thickness of 5mm or more and mass of 5kg or more (However, a specimen of mass of 0.1 to 5kg is measurable by securing to a massive base) Testing point: 5mm or more from edge of specimen, 3mm or more between testing points Specimen surface roughness: Ra of 2µm or less
Resolution	1-999 HL
Mass	320 g



**UD-412 Impact device**  
HLDC scale  
Use for inner walls of cylinders. The grip is short to allow positioning within a cylinder.



**UD-413 Impact device**  
HLD+15 scale  
Use for concave workpieces such as gear teeth, grooves, etc.



**UD-414 impact device**  
HLDL scale  
Use for gear teeth, welded corners, etc.

# Digital and Analogue Durometers

## HARDMATIC HH-300

### Series 811 - Shore A

These compact digital/dial durometers in the Shore A scale can test a range of different materials and offer you the following benefits:

- You can use them for testing the hardness of the materials including soft rubber, elastomers, natural rubber, casting resin, neoprene, polyesters, soft PVC, leather, etc.

#### Shore A

Model No.	HH-331	HH-332	HH-335	HH-336	HH-335-01	HH-336-01
Shore Scale	Shore A	Shore A	Shore A	Shore A	Shore A	Shore A
Indenter b	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm
Indenter d	ø 0,79 mm	ø 0,79 mm	ø 0,79 mm	ø 0,79 mm	ø 0,79 mm	ø 0,79 mm
Indenter r	-	-	-	-	-	-
θ	35°	35°	35°	35°	35°	35°
Pressure foot a	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm
Pressure foot f	ø 18 mm	ø 18 mm	44 x 18 mm	44 x 18 mm	ø 18 mm	ø 18 mm
Indenter protrusion	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm
Spring force WE, WA, WD	WA=550+75 HA [mN]	WA=550+75 HA [mN]	WA=550+75 HA [mN]	WA=550+75 HA [mN]	WA=550+75 HA [mN]	WA=550+75 HA [mN]
Display	Analog Dial	Digital	Analog Dial	Digital	Analog Dial	Digital
Dimensions (WxDxH)	188 x 68 x 35 mm	193 x 60 x 29,5 mm	146 x 68 x 34 mm	151 x 60 x 28,5 mm	146 x 68 x 34 mm	151 x 60 x 28,5 mm
Mass	0,32 kg	0,31 kg	0,3 kg	0,29 kg	0,27 kg	0,26 kg



811-331-10



811-332-10



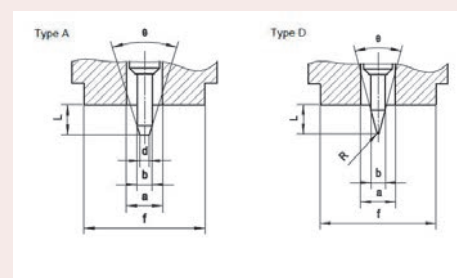
811-335-11



811-336-11

#### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
64AAA964	Reference material Shore, HH-300 Series Shore A 3pcs.
811-013	Testing stand, HH-300 Series Shore A compact types
811-019	Testing stand, HH-300 Series Shore A long types



Indenter geometry Shore A and D



#### Testing stand

- Workstage dimension: Ø90 mm
- Max. specimen height: 90mm



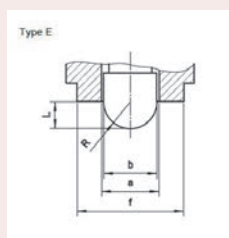
64AAA964 Shore A

# Digital and Analogue Durometers

## HARDMATIC HH-300

### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
811-013	Testing stand, HH-300 Series Shore A compact types



Indenter geometry Shore E



Testing stand  
- Workstage dimension: Ø90 mm  
- Max. specimen height: 90mm

### Series 811 - Shore E

These compact digital/dial durometers in the Shore E scale can test a range of different materials and offer you the following benefits:

- You can use them for testing the hardness of the materials including soft rubber, elastomers, natural rubber, casting resin, neoprene, polyesters, soft PVC, leather, etc.

#### Shore E

Model No.	HH-329	HH-330
Shore Scale	Shore E	Shore E
Indenter b	ø 5 mm	ø 5 mm
Indenter r	ø 2,5 mm	ø 2,5 mm
Pressure foot a	ø 5,4 mm	ø 5,4 mm
Pressure foot f	44 x 18 mm	44 x 18 mm
Indenter protrusion	2,5 mm	2,5 mm
Spring force WE, WA, WD	WE=550+75 HE [mN]	WE=550+75 HE [mN]
Display	Analog	Digital
Dimensions (WxDxH)	146 x 68 x 34 mm	147 x 59 x 40 mm
Mass	0,3 kg	0,29 kg



811-329-10



811-330-10

# Digital and Analogue Durometers

## HARDMATIC HH-300

### Series 811 - Shore D

These compact digital/dial durometers in the Shore D scale can test a range of different materials and offer you the following benefits:

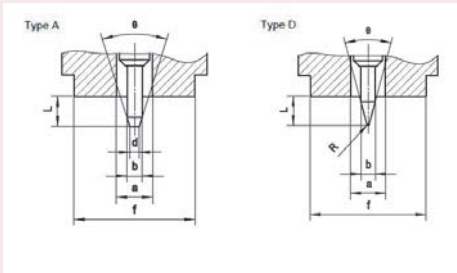
- You can use them for testing the hardness of the materials including hard rubber, hard plastics, acrylic glass, Polystyrene, rigid thermoplastics, vinyl, cellulose acetate, etc.

Shore D						
Model No.	HH-333	HH-334	HH-337	HH-338	HH-337-01	HH-338-01
Shore Scale	Shore D	Shore D	Shore D	Shore D	Shore D	Shore D
Indenter b	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm
Indenter d	-	-	-	-	-	-
Indenter r	R 0,1 mm	R 0,1 mm	R 0,1 mm	R 0,1 mm	R 0,1 mm	R 0,1 mm
θ	30°	30°	30°	30°	30°	30°
Pressure foot a	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm
Pressure foot f	ø 18 mm	ø 18 mm	44 x 18 mm	44 x 18 mm	ø 18 mm	ø 18 mm
Indenter protrusion	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm
Spring force WE, WA, WD	WD=444,5H D [mN]	WD=444,5H D [mN]	WD=444,5H D [mN]	WD=444,5H D [mN]	WD=444,5H D [mN]	WD=444,5H D [mN]
Display	Analog Dial	Digital	Analog Dial	Digital	Analog Dial	Digital
Dimensions (WxDxH)	188 x 68 x 35 mm	193 x 60 x 29,5 mm	146 x 68 x 34 mm	151 x 60 x 28,5 mm	146 x 68 x 34 mm	151 x 60 x 28,5 mm
Mass	0,32 kg	0,31 kg	0,3 kg	0,29 kg	0,27 kg	0,26 kg



### Optional accessories

No.	Description
905338	Digimatic Cable, Flat Straight Type, 1m
64AAA590	Reference material Shore, HH-300 Series Shore D 3pcs.
811-012	Testing stand, HH-300 Series Shore D all types



Indenter geometry Shore A and D



64AAA590 Shore D



# Hardness Test Blocks / Indenters

## Hardness Test Blocks / Indenters

**Hardness reference materials in quality control:  
The boost for your process safety!**



Please check out our comprehensive range of hardness test blocks in our test block leaflet PRE1477

The daily verification, performed by the user, is described in the according hardness testing standards and significantly contributes to quality management processes.

In the daily verification process, all parameters of the hardness test system that build up to the hardness value, are examined by indentations on the hardness reference material.

This periodical inspection of the machine by means of hardness reference materials should be carried out immediately before the daily start of the test schedule.

If the device is used only once a week, the check should only be done on that day.

In three-shift operation, a check at the beginning of each shift is recommended.

An according documentation enhances the process safety, as value shifts due to damage or malfunction can be detected easily.

A comprehensive direct and indirect verification should be performed once a year as part of a calibration. The direct examination includes test force, measuring system, test cycle and indenter. Indirect testing using hardness reference material blocks, indicate the correct interaction of all the parameters that were checked in the direct verification of the testing machine.

In addition, the repeatability of results of the hardness testing machine can also be checked with the hardness test blocks.

Mitutoyo offers a comprehensive range of hardness reference materials (hardness test blocks) to suit your quality management procedure perfectly.

Mitutoyo reference materials:

- High-end quality Made in Germany
- Independent DAkkS calibration according to DIN EN ISO and/or ASTM in an accredited laboratory
- Multiple calibrations (up to 3 scales on one test block and surface grid on request)
- Large square or rectangular surface with large space advantage over triangular or round test blocks
- Short delivery time
- MPE "Maximum Permitted Error" of the hardness testing system engraved – all relevant information at a glance



Large square or rectangular surface with large space advantage over triangular or round test blocks



The boxes keep the valuable test blocks safe and store the calibration certificate

# Hardness Test Blocks / Indenters

## Indenters

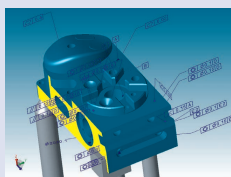
No.	Name	Standard	Machine type	Comment
19BAA162	Carbide Ball Brinell Ø5,0mm	w/o calibration certificate	all Mitutoyo Rockwell machines, HV-100 Series	without certificate
19BAA163	Carbide Ball Brinell Ø10,0mm	w/o calibration certificate	all Mitutoyo Rockwell machines, HV-100 Series	without certificate
19BAA281	Carbide Ball Brinell Ø1,0mm	w/o calibration certificate	all Mitutoyo Rockwell machines, HV-100 Series	without certificate
19BAA283	Carbide Ball Brinell Ø2,5mm	w/o calibration certificate	all Mitutoyo Rockwell machines, HV-100 Series	without certificate
19BAA507	Carbide Ball Rockwell Ø1,5875mm	w/o calibration certificate	all Mitutoyo Rockwell machines	without certificate
19BAA508	Carbide Ball Rockwell Ø3,175mm	w/o calibration certificate	all Mitutoyo Rockwell machines	without certificate
19BAA509	Carbide Ball Rockwell Ø6,35mm	w/o calibration certificate	all Mitutoyo Rockwell machines	without certificate
19BAA510	Carbide Ball Rockwell Ø12,7mm	w/o calibration certificate	all Mitutoyo Rockwell machines	without certificate
63BAL001	Carbide Ball Brinell Ø1,0mm	ISO 6506-2	all Mitutoyo Rockwell machines, HV-100 Series	with DAkkS certificate
63BAL002	Carbide Ball Brinell Ø2,5mm	ISO 6506-2	all Mitutoyo Rockwell machines, HV-100 Series	with DAkkS certificate
63BAL003	Carbide Ball Brinell Ø5,0mm	ISO 6506-2	all Mitutoyo Rockwell machines, HV-100 Series	with DAkkS certificate
63BAL004	Carbide Ball Brinell Ø10,0mm	ISO 6506-2	all Mitutoyo Rockwell machines, HV-100 Series	with DAkkS certificate
63BAL005	Carbide Ball Rockwell Ø1,5875mm	ISO 6508-2	all Mitutoyo Rockwell machines	with DAkkS certificate
63BAL006	Carbide Ball Rockwell Ø3,175mm	ISO 6508-2	all Mitutoyo Rockwell machines	with DAkkS certificate
63BAL007	Carbide Ball Rockwell Ø6,35mm	ISO 6508-2	all Mitutoyo Rockwell machines	with DAkkS certificate
63BAL008	Carbide Ball Rockwell Ø12,7mm	ISO 6508-2	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA001	Diamond Indenter Rockwell ISO 6508-2 HRA HRC HRD HRN	ISO 6508-2 Function test Table 4	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA002	Diamond Ind. Rockwell ISO 6508-2	ISO 6508-2 without Function test	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA004	Diamond Indenter Rockwell ASTM E-18	ASTM E-18 Function test	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA006	10HRC Diamond Indenter Rockwell ISO 6508-2	ISO 6508-2 Function test Table 5	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA007	HR-500 Diamond Indenter Rockwell ISO6508-2	ISO 6508-2 without Function test	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA008	Diamond Indenter Rockwell ISO6508-2 long Form	ISO 6506-2 Function test Table 5	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA009	Diamond Indenter Rockwell ISO6508-2 slim Form	ISO 6508-2 Function test Table 5	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA011	Diamond Indenter Vickers HV 0,2	ISO 6507-2	HV-100 Series, HV-112, HV-114, AVK Series	with DAkkS certificate
63DIA012	Diamond Indenter Vickers HV 5	ISO 6507-2	HV-100 Series, HV-112, HV-114, AVK Series	with DAkkS certificate
63DIA013	Diamond Indenter Knoop HK 0,01	ISO 4545-2	HM-100 Series, HM-200 Series, MVK-Series	with DAkkS certificate
63DIA014	Diamond Indenter Knoop HK 0,2	ISO 4545-2	HV-100 Series, HV-112, HV-114, AVK Series	with DAkkS certificate
63DIA015	Diamond Indenter Vickers HV0,01	ISO 6507-2	HM-100 Series, HM-200 Series, MVK-Series	with DAkkS certificate
63DIA016	Diamond Indenter Vickers HV0,2	ISO 6507-2	HM-100 Series, HM-200 Series, MVK-Series	with DAkkS certificate
63DIA021	Diamond Indenter Rockwell ISO 6508-2 HRA HRC HRD	ISO 6508-2 Function test Table 5	all Mitutoyo Rockwell machines	with DAkkS certificate
63DIA022	Diamond Indenter Rockwell Superficial ISO 6508-2 HRN	ISO 6508-2 Function test Table 6	all Mitutoyo Rockwell machines	with DAkkS certificate

## Rockwell indenters

Additionally to the geometrical specification for the calibration of Rockwell diamond indenters, a „function test“ is described in the relevant standards ISO 6508-2 and ASTM E-18. The intention is to verify the applicability of the indenter in regard of various indentation depth levels under different test forces.

## Vickers indenters

The grinding process for Vickers diamond indenters leaves a junction line at the point, where the faces of the diamond join together, rather than having a perfect tip. ISO and ASTM standards define the maximum length of the junction line in dependence to the test force that is being used. Due to the obtained length, the indenter is classified for the use in different testforce ranges.



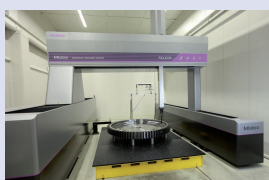
## CMM Software Page 554



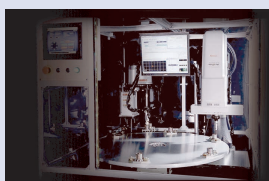
## Manual CMMs Page 558



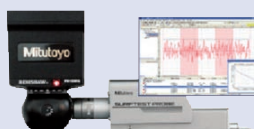
## Small- and Medium Size CMMs Page 559



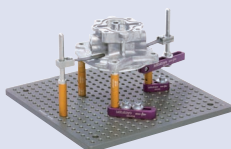
## Large Size CMMs Page 567



## In-Line and Shopfloor CMMs Page 569



## Measuring Heads, Probes and Styli Page 572



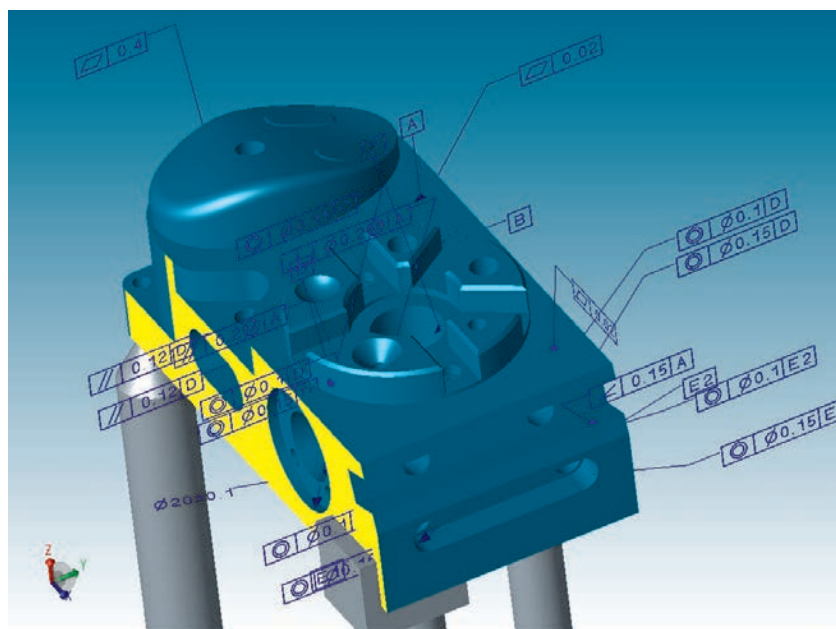
## Fixtures and Enclosures Page 581

# CMM Software

## MiCAT Planner

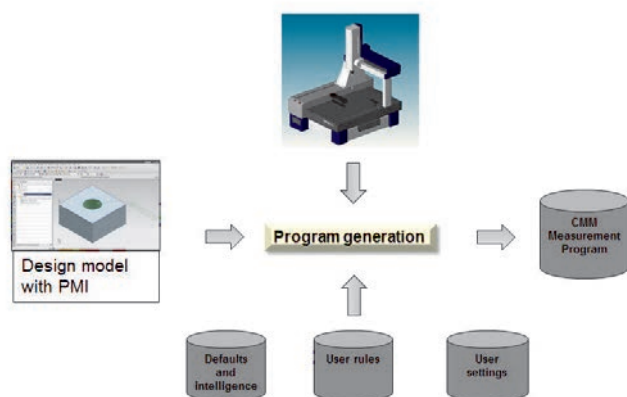
The new CMM software generation for an efficient, safe and automatic CMM programming. MiCAT Planner drastically reduces the programming time and thus will make your work much more efficient! Programs will now be made within minutes where it took hours or even days before. MiCAT planner is using PMI (Product Manufacturing Information) tolerance information inside the CAD file and creates the complete part program by considering your individual measurement strategy and your specific CMM. This guarantees a collision-free program in the shortest possible time

- Reduces programming time significantly
- Collision-free and optimized programs
- Increased availability of the measuring machine
- Flexibility in choosing the measuring machine
- Unified measurement strategies increase data quality
- Speeds up instruction of staff



**Step 1: Load the CAD model.**

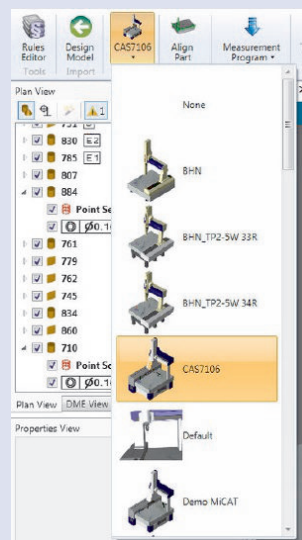
- Various CAD translators available: stp, Catia V4/V5, Creo, NX, Parasolid, SolidEdge, SolidWorks, Inventor
- Add missing tolerance information



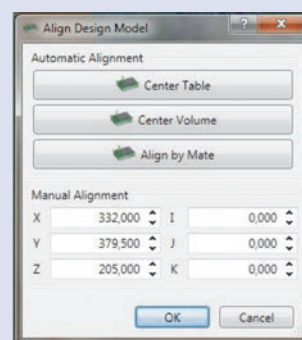
### Workflow by MiCAT Planner



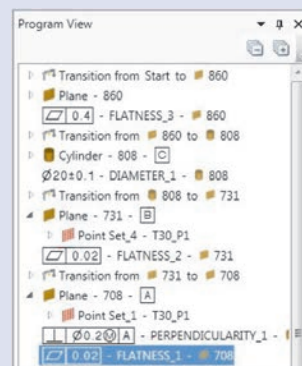
See how fast programs are generated with MiCAT Planner



### Step 2: Select the CMM



### Step 3: Align CAD model



### Step 4: Create the part program

No.	Icon	Function	Parameters
29		End	
30		Change probe tree	No. of probe tree = 30
31		Change probe	1
32		On/Off	On
33		DIC parameter	Measurement speed = 100.000 Measurement speed + 1 Start distance = 1.000 Measurement length = 100.000
34		Move	X = 50.000 Y = 143.000 Z = 131.102
35		Absolute movement	X = 50.000 Y = 157.000 Z = 130.991
36		Plane	000 (0) No. wire element
62		Memory of plane	000 (0) Plane (0)
64		Output text	FLATNESS_3
65		Tolerance Flatness	Element = Plane (0) Width of tolerance = 0.000
66		Move	X = 50.000 Y = 157.000 Z = 131.102
67		Absolute movement	X = 48.442 Y = 132.324 Z = 130.152
68		Cylinder	000 (0) Diameter
69		Tolerance Cylinder (0)	000 (0) Diameter = 20.000 - 0.100 - 0.100 (0.2)
97		Move	X = 48.693 Y = 128.537 Z = 130.152
98		Absolute movement	X = 13.700 Y = 156.000 Z = 130.152
99		Plane	720 (0) No. wire element
110		Memory of plane	720 (0) Plane (0)
117		Output text	FLATNESS_2
118		Tolerance Flatness	Element = Plane (0) Width of tolerance = 0.020
119		Move	X = 50.000 Y = 166.000 Z = 104.000
120		Absolute movement	X = 52.441 Y = 166.000 Z = 104.000

## Step 5: Transfer to MCOSMOS



# CMM Software

## MCOSMOS - The Modular Software for all Kinds of Measurement

The heart of your CMM: to organize, execute, calculate and report.

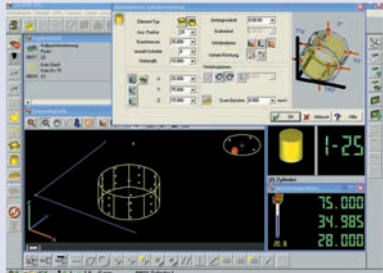
- Organize your measurement programs on the network
- Add commands and instructions to guide the operator
- Create individual reports meeting your customer's needs
- Archive your results in formats like PDF, XLS, HTML and many other
- SPC with MeasurLink or export data to CAQ systems
- Export detected geometrical elements to CAD systems
- Revision Management for authorized usage of validated part programs **as standard**
- Meet the requirements of **FDA Title 21 CFR Part 11** without extra costs

The following packages are also available for Offline programming.

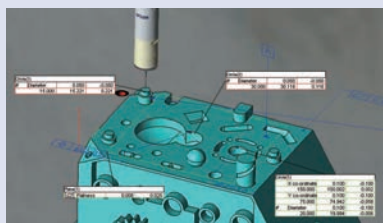
The so called "**Offline MCOSMOS**" packages allow you to create part programs whilst the CMM is proofing your product quality.



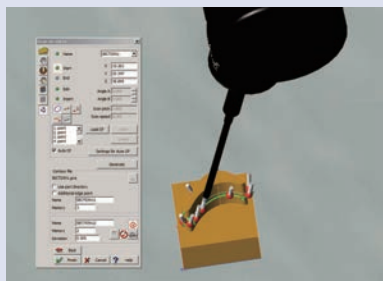
PartManager



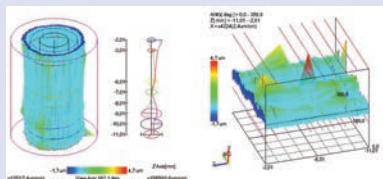
GEOPAK



CAT1000P



CAT1000S



ROUNDPAK-CMM



For details, please ask for the MCOSMOS brochure.

### Software package

	MCOSMOS Manual	MCOSMOS-1 Basic package	MCOSMOS-2 CAD package	MCOSMOS-3 Full package
<b>Part Manager</b>				
• System configuration				
• Part program handling				
• Data management				
• Create report templates				
<b>GEOPAK</b>				
• On/Off-line				
• For prismatic elements				
• Operator guidance				
• Parametric programs				
<b>CAT1000P</b>				
• CAD programming				
• For prismatic elements				
• Collision control				
• Incl. simulation				
<b>CAT1000S</b>				
• CAD programming				
• Free-form inspection				
• Surface + edge points				
• Graphical Reports				
<b>SCANPAK</b>				
• For 2D contours				
• Evaluate + manipulate				
• Graphical Reports				
• Data exchange to CAD + NC				

### Additional software packages meeting your needs:

#### MeasurLink:

SPC software with certified AQDEF interface. Allows you to collect data from different vendors and devices. Its database offers collecting and analyzing data from all over the world, analyse your process and create individual reports.

#### GEARPAK:

Turn your CMM into a gear measurement device! Extend your capabilities, measure gears, worm gears, helical gears. Just input the gear parameters - the rest will be done by GEARPAK: measurement strategy, path generation, probe changes, and of course the measurement report of your gear.

#### ROUNDPAK-CMM

Special evaluation tool for scanning measurements typically known from form measurement instruments. Topographic views and evaluation of form and position deviations.

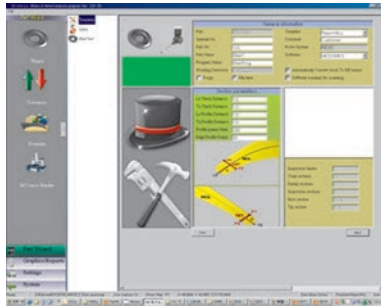


# CMM Software

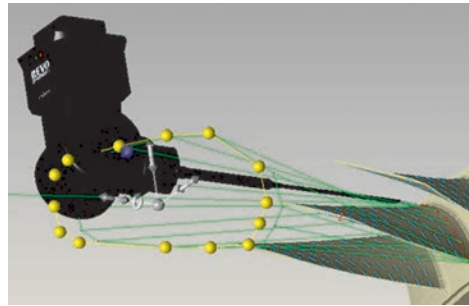
## MAFIS Express - Rapid Air Foil Inspection Software

Mitutoyo introduces the fastest way for inspecting blades and blisks: MAFIS Express.

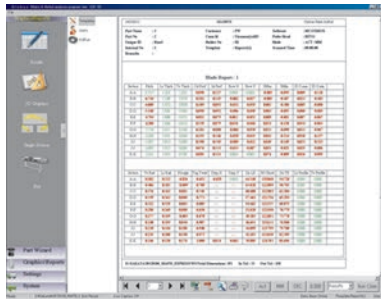
- Increases your throughput by time savings up to 90%
- Intuitive programming and easy handling
- For many kinds of airfoils like blades, blisks, gas turbines
- Easy Off-line programming on the CAD model
- Individual setting of the inspection routine: measure all or just some dedicated intersections
- Support of standards set by Rolls-Royce®, P&W, Siemens®, GE®, Honeywell®, SNECMA, Turbomeca® and others
- Ideal with the Revo® or SP25M probe heads



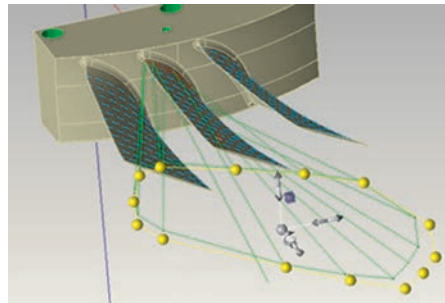
MAFIS Express



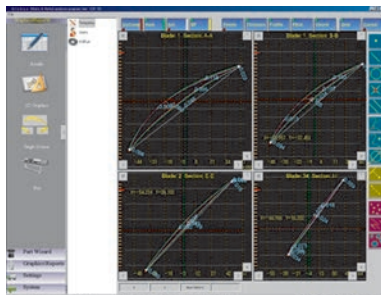
Setting intersections on the CAD model



Numerical evaluation



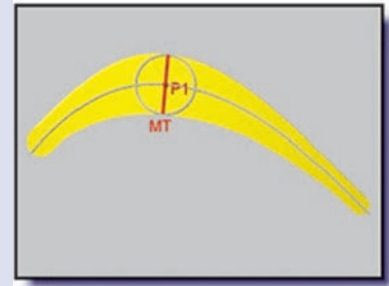
Optimizing the probe path



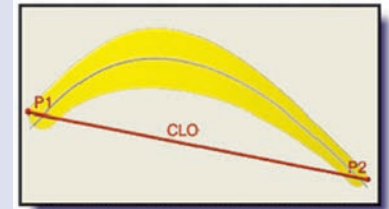
Graphical evaluation



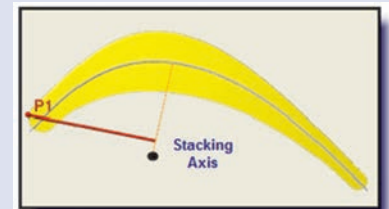
Take a look how quick air foils are inspected by MAFIS Express



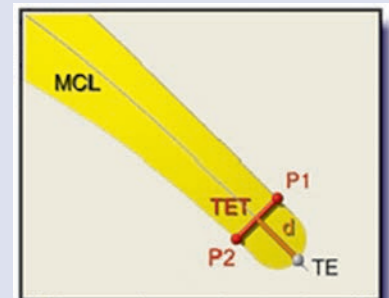
Maximum thickness



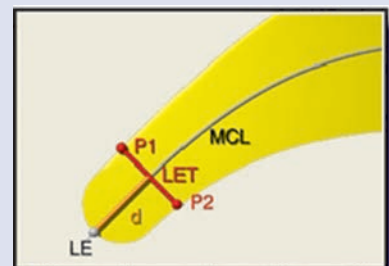
Overall Chord Length



Stacking Axis



Trailing Edge – thickness on specific distance



Leading Edge – thickness on specific distance

# CMM Software

## Point Cloud Processing Software for Coordinate Measuring Machines MSURF

### MSURF-S

Calculates point cloud data measured by CNC CMM with SurfaceMeasure. It generates scanning paths by defining the scanning start position, length, and width.

- Scanning paths can be created by simply defining three items : the scanning starting point, the scanning length, and the scanning width
- Scanning paths can be stored as measurement macros
- Point cloud data obtained from scanning can be exported in text or STL format
- MSURF-S can be started from MCOSMOS

### MSURF-I

Conducts analysis or comparison verification of measured point cloud data in reference to nominal data (supporting CAD data import).

- Importing CAD data
- Feature-by-feature comparison
- Comparison of cross-sectional shapes

### MSURF Planner

is software to automatically create measurement macros (surface form, feature form) for the line laser probe from 3D CAD data.

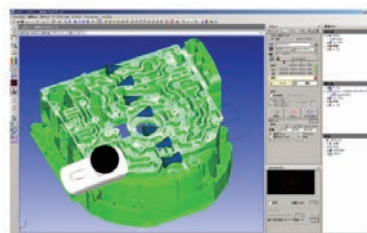
Optimized data (travel path, number of probe head revolutions, etc.) of a measurement path will contribute to improvements in productivity.

- Automatic scanning path programming.
- Automatic path generation for surface or feature extraction
- Mirroring function

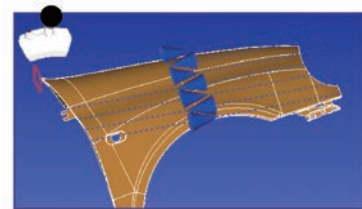
### MSURF-G

#### Off-line version for part program generation

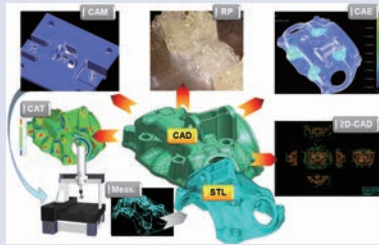
- Semi-automatic function for creating measurement paths with optimum probe orientation
- Detection of collision between the probe and the workpiece model
- Generation of simulated data for the point cloud expected to be obtained through scanning
- Displaying measurement movements (scanner movements) in animation



Screen sample from MSURF-G



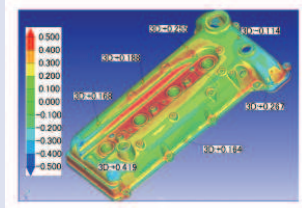
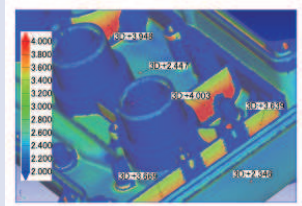
Screen sample from MSURF-G



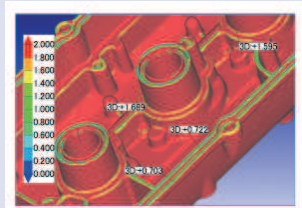
Screen sample from MSURF-S/I



Auto-change rack



Error color-coded map



Surface curvature evaluation



SurfaceMeasure 606T

# CRYSTA-PLUS M Series

## Series 196 - Manual CMM

Welcome to the world of 3D coordinate measuring technology!

This is Mitutoyo's manual floating bridge type coordinate measuring machines designed to give you very high accuracy in a wide range of applications. CRYSTA-PLUS M is the intelligent alternative to the complex, cost-intensive measuring equipment with conventional multi-point measuring devices. These CMM's will introduce you into the world of 3D measurement and will demonstrate its strengths wherever the measuring tasks are constantly changing, different work pieces are involved, and random measurements are needed

The Crysta-Plus M offers you the following benefits:

- High-precision, self-adjusting air bearings on all axes
- Lightweight moving components give you very smooth operation
- Force reducing grip
- Continuous fine feed over the entire measuring range
- Dust protected glass scales
- With powerful Mitutoyo MCOSMOS software
- Temperature compensation (optional)
- Permissible ambient temperature from 15°C to 30°C
- Optional LED illumination for better view



Crysta-Plus M574



Crysta-Plus M7106

Crysta-Plus M Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
196-683	443	400 x 400 x 300	180	480	410
196-684D	443	400 x 400 x 300	180	480	410
196-591	544	500 x 400 x 400	180	590	512
196-592	544	500 x 400 x 400	180	590	512
196-596	574	500 x 700 x 400	180	590	646
196-597	574	500 x 700 x 400	180	590	646
196-342	776	700 x 700 x 600	500	800	1560
196-352	7106	700 x 1000 x 600	800	800	1800



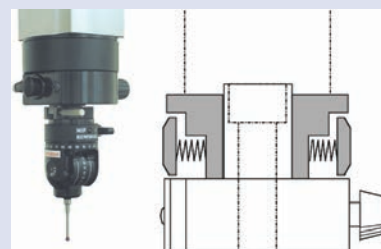
MCOSMOS

## Specifications

Digital step	0,5 µm
Accuracy	E0, MPE from: (3+0,4L/100) µm
Guide system	Air bearing
Axis clamp	One-touch air clamp
Fine feed	Entire range



One-touch air clamp and fine feed for rapid and easy positioning



Ergonomically designed guide grip on Z-axis for reliable measurement (only for Crysta-Plus M776 and M7106)

Accuracy is specified for the following environmental conditions for the CMM

Temperature range		19°C - 21°C	<b>15°C - 30°C*</b>
Temperature change	Per hour	-	<b>2 K</b>
	Per 24 hours	-	<b>5 K</b>
Temperature gradient	Vertical	0.5 K/m	<b>1 K/m</b>
	Horizontal	0.5 K/m	<b>1 K/m</b>

\*The values shown in bold in the table above apply when using the temperature compensation system (optional):



CRYSTA-Plus M brochure on request



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task.



# CRYSTA-APEX S 500, 700 & 900 Series

## Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (1,7+0,3L/100) µm
Max. drive speed	519 mm/s (3-axis)

Accuracy is specified for the following environmental conditions for the CMM\*:

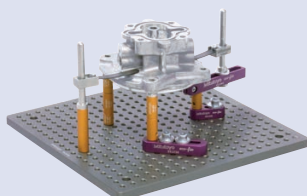
Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	2°C	2°C
	Per 24 hours	2°C	5°C
Temperature gradient	Vertical	1 K/m	1 K/m
	Horizontal	1 K/m	1 K/m



Joystick controller

### Features:

- 1 Lever (selectable)
- 2 Levers (selectable)



Mitutoyo eco-fix fixture kits:

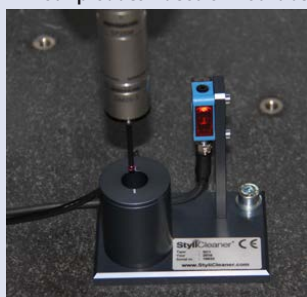
- flexible & quick setup
- time & cost saving
- easy adaption of product changes



CRYSTA-Apex S brochure on request



Scan QR Code with your mobile device and watch our product videos on YouTube



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## Series 191 - Standard CNC CMM

Measuring equipment performance is being challenged as never before. Manufactured products are continuously improving in terms of increased lifetime and decreased energy consumption, often achieved through the application of tighter tolerances, and the ubiquitous Coordinate Measuring Machine now meets these challenges.

In the CRYSTA-Apex S series, Mitutoyo offers you an advanced CMM capable of making very accurate measurements at high speed. It's also a future-proof investment since probe systems and software can easily be changed, or added to the system, whenever required.

This series contains a complete range going from small, medium and big size CNC CMM.

- Lightweight materials and an innovative machine structure deliver high motion stability, accuracy and affordability.
- The temperature compensation function (16°C to 26°C) allows you to take accurate measurements even on the shop floor.
- Compatible vision and scanning probe technologies give you flexible and effective measurement capabilities.
- Multi-sensors capability



CRYSTA-Apex S9106

## CRYSTA-Apex S Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-244-10	544	500 x 400 x 400	180	545	515
191-248-10	574	500 x 700 x 400	180	545	625
191-252-10	776	700 x 700 x 600	800	800	1675
191-254-10	7106	700 x 1000 x 600	1000	800	1951
191-292-10	9106	900 x 1000 x 600	1200	800	2231
191-292H-10	9108	900 x 1000 x 800	1200	1000	2261
191-294-10	9166	900 x 1600 x 600	1500	800	2868
191-294H-10	9168	900 x 1600 x 800	1500	1000	2898
191-296-10	9206	900 x 2000 x 600	1800	800	3912
191-296H-10	9208	900 x 2000 x 800	1800	1000	3942

# CRYSTA-APEX S 1200 Series

## Series 191 - Standard CNC CMM

The CRYSTA-APEX S Series is a high performance, cost effective coordinate measuring machine, designed and constructed according to Mitutoyo’s extensive experience in CNC CMM technology. It offers you the following benefits:

- Lightweight materials and an innovative machine structure deliver high motion stability, accuracy and affordability.
- The temperature compensation function (16°C to 26°C) allows you to take accurate measurements even on the shop floor.
- Compatible vision and scanning probe technologies give you flexible and effective measurement capabilities.
- Multi-sensors capability



CRYSTA-Apex S 122010

CRYSTA-Apex S Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-392-10	121210	1200 x 1200 x 1000	2000	1000	4050
191-394-10	122010	1200 x 2000 x 1000	2500	1000	6150
191-396-10	123010	1200 x 3000 x 1000	3000	1000	9110

### Specifications

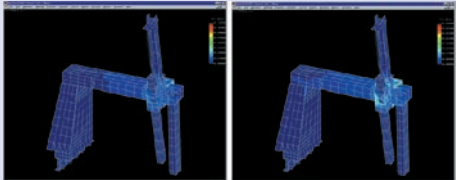
Digital step	0,1 µm
Accuracy	E0, MPE from: (2,3+0,3L/100) µm
Max. drive speed	693 mm/s



Temperature compensation system (temperature sensors)

Accuracy is specified for the following environmental conditions for the CMM\*:

Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	2°C	2°C
	Per 24 hours	2°C	5°C
Temperature gradient	Vertical	1 K/m	1 K/m
	Horizontal	1 K/m	1 K/m



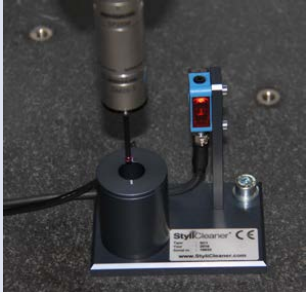
The machine structure has been optimized using FEM (Finite-element Method) and modal analysis



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.



Refer to the CRYSTA-Apex S brochure



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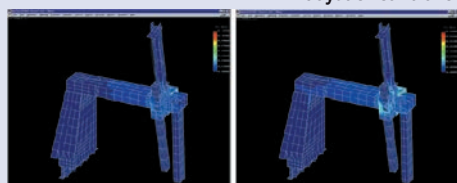
# CRYSTA-APEX S 1600 & 2000 Series

## Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (3,3+0,45L/100) µm
Max. drive speed	693 mm/s



Joystick controller



The machine structure has been optimized using FEM (Finite-element Method) and modal analysis



Refer to the CRYSTA-Apex S brochure



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## Series 191 - Standard CNC CMM

The CRYSTA-APEX S 1600 & 2000 series offers you up to 12,8m³ measuring volume and still keeps an excellent 4,5 µm accuracy or better.

This series is developed for supporting quality evaluation of volumetric parts.

This high performance, cost effective coordinate measuring machine, designed and constructed according to Mitutoyo's extensive experience in CNC CMM technology.

Ready for touch trigger probe, scanning probe, optical probe and laser scanner probe.

- Proven bridge type construction
- High rigidity air-bearing guiding on every axis
- High accuracy
- High speed and acceleration
- Temperature compensation from 16° to 24°C
- Glass scale with high resolution 0,1 µm
- Multi-sensors capability
- Multi-Function Joystick Box including two levers and speed adjustment
- Optional with anti-vibration table



CRYSTA-Apex S 163012

## CRYSTA-Apex S Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-286-10EU	162012	1600 x 2000 x 1200	3000	1400	9300
191-266-10EU	163012	1600 x 3000 x 1200	3500	1400	10600
191-276-10EU	164012	1600 x 4000 x 1200	4500	1400	14800
191-286H-10EU	162016	1600 x 2000 x 1600	3000	1800	9350
191-266H-10EU	163016	1600 x 3000 x 1600	3500	1800	10650
191-276H-10EU	164016	1600 x 4000 x 1600	4500	1800	14850
191-366H-10EU	203016	2000 x 3000 x 1600	4000	1800	14100
191-376H-10EU	204016	2000 x 4000 x 1600	5000	1800	19400

# STRATO-APEX 500, 700 & 900 Series

## Series 355 - High accuracy CNC CMM

The challenges for measurement equipment are rising. Products are continuously improving as a result the lifetime of products is increasing while their energy consumption is reduced. Additionally, the throughput of production is driven up. All these facts must be taken into account for your measuring equipment. With the STRATO-Apex CMM, Mitutoyo offers you the opportunity to match both: precision and velocity.

This high accuracy CNC coordinate measuring machine that allows you to get accurate results at lightning speed.

The STRATO-APEX Series offers you the following benefits:

- High measurement accuracy and high-speed motion
- High-performance scanning
- Ultra high precision scales on each axis
- Anti-vibration system reduces the impact of nearby vibration sources (optional for 574)
- Multi-sensors capability



STRATO-Apex 9106

STRATO-Apex Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
355-522-10	574	500 x 700 x 400	180	560	1530
355-502-10	776	700 x 700 x 600	500	770	1895
355-507-10	7106	700 x 1000 x 600	800	770	2180
355-512-10	9106	900 x 1000 x 600	800	770	2410
355-517-10	9166	900 x 1600 x 600	1200	770	3085

## Specifications

Digital step	500: 0,05 µm 700/900: 0,02 µm
Accuracy	E0, MPE from: (0,7+0,25L/100) µm
Max. drive speed	519 mm/s

Accuracy is specified for the following environmental conditions for the CMM\*:

Temperature range	Series 500: 18°C -22°C Series 700/900: 19°C -21°C
Temperature change	Per hour 1°C Per 24 hours 2°C
Temperature gradient	Vertical 1 K/m Horizontal 1 K/m



Mitutoyo eco-fix fixture kits:

- flexible & quick setup
- time & cost saving
- easy adaption of product changes



Refer to the STRATO-Apex brochure



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# STRATO-APEX 1600 Series

## Specifications

Digital step	0,05 µm
Accuracy	E0, MPE from: (2,5+0,4L/100) µm
Max. drive speed	606 mm/s
3D Acceleration	1350 mm/s <sup>2</sup>

Accuracy is specified for the following environmental conditions for the CMM:\*

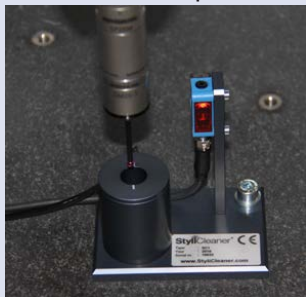
Temperature range		18°C - 22°C
Temperature change	Per hour	1 K
	Per 24 hours	2 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task.



Refer to the STRATO-Apex brochure



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## Series 355 - High accuracy CNC CMM

High precision large size bridge type CNC CMM, designed to provide top scanning performance with high accuracy, ready for touch trigger probe, scanning probe, optical probe, laser scanner probe.

- Improve structural rigidity bridge type construction with compensation technology
- High accuracy
- High speed and acceleration
- Temperature compensation from 18° to 22°C
- High precision glass scale with resolution 0,05 µm
- Integrated vibration-damping units with auto-levelling air springs
- Granite working table with M8 threads
- Multi-Function Joystick Box including two levers and a speed adjustment



## STRATO-Apex Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
355-532-10	162012	1600 x 2000 x 1200	3500	1350	11150
355-534-10	162016	1600 x 2000 x 1600	3500	1750	11200
355-536-10	163012	1600 x 3000 x 1200	4000	1350	15300
355-538-10	163016	1600 x 3000 x 1600	4000	1750	15350

# LEGEX Series

## Series 356 - Ultra-High Precision Premium CNC CMM

The LEGEX Series is an ultra-high precision CNC coordinate measuring machine with the world's highest level of accuracy. This is made possible by rigorous analysis of all possible error producing factors and the elimination or minimization of their effects. The fixed bridge structure and precision air bearings running on highly rigged guideways ensure superior motion stability and ultra-high geometrical accuracy. Due the "Center of gravity" placed drive systems of the sliders we reached the best possible dynamic performance. In addition, other various technologies have been utilized in the structure of the drive unit, measuring against vibration etc. to provide ultra-high accuracy. Using FEM structure analysis simulations, guarantee geometric motion accuracy that has minimal errors from fluctuations in the load and other variables. In addition, other various technologies have been utilized in the structure of the drive unit, measuring against vibration etc. to provide ultra-high accuracy. The construction is designed for thermal stability, low expansion crystallized glass scales and temperature compensation, results in an accuracy temperature range of 18 °C to 22°C. This will be helping you reduce measurement environment maintenance costs.The high standard of the design and technology will give you an ultra-high accurate Coordinate Measuring Machine.

The LEGEX Series offers you the following benefits:

- Rigorous analysis of all possible error-producing factors, and elimination or minimization of their effects, delivers unsurpassed accuracy of 0,28µm
- Ultra-high accuracy crystallized-glass scale with the ultra-low expansion coefficient of 0,01x10-6/K is used on each axis
- The fixed bridge structure and precision air bearings, running on highly rigid guideways, give you superior motion stability and ultra-high geometrical accuracy
- You can use many different types of optional probe systems, including touch-trigger probes, laser scanning probes, and a vision measuring probe.



Legex 9106

### LEGEX Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
356-403-10	574	500 x 700 x 450	250	700	3500
356-413-10	774	700 x 700 x 450	500	700	5000
356-423-10	776	700 x 700 x 600	500	850	5100
356-433-10	9106	900 x 1000 x 600	800	850	6500



### Specifications

Digital step	0,01 µm
Accuracy	E0, MPE from: (0,28+0,1L/100) µm
Max. drive speed	200 mm/s

Accuracy is specified for the following environmental conditions for the CMM\*

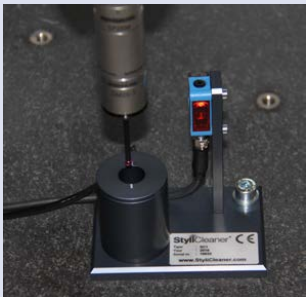
Temperature range		20±1°C
Temperature change	Per hour	0,5 K
	Per 24 hours	1 K/m
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



CMM calibration using a virtually zero thermal expansion glass gauge



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task.



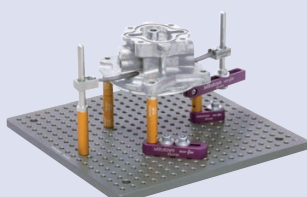
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# CRYSTA-Apex EX 500T/700T/900T Series

## Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (1,7+0,3L/100) µm
Max. drive speed	519 mm/s (3-axis)



**Mitutoyo eco-fix fixture kits:**  
 - flexible & quick setup  
 - time & cost saving  
 - easy adaption of product changes



CRYSTA-Apex S brochure on request



Scan QR Code with your mobile device and watch our product videos on YouTube



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## Series 191 - Standard CNC CMM equipt with PH20

The EX T series CNC CMM are equipped with a PH20 probe head that will provide you 5-axis touch-trigger operation for significantly higher productivity.

5-Axis operation reduces the time required for probe rotational movements and allows more flexible positioning. This also ensures easy acces to complex workpieces and saves time during both programming and measurement.

In addition to 3-axis point measurement similar to conventional CMM's the PH20 supports "Head Touch" operation for rapid measurement using the two rotational axis of the probe head only, without any movement required along the CMM axes.



CRYSTA-Apex EX 544T

## CRYSTA-Apex S Models:

No.	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-244-30	500 x 400 x 400	180	545	515
191-248-30	500 x 700 x 400	180	545	625
191-252-30	700 x 700 x 600	800	800	1675
191-254-30	700 x 1000 x 600	1000	800	1951
191-292-30	900 x 1000 x 600	1200	800	2231
191-294-30	900 x 1600 x 600	1200	1000	2261
191-296-30	900 x 2000 x 600	1500	800	2868



# CRYSTA-Apex EX 1200R Series

## Series 191 - Standard CNC CMM

- CRYSTA-Apex EX 1200R series products are advanced CNC CMMs equipped with the REVO probe head and a choice of probes to create a range of standard 5-axis measuring machines.
- 5-axis operation reduces the time required for probe repositioning movements and allows more flexible positioning. This also facilitates access to complex workpieces and saves time during both programming and measurement.
- Allows ultra high-speed 5-axis scanning (max. 500 mm/s), far surpassing conventional 3-axis control. Support for high-speed sampling of up to 4 points per second allows acquisition of densely spaced measurement points, even during fast scanning.
- Internal implementation of laser sensing technology ensures high-accuracy measurement, even with long styli (up to 500 mm\*1).

\*1

Distance from probe rotation center to stylus tip



CRYSTA-Apex EX 123010R

CRYSTA-Apex EX 1.200R Series:

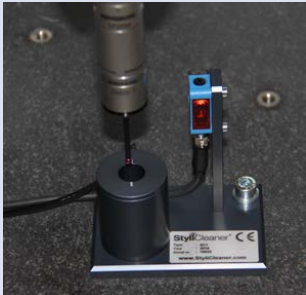
No.	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-392V-10	1200 x 1200 x 1000	2000	1160	4050
191-394V-10	1200 x 2000 x 1000	2500	1160	6150
191-396V-10	1200 x 3000 x 1000	3000	1160	9110

### Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (2,9+4L/1.000) µm
Max. drive speed	300 mm/s



Refer to the CRYSTA-Apex S brochure

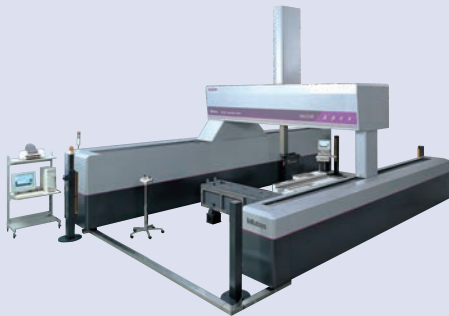


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# FALCIO-APEX Gantry Series

## Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (3,5+0,45L/100) µm
Max. drive speed	520 mm/s



Accuracy is specified for the following environmental conditions for the CMM:\*

Temperature range		18°C - 22°C
Temperature change	Per hour	1 K
	Per 24 hours	2 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



Scanning with probe SP80 and 100 mm styli.

## Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.

## Foundation

This type series always requires a special foundation. Please contact your local Mitutoyo partner for further details.

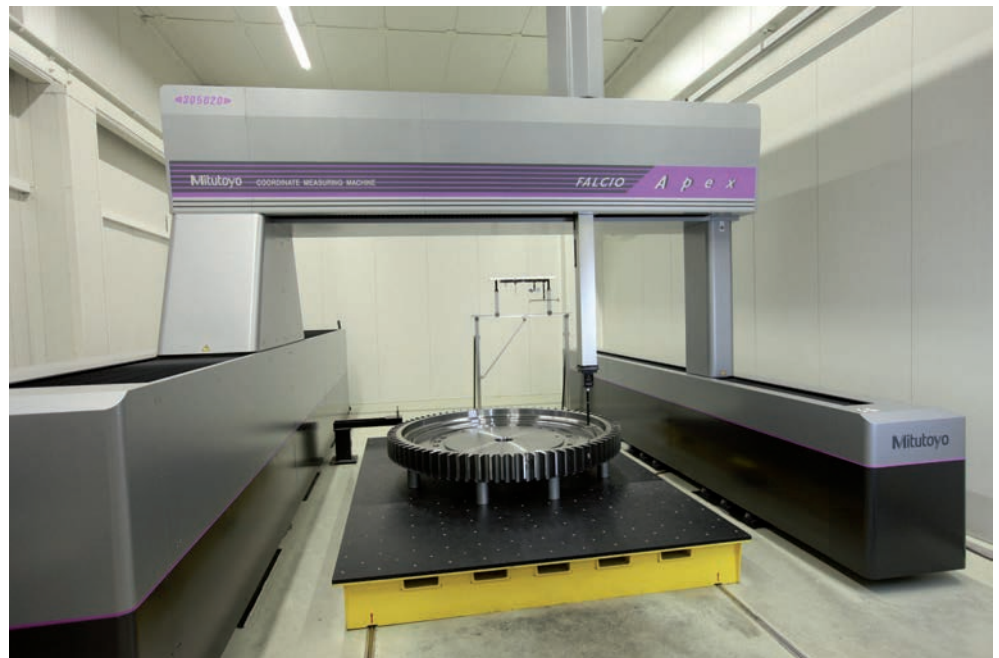


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## Series 355 - High accuracy Large CNC CMM

High precision gantry type CNC CMM, designed to provide top scanning performance for your largest workpieces, ready for touch trigger probe, scanning probe, optical probe, laser scanner probe. Used for measurements on big molds, parts of windmills, airplanes, ships etc. Anchored to the floor foundations, this CMM allows almost unlimited loading mass since the workpiece is not placed on the machine structure. These CMMs are also compatible with multisensory applications.

- Improve structural rigidity gantry type construction with compensation technology
- High accuracy
- High speed and acceleration
- High speed and acceleration
- Temperature compensation from 18° to 22°C
- High precision glass scale with resolution 0,1 µm
- Multi-Function Joystick Box including two levers and a speed adjustment
- Available in many different sizes from 2000 x 3000 x 1600 mm to 3000 x 5000 x 2000 mm.



FALCIO-Apex 305020 G measuring a gear for a wind turbine engine

No.	Range [mm]	Mass [kg]
FALCIO-Apex 203015 G	2000 x 3000 x 1500	12000
FALCIO-Apex 305020 G	3000 x 5000 x 2000	16000



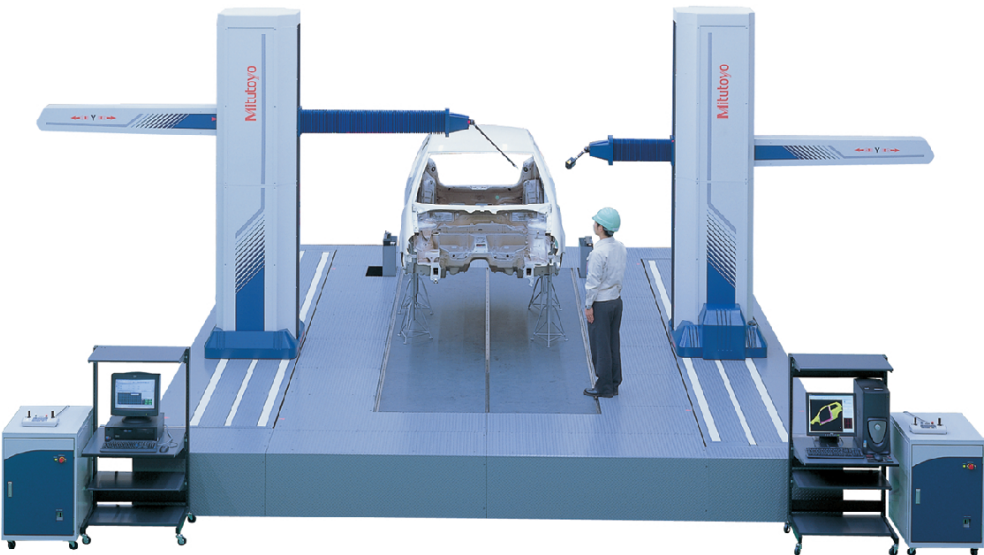
# CARB-Strato Series / CARB-Apex Series

## Series 360 - Car Body Measuring System

A large, horizontal-type arm CNC CMM for measuring car bodies or similar components. Single/ dual-head types are available ; the dual-head type measures by controlling two heads simultaneously, one from each side.

**MAIN FEATURES CARBstrato** : large, high precision, dual-head type.

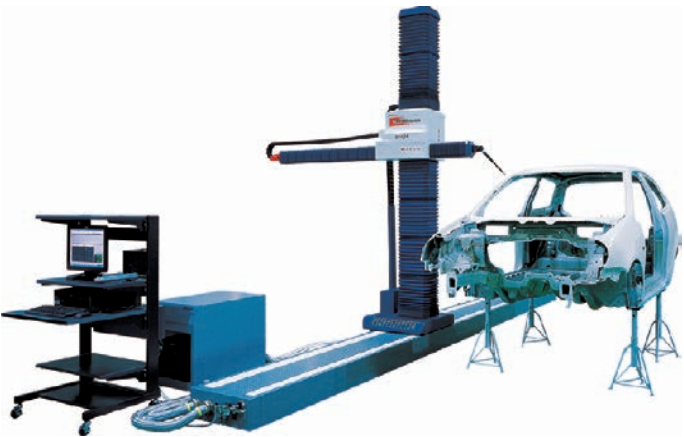
**MAIN FEATURES CARBapex** : large, single-head type, affordable.



CARBstrato

No.	Accuracy <sup>(1)</sup> E <sub>0,MPE</sub>
CARBstrato	(18+20L/1000)µm
CARBapex	(25+28L/1000)µm

<sup>(1)</sup> According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus ø 4x50 mm.  
L= measured length (mm).



CARBapex

### Specifications

Digital step	0,1 µm
Range X-axis	4000-8000 mm
Scale	High accuracy linear encoder
Guide system	X-axis : linear guide ; YZ-axis : air bearing
Max. drive speed	866 mm/sec (CARBstrato) 519 mm/sec (CARBapex)
3D Acceleration	0,2G (CARBstrato) 0,1G (CARBapex)



CARBstrato / CARBapex Series brochure on request

### Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.

### Foundation

This type series always requires a special foundation. Please contact your local Mitutoyo partner for further details.



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.



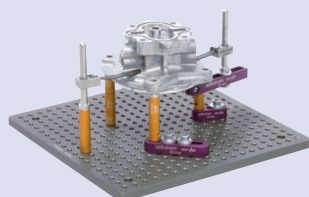
# MACH KO-GA-ME Series

## Specifications

Digital step	0,02 µm
Accuracy	E0, MPE from: (2,4+0,57L/100) µm
Max. drive speed	340 mm/s
3D Acceleration	6750 mm/s <sup>2</sup>



MACH Ko-ga-me 12128-3V with optional stand



Mitutoyo eco-fix fixture kits:  
- flexible & quick setup  
- time & cost saving  
- easy adaption of product changes



Refer to the INLINE Measuring systems brochure



Take a look how MACH Ko-ga-me can boost your productivity

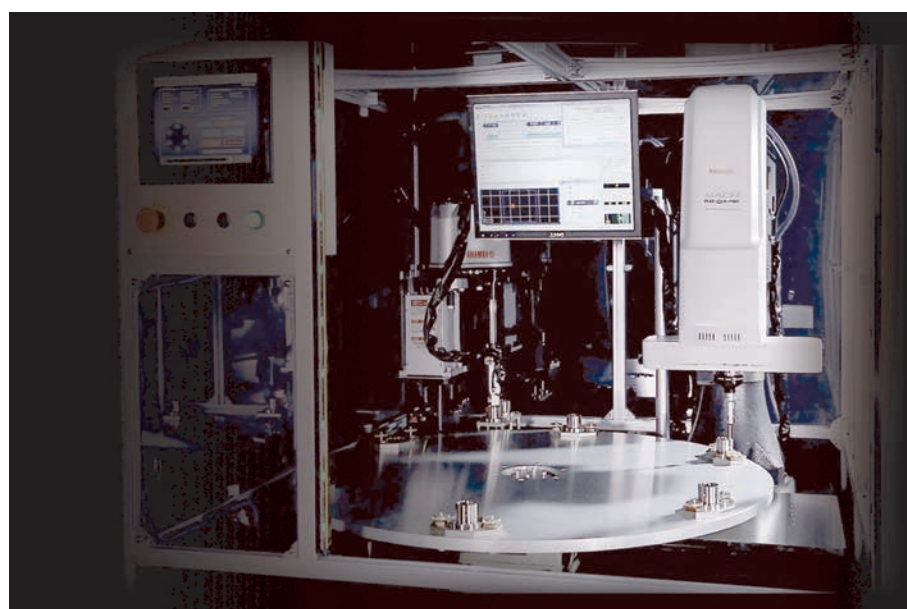
## Series 357 - Agile Measurement System

The MACH KO-GA-ME is a unique and compact CMM ready for automated measurements. Looking for the fast, extremely compact, lightweight and easy to mount metrology solution? The MACH KO-GA-ME, essential a compact CMM, is your perfect solution for automated cells. The guaranteed accuracy temperature of 10 °C up to 35 °C provides flexibility and performance also for your production environments.

Mounted on any rigid frame, including machine tools, the KO-GA-ME will give you CMM capabilities without the space requirements of a full-sized machine.

The MACH Series offers you the following benefits:

- High-speed measurements
- Designed for production environments
- Highly reliable
- Extremely small footprints
- Perfect for automated cells and stand-alone solutions
- Ideal for single feature inspection and usable with scanning and point to point probes
- Measuring range up to 120 mm
- Resolution of 0,02 µm
- MeasurLink SPC software (optional)



In-line Application example with MACH Ko-ga-me

## MACH Ko-ga-me Models:

No.	Model	Range [mm]	Mass [kg]
357-165	12128-3V	120 x 120 x 80	36

# MACH-3A 653

## Series 360 - High-Speed In-Line CMM

The MACH-3A 653 is a horizontal spindle type with index table coordinate measuring machine and is designed for fast and precise inline measurement. It grants outstanding throughput will allow you to boost up your measuring process. His small foot print and protection against rough production environments makes him suitable for workshop and inline production measurements. The MACH Series offers you the following benefits:

- Super High speed and acceleration
- Drastic reduction of the measurement cycle compared with any conventional CMM
- All in One Compact design to minimize the foot print in the workshop and to improve the dust resistance
- Work piece handling and routing in the same posture as for other horizontal spindle machining centres
- Control unit and PC are installed in the dust-tight rack with heat exchanger.
- Ease-of-maintenance construction and air-free operation using high accuracy linear ball bearing
- Temperature compensation from 5°C to 40°C
- Glass scale with high resolution 0,1 µm
- Safety joystick box with deadman switch and speed adjustment
- Optional with index table for higher flexibility



No.	Model	Range [mm]
360-415-10	MACH-3A 653	600 x 500 x 280

### Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (2,2+0,35L/100) µm
Max. drive speed	1212 mm/s

Accuracy is specified for the following environmental conditions for the CMM

Temperature range		5°C - 40°C
Temperature change	per hour	2 K
	per 24 hours	10 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m

### Safety System

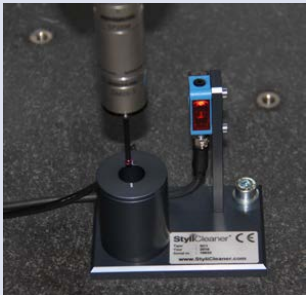
For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.



Refer to the INLINE Measuring systems brochure



Take a look how MACH-3A 653 can boost your productivity



StyliCleaner always Reliable and Clean Stylus



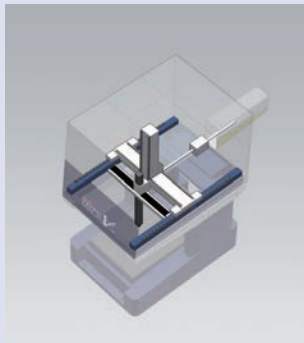
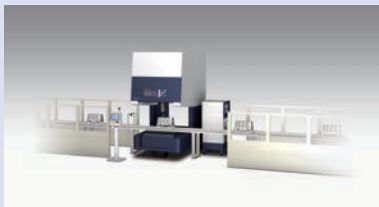
# MACH-V 9106

## Specifications

Digital step	0,1 µm
Accuracy	E0, MPE from: (2,5+0,35L/100) µm
Max. drive speed	866 mm/s

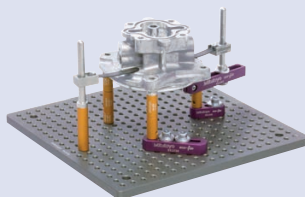
Accuracy is specified for the following environmental conditions for the CMM\*

Temperature range		5°C - 35°C
Temperature change	per hour	2 K
	per 24 hours	10 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



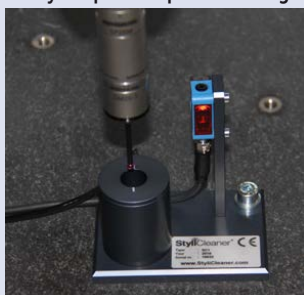
## Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.



## Mitutoyo eco-fix fixture kits:

- flexible & quick setup
- time & cost saving
- easy adaption of product changes



StyliCleaner always Reliable and Clean Stylus

## Series 360 - In-line type CNC CMM

The MACH-V 9106 is a vertical spindle type coordinate measuring machine and is designed for fast and precise inline measurement. It grants outstanding throughput will allow you to boost up your measuring process.

His design is so chosen that work pieces can be conveyed through the CMM either in front/back or left/right. This makes it a very flexible system to integrate. Also it can provide pre/post machining feedback to your machine tools for process tuning.

- Higher speed and accuracy with barycentric drive
- Improved dust resistance by installing all drive system and scale units in the dust-tight enclosure on the machine top
- Control unit and PC are installed in the dust-tight rack
- Space-saving design helps installation in a production line
- Flexible loading options due open access to the measuring area
- Ease-of-maintenance construction and air-free operation using high accuracy linear ball bearing
- Temperature compensation from 5° to 35°C
- Glass scale with high resolution 0,1 µm.



MACH-V 9106

No.	Model	Range [mm]
360-224-10EU	MACH-V9106	900 x 1000 x 600



Scan QR Code with your mobile device and watch our product videos on YouTube

# CMM Probes

## SURFTEST Probe

### Surface Roughness Measurement directly on the CMM!

This latest Mitutoyo probe head closes the gap between typical dimensional CMM measurements and surface roughness inspection. Instead of having to take the workpiece to another measuring instrument or using additional portable systems, the SURFTEST Probe adds roughness measurement capability to your CMM and so avoids all the cost and inconvenience of additional systems. It brings the proven technology of the SJ-310 series to the CMM with all its highly capable range of detectors developed for handling specialist applications such as roughness measurement on gears, inside small holes or deep grooves, in addition to simple flat surface measuring tasks.

- Proven technology from Mitutoyo's SJ-310 Surf test
- Chose from five types of detector for variant applications
- High accuracy – no CMM movement during measurement
- One CNC measurement cycle produces all results
- Graphical and numerical output
- One Measurement report for all GD&T requirements

## SurfaceMeasure

### Ultra-high speed data collection

SurfaceMeasure is a laser probe that collects coordinate values of the surface of the workpiece by moving and irradiating laser light over the workpiece.

\* When using SurfaceMeasure 606/610/1010

### Advantages of non-contact type

Non-contact measurement enables measurement of materials that can be easily-deformed by contact measurement, including resin or thin, elastic parts.

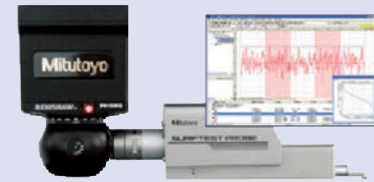
### Powder-less measurement

Automatic configuration of the camera sensitivity and the laser intensity settings according to the environment and materials enable establishing a simple and comfortable laser-scanning environment since measurement is now powder and spray free.

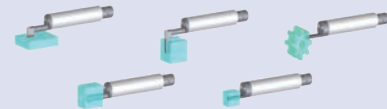
### Evaluation cases

The collected point cloud data can be used by various optional software in a wide range of applications, such as editing, plane creation, comparison using CAD data and more.

No.	Model	Max. scan width	Max. scan depth	Scanning error	Max. Acquisition rate	Line Laser	Point Laser
02AQH100	SM 606	60 mm	60 mm	12 µm	75000 points/sec	Wave length: 660 nm Power output: 4mW	Wave length: 635 nm Power output: 1mW
02AQH200	SM 606T	3x65 mm	65 mm	17 µm	3x25000 points/sec	Wave length: 660 nm Power output: 4mW	Wave length: 635 nm Power output: 1mW
02AQH250	SM 610	60 mm	100 mm	15 µm	75000 points/sec	Wave length: 660 nm Power output: 4mW	Wave length: 635 nm Power output: 1mW
02AQH280	SM 1010	100 mm	100 mm	18 µm	75000 points/sec	Wave length: 660 nm Power output: 4mW	Wave length: 635 nm Power output: 1mW
02AQH290	SM 403	40 mm	30 mm	8 µm	60000 points/sec	Wave length: 660 nm Power output: 4mW	Wave length: 635 nm Power output: 1mW
02AQJ500	SM 201FS	23 mm	15 mm	1,8 µm	25000 points/sec	Wave length: 670 nm Power output: 1mW	



SURFTEST Probe



Optional detectors



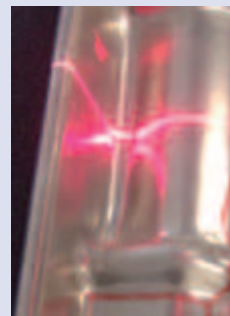
Scan QR Code with your mobile device and watch our product videos on YouTube

### Specifications

Laser Class	Class 2 [EN/IEC 60825-1(2014)] Class 2 [JIS C 6802: 2014] Laser Type: Red-light semiconductor
	SurfaceMeasure 201FS Laser Type: Semiconductor



Measurement of color sample plate



Measurement of glossy parts



The flying spot type is capable of scanning difficult parts, such as this impeller, precisely and achieves highest scanning accuracy in the class.

## CMM Probes



SM 403/606/610/1010



SM 606T



SM 201FS



QVP (Quick Vision Probe)

### QVP

#### Mitutoyo's Vision Probe System for CMMs

The Quick Vision Probe will make from your CMM an VMM (VisionMM). Put in an probe change rack you can use it together with other probes. Were traditional probes can not be used, very small holes and flexible parts, the QVP can do this Job.

- Fast optical measurements – the perfect choice for small features and soft materials
- Ideal in combination with tactile probes
- Prepared for automatic probe change
- Four objective lenses offer different optical magnification
- From 0,375 x to 3,75 x
- White LED ring light
- White LED coaxial light

# CMM Probes

## MPP-310Q

### Ultra-High accuracy and low measuring force Scanning Probe

This ultra-high precision scanning probe incorporates built-in XYZ scales for highest accuracy performance.

The compact size of this probe is ideal for low measuring force and high speed scanning.

Data collection can be performed by scanning measurement, ultrahigh precision point measurement and center alignment measurement.

Special developed for our Ultra-High accuracy CMM

- High resolution of 0,01  $\mu\text{m}$
- Measuring range  $\pm 1$  mm
- Extremely low measuring forces of 0,03 N
- Styli length up to 200 mm
- Air bearing for smooth measurements
- Axis clamping for scanning on slanted or arched surfaces



MPP-310Q

## PH20

### Rapid tactile measurements at any probe angle

- Head touch for improved repeatability
- Feature-based calibration for improved accuracy
- Probe change with TP20 moduls
- Allowing subsequent measurement at any head angle
- Full support in MCOSMOS



PH20

# CMM Probes

## Revo

### 5-axis measurement technology

- Rapid scanning at any angle
- dynamic 2-axis head provides most of the stylus motion
- High accuracy and repeatability
- Scanning with 5-axes of simultaneous motion allows unparalleled measurement flexibility
- 'Head-touches' take measurement points faster, with improved accuracy and repeatability
- 5-axis motion eliminates time spent indexing the head



Revo



Refer to the Measuring Heads brochure



5-axis scanning options with CRYSTA-Apex and Revo



# CMM Probes

## Scanning probe systems

Scanning probes can acquire several hundred surface points each second, enabling measurement of form as well as size and position.

Scanning probes can also be used to acquire discrete points in a similar way to touch-trigger probes.

A range of solutions is available, suitable for all sizes and configurations of CMM.



**SP80**  
is a quill-mounted scanning probe that uses digital scale and readhead technology, to provide exceptional scanning performance, even with long styli.



**SP25M**  
At just 25 mm in diameter, the SP25M is small and light, making it ideally suited to mounting on articulating heads. It is also sufficiently compact to suit small CMM's



**SP600M**  
Renishaw's SP600 analogue scanning probe offers high-performance inspection, digitizing and profile scanning capability for a wide range of CMM's.

## Touch-trigger probe systems



**TP7M**  
High accuracy type



**TP200**  
Compact and high accuracy (stylus change type)



**SCR200**  
Rack



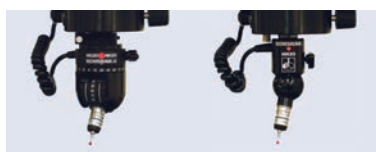
**Micro Touch Probe**  
UMAP-CMM



**TP20**  
Compact type



**MCR20**  
Rack



**MH20i / MH20**  
Manual Probes

## Probe heads



**PH10M**  
Motor drive index type



**MIH**  
Manual index type



**PH1**  
Simple manual type



CMM Probes brochure on demand

# Styli Kits

Mitutoyo offers you over 600 styli plus highly specialised equipment within a wide range of selected materials like steel, aluminium, ceramics, ruby, zirconium oxide or silicon nitride.



Styli Kit M2  
Addition

## Styli Kit M2 Addition

No.	Contents	Description	Length [mm]
K651382	1x Part No. K651058	5-way stylus holder M2	7,5
	1x Part No. K651040	Extension steel M2	30
	1x Part No. K651039	Extension steel M2	20
	4x Part No. K651038	Extension steel M2	10
	1x Part No. K651022	Stylus steel-ruby M2	20
	1x Part No. K651021	Stylus steel-ruby M2	20
	5x Part No. K651019	Stylus steel-ruby M2	20
	1x Part No. K651012	Stylus steel-ruby M2	10
	2x Part No. K651223	Pin spanner ø 1,2 mm	23



Styli Kit M2  
Basic 1

## Styli Kit M2 Basic 1

No.	Contents	Description	Length [mm]
K651377	1x Part No. K651012	Stylus steel-ruby M2	10
	1x Part No. K651014	Stylus steel-ruby M2	10
	1x Part No. K651019	Stylus steel-ruby M2	20
	1x Part No. K651016	Stylus steel-ruby M2	10
	1x Part No. K651021	Stylus steel-ruby M2	20
	1x Part No. K651022	Stylus steel-ruby M2	20
	1x Part No. K651031	Cylinder stylus steel M2	13
	1x Part No. K651062	Adaptor M2	7
	1x Part No. K651054	5-way stylus M2	30
	1x Part No. K651083	Disk stylus steel M2	7,5
	1x Part No. K651085	Disk stylus steel - ruby M2	10
	1x Part No. K651038	Extension steel M2	10
	1x Part No. K651039	Extension steel M2	20
	2x Part No. K651223	Pin spanner ø 1,2 mm	23



Styli Kit M2  
Basic 2

## Styli Kit M2 Basic 2

No.	Contents	Description	Length [mm]
K651354	1x Part No. K651235	Stylus tungsten carbide-ruby M2	20
	1x Part No. K651249	Stylus tungsten carbide-ruby M2	20
	1x Part No. K651019	stylus steel-ruby M2	20
	1x Part No. K651347	Stylus carbon fiber-ruby M2	50
	1x Part No. K651348	Stylus carbon fiber-ruby M2	50
	1x Part No. K651349	Stylus carbon fiber-ruby M2	50
	1x Part No. K651350	Stylus extension CRP M2	40
	1x Part No. K651351	Stylus extension CRP M2	50
	1x Part No. K651352	Stylus extension CRP M2	70
	1x Part No. K651353	Stylus extension CRP M2	90
	1x Part No. K651058	5-way stylus holder M2	7,5
	1x Part No. K651223	pin spanner ø 1,2 mm	



Styli Kit M2  
Expansion

## Styli Kit M2 Expansion

No.	Contents	Description	Length [mm]
K651378	1x Part No. K651236	Stylus tungsten carbide-ruby M2	10
	1x Part No. K651248	Stylus tungsten carbide-ruby M2	20
	2x Part No. K651257	Stylus tungsten carbide-ruby M2	30
	1x Part No. K651233	Stylus tungsten carbide-ruby M2	10
	1x Part No. K651276	Stylus tungsten carbide-ruby M2	10
	1x Part No. K651012	Stylus steel-ruby M2	10
	1x Part No. K651013	Stylus steel-ruby M2	10
	1x Part No. K651014	Stylus steel-ruby M2	10
	1x Part No. K651015	Stylus steel-ruby M2	10
	2x Part No. K651020	Stylus steel-ruby M2	20
	1x Part No. K651032	Cylinder stylus-ruby M2	20
	1x Part No. K651052	4-way stylus-ruby M2	10
	1x Part No. K651098	Tip stylus tungsten carbide M2	10
	1x Part No. K651083	Disk stylus steel M2	7,5
	1x Part No. K651084	Disk stylus steel M2	7,5
	1x Part No. K651041	Extension steel M2	40
	2x Part No. K651223	Pin spanner ø 1,2 mm	23

# Styli Kits

## Styli Kit M2 Professional

No.	Contents	Description	Length [mm]
K651379	1x Part No. K651236	Stylus tungsten carbide-ruby M2	10
	1x Part No. K651248	Stylus tungsten carbide-ruby M2	20
	1x Part No. K651233	Stylus tungsten carbide-ruby M2	10
	2x Part No. K651276	Stylus tungsten carbide-ruby M2	10
	2x Part No. K651012	Stylus steel-ruby M2	10
	1x Part No. K651013	Stylus steel-ruby M2	10
	3x Part No. K651014	Stylus steel-ruby M2	10
	5x Part No. K651019	Stylus steel-ruby M2	20
	1xPart No. K651015	Stylus steel-ruby M2	10
	2xPart No. K651020	Stylus steel-ruby M2	20
	1x Part No. K651016	Stylus steel-ruby M2	10
	2x Part No. K651021	Stylus steel-ruby M2	20
	3x Part No. K651017	Stylus steel-ruby M2	10
	3x Part No. K651022	Stylus steel-ruby M2	20
	2x Part No. K651018	Stylus steel-ruby M2	10
	2x Part No. K651024	Stylus steel-ruby M2	10
	1x Part No. K651025	Stylus steel-ruby M2	11
	1x Part No. K651030	Cylinder stylus steel M2	11
	1x Part No. K651031	Cylinder stylus steel M2	13
	1x Part No. K651032	Cylinder stylus steel M2	20
	1x Part No. K651062	Adaptor M2	7
	1x Part No. K651052	4-way stylus-ruby M2	10
	1x Part No. K651053	5-way stylus-ruby M2	18
	1xPart No. K651054	5-way stylus-ruby M2	30
	1xPart No. K651097	Tip stylus steel M2	15
	1xPart No. K651098	Tip stylus tungsten carbide M2	10
	1x Part No. K651083	Disk stylus steel M2	7,5
	1x Part No. K651084	Disk stylus steel M2	7,5
	1xPart No. K651085	Disk stylus steel - ruby M2	10
	1xPart No. K651090	Hollow ball ceramic M2	11
	1xPart No. K651058	5-way stylus holder M2	7,5
	4xPart No. K651037	Extension steel M2	5
	2x Part No. K651038	Extension steel M2	10
	2x Part No. K651039	Extension steel M2	20
	2xPart No. K651040	Extension steel M2	30
	2x Part No. K651041	Extension steel M2	40
	2x Part No. K651223	Pin spanner ø 1,2 mm	23



Styli Kit M2 Professional



Styli Kit M2 Starter



Styli Kit M3 CRP 1



Styli Kit M3 CRP 2

## Styli Kit M2 Starter

No.	Contents	Description	Length [mm]
K651376	1x Part No. K651012	Stylus steel-ruby M2	10
	1x Part No. K651019	Stylus steel-ruby M2	20
	1x Part No. K651021	Stylus steel-ruby M2	20
	1x Part No. K651022	Stylus steel-ruby M2	20
	1x Part No. K651038	Extension steel M2	10
	1x Part No. K651039	Extension steel M2	20
	2x Part No. K651223	Pin spanner ø 1,2 mm	23

## Styli Kit M3 CRP 1

No.	Contents	Description	Length [mm]
K651318	1x Part No. K651297	Stylus carbon fiber-ruby M3	21
	1x Part No. K651298	Stylus carbon fiber-ruby M3	21
	1x Part No. K651301	Stylus carbon fiber-SiNi M3	21
	1x Part No. K651299	Stylus carbon fiber-ruby M3	31
	1x Part No. K651300	Stylus carbon fiber-ruby M3	40
	1x Part No. K651303	Stylus carbon fiber-ruby M3	50
	1x Part No. K651223	pin spanner ø 1,2 mm	

## Styli Kit M3 CRP 2

No.	Contents	Description	Length [mm]
K651319	1x Part No. K651302	Stylus carbon fiber-ruby M3	21
	1x Part No. K651304	Stylus carbon fiber-ruby M3	21
	1x Part No. K651303	Stylus carbon fiber-ruby M3	50
	1x Part No. K651306	Stylus carbon fiber-ruby M3	50
	1x Part No. K651305	Stylus carbon fiber-ruby M3	75
	1x Part No. K651223	Pin spanner ø 1,2 mm	

# Styli Kits



Styli Kit M3  
Basic

## Styli Kit M3 Basic

No.	Contents	Description	Length [mm]
K651381	1x Part No. K651170	Adaptor steel M3	5
	1x Part No. K651146	Stylus steel-ruby M3	21
	5x Part No. K651147	Stylus steel-ruby M3	21
	1x Part No. K651148	Stylus steel-ruby M3	21
	3x Part No. K651151	Stylus steel-ruby M3	31
	1x Part No. K651152	Stylus steel-ruby M3	33,5
	1x Part No. K651169	5-way stylus holder M3	13
	1x Part No. K651180	swivel steel M3	11,5
	1x Part No. K651172	disc stylus M3	33
	1x Part No. K651174	disc stylus M3	7,5
	1x Part No. K651157	extension steel M3	20
	1x Part No. K651159	extension steel M3	35
	2x Part No. K651223	Pin spanner ø 1,2 mm	23
	1x Part No. K650135	hexagonal screwdriver	



Styli Kit M3  
CRP 3

## Styli Kit M3 CRP 3

No.	Contents	Description	Length [mm]
K651320	1x Part No. K651302	Stylus carbon fiber-ruby M3	21
	1x Part No. K651304	Stylus carbon fiber-ruby M3	21
	1x Part No. K651303	Stylus carbon fiber-ruby M3	50
	1x Part No. K651306	Stylus carbon fiber-ruby M3	75
	1x Part No. K651305	Stylus carbon fiber-ruby M3	100
	1x Part No. K651223	Pin spanner ø 1,2 mm	



Styli Kit M3  
Starter

## Styli Kit M3 Starter

No.	Contents	Description	Length [mm]
K651380	1x Part No. K651146	Stylus steel-ruby M3	21
	1x Part No. K651147	Stylus steel-ruby M3	21
	1x Part No. K651148	Stylus steel-ruby M3	21
	1x Part No. K651151	Stylus steel-ruby M3	31
	1x Part No. K651152	Stylus steel-ruby M3	33,5
	1x Part No. K651157	extension steel M3	20
	1x Part No. K651159	extension steel M3	35
	2x Part No. K651223	Pin spanner ø 1,2 mm	23



Styli Kit M4

## Styli Kit M4

No.	Contents	Description	Length [mm]
K651383	1x Part No. K651184	Stylus ceramic-ruby M4	100
	1x Part No. K651182	Stylus ceramic-ruby M4	50
	1x Part No. K651216	Adaptor ceramic M4/M3	100
	1x Part No. K651215	Adaptor ceramic M4/M3	75
	1x Part No. K651214	Adaptor ceramic M4/M3	50
	1x Part No. K651204	extension ceramic M4	50
	1x Part No. K651203	extension ceramic M4	30
	1x Part No. K651170	Adaptor M3/M2	5
	1x Part No. K651208	Adaptor M4/M3	9
	2x Part No. K650346	Pin spanner	49
	2x Part No. K651223	Pin spanner	23
	1x Part No. K651058	5-way stylus holder M2	7,5
	1x Part No. K651169	5-way stylus holder M3	13
	1x Part No. K651206	5-way stylus holder M4	18
	1x Part No. K651186	Stylus steel-ruby M4	19,5
	4x Part No. K651187	Stylus steel-ruby M4	19
	1x Part No. K651188	Stylus steel-ruby M4	18

StyliCleaner

The integrated solution to clean your probe tip

Reliable? Avoid mismeasurement with the StyliCleaner

Put an end to the risk of wrong measuring data caused by a polluted stylus!

Mitutoyo Styli Cleaner The automated solution to remove dust or chip from coordinate measuring machines' styli. The StyliCleaner automatically cleans your probe tip - even during the measurement process. In as little as 30 seconds a combination of compressed air and detergent reliably removes all dirt from the sensor. The StyliCleaner not only sets an end to the hassle of manual cleaning but also to the time-consuming recalibration of all probe angles that follows it. As a result, StyliCleaner dramatically increases the efficiency and reliability of your quality assurance!

Developed by a Mitutoyo application engineer together with one of his customers, only with a prototype, has shown exceptional results from the beginning. Also, other customers did tests and were happily surprised by the results. Especially there were production measurements and SPC were involved. That's why in every Metrology course it is mentioned: Clean the part, the fixture and the styli.

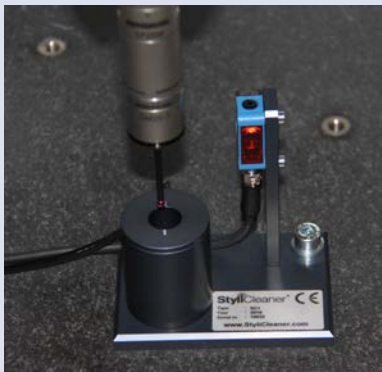


Polluted Styli tip



Cleaned Styli tip

No.	Model	Remarks
63AAA102	SC1	For straight styli only



StyliCleaner always Reliable and Clean Stylus



# CMM Fixtures

## eco-fix CMM fixtures Series

### Mitutoyo eco-fix CMM fixtures Series – Experience in Accuracy

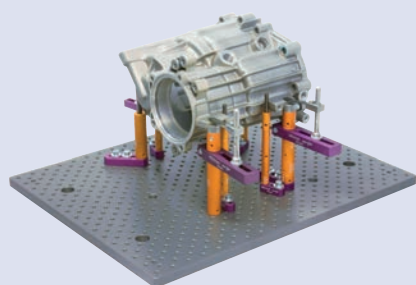
Mitutoyo fixture kits series “eco-fix” is a very fast and affordable solution to get workpieces clamped on the measuring machine. In just a few minutes, your fixture is ready for measurement.

Therefore, eco-fix is a very attractive alternative to customised jigs.

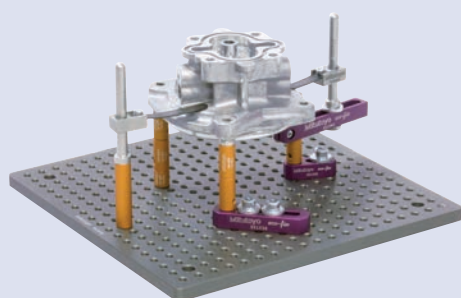
The modular clamping system for CMM and form measuring machines, eco-fix, allows relaxed working in many ways. For the first time, functions and colours are conjoint in a practice-oriented concept for time-saving economical working and confusion-proof handling.

Clear optical differentiation of elements by colour

- Black: base plate
- Violet: brackets
- Orange: build up components
- Silver: Top pieces for workpiece support



Workpiece set up on eco-fix base plate



Fixtures leaflet PRE 1403



# CMM Fixtures

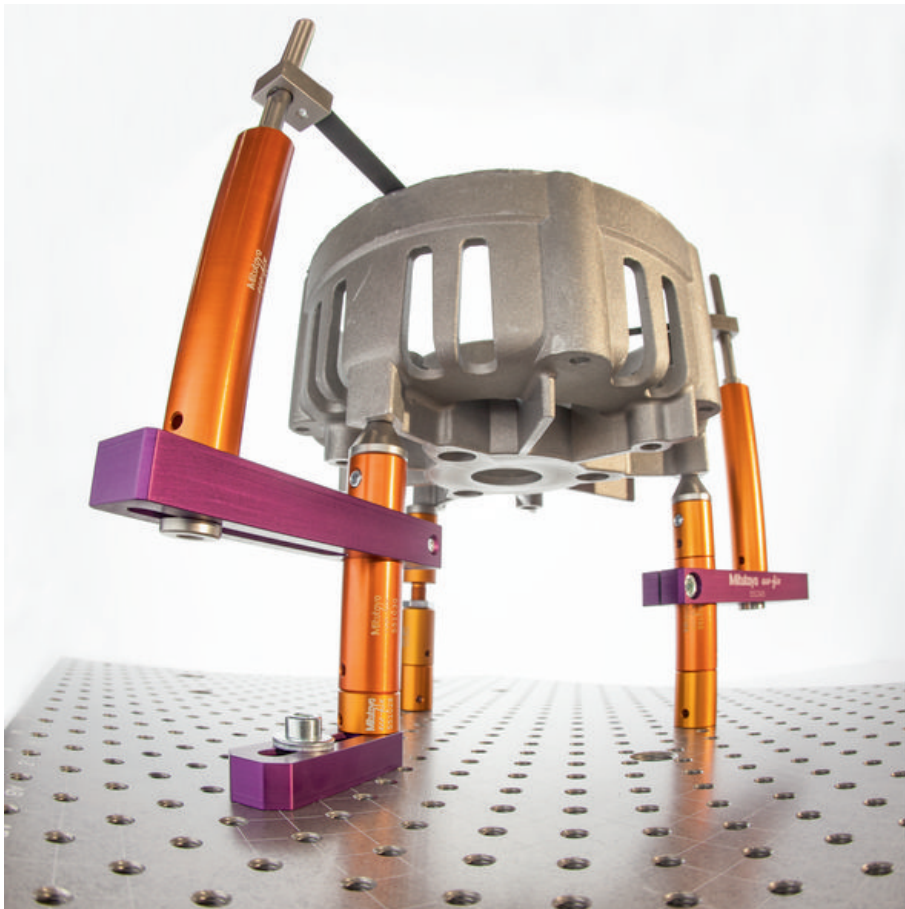
## eco-fix CMM fixtures Series

An easy way to document your repeatable fixture set-up for reduced variation:

- Parts numbers featured on all elements for easy identification of components
- Alpha numeric grid pattern on all base plates for simplified positioning and relocation of elements
- Fits all CMM brands
- Build your individual fixture in only 20 minutes!
- Flexible modular systems
- Fast & affordable
- Suitable for various different workpieces or other measuring equipment
- Easy adaption to product changes
- M6 thread pattern
- Purchase one kit for each workpiece

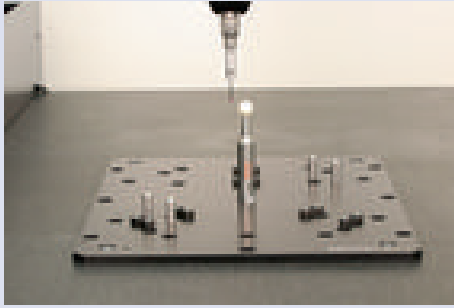
The major advantage of eco-fix is that – in contrast to conventional solutions – no additional joints are required due to the state-of-the-art construction. These are the ideas that count in a daily job routine and make eco-fix noticeably better priced than similar systems – without saving on performance and versatility.

The results are systematic efficiency at compelling profitability and considerably reduced costs at enormous versatility.



## CMM Fixtures

### Mitutoyo eco-fix pallet receiver system

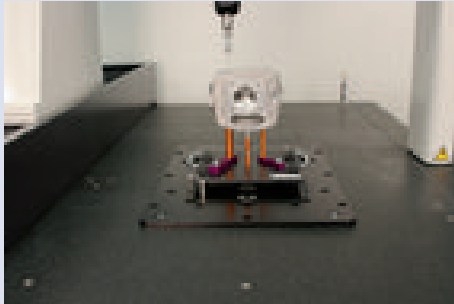


Receiver pallet and master ball on the granite

The affordable new manual pallet receiver system is perfectly suitable where workpiece throughput shall be boosted although fully automated solutions are not feasible or beyond budget. It significantly speeds up measuring on coordinate measuring machines.

Just a few of the systems strong points:

- Easy, precise and fast repositioning
- Enhances semi-automatic serial CMM measurement
- Significantly higher measurement throughput
- Stowing rack for perfect workshop tidiness.



Base pallet and fixtured workpiece in measurement position

In combination with the well-known eco-fix system, you get the most out of CMM measurement. The pallet system comprises the tried and tested Mitutoyo eco-fix system, a base plate with two handles and three semi-spheres on the bottom. The latter help the measuring staff with quickly and precisely positioning the pallet on the receiver frame fixed to the measuring machine – in just one step. This way, fine-adjusting of the position is a thing of the past.

During the measuring process another workpiece can be positioned on a second, identically equipped pallet and placed on the machine as soon as the first workpiece has been measured. This not only guarantees very quick measurement and – as a consequence – a high workpiece throughput but also top process safety.

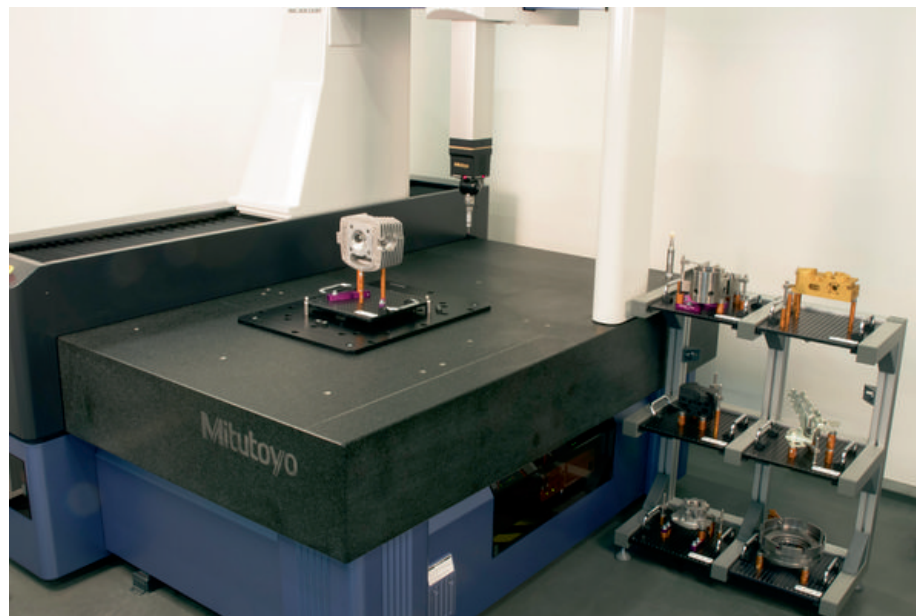
Mitutoyo offers a rack system that can hold up to six pallets that can be placed close to the CMM. It will hold the Fixtures prepared for the next measurement. For perfect tidiness in the measuring room and stowing away pallets that are currently not in use Mitutoyo offers customized racks system that can hold all of your fixture pallets, even when equipped with fixtures and workpieces. That way, you can build up a fixture archive for all your parts with a repetitive measurement schedule.



Start measurement process



Fixtures leaflet PRE 1403





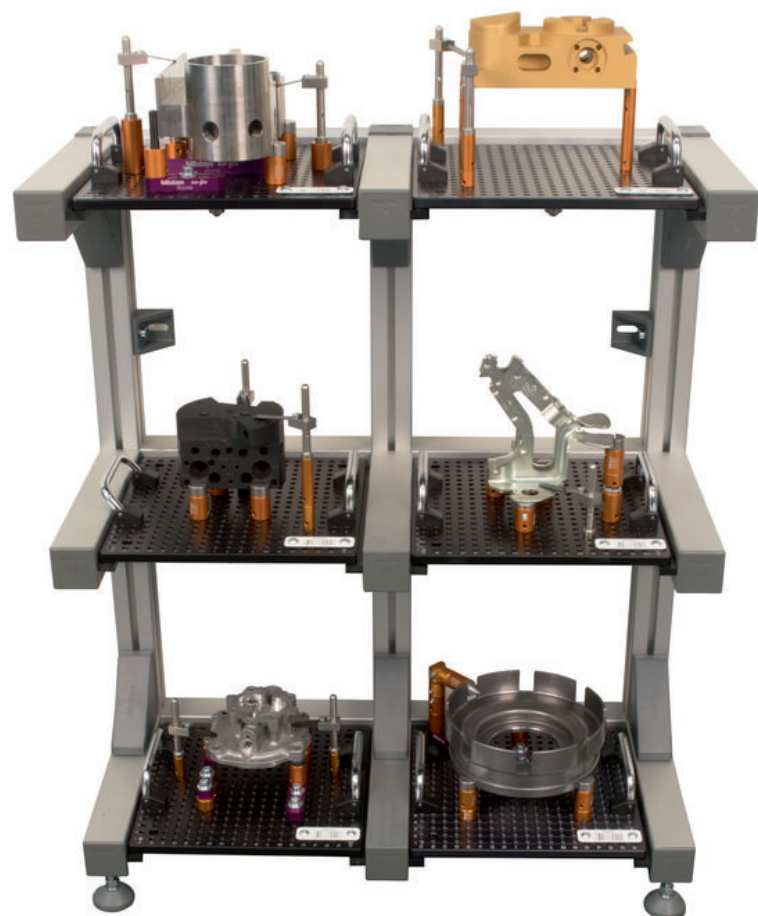
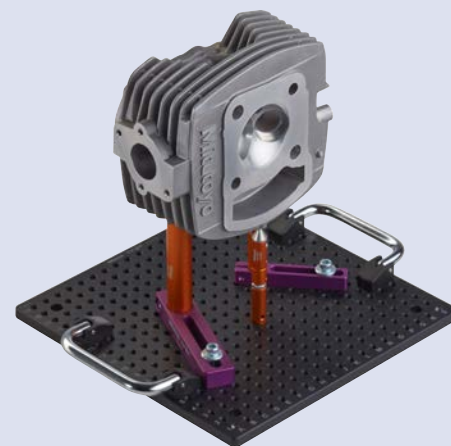
## CMM Fixtures



eco-fix kits available in many configurations.



Pallet receiver base and handles



Eco-fix storage rack with fixtured workpieces

# CMM Fixtures

## FixtureBuilder Software

The free of charge software FixtureBuilder enables the user to easily plan and set up his CMM fixture in just a few minutes. Repeatable fixturing has never been easier and at a better price performance ratio.

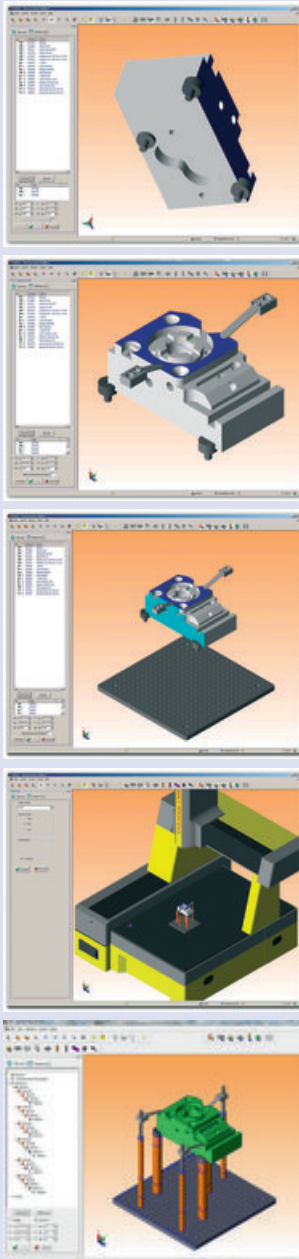
"FixtureBuilder" is a software tool that allows users to create virtual clamping fixtures quickly and easily. Users can choose whether to set the virtual fixture up manually or to allow the software's "AutoMode" to perform the task.

The interactive "AutoMode" operating mode guides the user step by step to a finalized clamping fixture. Only very few data need to be input, for example the choice of component to be clamped or the position and type of contact and tensioning points. This data is sufficient to enable FixtureBuilder to independently create a complete clamping fixture.

- Fixture building by mouse click
- Ideal for online programming
- Parts list with material overview
- Documented structure
- Automatic weight determination
- allows data to be imported in Acis (\*.sat), Iges (\*.igs) and Step (\*.stp) formats

FixtureBuilder software allows data to be imported in Acis (\*.sat), Iges (\*.igs) and Step (\*.stp) formats. The export functions it offers include Hoops file (\*.hsf), Autodesk (\*.dwf), 3d PDF (\*.pdf) and Acis Files (\*.sat). Integrated into Mitutoyo's MCOSMOS CMM software, FixtureBuilder allows data to be processed in all MCOSMOS import formats. The fixture design can be imported into the measuring software, either on its own or complete with component, and thus be used for offline programming of the coordinate measuring machine.

A parts list with assembly instructions is available in various output formats for the assembly of the real fixture created in FixtureBuilder. The 3-D function in PDF format is especially practical as it allows limitless variations on the view of the fixture model in the PDF document. The virtual design can therefore be examined from all possible views and positions.

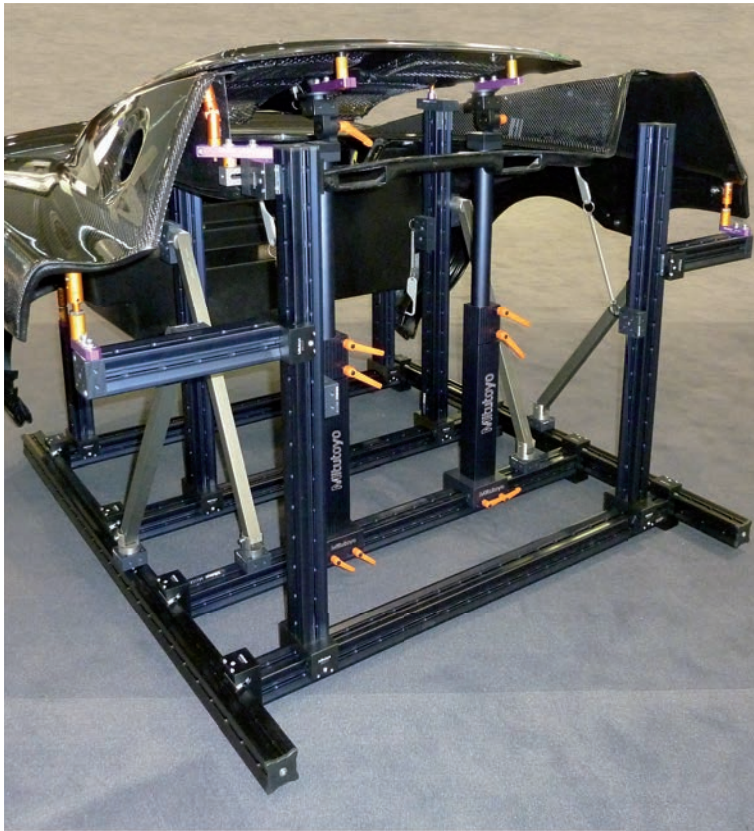




# CMM Fixtures

## VARI-FIX

- flexible RST profiles
- fully height-adjustable
- rotative parts allow 360° positioning
- combinable with all eco-fix parts



## CMM Enclosures

Protect your investment for contamination, improve reliability of measurements and reduce maintenance costs. Mitutoyo's Inspection Enclosures are designed to help keep your CMMs and instruments free of airborne contamination.

### Features and benefits:

- Standard fans create positive pressure inside the enclosure to exclude airborne contaminants, increase reliability of measurements and reduce CMM maintenance costs.
- Air-conditioning option is available to add temperature control to the clean air environment.
- Enclosed volume provides greatly improved working conditions for intricate inspection operations.
- Double doors fold back enabling easy access for part loading.
- Modular Design with removable panels enables easy construction around existing machines, straightforward relocation (if required) and assists in annual CMM servicing.
- Enclosures are robustly built to withstand the demands of a busy shopfloor manufacturing facility.
- Transparent, polycarbonate, easy-clean panels pass sufficient light for normal use and are shatterproof, tough and durable.
- Clean, functional design enhances the appearance of your CMMs.

### Technical details:

- Framework fabricated from extruded aluminium.
- Lower panels made from PVC - available in a variety of colours
- Upper panels in clear polycarbonate.



**Manual 2D Vision Measuring Systems Quick Image**  
**Page 589**



**Manual 3D Vision Measuring Systems Quick Scope**  
**Page 591**



**3D CNC Vision Measuring Systems Quick Vision**  
**Page 593**



**3D CNC Multisensor Measuring Systems Quick Vision**  
**Page 599**



**MiScan Vision System**  
**Page 603**



**3D CNC Measuring Systems for Micro Geometries**  
**Page 604**



**Software for Quick Vision Systems**  
**Page 606**



**Accessories for Vision Systems**  
**Page 608**



## Quick Image

### Specifications

Measuring Mode	High-resolution mode and Normal mode
Optical system working distance	90 mm
Optical system depth of focus	<b>High-resolution mode :</b> ±0,6 mm (QI-A, QI-B and QI-C) <b>Normal mode :</b> ±11 mm (QI-A and QI-C) ±1,8 mm (QI-B)
Accuracy <sup>(1)</sup>	$E_{1(x,y)} = \pm(3,5+0,02L) \mu\text{m}$ L = measured length (mm) <sup>(1)</sup> According to Mitutoyo inspection method
Optical system magnification	<b>QI-A and QI-C models :</b> 0,2X <b>QI-B models :</b> 0,5X
CCD camera	3 Megapixels colour CCD camera
Illumination	- Contour LED - Coaxial LED - 4-quadrant LED ring light

### Optional accessories

No.	Description
937179T.	Footswitch
12AAJ088.	Reinforced footswitch

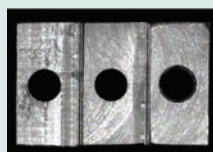


Image of a stepped block using the double telecentric objective showing the orthographic view produced.

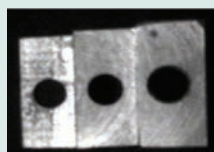


Image of the same object using a standard objective



Refer to the Quick Image brochure

The ultimate in simple operation with **one click measurement**.

This non-contact 2D vision measuring system brings you a new concept in 2D vision measuring instruments. It offers several unique features to improve the efficiency of your measurements, including:

- Long focal depth and wide field of view.
- Double telecentric optical system.
- 3Mega-pixel colour camera.
- Four-quadrant LED ring light.
- Motorized stage models provide highest measurement efficiency.



QI-A 4020D



QI-C 2017D

### QI-A models, 0,2x Magnification, Manual stage

Model	QI-A1010D	QI-A2010D	QI-A2017D	QI-A3017D	QI-A4020D
No.	361-850A	361-851A	361-852A	361-853A	361-854A
Travelling range X-, Y-axis [mm]	100 x 100	200 x 100	200 x 170	300 x 170	400 x 200
Travelling range Z-axis [mm]	100	100	100	100	100
Stage glass size [mm]	170 x 170	242 x 140	260 x 230	360 x 230	440 x 232
Max. stage loading kg	10	10	20	20	15
Mass kg	65	69	150	158	164

### QI-B models, 0,5x Magnification, Manual stage

Model	QI-B1010D	QI-B2010D	QI-B2017D	QI-B3017D	QI-B4020D
No.	361-855A	361-856A	361-857A	361-858A	361-859A
Travelling range X-, Y-axis [mm]	100 x 100	200 x 100	200 x 170	300 x 170	400 x 200
Travelling range Z-axis [mm]	100	100	100	100	100
Stage glass size [mm]	170 x 170	242 x 140	260 x 230	360 x 230	440 x 232
Max. stage loading kg	10	10	20	20	15
Mass kg	65	69	150	158	164

### QI-C models, 0,2x Magnification, Motorized stage

Model	QI-C2010D	QI-C2017D	QI-C3017D
No.	361-860A	361-861A	361-862A
Travelling range X-, Y-axis [mm]	200 x 100	200 x 170	300 x 170
Travelling range Z-axis [mm]	100	100	100
Stage glass size [mm]	242 x 140	260 x 230	360 x 230
Max. stage loading kg	10	20	20
Mass kg	72	153	161

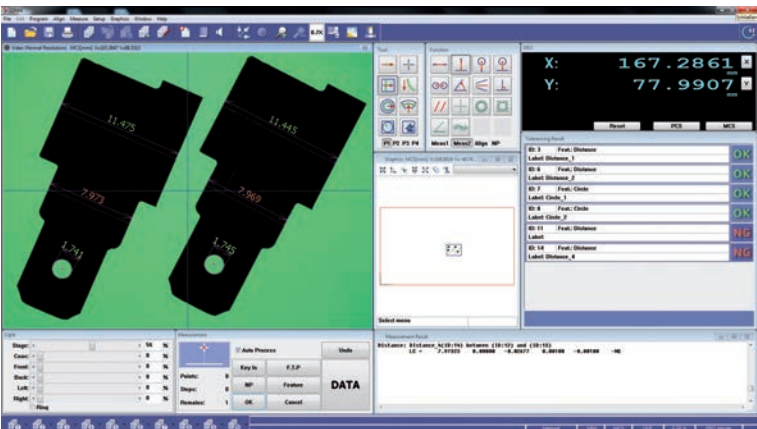


# Software for Quick Image Systems

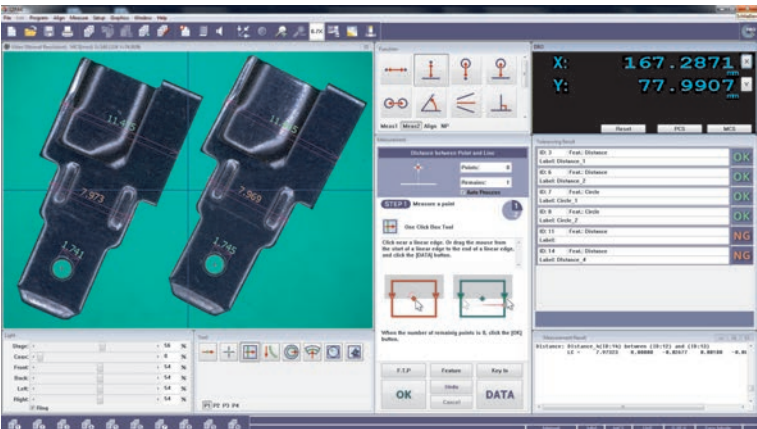
## QIPAK

- One click measurement with QUICK GO / NG decision
- Single mouse-click edge-detection tools; very easy to use.
- Template tools for comparative analysis.
- Video image capture.
- Stage navigation function gives improved measurement cycles.
- Image stitching provides wide area measurement.

No.	Type
QIPAK	Software for Quick Image Systems



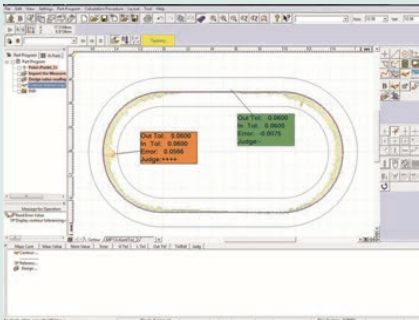
Example 1 screen layout QIPAK



Example 2 screen layout QIPAK

## Specifications

QIPAK	MEASURLINK
Additional software (optional)	(refer to the Measurlink page)
	QS CAD-IMPORT/EXPORT
	FORMTRACEPAK-AP <sup>(1)</sup>



<sup>(1)</sup> FORMTRACEPAK-AP

Simple and easy-to-use 2D contour analysis.  
Graphic reports (geometry or scanning) edition.  
Allows measurement by comparison.  
For more information refer to FORMTRACEPAK-AP.



# Manual Quick Scope QS-L Series

## Specifications

Accuracy <sup>(1)</sup>	$E_{1(x,y)} = (2,2 + 0,02L) \mu m$ $E_{1(z)} = (4,5 + 0,006L) \mu m$ L=measured length (mm) <sup>(1)</sup> According to Mitutoyo inspection method
Illumination	- Contour: White LED - Coaxial: White LED - Ring Light: 4-quadrant White LED

## Optional accessories

No.	Description
937179T.	Footswitch
12AAJ088.	Reinforced footswitch
02ATN695.	Calibration chart with holder
02AVA410	Z-Objective 1X
02AVA450	Z-Objective 2X

Refer to the Optical Accessories page for Quick Scope / Quick Vision for more information on calibration charts.



1X, 1.5X and 2X interchangeable lens



Quick Scope brochure on request

## Series 359

This manual vision measuring system is an excellent surface observation system which you can use on a wide variety of workpieces.

The Quick Scope offers you the following benefits:

- 0,1  $\mu m$  resolution and 150 mm Z-axis range.
- Power zoom enabling you to change magnification change quickly and easily.
- Fine illumination capability enabling you to change lighting to match your workpiece requirements.
- A quick release system on the stage, so you can switch instantly between coarse and fine movement.
- Quick navigation function allowing you to repeat measurements quickly.
- Motorized Z-axis enables fast and accurate Auto Focus.



## QS-L Z/AFC models

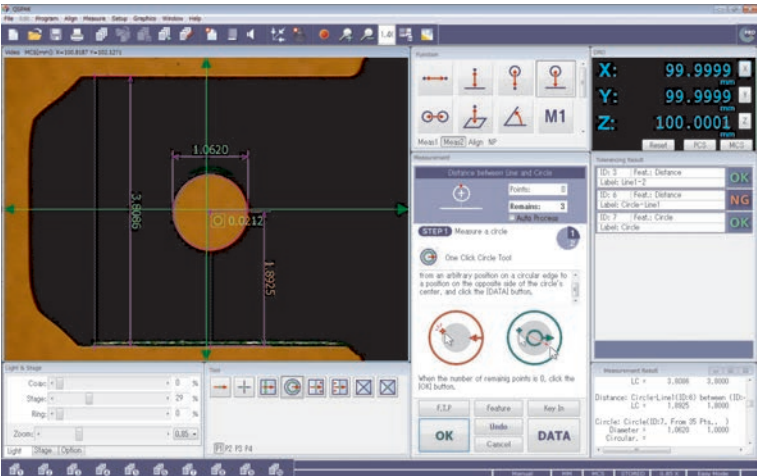
Model	QS-L2010Z/AFC	QS-L3017Z/AFC	QS-L4020Z/AFC
No.	359-713-10	359-714-10	359-715-10
Sensor type	Colour CMOS 3 Megapixels	Colour CMOS 3 Megapixels	Colour CMOS 3 Megapixels
AF (motorized Z-axis)	Yes	Yes	Yes
Objective lens	Zoom type	Zoom type	Zoom type
Travelling range X-, Y-axis [mm]	200 x 100	300 x 170	400 x 200
Travelling range Z-axis [mm]	150	150	150
Magnification (optical system)	0,75X -> 5,25X with 1,5X objective	0,75X -> 5,25X with 1,5X objective	0,75X -> 5,25X with 1,5X objective
Z-axis measurement	Motorized with AF	Motorized with AF	Motorized with AF
Max. stage loading kg	10	20	15
Mass kg	70	160	167

# Software for Quick Scope Systems

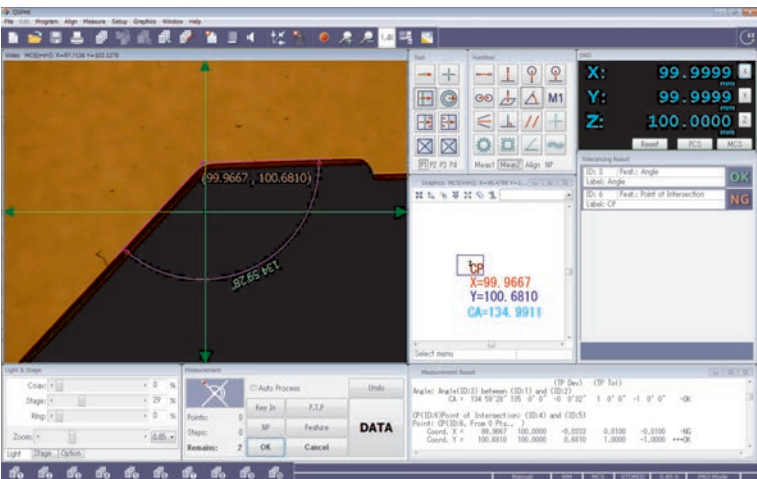
## QSPAK

- Easy to use, single mouse-click edge-detection tools
- Template tools for comparative analysis.
- Video image capture.
- Stage navigation function for CNC machines giving you improved measurement cycles.

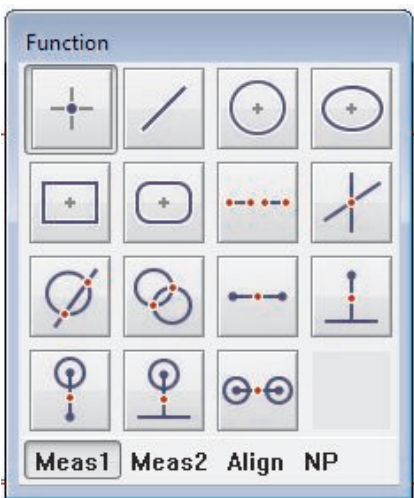
No.	Type
QSPAK	Software for Quick Scope systems



QSPAK Layout: Easy mode



QSPAK Layout: Pro mode

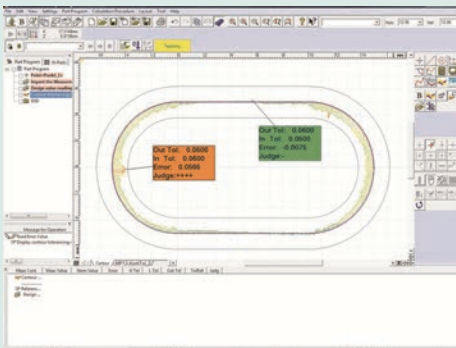


Measurement item commands



## Specifications

QIPAK	MEASURLINK
Additional software (optional)	(refer to the Measurlink page)
	QS CAD-IMPORT/EXPORT
	FORMTRACEPAK-AP <sup>(1)</sup>



<sup>(1)</sup> FORMTRACEPAK-AP

Simple and easy-to-use 2D contour analysis.  
Graphic reports (geometry or scanning) edition.  
Allows measurement by comparison.  
For more information refer to FORMTRACEPAK-AP

# Quick Vision ACTIVE Series

## Series 363

This CNC Vision Measuring System combines the flexibility of a high quality zoom lens with the speed of a state-of-the-art digital colour camera and offers the following benefits:

- Programmable LED stage and coaxial light
- Programmable 4-quadrant LED ring light
- High-resolution and high-speed CMOS colour camera
- High-quality 7-step zoom optics with interchangeable lenses
- Compact design
- Powerful, user-friendly QVPAK software
- Touch probe option: 364 Series or retrofit.



Quick Vision ACTIVE 404

No.	Type	Accuracy	Model	Range (X, Y, Z-axis) with Vision Head	Max. stage loading [kg]	Mass [kg]
363-109-10Y	QV ACTIVE 202	$E_{1(x,y)} = (2+0,3L/100) \mu m$ $E_{1(z)} = (3+0,5L/100) \mu m$ $E_{2(xy)} = (2,5+0,4 L/100) \mu m$ L = measured length (mm)	QV-L202Z1L-D	250 x 200 x 150 mm	10	155
363-110-10Y	QV ACTIVE 404	$E_{1(x,y)} = (2+0,3L/100) \mu m$ $E_{1(z)} = (3+0,5L/100) \mu m$ $E_{2(xy)} = (2,5+0,4 L/100) \mu m$ L = measured length (mm)	QV-L404Z1L-D	400 x 400 x 200 mm	20	324

Accuracy: According to Mitutoyo inspection method / Mass: Main Unit with Stand

## Specifications

Resolution	0,1 $\mu m$
Illumination	(White LED) • Contour • Coaxial • 4-quadrant ring light
Magnification change system	Zoom optical system with 8 positions Standard 1,5X magnification lens
Sensor type	High resolution CMOS colour camera
Additional objective lenses	1X and 2X magnification

## Optional accessories

No.	Description
02ATN695	Calibration Chart, Pixel Calibration Chart with Holder
02ATV522	Machine Stand QVST-4L
02ATV515	Machine Stand QVST-2L
02AVA410	Z-Objective 1X
02AVA450	Z-Objective 2X



QV ACTIVE with optional Opti-fix clamping system



1X, 1,5X and 2X interchangeable lens

# Quick Vision APEX / HYPER Series

## Series 363

This CNC Vision Measuring System is a floor-standing vision measuring machine which offers you the following benefits:

- Programmable LED stage and coaxial lighting.
- Programmable 4-quadrant LED ring light.
- Pattern focus function.
- Accuracy specifications conforming to ISO 10360-7 standard (on request).
- Temperature compensation as standard feature.
- Touch probe option: 364 Series or retrofit

### Optional PFF Function (Points From Focus)

- PFF enhances the functionality of standard QV models with 3D topography measurements
- No additional sensor necessary
- High scanning range in Z axis from 2,7 mm up to 40,6 mm depending on the objective lens in use and in wide range mode

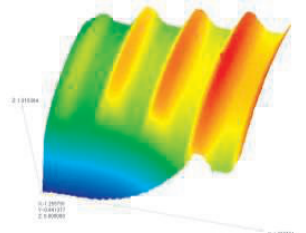


Touch Probe option

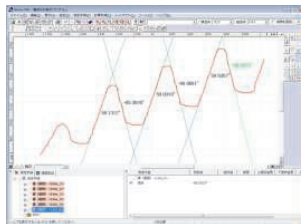
Quick Vision Apex 302 PRO



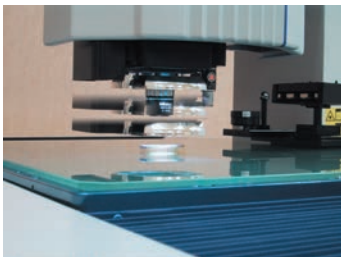
Workpiece to be measured with PFF



3D Analysis of PFF measurement



2D Analysis of PFF measurement



PRL = Programmable Ring Light

Fine control of angle and direction provides illumination for optimal measurement. You can set the angle in the range from 30° to 80°. This type of illumination is effective for enhancing the edge of inclined surfaces or very small steps. Illumination can be controlled independently from back or front, right or left. Measurement with edge enhancement is possible if you form a shadow by illuminating from only one direction.

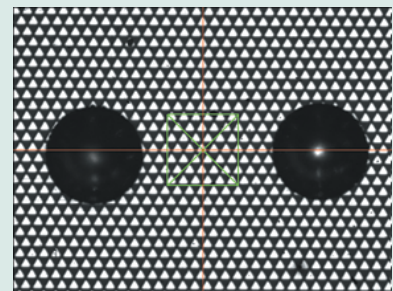
### Specifications

Illumination	<b>White LED:</b> <ul style="list-style-type: none"><li>- Contour</li><li>- Coaxial</li><li>- 4 quadrant PRL</li></ul>
	Programmable Power Turret (PPT) 1X ; 2X ; 6X
Magnification change system	
Sensor Type	<b>QV PRO Models:</b> High sensitivity CCD B&W camera
	<b>QV PRO3 Models:</b> High sensitivity CCD Colour camera
Factory option	<b>For QV APEX and QV HYPER:</b> - TAF Tracking Auto Focus
	<b>For QV APEX:</b> - PRO 3 models Colour CCD camera
	Refer to the Quick Vision Accessories page for details
Additional objective lenses	Refer to the Optical Accessories page for Quick Scope / Quick Vision

### Optional accessories

No.	Description
<b>Calibration charts</b>	
02ATN695.	Calibration chart with holder
<b>Machine stands</b>	
02ATN332.	Machine Stand for QV-302
02ATN333.	Machine Stand for QV-404
02ATN334.	Machine Stand for QV-606

Refer to the Optical Accessories page for Quick Scope / Quick Vision for more information on calibration charts.



Auto Focus Tool : type Pattern Focus  
(tool for focusing on difficult surfaces such as mirrors, polished surface clear glass).



Refer to the Quick Vision brochure



# Quick Vision APEX / HYPER Series



Quick Vision brochure on request



Scan QR Code with your mobile device and watch our product videos on YouTube

## Series 363 - Quick Vision APEX / HYPER

Quick Vision 302  
Range : 300 x 200 x 200 mm

Type	Quick Vision APEX 302 PRO	Quick Vision APEX 302 PRO3	Quick Vision HYPER 302 PRO
No.	363-170-10SY	363-171-10Y	363-173-10SY
Model	QV-X302P1L-D	QV-X302P3L-D	QV-H302P1L-D
Resolution $\mu\text{m}$	0,1	0,1	0,02
Accuracy <sup>(1)</sup>	$E_{1(x,y)} = (1,5+0,3L/100)$ $E_{1(z)} = (1,5+0,4L/100)$ $E_{2(xy)} = (2+0,4L/100)$	$E_{1(x,y)} = (1,5+0,3L/100)$ $E_{1(z)} = (1,5+0,4L/100)$ $E_{2(xy)} = (2+0,4L/100)$	$E_{1(x,y)} = (0,8+0,2L/100)$ $E_{1(z)} = (1,5+0,2L/100)$ $E_{2(xy)} = (1,4+0,3L/100)$
Max. stage loading kg	20	20	15
Mass kg	360	360	360

Quick Vision 404  
Range : 400 x 400 x 250 mm

Type	Quick Vision APEX 404 PRO	Quick Vision APEX 404 PRO3	Quick Vision HYPER 404 PRO
No.	363-180-10SY	363-181-10Y	363-183-10SY
Model	QV-X404P1L-D	QV-X404P3L-D	QV-H404P1L-D
Resolution $\mu\text{m}$	0,1	0,1	0,02
Accuracy <sup>(1)</sup>	$E_{1(x,y)} = (1,5+0,3L/100)$ $E_{1(z)} = (1,5+0,4L/100)$ $E_{2(xy)} = (2+0,4L/100)$	$E_{1(x,y)} = (1,5+0,3L/100)$ $E_{1(z)} = (1,5+0,4L/100)$ $E_{2(xy)} = (2+0,4L/100)$	$E_{1(x,y)} = (0,8+0,2L/100)$ $E_{1(z)} = (1,5+0,2L/100)$ $E_{2(xy)} = (1,4+0,3L/100)$
Max. stage loading kg	40	40	30
Mass kg	579	579	579

Quick Vision 606  
Range : 600 x 650 x 250 mm

Type	Quick Vision APEX 606 PRO	Quick Vision APEX 606 PRO3	Quick Vision HYPER 606 PRO
No.	363-190-10SY	363-191-10Y	363-193-10SY
Model	QV-X606P1L-D	QV-X606P3L-D	QV-H606P1L-D
Resolution $\mu\text{m}$	0,1	0,1	0,02
Accuracy <sup>(1)</sup>	$E_{1(x,y)} = (1,5+0,3L/100)$ $E_{1(z)} = (1,5+0,4L/100)$ $E_{2(xy)} = (2+0,4L/100)$	$E_{1(x,y)} = (1,5+0,3L/100)$ $E_{1(z)} = (1,5+0,4L/100)$ $E_{2(xy)} = (2+0,4L/100)$	$E_{1(x,y)} = (0,8+0,2L/100)$ $E_{1(z)} = (1,5+0,2L/100)$ $E_{2(xy)} = (1,4+0,3L/100)$
Max. stage loading kg	50	50	40
Mass kg	1450	1450	1450



Quick Vision Apex 404 PRO



# Quick Vision STREAM PLUS Series

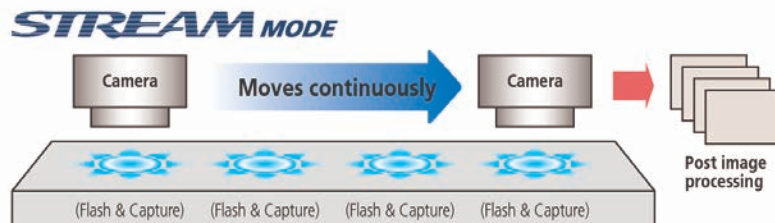
## Series 363

This CNC vision measuring system enables you to carry out measurements at lightning speed. The Quick Vision Stream Plus offers you the following benefits:

- Non-stop measurement in your production environment thanks to high-tech lighting options.
- Combining quadricolour and stroboscopic lighting, it captures and processes all the workpiece images you need to make accurate and rapid measurements.



Quick Vision STREAM PLUS 606 PRO



### STREAM Mode

- The measurement mode of non-stop vision measuring is referred to as the STREAM mode.

Type	Quick Vision STREAM PLUS 302	Quick Vision STREAM PLUS 404	Quick Vision STREAM PLUS 606
No.	363-172-10Y	363-182-10Y	363-192-10Y
Model	QV-X302P15-D	QV-X404P15-D	QV-X606P15-D
Range (X, Y, Z-axis) with Vision Head	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Max. measuring speed	40 mm/s	40 mm/s	40 mm/s
Max. drive speed (X-, Y-, Z-axis)	300 mm/s	XY : 400 mm/s Z : 300 mm/s	XY : 400 mm/s Z : 300 mm/s

Other features are identical to QV-APEX

## Specifications

Resolution	0,1 µm
CCD camera	High-sensitivity B&W, progressive scan CCD
Accuracy <sup>(1)</sup>	$E_{1(x,y)} = (1,5+0,3L/100) \mu m$ $E_{1(z)} = (1,5+0,4L/100) \mu m$ $E_{2(x,y)} = (2+0,4L/100) \mu m$ L = measured length (mm) <sup>(1)</sup> According to Mitutoyo inspection method
Illumination	Hi-intensity LED (stroboscopic and continuous illumination, switchable) : - Contour (Blue) - Coaxial (RGB & W) - 4-quadrant PRL (RGB & W) (PRL : refer to the QV-ELF page)
	Pattern focus function (Pattern focus : refer to the QV-ACCEL page)

## Additional Specifications

Factory option	- Tracking Auto Focus (TAF) (Refer to Quick Vision Accessories for details)
Additional objective lenses	Refer to the Optical Accessories page for Quick Scope / Quick Vision

## Optional accessories

No.	Description
<b>Calibration charts</b>	
02ATN695.	Calibration chart with holder
<b>Machine stands</b>	
02ATN332.	Machine Stand for QV-302
02ATN333.	Machine Stand for QV-404
02ATN334.	Machine Stand for QV-606

Refer to the Optical Accessories page for Quick Scope / Quick Vision for more information on calibration charts.



Non-stop vision measurement



Refer to the Quick Vision brochure



Scan QR Code with your mobile device and watch our product videos on YouTube

# Quick Vision ACCEL Series

## Specifications

Resolution	0,1 µm
High-sensitivity CCD camera	<b>PRO models</b> : B&W <b>PRO3 models</b> : Colour
Contour illumination	<b>PRO models</b> : White LED <b>PRO3 models</b> : White LED
Coaxial illumination	<b>PRO models</b> : White LED <b>PRO3 models</b> : White LED
4-quadrant PRL (1) illumination	<b>PRO models</b> : White LED <b>PRO3 models</b> : White LED (1) PRL : refer to the QV APEX
Pattern Focus (2)	<b>(2) See image below</b>
Magnification change system	Programmable Power Turret (PPT) 1X ; 2X ; 6X

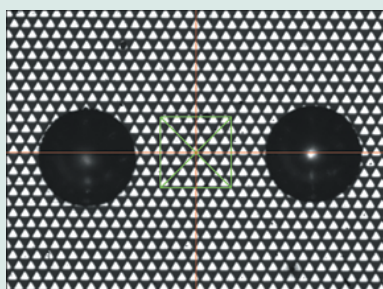
## Additional Specifications

Additional objective lenses	Refer to the Optical Accessories page for Quick Scope / Quick Vision
Factory option	- <b>Tracking Auto Focus (TAF)</b> Refer to Quick Vision accessories

## Optional accessories

No.	Description
02ATN695.	Calibration chart with holder

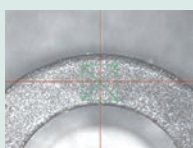
Refer to the Optical Accessories page for Quick Scope / Quick Vision for more information on calibration charts.



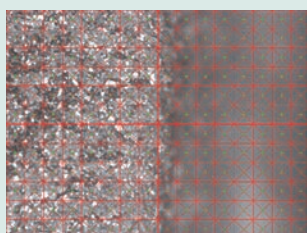
**Auto Focus Tool : type Pattern Focus** (focusing for option difficult surfaces such as mirrors, polished surface clear glass).



**Auto Focus Tool : Edge Focus type**



**Auto Focus Tool : Surface Focus type**



**Auto Focus Tool : Multi-point Auto Focus type**



Quick Vision brochure on request

## Series 363

This CNC vision measuring system is a moving-bridge type structure.

The Quick Vision ACCEL offers you the following benefits:

- The moving-bridge type structure results in a fixed stage. This means that the workpiece fixture can be designed more simply, which in turn means you need significantly fewer man-hours for fixture fabrication and inspection.
- The system comes complete with a machine stand.
- 3D topography measurements are possible with the optional PFF functionality.
- Touch probe option: 364 Series or retrofit
- Tracking Auto Focus (TAF) as factory option.



**Touch Probe option**



**Quick Vision ACCEL 1212 PRO3**

Model PRO	QV ACCEL 808 PRO	QV ACCEL 1010 PRO	QV ACCEL 1212 PRO	QV ACCEL 1517 PRO3
<b>No.</b>	<b>363-315-10Y</b>	<b>363-335-10Y</b>	<b>363-355-10Y</b>	<b>363-375-10Y</b>
Model PRO3	QV ACCEL 808 PRO3	QV ACCEL 1.010 PRO3	QV ACCEL 1.212 PRO3	QV ACCEL 1.517 PRO3
<b>No.</b>	<b>363-316-10Y</b>	<b>363-336-10Y</b>	<b>363-356-10Y</b>	<b>363-376-10Y</b>
Range (X, Y, Z-axis) with Vision Head	800 x 800 x 150 mm	1000 x 1000 x 150 mm	1250 x 1250 x 100 mm	1500 x 1750 x 100 mm
Max. drive speed X, Y-axis mm/s	400	400	300	300
Accuracy E1(x,y) (3)	(1,5+0,3L/100) µm	(1,5+0,3L/100) µm	(2,2+0,3L/100) µm	(2,2+ 0,3L/100) µm
Stage glass size [mm]	883 x 958	1186 x 1186	1440 x 1440	1714 x 1968
Max. stage loading kg	10	30	30	30
Mass kg	2050	2950	3600	4500

(3) According to Mitutoyo inspection method L = measured length (mm)  
For a description of PRO and PRO3 models, refer to QV-APEX

# Quick Vision ULTRA

## Series 363

This CNC vision measuring system gives you ultra-high accuracy. The Quick Vision ULTRA offers you the following benefits:

- Axial translation straightness is maximised through the use of a precision air-bearing linear guide system.
- High resolution (0,01 µm) scales, manufactured at an ultra-precision facility located 11 m underground, are used on all axes.
- The scales are made from glass that has a virtually zero thermal expansion coefficient, so your measuring accuracy has minimal variation in changing temperatures.
- The base structure was designed using Finite Element Method analysis; this gives you the optimal stiffness/weight ratio combined with excellent geometrical stability, in terms of axial straightness/ perpendicularity, with changing temperatures.
- Accuracy specification conforming to ISO 10360-7 are available (on request).
- 3D topography measurements are possible with the optional PFF functionality.



Quick Vision ULTRA 404 PRO

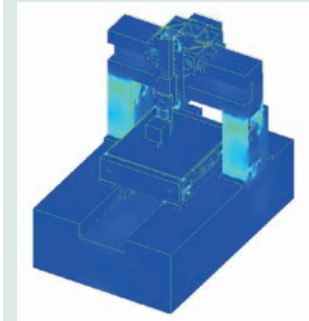
Type	Quick Vision ULTRA 404 PRO
No.	363-518-10SY
Model	QV-U404P1N-D
Range (X, Y, Z-axis) with Vision Head	400 x 400 x 200 mm
Accuracy <sup>(1)</sup>	$E_{1(x,y)} = (0,25+0,1L/100) \mu\text{m}$ $E_{1(z)} = (1,5+0,2L/100) \mu\text{m}$ $E_{2(xy)} = (0,5+0,2L/100) \mu\text{m}$ L = measured length (mm)
Resolution µm	0,01
Magnification change system	Programmable Power Turret (PPT) 1X ; 2X ; 6X
Dimensions (W x D x H) <sup>(2)</sup> mm	1.172 x 1.735 x 1.910
CCD camera	High-sensitivity CCD B&W
Max. drive speed (X-, Y-, Z-axis)	150 mm/s
Illumination	Halogen (Cold light via optical fibre) - Contour - Coaxial - 4-quadrant PRL (PRL : refer to the QV-APEX page)
Max stage loading [kg]	40
Stage glass size [mm]	493 x 551
Mass <sup>(2)</sup> kg	2150

<sup>(1)</sup> According to Mitutoyo inspection method.

<sup>(2)</sup> Including machine stand

## Additional Specifications

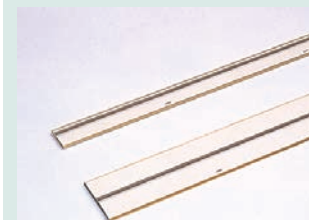
Factory option	- Tracking Auto Focus (TAF) Refer to Quick Vision Accessories page
Additional objective lenses	Refer to Objective page for Quick Scope / Quick Vision



By using FEM (Finite Element Method) analysis of the base design, the placement of stiffening ribs and beams has been determined for the Ultra Quick Vision to provide optimal structural rigidity.



Ultra-precision scale manufacturing facility 11 metres underground



Ultra-high accuracy crystallized glass scale with virtually zero thermal expansion. The Ultra Quick Vision is equipped with a crystallized glass scale having a resolution of 0.01 µm and linear expansion coefficient of  $0.08 \times 10^{-6}/K$ . This virtually zero thermal expansion means the Ultra Quick Vision can minimise accuracy fluctuation due to thermal changes.



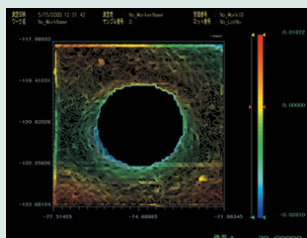
Quick Vision brochure on request



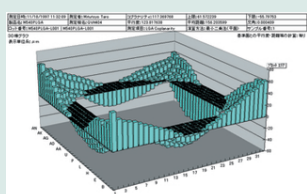
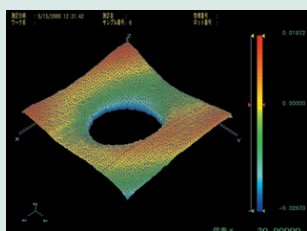
## Specifications

Factory option

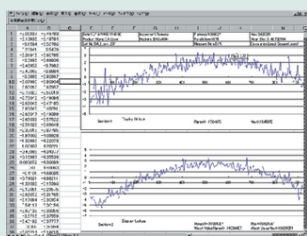
- Colour CCD camera  
QV PRO 3 models



Curved-form analysis (MSHAPE-QV)  
2D / 3D contour lines display  
2D / 3D unfiltered profile display  
Shadowgraph display  
Curved plane analysis  
Unfiltered profile analysis, etc.



Data processing (QV Graph)  
3D bar chart display  
3D surface chart display  
2D continuous cross-section graph display



Quick Vision brochure on request

# Quick Vision HYBRID Type 1 Series

## Series 365 - CNC Vision Measuring System

This CNC vision measuring system is a multi-sensor machine.

The Quick Vision HYBRID Type 1 offers you the following benefits:

- It allows you to make vision measurements with a CCD camera, and carry out high-speed scanning, by applying a vision measurement unit in parallel with a non-contact displacement sensor.
- The focusing point method minimises the difference in the measuring face reflectance and gives you high measurement reproducibility.
- The double pinhole method (less directivity) is employed as the measurement principle.



Quick Vision H1 APEX 404 PRO



Quick Vision Hybrid system - Type 1

The scanning laser system for Quick Vision HYBRID adds 3D profiling capability. The laser probe with  $0.01 \mu\text{m}$  resolution continuously scans the workpiece surface and gathers coordinate data, enabling the evaluation of surface contours, peak heights, etc. The double pinhole detection method is adopted to prevent measurement being affected by the colour, reflection factor, etc., of the surface.

Available for Quick Vision APEX ; Quick Vision STREAM PLUS ; Quick Vision HYPER and Quick Vision ACCEL models.

# Quick Vision HYBRID Type 1 Series

## Series 365 - CNC Vision Measuring System

### Quick Vision ACCEL-based

Accuracy when using vision sensor: Same as standard Quick Vision ACCEL

Accuracy  $E_{1(2)}$  when using non-contact displacement sensor: QV ACCEL 808 and 1010 (2,5+0,4L/100)  $\mu\text{m}$

QV ACCEL 1212 and 1517 (3,5+0,5L/100)  $\mu\text{m}$  <sup>(1)</sup>

Type	Quick Vision H1 ACCEL 808	Quick Vision H1 ACCEL 1010	Quick Vision H1 ACCEL 1212	Quick Vision H1 ACCEL 1517
No.	365-315-10Y	365-335-10Y	365-355-10Y	365-375-10Y
Model	QVH1-A808P1L-C	QVH1-A1010P1L-C	QVH1-A1212P1L-C	QVH1-A1517P1L-C
Range - Vision	800 x 800 x 150 mm	1000 x 1000 x 150 mm	1250 x 1250 x 100 mm	1500 x 1750 x 100 mm
Range - Non-contact Displacement Sensor (Type 1)	680 x 800 x 150 mm	880 x 1000 x 150 mm	1130 x 1250 x 100 mm	1380 x 1750 x 100 mm

### Quick Vision APEX-based

Accuracy when using vision sensor: Same as standard Quick Vision APEX

Accuracy  $E_{1(2)}$  when using non-contact displacement sensor: (1,5+0,4L/100)  $\mu\text{m}$  <sup>(1)</sup>

Type	Quick Vision H1 APEX 302	Quick Vision H1 APEX 404	Quick Vision H1 APEX 606
No.	365-170-10SY	365-180-10SY	365-190-10SY
Model	QVH1-X302P1L-D	QVH1-X404P1L-D	QVH1-X606P1L-D
Range - Vision	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Range - Non-contact Displacement Sensor (Type 1)	180 x 200 x 200 mm	280 x 400 x 250 mm	480 x 650 x 250 mm

### Quick Vision HYPER-based

Accuracy when using vision sensor: Same as standard Quick Vision HYPER

Accuracy  $E_{1(2)}$  when using non-contact displacement sensor: (1,5+0,2L/100)  $\mu\text{m}$  <sup>(1)</sup>

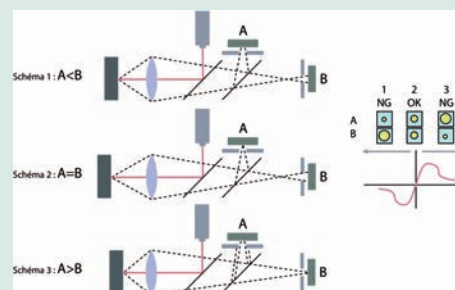
Type	Quick Vision H1 HYPER 302	Quick Vision H1 HYPER 404	Quick Vision H1 HYPER 606
No.	365-173-10SY	365-183-10SY	365-193-10SY
Model	QVH1-H302P1L-D	QVH1-H404P1L-D	QVH1-H606P1L-D
Range - Vision	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Range - Non-contact Displacement Sensor (Type 1)	180 x 200 x 200 mm	280 x 400 x 250 mm	480 x 650 x 250 mm

### Quick Vision STREAM PLUS-based

Accuracy when using vision sensor: Same as standard Quick Vision STREAM PLUS

Accuracy  $E_{1(2)}$  when using non-contact displacement sensor: (1,5+0,4L/100)  $\mu\text{m}$  <sup>(1)</sup>

Type	Quick Vision H1 STREAM PLUS 302	Quick Vision H1 STREAM PLUS 404	Quick Vision H1 STREAM PLUS 606
No.	365-172-10Y	365-182-10Y	365-192-10Y
Model	QVH1-X302P1S-D	QVH1-X404P1S-D	QVH1-X606P1S-D
Range - Vision	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Range - Non-contact Displacement Sensor (Type 1)	180 x 200 x 200 mm	280 x 400 x 250 mm	480 x 650 x 250 mm



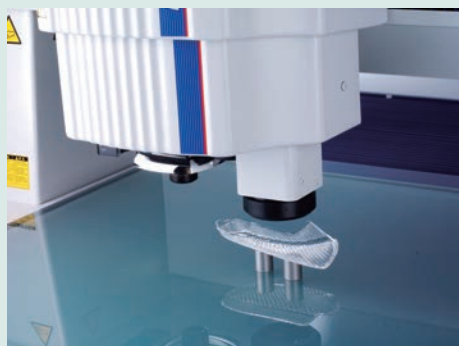
QV-Hybrid Type 1 : Laser principle, double pinhole method



# Quick Vision HYBRID Type 4 Series

## Series 365 - CNC Vision Measuring System

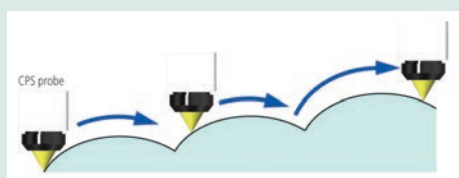
- The Quick Vision HYBRID type 4 is a multi-sensor machine that enables the topography of the surface and the thickness of transparent objects to be measured.
- The measuring range of the scanning sensor is 0-1200  $\mu\text{m}$ .
- Effective even for high inclination angles both of mirrored surfaces and diffuse surfaces. Maximum measurable inclination angle :  $\pm 80^\circ$  (diffuse surface).
- Achieves high resolution and high accuracy height measurement by the wavelength confocal method using axial chromatic aberration.
- The automatic light intensity control provides reliable measurements even when reflectance of the measured surface changes during measurement.



Hybrid Type 4 system

The Quick Vision Hybrid Type 4 is a machine which allows vision measurement with a CCD camera and high-speed scanning with a non-contact displacement sensor.

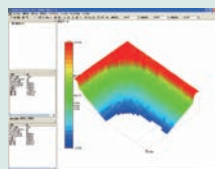
The Hybrid Type 4 CPS sensor is available for Quick Vision Apex/Hyper and Quick Vision Stream Plus models.



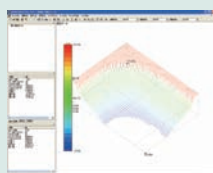
Scanning measurement with automatic movement of the Z-axis



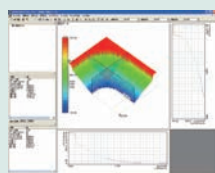
Form analysis of plastic molded parts having a slope.



Solid colour display



Shaped display



Extraction of arbitrary section



Quick Vision H4 HYPER 606 PRO

### 1: QV APEX-based

Accuracy when using vision sensor: Same as standard Quick Vision APEX

Accuracy  $E_{1(z)}$  when using non-contact displacement sensor: (1,5+0,4L/100)  $\mu\text{m}^{(1)}$

Type	Quick Vision H4 APEX 302	Quick Vision H4 APEX 404	Quick Vision H4 APEX 606
No.	365-413-10SY	365-433-10SY	365-453-10SY
Model	QVH4A-X302P1L-D	QVH4A-X404P1L-D	QVH4A-X606P1L-D
Range (X, Y, Z-axis) with Vision Head	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Range - Non-contact Displacement Sensor (Type 4)	176 x 200 x 200 mm	276 x 400 x 250 mm	476 x 650 x 250 mm

### 2: QV STREAM PLUS-based

Accuracy when using vision sensor: Same as standard Quick Vision STREAM PLUS

Accuracy  $E_{1(z)}$  when using non-contact displacement sensor: (1,5+0,4L/100)  $\mu\text{m}^{(1)}$

Type	Quick Vision H4 STREAM PLUS 302	Quick Vision H4 STREAM PLUS 404	Quick Vision H4 STREAM PLUS 606
No.	365-415-10Y	365-435-10Y	365-455-10Y
Model	QVH4A-X302P1S-D	QVH4A-X404P1S-D	QVH4A-X606P1S-D
Range (X, Y, Z-axis) with Vision Head	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Range - Non-contact Displacement Sensor (Type 4)	176 x 200 x 200 mm	276 x 400 x 250 mm	476 x 650 x 250 mm

### 3: QV HYPER-based

Accuracy when using vision sensor: Same as standard Quick Vision HYPER

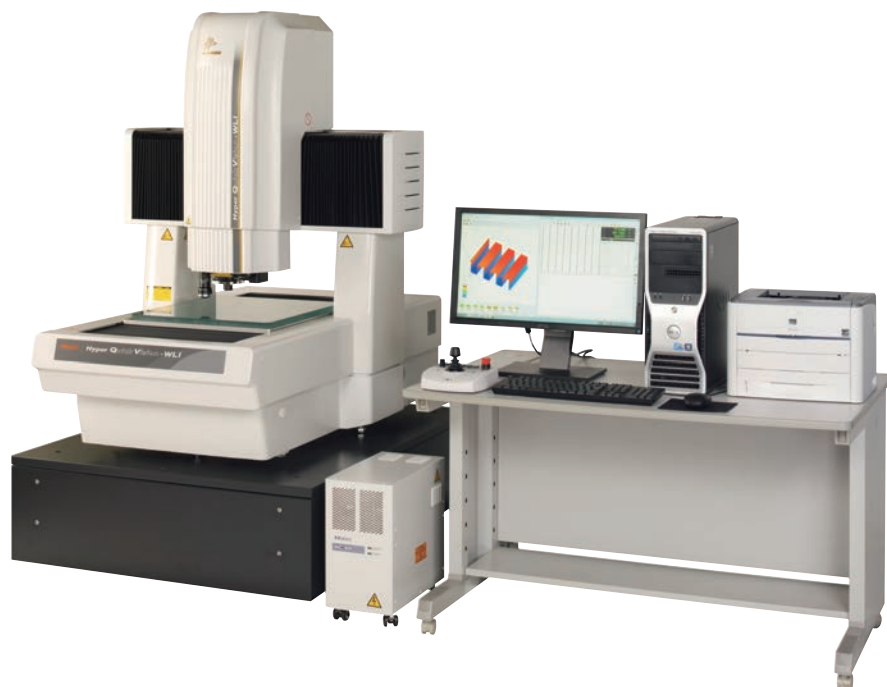
Accuracy  $E_{1(z)}$  when using non-contact displacement sensor: (1,5+0,4L/100)  $\mu\text{m}^{(1)}$

Type	Quick Vision H4 HYPER 302	Quick Vision H4 HYPER 404	Quick Vision H4 HYPER 606
No.	365-416-10SY	365-436-10SY	365-456-10SY
Model	QVH4A-H302P1L-D	QVH4A-H404P1L-D	QVH4A-H606P1L-D
Range (X, Y, Z-axis) with Vision Head	300 x 200 x 200 mm	400 x 400 x 250 mm	600 x 650 x 250 mm
Range - Non-contact Displacement Sensor (Type 4)	176 x 200 x 200 mm	276 x 400 x 250 mm	476 x 650 x 250 mm

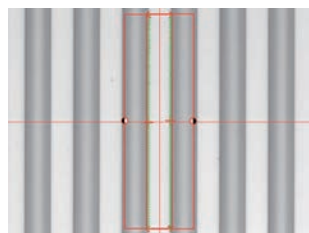
# Quick Vision White Light Interferometer

## Series 363

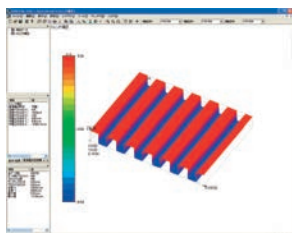
- Combined non contact measurements with vision system and White Light Interferometer (WLI)
- Easy alignment and positioning with vision sensor
- Full QVPAK functionality with Vision system
- Enhanced functionality with WLI-system for high resolution topography evaluation such as surface roughness analysis



Quick Vision WLI 404 PRO



Video image of part



3D Analysis of measured part



2D Analysis of measured part

Specifications when using vision sensor are same as Quick Vision HYPER

Type	Hyper Quick Vision WLI 302	Hyper Quick Vision WLI 404	Hyper Quick Vision WLI 606
No.	363-713-10SY	363-714-10SY	363-715-10SY
Model	QVW-H302P1L-D	QVW-H404P1L-D	QVW-H606P1L-D
Range (X, Y, Z-axis) with Vision Head	300 x 200 x 190 mm	400 x 400 x 240 mm	600 x 650 x 220 mm
Range with WLI Head	215 x 200 x 190 mm	315 x 400 x 240 mm	515 x 650 x 220 mm
Tube Lens WLI Head	2x	2x	2x
Repeatability WLI Head	$2\sigma \leq 0,08 \mu\text{m}$	$2\sigma \leq 0,08 \mu\text{m}$	$2\sigma \leq 0,08 \mu\text{m}$
Z-axis measuring range WLI Head	170 $\mu\text{m}$	170 $\mu\text{m}$	170 $\mu\text{m}$
Max. stage loading kg	15	25	35



Scan QR Code with your mobile device and watch our product videos on YouTube

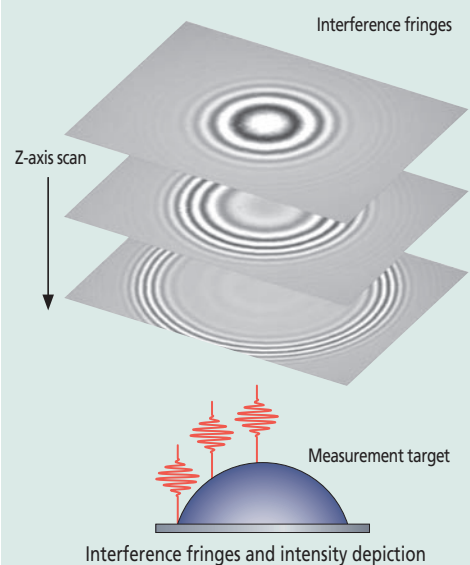
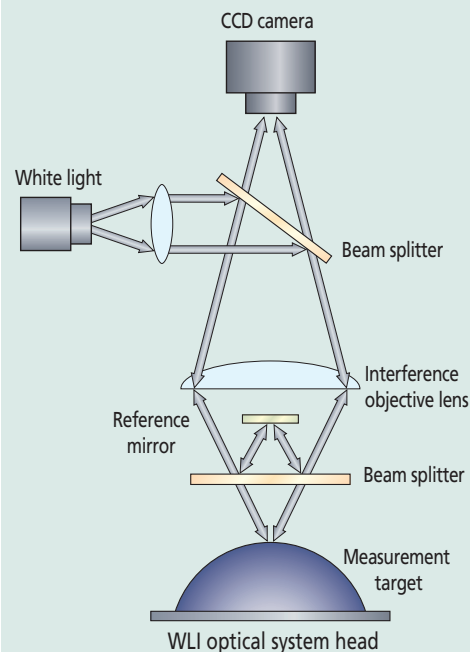
## Optional accessories

No.	Description
02ALT630	Quick Vision WLI Objective, A-10X
02ALT670	Quick Vision WLI Objective, A-25X
02ALY400	Quick Vision WLI Objective, A-5X



## QV WLI Objective lenses

Magnification 10X: Field of View 0,32 x 0,24 mm  
Magnification 25X: Field of View 0,128 x 0,096 mm  
Magnification 5X: Field of View 0,64 x 0,48 mm



# MiScan Vision System

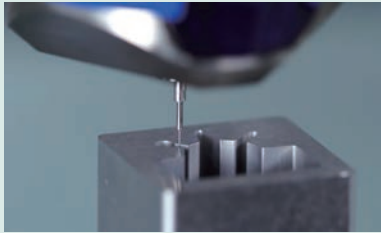
## Series 364 - CNC Vision Measuring System

The MiSCAN MVS-HYPER and MVS-APEX vision systems combine advanced image processing with tactile scanning measurements.

- The MVS-HYPER 302 can be equipped with either the MPP-Nano probe or SP25M scanning probe
- MPP-Nano is a high accuracy scanning probe for measurement of minute parts and uses stylus modules with tip diameters varying from 125 upto 500  $\mu\text{m}$
- MVS-HYPER 404 and MVS APEX 404 models are equipped with the SP25M scanning probe for standard scanning jobs with medium size measuring range.
- The MiSCAN Vision Systems are driven by the powerful combination of MCOSMOS and VISION-PAK-PRO software to guarantee maximum functionality for both non-contact and tactile measurements.
- All the benefits of the standard QUICK VISION HYPER/APEX systems are also incorporated in the MiSCAN Vision systems



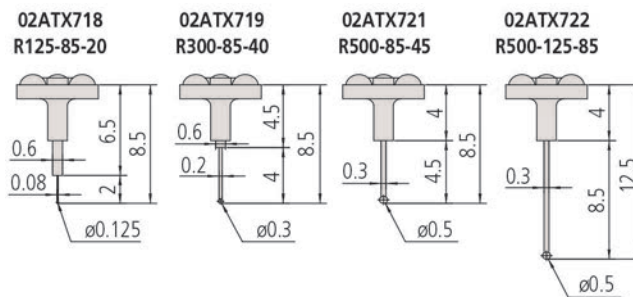
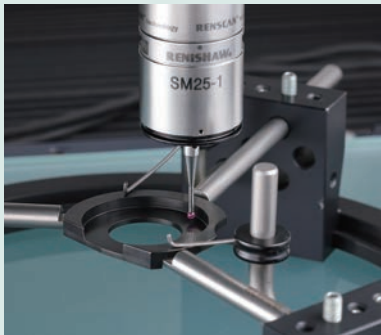
MPP-NANO Module 0.8 master gear measurement



MPP-NANO mold scanning



SP25M



Type	MiSCAN HYPER 302	MiSCAN APEX 404	MiSCAN HYPER 404
No.	364-502SY	364-511SY	364-512SY
Model	MVS-H302P1L-D	MVS-X404P1L-D	MVS-H404P1L-D
Measuring range using vision sensor	300 x 200 x 200 mm	400 x 400 x 250 mm	400 x 400 x 250 mm
Resolution $\mu\text{m}$	0,02	0,1	0,02
Measuring range using scanning probe	175 x 200 x 200 mm	275 x 400 x 250 mm	275 x 400 x 250 mm
Measurement accuracy with vision sensor [ $\mu\text{m}$ ]	$E_{1x}, E_{1y} = (0,8+0,2L/100)$ $E_{1z} = (1,5+0,2L/100)$ $E_{2xy} = (1,4+0,3L/100)$	$E_{1x}, E_{1y} = (1,5+0,3L/100)$ $E_{1z} = (1,5+0,4L/100)$ $E_{2xy} = (2,0+0,4L/100)$	$E_{1x}, E_{1y} = (0,8+0,2L/100)$ $E_{1z} = (1,5+0,2L/100)$ $E_{2xy} = (1,4+0,3L/100)$
Measurement accuracy with scanning probe [ $\mu\text{m}$ ]	$E_{0,MPE} = (1,9+0,4L/100)$	$E_{0,MPE} = (2,5+0,6L/100)$	$E_{0,MPE} = (1,9+0,4L/100)$
Max. stage loading kg	15	40	30
Mass kg	360	579	579



# UMAP Vision System Series

## UMAP : Ultra Micro Accurate Probe

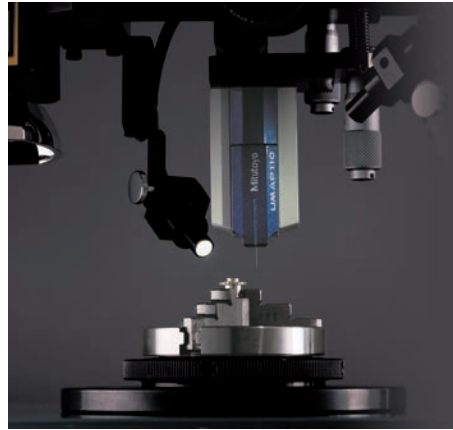
The UMAP (Ultra Micro Accurate Probe) is a micro-form measuring system

The UMAP offers you the following benefits:

- Dual functions of high-accuracy contact and non-contact measurement in one machine.
- Contact (micro-stylus UMAP probe) and non-contact (vision probe) measuring probes are installed.
- You can measure micro-features of parts previously impossible to reach.
- Several diameters of micro-stylus are available from 15 µm to 300 µm.



Hyper UMAP 302 Type 2



UMAP Probe Unit

### UMAP Probes

(ultrasonic micro stylus probes)

Stylus ultrasonic micro-vibration and its amplitude-sensing enable UMAP probe to perform contact measurement of micro-features of parts.

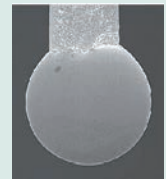
5 choices of stylus tip diameter are available from 15 µm to 300 µm.



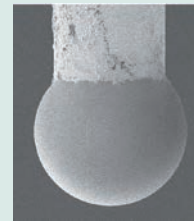
UMAP 101  
ø15 µm  
L = 0,2 mm



UMAP 103  
ø30 µm  
L = 2 mm



UMAP 107  
ø70 µm  
L = 5 mm



UMAP 110  
ø100 µm  
L = 10 mm



UMAP 130  
ø300 µm  
L = 16 mm



Refer to the UMAP Vision system brochure

### Type 2 - QVPAK + CCD + UMAP Probe

Type	Hyper UMAP 302 Type 2	Ultra UMAP 404 Type 2
No.	364-713-10SY	364-717-10SY
Model	UVS2-H302P1L-D	UVS2-U404P1N-D
Range (X-, Y-axis) <sup>(1)</sup>	185 x 200 mm	285 x 400 mm
Range (Z-axis) <sup>(1)</sup>	- UMAP 101/103 : 175 mm - UMAP 107/110 : 180 mm - UMAP 130 : 185 mm	- UMAP 101/103 : 175 mm - UMAP 107/110 : 180 mm - UMAP 130 : 185 mm
Accuracy <sup>(2)</sup>	$E_{1(x,y)} = (0,8+0,2L/100) \mu m$ $E_{1(z)} = (1,5+0,2L/100) \mu m$	$E_{1(x,y)} = (0,25+0,1L/100) \mu m$ $E_{1(z)} = (1,5+0,2L/100) \mu m$
Repeatability ( $\sigma$ )	- UMAP 101/103/107 : 0,1 µm - UMAP 110/130 : 0,15 µm	- UMAP 101/103/107 : 0,08 µm - UMAP 110/130 : 0,12 µm

# Software for Quick Vision Systems

## QVPAK

- QVPAK controls multiple sensors: CCD, Touch Probe, continuous scanning devices, special UMAP or LNP probes.
- Powerful mathematical algorithms are provided that help you to detect difficult edges via noise filters (similar to morphological filters) and advanced detection tools that take into account the texture of the target surface.
- Partprogramming and editing is made easy with the user friendly Easy Editor.
- 3D graphic display or measuring planes display with the QVclient QVGraphic.
- QVPAK also offers you various QVclients (standard), real assistants for users (programming mode) or operators (production mode) such as QVSmartEditor and QVNavigator.

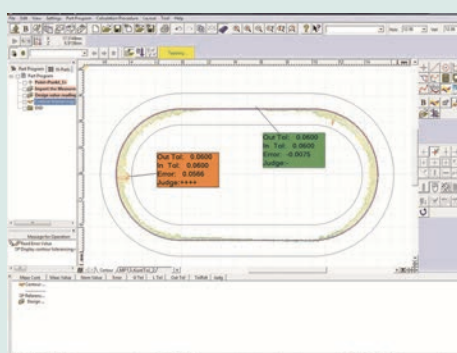
## Optional software modules for Quick Vision System

- Formtracepak-AP-QV for 2D contour analysis
- Formtracepak-Pro for 3D surface analysis
- QV Part Manager for managing the execution of parts programs of multiple parts
- Easypag-Pro for offline generation of part programs from 2D CAD data
- QV3DCAD-online for online generation of part programs from 3D CAD files
- MeasurLink for statistical process control (SPC)
- QV3DPAK for 3D topography measurements (see explanation below)
- For more information refer to the Vision Measuring Machines brochures

## Optional PFF Function (Points From Focus)

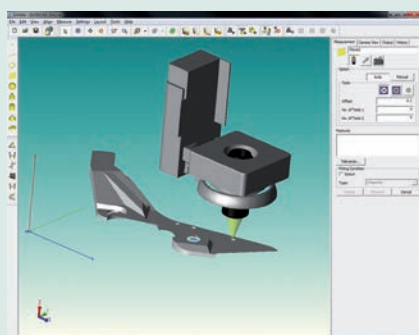
- PFF enhances the functionality of standard QV models with 3D topography measurements
- No additional sensor necessary
- High scanning range in Z axis from 2,7 mm upto 40,6 mm depending on the objective lens in use and in wide range mode
- PFF is a retro fittable option for Quick Vision ELF, Quick Vision APEX/HYPER, Quick Vision ACCEL and Quick Vision ULTRA.

Please contact your local Mitutoyo office for more detailed information.



FORMTRACEPAK-AP

Simple and easy-to-use 2D contour analysis.  
Graphic reports (geometry or scanning) edition.  
Allows measurement by comparison.  
For more information refer to FORMTRACEPAK-AP.



QV3DCAD-Online

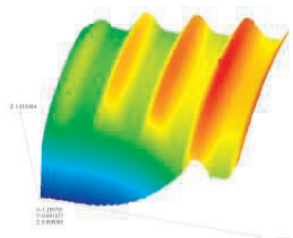
Automatic program generation from 3D CAD files  
issued from a CAD system (must be associated  
with a converter).



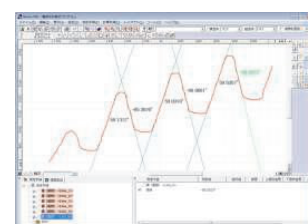
Vision Measuring Machines brochures on request



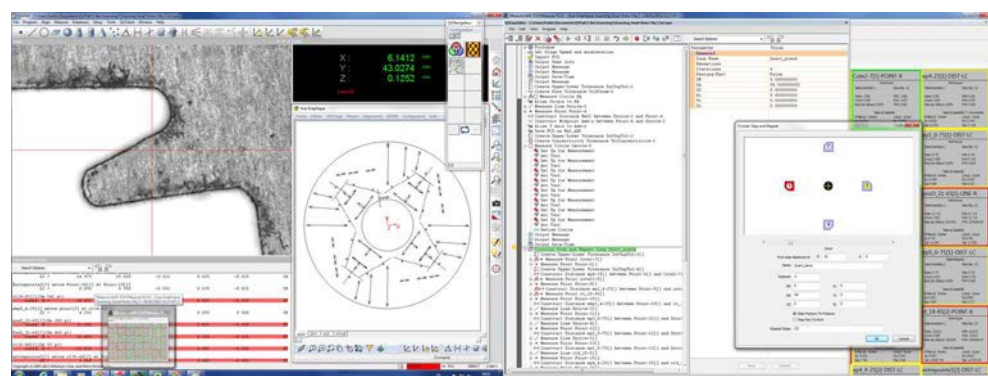
Workpiece to be measured with PFF



3D Analysis of PFF measurement



2D Analysis of PFF measurement



Example of the QVPAK screen layout.



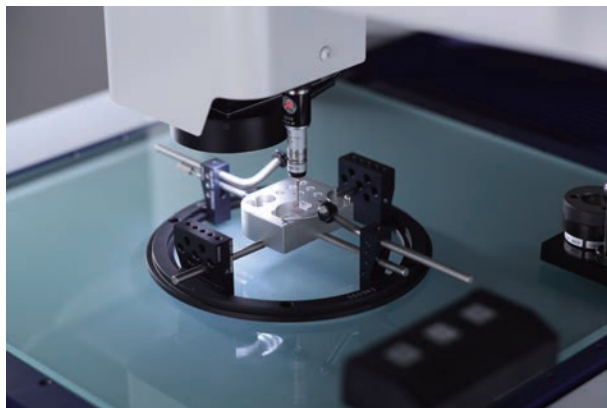
# Accessories for Quick Vision Systems

## Touch Probe Option - Series 364 or Retrofit

An optional touch probe (TP) is available for following QV models:

Quick Vision-ACTIVE; Quick Vision-APEX ; Quick Vision-HYPER ; Quick Vision-ACCEL.

- The Quick Vision-TP system allows you to carry out both non-contact and contact measurements.
- Compatible with Renishaw Touch Probe TP 20 or TP 200.
- An optional MCR20 rack for storing probe modules enhances functionality even more.



Quick Vision ACTIVE with Touch Probe option



Quick Vision-APEX with Touch Probe option



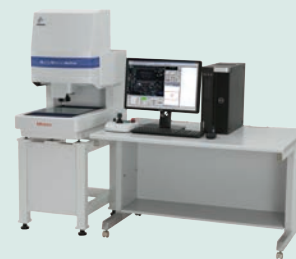
TP20  
Compact stylus change type.



TP200  
Compact and high accuracy stylus change type



Styli kit M2  
Starter



Quick Vision-ACTIVE models



QV-APEX and HYPER models



Quick Vision Accel models



Refer to the Quick Vision brochure

# Accessories for Quick Vision Systems

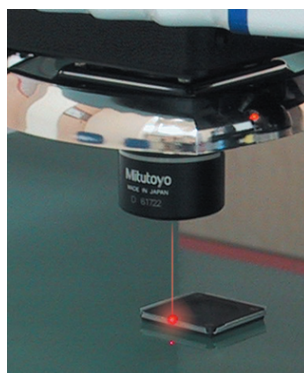
## Tracking Auto Focus

### Tracking Auto Focus Function TTL (Through The Lens) \*

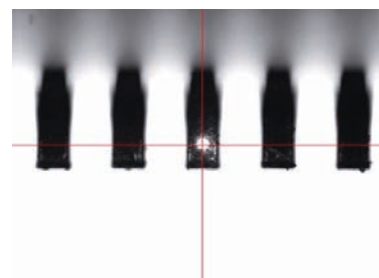
For Quick Vision-APEX, Quick Vision-HYPER, Quick Vision-STREAM PLUS, Quick Vision-ULTRA  
The Tracking Auto Focus unit (TAF) allows stable, high-speed measurement in the Z-axis, due to the Knife-edge method adopted in the detection system.

The TAF function tracks the waviness and warp of the workpiece surface in Z direction and enhances throughput compared with normal measuring mode.

When TAF is used on a Quick Vision Stream Plus model, fully non-stop measurements become possible.



Coaxial laser Tracking Auto Focus (TAF)



Laser spot of Tracking Auto Focus system (TAF)



Measurement example : Height of leads on a QFP package

TAF (Tracking Auto Focus)\*

No.	Objective lens	Tracking range [mm]	Laser spot diameter [μm]
TAF-HR2,5X	QV-HR2,5X	±0,5	2,1
TAF-SL2,5X	QV-SL2,5X	±0,5	3,1
TAF-5X	QV-5X	±0,125	1,5
TAF-HR1X	QV-HR1X	±3,15	5,2
TAF-SL1X	QV-SL1X	±3,15	8

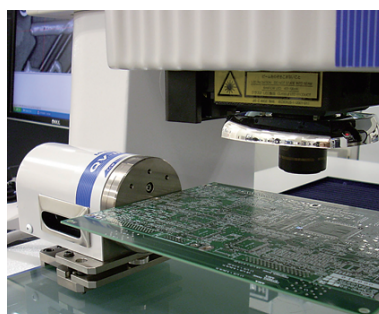
\*factory option

### Specifications

QV Index Head	Automatic multi-plane measurement is possible with the optional index table
Min. rotation angle	0,1 °
Max. rotation speed	10 rpm
Positioning Accuracy	±0,5°
Max. workpiece ø [mm]	140

### QV Index Head

Using the QV Index to rotate the workpiece makes it possible to automatically measure multiple surface without having to dismount/remount the workpiece.



# Objective Lenses and Calibration Charts

## Objective Lenses and Calibration Charts

No.	Model
02ALT630	QV WLI A-10X
02ALT670	QV WLI A-25X
02ALY400	QV WLI A-5X

### 1. QV-Objective lens - HR and SL (Long Working Distance) models

No.	Magnification	NA <sup>(2)</sup>	Model	Turret lens Mag. QV	Monitor Mag. QV	Working distance [mm]
02AKT199	0,5X		QV-SL0,5X	1X 2X 6X	16X 32X 96X	30,5
02ALA150	1X		QV-SL1X	1X 2X 6X	32X 64X 192X	52,5
02ALA170	2,5X		QV-SL2,5X	1X 2X 6X	80X 160X 480X	60
02ALA420	5X		QV-5X	1X 2X 6X	160x 320X 960X	33,5
02ALG010	10X		QV-SL10X	1X 2X 6X	320X 640X 1920X	30,5
02ALG020	25X		QV-25X	1X 2X 6X	800X 1600X 4800X	13
02AKT250	1X	0,084	QV-HR1X	1X 2X 6X	32X 64X 192X	40,6
02AKT300	2,5X	0,21	QV-HR2,5X	1X 2X 6X	80X 160X 480X	40,6
02AKT650	10X	0,42	QV-HR10X	1X 2X 6X	320X 640X 1920X	20

### Other Accessories

#### Machine Stands

No.	Model
02ATN695	Calibration chart with holder
02ATN697	Compensation chart with holder

### Additional Specifications

- |         |  |
|---------|--|
| Remarks | <ul style="list-style-type: none"> <li>The monitor magnifications are approximate values.</li> <li>QV-10X, QV-25X : Depending on the workpiece the illumination may be insufficient at a turret lens magnification of 2X and 6X for QV models.</li> <li>QV-25X : The PRL illumination is restricted in its usable position.</li> </ul> |
|---------|--|



Calibration Glass chart & Compensation glass chart with holder

A calibration or compensation chart is used to calibrate or compensate for the pixel size of the CCD sensor, autofocus accuracy and the optical axis offset at each magnification of the Programmable Power Turret (PPT) or of the zoom.

# Modular Clamping System OPTI-FIX

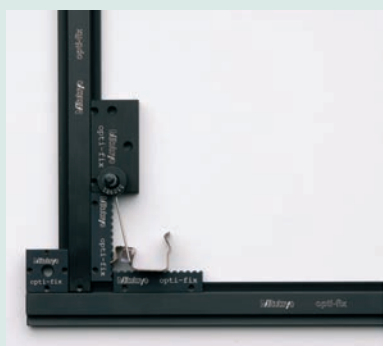
## The modular clamping system for vision measuring systems

This modular and flexible clamping system is ideal for use with vision measuring systems including profile projectors, measuring microscopes and image analysis measuring machines. OPTI-FIX offers you the following benefits:

- The system's highly compact components enable you to keep parts in the required position during measurement.
- It enables you to make reliable repeated measurements on a batch of parts, or measurements in particular positions.
- The system elements are assembled with dovetail joints.
- You are offered a choice of several kits.



Holding a cylindrical part between clamping tips.



Toothed rule that lets light pass  
Spring flange locking the part in the measurement position.



Batch measurement of identical parts placed against the right-angled frame.



Refer to the OPTI-FIX brochure

No.	Model	Description
K551056	Opti-Set Start	- Comprising 16 elements - Construction of a right-angled frame of dimensions 250x100mm
K551057	Opti-Set Basic	- Comprising 26 elements - Construction of a frame of dimensions 200x100mm
K551059	Opti-Set Advanced	- Comprising 51 elements - Construction of a frame of dimensions 400x250mm - Allows aerial positioning of parts
K551060	Opti-Set Professional	- Comprising 115 elements - Construction of frame of dimensions 400x250mm - Complete and highly versatile kit
K551058	Opti-Set Rotation	- Comprising 23 elements - Construction of frame of dimensions 250x200mm - Including accessories for holding cylindrical parts
K550298	Opti-Set Round	- Comprising 18 elements allowing aerial positioning of complex parts - This kit is supplied in a case (see photo below)
K550989	Adjustable magnetic clamp	Only 3 clamps are necessary to hold the OPTI-FIX clamping system to the machine surface

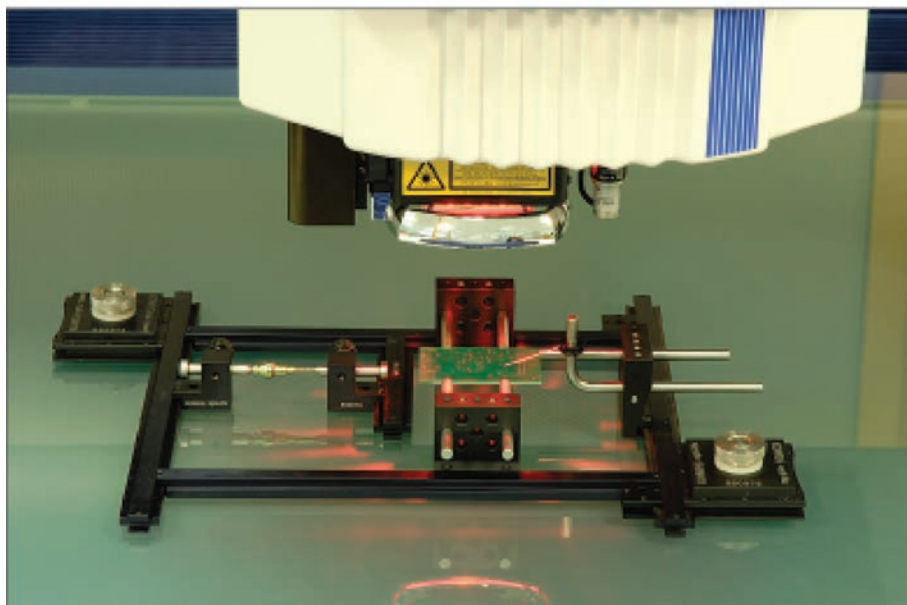


Opti-Set Round



# Modular Clamping System OPTI-FIX

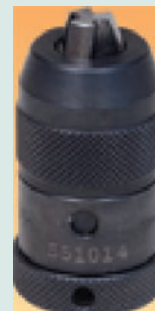
## OPTI-FIX Clamping System



Electronic board raised to give clearance for the components on its underside. Placed directly on the glass stage of the machine without the OPTI-FIX clamping system, the electronic board would not lie flat. The set-up is held on the glass surface by 2 suction



Mini-vise (internal-external)



Precision quick chuck



Clamping jaw



Jaw tip  $\phi 0-2$



Jaw tip  $\phi 1-3$



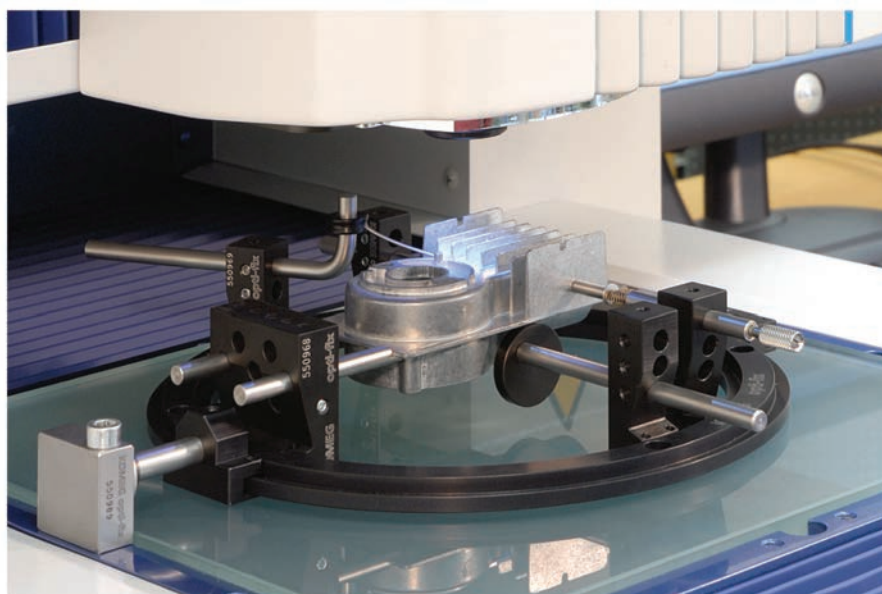
Jaw tip  $\phi 4-5$



Perpendicular jaw tip



OPTI-FIX brochure on request



Example of application for holding prismatic parts (without the OPTI-FIX clamping system, the part could not be positioned correctly). The set-up is held on the glass surface by a magnetic clamp attached to the stage frame.



### Batteries Page 612



### Washers, Anvils Page 612



### Mirrors, Stage Glass Page 613



### Paper Rolls, Ink Ribbons, Bulbs Page 614

# Batteries

## Batteries

No.	To fit product	Product No.	Description
011037	QM-Height	518-22x	4 x LR-6
	DP-1DX	264-501	
	Digi-Test	209-5xx	
	DP-1VR	264-504-5D	
	DP-1VR (UK only)	264-504-5E	
011076	DP-1HS	264-503	4 x
011263	Indicator	209-xxx	1 x LCR-123A
011372	Contact Block	900xxx	2 x
055AA217D	Height Gauge	192-6xx	1 x CR-2.032
12BAA240D			
352011	MST201/401/402	178-121/178-907	1 x
938882	Micrometer/Caliper	All models	1 x SR-44
	Height Gauge	192-6xx	
	Height Gauge	570-xxx	
353489	MST-501	178-961	3 x LR-14
	CBH-400	218-982	

# Washers, Anvils

## Carbide-tipped Anvils for Series 511

No.	Measuring range (inside)	Anvil number
21DZA213A	18/35 mm	1
21DZA213B	18/35 mm	2
21DZA213C	18/35 mm	3
21DZA213D	18/35 mm	4
21DZA213E	18/35 mm	5
21DZA213F	18/35 mm	6
21DZA213G	18/35 mm	7
21DZA213H	18/35 mm	8
21DZA213J	18/35 mm	9
21DZA232A	35/60 mm or 50/150 mm	1
21DZA232B	35/60 mm or 50/150 mm	2
21DZA232C	35/60 mm or 50/150 mm	3
21DZA232D	35/60 mm or 50/150 mm	4
21DZA232E	35/60 mm or 50/150 mm	5
21DZA232F	35/60 mm or 50/150 mm	6
21DZA232G	50/150 mm	7
21DZA232H	50/150 mm	8
21DZA232J	50/150 mm	9
21DZA232L	50/150 mm	10
21DZA232M	50/150 mm	11
102178	Extension for 35/150 mm	

## Replacement Washers for Series 511

Thickness 0.5 mm	Thickness 1 mm	Thickness 2 mm	Thickness 3 mm
No.	No.	No.	No.
205457	205458	205459	205460
205623	205624		

# Mirrors, Stage Glass

## Projection Lenses for Profile Projectors

### PJ250

Magnification	Lens	Oblique illumination mirror assembly	Oblique illumination mirror
	No.	No.	No.
10X	172-125	172-290	515514
20X	172-126	172-291	515515

### PJ300

Magnification	Lens	Oblique illumination mirror assembly	Oblique illumination mirror
	No.	No.	No.
10X	172-202	172-292	515516
20X	172-203	172-293	515517

## Stage Glass for Profile Projectors and Microscopes

No.	Dimensions [mm]
200674	ø60 mm
200662	ø66 mm
200673	ø80 x 5 mm
383141	ø84 mm
200667	ø100 x 5 mm
384111	ø180 mm
380405	96 x 96 x 5 mm
380495	154 x 96 x 5 mm
12BAE041	154 x 154 x 5 mm
515264	190 x 160 x 5 mm or 190 x 160 x 6 mm
381349	196 x 96 x 5 mm
382762	280 x 180 x 6 mm
517505	310 x 170 x 8 mm

# Paper Rolls, Ink Ribbons, Bulbs

## Ink Ribbons

No.	Quantity	To suit product	Product No.
198728	5	DP-1HS	264-503

## Paper Rolls

No.	Quantity	To suit product	Product No.
353535	1	MST501	178-961
908353-1	2	MPK10	264-103
		MPK100	264-xxx
		MPK120	264-xxx
011074	5	DP-1HS	264-503
011046	10	MST201	178-121
		MST301	178-127/178-128
		MST4	178-911
09EAA082-5	5	DP-1VR	264-504-5D
		DP-1VR (UK only)	264-504-5E
12AAA802	10	LH-600B (thermal printer)	518-321-0
		LH-600C (thermal printer)	518-331-20/518-332-20
		LH-600D (thermal printer)	518-341-20/518-342-20
12AAN052	10	LH-600E/ LH-600EG	518-351D-21/518-352D-21
270004	10	STP2	178-802
		DP-1DX/1AT	264-501/502
270490	10	Multiprinter	164-515
997471	10	RA300	211-961/211-962
		RA400	211-963/211-964
997662	10	RA112/122	211-921/941
998698D	10	RA114	211-705

# Paper Rolls, Ink Ribbons, Bulbs

## Bulbs

No.	To fit product	Illumination	Description
011315			10,8V 30W
02AKJ023D	377-090-1DD		8W
101479	TM10		6,3V
11BAC224			AVK-A
162151	CF 10 (Halogen)		6V 10W
19BAA095	AVK-C MVK-E3/-G/-VL		6V 15W (10 pcs)
200672	PJ250	Surface	10V 70W
383038D	TM505/510		24V 2W
510187	PV600	Surface	10V 300W
512305	PH14 PH350H/353H/361H/600H (Halogen) PJ251/321/2500/3000/300H(Halogen) PJ311/PJ311 T4/Z1 (Halogen) PV600/5000/350H/500H (Halogen) PJH30/3000 (Halogen)	Surface or Contour	24V 150W
513614	DR DV4 SR (Halogen)		6V 10W
513666	FS50/110 (Halogen) TM/111/301/311/321/331		6V 20W
513667N	FS50F/50L/110 (Halogen) MF200 (Halogen) HV TM111/301/311/321/331 MF505/510/1020/1030 MF505TH/510TH/1020TH/1030TH TF510F/510FW/1020F		12V 50W
515557	TM200	Contour	8V 24W
515558	TM200	Surface	8V 24W
515559	TM Illumination		8V 12W

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## Mitutoyo in Europe

As Europe has become more integrated, a huge and vital market is being created. Mitutoyo is well placed for the integrated expansion of the European market. Under the strategic direction of Mitutoyo Europe GmbH there is a large production, sales and service network at your disposal, with (at present) more than 85 offices in 33 European countries.

Our leading market representation ensures that Mitutoyo's customers can take full advantage of the potential of the opportunities in this growing market - several integrated supply chain service functions supporting our dealer partners and commercial customers. We provide our clients on-site service in the areas of demand planning, integrated supply systems, distribution management, warehousing and fleet management.

Mitutoyo guarantees its service for installation, calibration, inspection and repair. From the smallest caliper towards the largest measuring device, just rely on our service. Moreover we support international customers with multilingual staff. A Japanese company opening a facility in Europe? Mitutoyo trains your staff in the Japanese language. A German company relocates capital equipment to a new plant in Russia? Mitutoyo supports your staff in Russia in the German language. Mitutoyo is where you are!

## Research and development

Research and development is the cornerstone of our growth strategy and we are always seeking to provide innovative solutions by continually investing in our research and development capabilities. In recent times, the company has established itself as one of the world's most innovative providers of measuring technologies.

With substantial financial, technological and human investment Mitutoyo continues to develop advanced measurement solutions for quality assurance. New concepts, principles and technologies are constantly under development. Innovations are leading to continual improvement of our current products and may also form the basis of entirely new product lines.

## Specialised products

If you want to accurately measure down to the micron under challenging conditions, you cannot afford mistakes in the choice of instruments and you do not want to deal with compatibility issues. Mitutoyo users have no interface problems and know they can rely on measurement systems from a supplier with one of the widest product ranges in the world.

Our current product portfolio includes more than 5000 specialised measuring instruments, from the traditional analogue micrometer to the highly accurate 3D coordinate measuring machines. The product range and Mitutoyo system solutions are optimally matched and work closely together. Mitutoyo complies with the requirements of international quality systems, including ISO 9001 and ISO / TS 16949 (automotive) and AS9100 (aerospace), as well as MSA R & R studies. This will not change in the future.

## Proven quality

When it comes to quality assurance, only what is proven or what is provable matters. Your work demands guarantees regarding quality assurance.

Mitutoyo provides certificates and quality guarantees. These include a TÜV quality seal, an internationally recognised calibration certificate, guarantee card confirming IP protection, CE, etc.. With equipment that is, amongst other things, of proven high quality, you can concentrate fully on your own quality assurance.

## Customised solutions

Mitutoyo stands for technological competence and ensures, in addition to sound advice, outstanding performance in project management and engineering. A good example is the M<sup>3</sup> Solutions concept. M<sup>3</sup> stands for Mitutoyo Measurement Metrology and is a service aimed at providing individual measurement solutions. This ensures we can meet the very specific needs of customers in the field related to production and integrated quality assurance.

M<sup>3</sup> Solutions include measurement task definition, environmental analysis and solution development including costs, project management and delivery of the plan. Additionally, you can rely on the vast experience of the largest single provider of length measurement technology to ensure your own specific requirements are met.

## Training and knowledge

Do you want to know more? Then Mitutoyo is the right place. In our education and training center MIM (Mitutoyo Institute of Metrology) we offer software courses and seminars concerning the basics of 3D coordinate measuring technology, imaging metrology, surface roughness measurements and the subjects of hardness, roundness and using basic hand-held measuring tools.



Apart from knowledge, MIM is also focused on the dialogue between specialists. Therefore, it is not only intended for customers of Mitutoyo, but also for all other experts in the field of manufacturing, service, education, science and research.

### Technical support

Mitutoyo provides full support, especially in the area of technical customer service. We cover your needs from A to Z. Client services are extensive and range from regular maintenance of your equipment to repairing in our specialised workshops. From your first call, you benefit from the expertise of our technical customer service, even before the purchase of a measuring

between laboratories in fifteen countries, giving Mitutoyo a unique position in global metrological expertise. All fifteen calibration laboratories meet the high demands of ISO 17025.

The ISO / EC 17025 describes the general requirements for the competence of calibration laboratories. Mitutoyo performs all calibrations in accordance with this directive.

Each calibration and repair division contains a calibration laboratory enabling us to provide an optimal service in the area of calibration. To get an overview of what Mitutoyo calibration can do for you, please visit our website.



system. We advise you regarding the equipment specification that represents the best solution for your measurement needs. We can also show you how to get the best out of your existing equipment. We provide training in the use of our products to ensure optimal usage of software. All Mitutoyo hand-held measuring instruments sent in for repair are returned in a timely fashion after attention from our team of experienced and skilled technicians.

With this expertise and many years of experience we can advise customers with respect to maintenance, repair and calibration requirements for any other Mitutoyo measuring instrument.

### Calibration by Mitutoyo

#### The standard for many of our clients

Through a unique international network of accredited Mitutoyo calibration laboratories we provide you with the security of metrological cross-checking

### Optimisation by Mitutoyo

Part programming by Mitutoyo is a service that many of our clients benefit from. You can use our team of support specialists to help automate your measurement procedures.

Mitutoyo also offers a measurement service that may be a good solution for you if you are unable to carry it out due to lack of time, manpower or capacity. Our 3D coordinate measuring machines provide very accurate measurements and, if you wish, our specialists can write individual measurement programs for your Mitutoyo CMM.

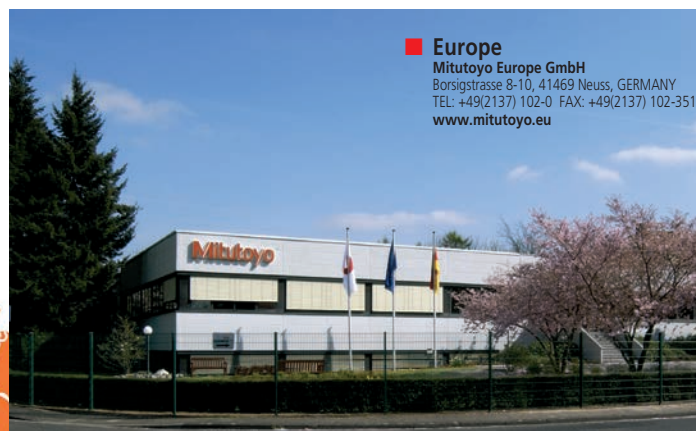
We can provide part programming on site, thus ensuring our specialists can directly support you or your staff when writing or designing measurement programs.



# European Network

Since opening up the European market in the early sixties Mitutoyo has been continuously consolidating its presence in this economically important region.

We have been preparing for the expansion of the European market well in advance before it became reality to this extent. As a result, a close net of production, sales and service facilities in more than 85 establishments with different focal points is available to the customers in 33 European countries.



In January 2010 Mitutoyo synchronised and strengthened the concerted pan-European activities by the establishment of an European headquarters. The location of Mitutoyo Europe GmbH is Neuss in the vicinity of Dusseldorf, Germany.

Mitutoyo Europe GmbH oversees all the activities of Mitutoyo's sales, service and production facilities throughout Europe and adjacent markets, including those of business strategies of such European operations. A Mitutoyo Europe GmbH key objective is to promote coordination amongst its European Group Companies in order to optimise its sales and technical support services in the best interests of customer satisfaction. A strong community for Europe's future.

- **Headquarter**
- **Sales Company**
- **Service Center**
- **Calibration Center**
- **M<sup>3</sup> Solution Center**
- **Mitutoyo Institute of Metrology**
- **Research and Development Facility**
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Vision Probe System for CMMs	Probe	573
Vision Software	SOFT	590
Vision Unit	359	440
VMU Video Microscope Unit	378	442

## W

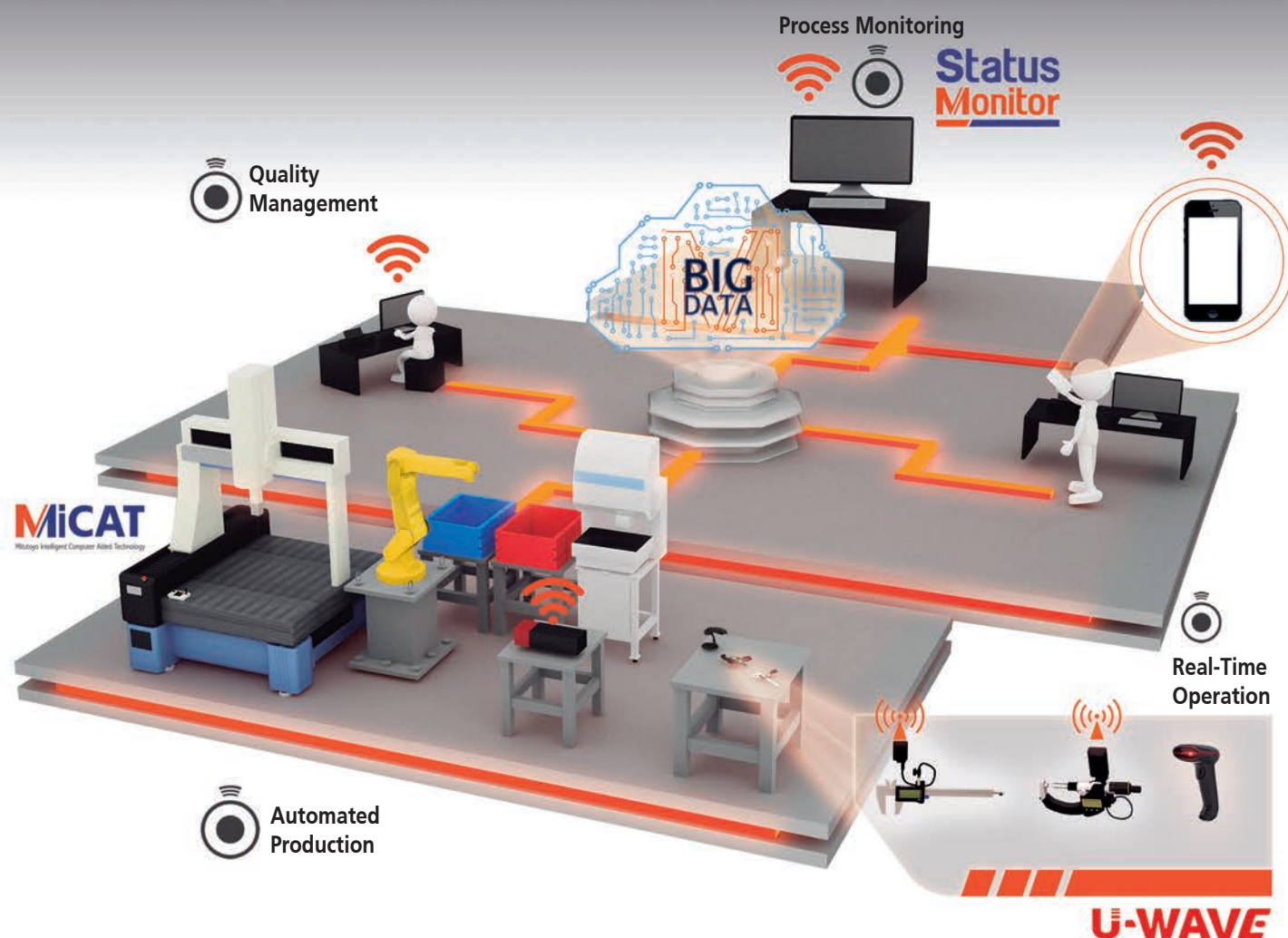
Wire Micrometer	147	85
Workpiece Fixtures	172	473
Workshop Vernier Caliper with Long jaws	534	187

## Z

ZERO CERA Block	617	354
		580, 581, 582,
		583, 584, 585
	378	450

# INDUSTRY 4.0

# MeasurLink®



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