

# Mitutoyo

Catalog No. US-1005



## Measuring Instruments Catalog



## Notes on Use

### **Export Compliance**

All products in this catalog are subject to the Foreign Exchange and Foreign Trade Control laws of Japan, US Export Administration Regulations (EAR) or the Canadian Export and Import Permits Act. Re-export or relocation of any of these products may require prior approval by an appropriate governing authority. If a purchased product is exported or re-exported, even if it is not considered a regulated item by a governing authority, Mitutoyo would like to be made aware, as the customer service available for that product may be affected. If you have any questions, please consult your local Mitutoyo sales office.

### **Safety Caution**

Carefully read the specifications and functions in this catalog before selecting products. Safety may be compromised if you use products for purposes other than those stated here.

Feel free to contact your nearest Mitutoyo sales center if you wish to use a product for other purposes or in a special environment.

### **Appearance and Specifications**

Appearance and specifications are subject to change without prior notice for product improvement. The product names in this catalog are registered trademarks or trademarks of Mitutoyo or their respective companies.

# Mitutoyo Precision Measuring Machines Trusted Throughout the World

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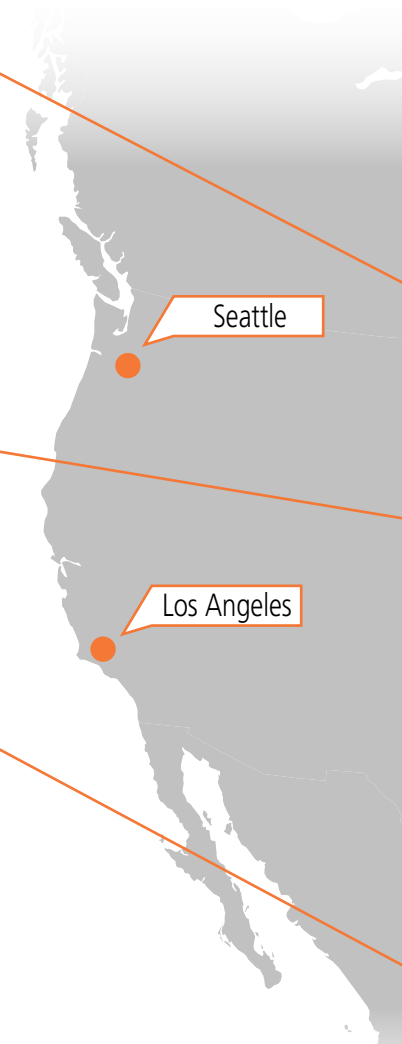
## Mitutoyo America Corporation

Established in 1963, Mitutoyo America Corporation has locations all across the United States and Canada, including corporate offices, sales offices, M<sup>3</sup> Solution Centers, calibration and repair laboratories, and research and development facilities. Mitutoyo America offers a full product line of precision measuring tools, instruments and equipment. Mitutoyo provides a comprehensive metrology organization, with dependable product and technical support, state-of-the-art calibration and repair services, unmatched education and training programs and cutting-edge research and development.

As the leading metrology company in the world, Mitutoyo is committed to future product development that applies breakthrough technologies to its full range of dimensional measurement tools, instruments and systems. With the belief that providing high-quality metrology goods and services to its customers will in turn, allow its customers to provide high-quality product to theirs, Mitutoyo continues to develop the most advanced and sophisticated metrology equipment available. **"Precision is our profession"** is not just the company motto, but also the principle by which every Mitutoyo employee stands when serving our customers.



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## M<sup>3</sup> Solution Centers

Mitutoyo Tools and instruments can be seen and demonstrated conveniently at any one of nine Mitutoyo M<sup>3</sup> Centers nationwide. These centers are fully equipped featuring operational models of the latest Mitutoyo tools and instruments. By appointment or walk-in basis, product demonstrations at M<sup>3</sup> Solution Centers are carried out by our experienced, highly trained staff. Contact your Mitutoyo distributor or the Mitutoyo regional office near you for more information.



\*M<sup>3</sup> = Mitutoyo, Measurement, Metrology



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# Company Profile



## Product Demonstration / Application Support (M<sup>3</sup> Solutions Centers)

With several locations across North America, Mitutoyo's M<sup>3</sup> Solutions Centers provide hands-on access to the full range of Mitutoyo precision tools and instruments, including the latest technologies Mitutoyo has to offer. Available to walk-ins or by appointment, highly trained and industry-experienced applications engineers will provide product demonstrations, answer questions and assist in the development of application-specific solutions. Contact your Mitutoyo distributor or the M<sup>3</sup> Solutions Center in your area for additional information.

## Sales Support / Customer Service

To ensure fast, dependable responses to all product-related questions and needs, Mitutoyo America Corporation's Sales Support group is available to assist with information on all Mitutoyo precision tools and instruments. Friendly, knowledgeable customer service representatives can provide product specifications, availability, and pricing, as well as recommend a local authorized Mitutoyo distributor.

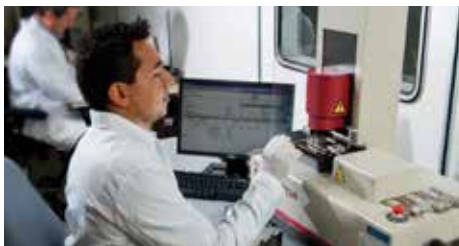
## Technical Support Services

Fast technical support for all Mitutoyo precision tools, instruments and software applications is available to distributors and customers through Mitutoyo's technical support services and is only a phone call away. Highly skilled engineers and technicians with knowledge of all Mitutoyo products can provide product information, answer technical questions, and offer application guidance. Contract programming and inspection services utilizing our most advanced technologies are also available.

## Software Application Training

To maximize the value of Mitutoyo precision instrument purchases, Mitutoyo America Corporation provides customized training for all CMM, Vision, Form, and data management (MeasurLink) software applications it provides. Highly trained software instructors provide hands-on, one-on-one or group training with content appropriate for all customer needs. Training classes can be arranged at locations throughout North America.





### Calibration Services



Mitutoyo America Corporation's calibration laboratory utilizes state-of-the-art technology to calibrate virtually any metrology tool. A2LA accredited (Certificate 0750.01) to ISO/IEC 17025 for testing and calibration labs, this facility employs professional calibration technicians to provide NIST-traceable accuracy certification, as well as calibration services for Mitutoyo and other manufacturer's gages and gage blocks. Canadian calibration laboratory is CLAS accredited to ISO/IEC 17025.

### Field Service

Committed to ensuring value and longevity in its products, Mitutoyo America Corporation provides field service for all of its major measuring instrument products. A fully staffed field service department arranges the installation, repair, and A2LA-accredited calibration (Certificate 0750.01) of Mitutoyo metrology instruments. Capable of certifying calibration on any service visit, Mitutoyo's accredited field service technicians get equipment back into production quickly. Service agreements are available at the time of equipment purchase. Canadian field service laboratory is CLAS accredited to ISO/IEC 17025.



### Repair Services

Mitutoyo America Corporation's in-house repair facilities are capable of repairing the full range of Mitutoyo precision tools. Skilled technicians provide quality repairs backed by a full 90-day warranty on parts and labor. Repairs are done in either the Aurora, IL, facility or the City of Industry, CA, facility. Repair service is also available in Canada.

### Parts Center

Mitutoyo America Corporation's parts center stocks more than 10,000 individual parts for Mitutoyo products. Same day and 24-hour shipping is available for most part requests. For CMM parts, a specialized group is available to provide additional CMM support services. A Mitutoyo product parts catalog is available on CD-ROM through the Parts Center or through a local Mitutoyo distributor.

# Company Profile



## Mitutoyo Institute of Metrology



The Mitutoyo Institute of Metrology provides educational courses and on-demand resources across a wide variety of measurement related topics including basic inspection techniques, principles of dimensional metrology, calibration methods and GD&T. Through the Mitutoyo worldwide operations, we are the premier educational provider within the quality field. Our seminars are led by experienced professionals at locations across the U.S. For seminars outside the U.S., please visit the Mitutoyo Worldwide site. All courses are approved for Continuing Education Units (CEU) and include a Certificate of Attendance.



## CT Lab / MEI (R&D and Software Development)

Mitutoyo America's CT Labs and Micro Encoder Inc. are part of an international network of Mitutoyo research and development facilities charged with developing breakthrough technologies for the company's range of dimensional measurement tools, instruments and systems and for the advancement of the field of metrology. Highly skilled developers and engineers utilize cutting-edge development tools to produce the most advanced and sophisticated metrology software and equipment available. Mitutoyo America Corporation is a Microsoft® Gold Certified Partner, providing the entire organization access to a host of Microsoft® development tools and support, and ensuring that Mitutoyo software applications work reliably in Microsoft® OS and network environments.

## Mitutoyo Custom Solutions

Standard products alone cannot always solve our customers' measuring challenges. That is why we established an engineering group to integrate our equipment into application-engineered custom solutions. Called Sales Solutions, this group can create a solution as simple as fixturing. Other times, the answer may require integration of the latest metrology equipment, process control software and robotics to create an automated metrology cell. Whatever the level of complexity, for application and integration of measurement technologies simple or complex – proven or newly emerging – you can count on Sales Solutions to develop a plan to improve your process capability, productivity and bottom line.





# Global Network

Following the establishment of MTI Corporation (U.S.) in 1963, Mitutoyo has been expanding its market throughout the world. Currently, the company has R&D, manufacturing, sales, and engineering service bases in 30 countries, as well as network of distributors in some 80 countries. Mitutoyo maintains its rock-solid status as a leading global manufacturer providing services tailored to each regional society.



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Mitutoyo Hungária Kft.

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PT. Mitutoyo Indonesia

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Mitutoyo Measuring Instruments (Shanghai) Co., Ltd.

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Tianjin Office

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# Meaning of Symbols

**ABSOLUTE™**

ABSOLUTE is a trademark of Mitutoyo Corporation.

## ABSOLUTE Linear Encoder

This is an electronic measuring scale that provides a direct readout of absolute linear position when switched on, without needing to be zeroed or reset. Electrostatic, electromagnetic and a combination of electrostatic and optical methods are used in implementing this capability but the key feature is Mitutoyo's patented technology of building absolute positional information into the scale so it can be read at start up. These linear encoders are widely used in Mitutoyo's measuring instruments as the in-built length standard and their use greatly contributes to the generation of highly reliable measurement data, particularly in harsh environments where contamination by cutting fluids, coolants and dust must not affect performance.

### 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\*1.
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 20,000 hours)\*2 under normal use.

\*1: Unless the battery is removed.

\*2: In the case of the ABSOLUTE Digimatic caliper (electrostatic capacitance model).

**IP65**

**IP66**

**IP67**

IP is a trademark of Mitutoyo Corporation.

## IP Codes

These codes 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 $\text{S}\phi 50\text{mm}$ and greater   | A $\text{S}\phi 50\text{mm}$ object probe shall not fully penetrate enclosure*   |
| 2                            | Protected against solid foreign objects of $\text{S}\phi 12.5\text{mm}$ and greater | A $\text{S}\phi 12.5\text{mm}$ object probe shall not fully penetrate enclosure*   |
| 3                            | Protected against solid foreign objects of $\text{S}\phi 2.5\text{mm}$ and greater  | A $\text{S}\phi 2.5\text{mm}$ object probe shall not fully penetrate enclosure*  |
| 4                            | Protected against solid foreign objects of $\text{S}\phi 1.0\text{mm}$ and greater  | A $\text{S}\phi 1.0\text{mm}$ 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.  |

\*: 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 standardized 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. |

## About the TÜV Rheinland certification marks

All products with the marks shown on the left have passed the IP test carried out by the German accreditation organization, TÜV Rheinland.



## 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.

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



## MeasurLink ENABLED marks

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink. MeasurLink® is a registered trademark of Mitutoyo Corporation in Japan and Mitutoyo America Corporation in the United States.



## Installation of Main Unit Startup System

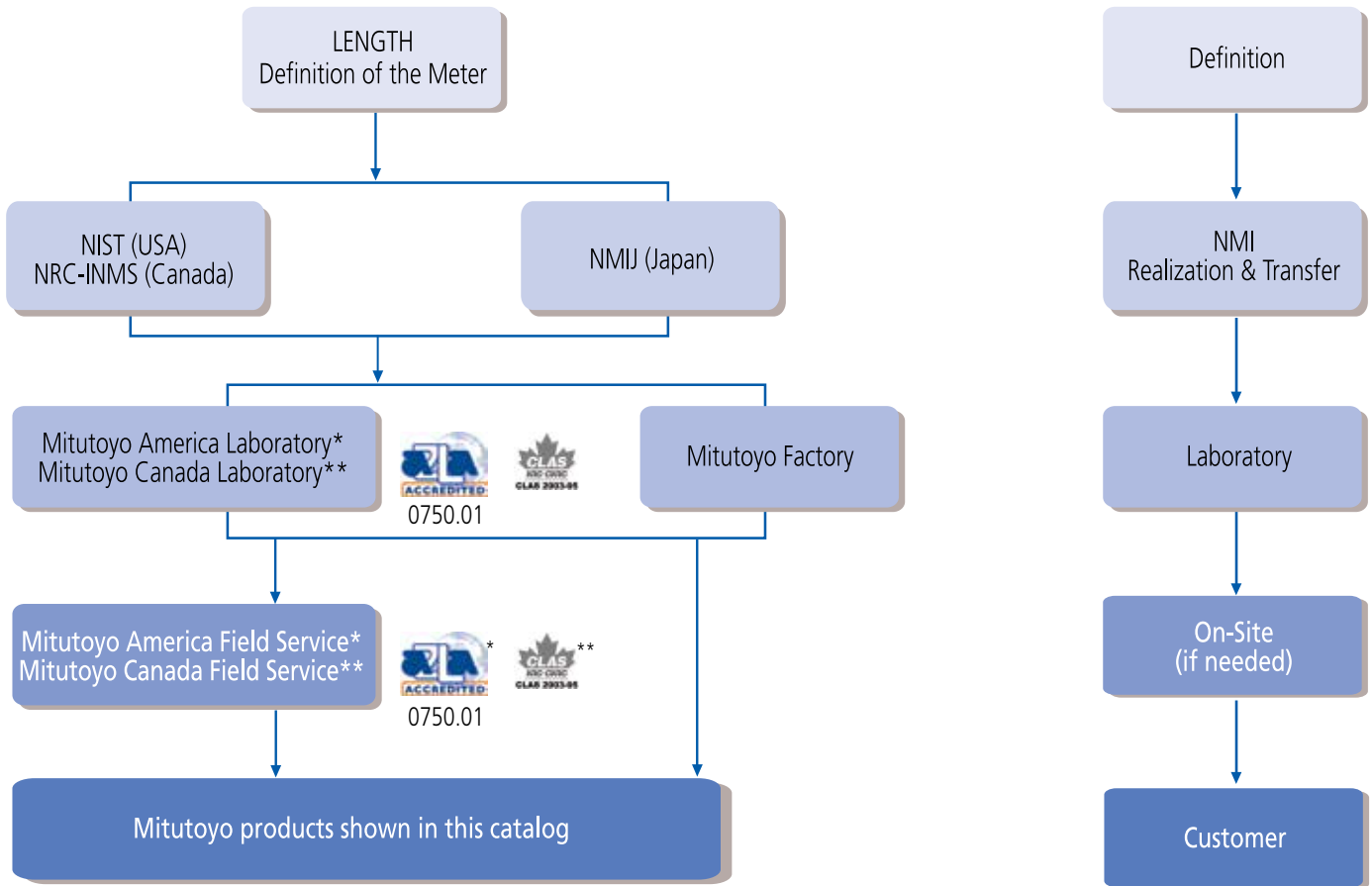
As a part of the enhancement of our export control system, the large CNC measuring machines (all the CNC Coordinate Measuring Machines, Vision Measuring Systems, and Form Measuring Machines) are now equipped with a Main Unit Startup System (relocation detecting system) before export.

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.

**Main Unit Startup System**

# Traceability Mitutoyo North America



Traceability is an essential requirement for all measurements. At Mitutoyo, we consider providing traceability to our customers to be a critical part of our business. Traceability is often referred to as a "chain of comparisons," and that chain always starts with a precise definition. For length measurements, the meter is defined by how far light moves in a vacuum in a defined amount of time. The job of reducing that definition into a practical measurement belongs to the world's National Metrology Institutes (NMI). The NMI in the United States is the National Institute of Standards and Technology (NIST), where they realize and transfer the definition of length to physical measurements of gage blocks, line scales, and other primary standards. From there, traceable measurements at other laboratories and factories are possible. Mitutoyo factories and calibration labs regularly send their standards to NIST; however, traceability can also be established through other recognized NMIs, such as the National Metrology Institute of Japan (NMIJ). The world's leading NMIs, such as NIST and NMIJ, routinely participate in intercomparisons to ensure global traceability to the same unit of length.

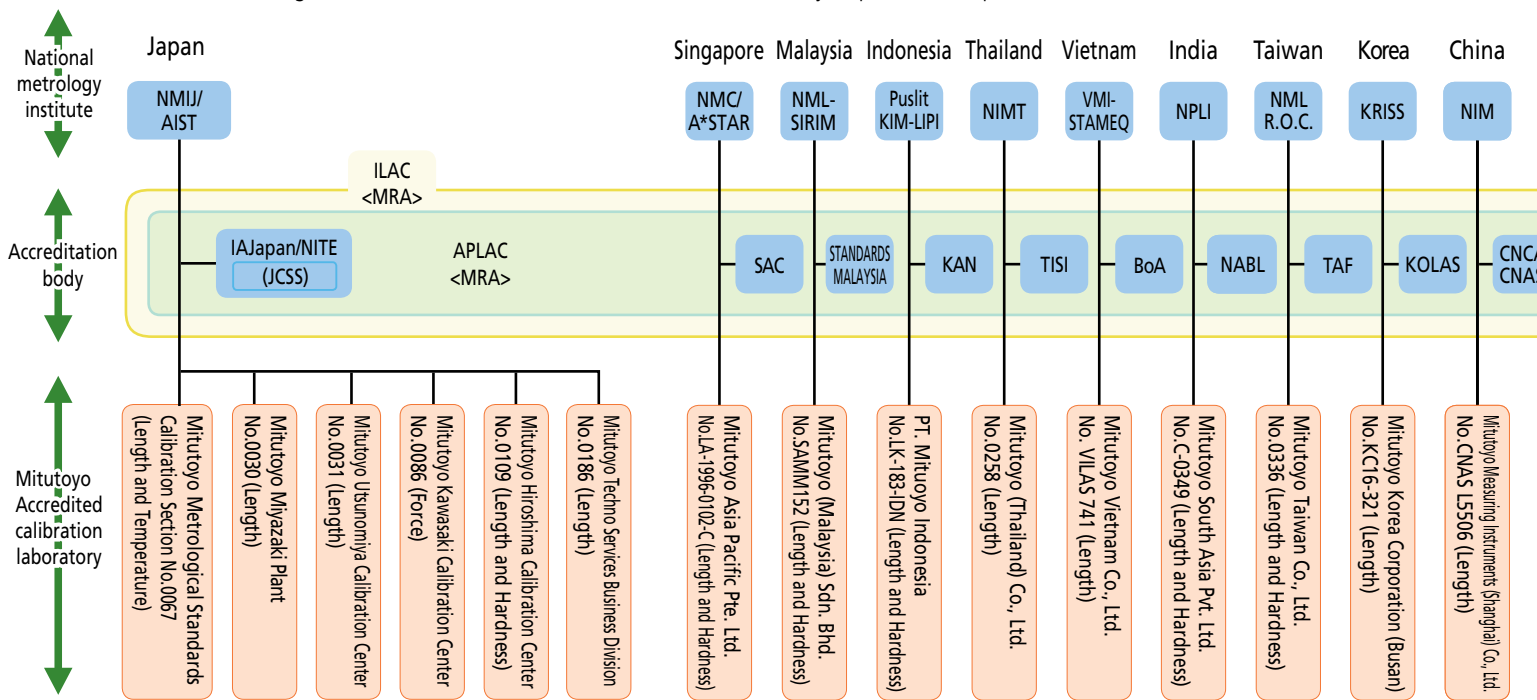
The requirements for demonstrating traceability vary from industry to industry. In the past, some industries required NIST test numbers, but that practice is now obsolete and has been replaced in many industries by the much more demanding requirement of ISO 17025 accreditation. To meet these needs, Mitutoyo America offers our customers A2LA-accredited calibrations either in our labs (Certificate 0750.01), or at your facility (Certificate 0750.01). None of our competitors can match the range and accuracy of accredited calibration services offered by Mitutoyo. Not every quality system requires accreditation, and for the less demanding needs, our standard factory issued certificates can still be used to ensure the required traceability.

Whatever the measurement, whatever the requirements for traceability, Mitutoyo has the most technically advanced metrology products and calibration services to meet your specific needs.

# Offering High-level Calibration Services

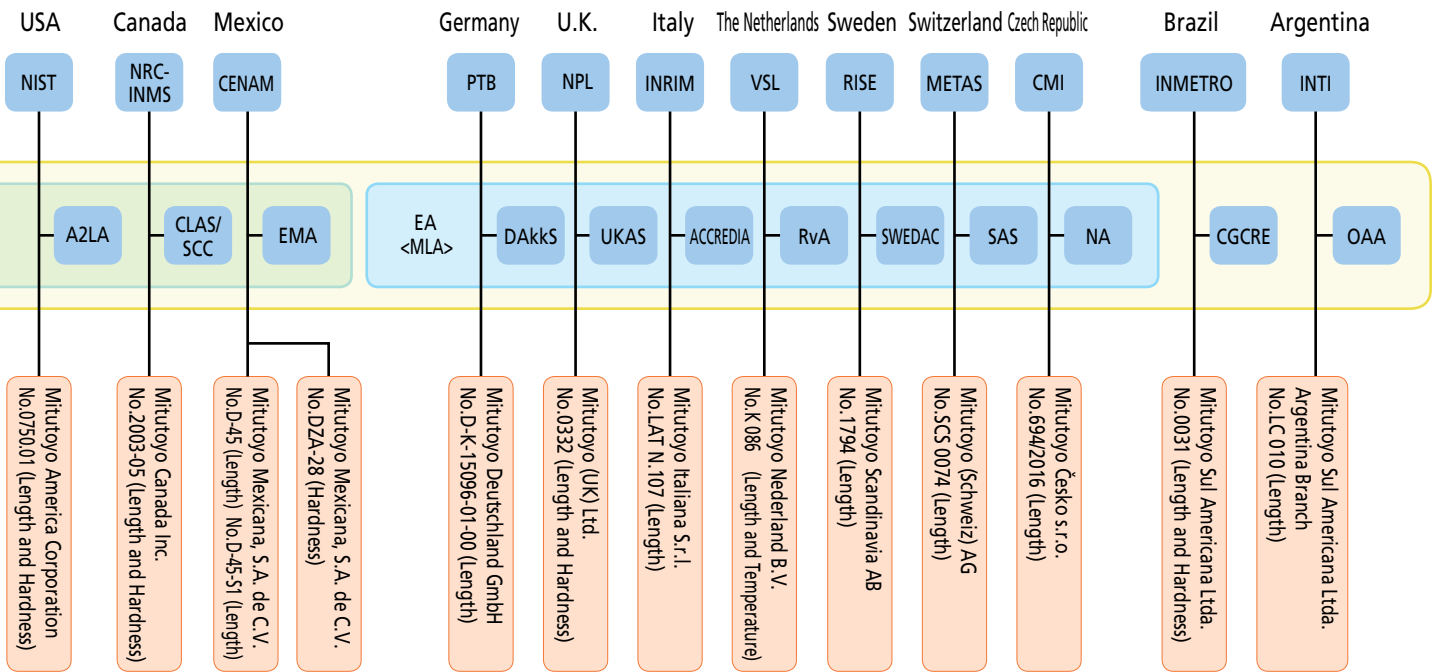
## Calibration Laboratories

Mitutoyo has built a network for comprehensive support of calibration of precision measuring products in the global market. To provide calibration services on a global scale, Mitutoyo has calibration laboratories that have received ISO/IEC 17025 certification, an international standard, from accredited organizations in each of the countries in which Mitutoyo operates in Japan and abroad.



- Japan
  - AIST : National Institute of Advanced Industrial Science and Technology
  - NMIJ : National Metrology Institute of Japan
  - IAJapan : International Accreditation Japan
  - NITE : National Institute of Technology and Evaluation
  - JCSS : Japan Calibration Service System
- Singapore
  - NMC/A\*STAR : National Metrology Centre/ Agency for Science, Technology and Research
  - SAC : Singapore Accreditation Council
- Malaysia
  - NML-SIRIM : National Metrology Laboratory-Standards and Industrial Research Institute of Malaysia
  - STANDARDS : STANDARDS MALAYSIA
  - MALAYSIA
- Indonesia
  - Puslit KIM-LIPI : Research Center for Calibration, Instrumentation and Metrology- Indonesian Institute of Science
  - KAN : Komite Akreditasi Nasional
- Thailand
  - NIMT : National Institute of Metrology (Thailand)
  - TISI : Thai Industrial Standard Institute
- Vietnam
  - VMI-STAMEQ : Vietnam Metrology Institute, Directorate for Standards and Quality
  - BoA : BUREAU OF ACCREDITATION
- India
  - NPLI : National Physical Laboratory of India
  - NABL : National Accreditation Board for Testing and Calibration Laboratories
- Taiwan
  - NML R.O.C. : National Measurement Laboratory R.O.C.
  - TAF : Taiwan Accreditation Foundation
- Korea
  - KRISS : Korea Research Institute of Standards and Science
  - KOLAS : Korea Laboratory Accreditation Scheme
- China
  - NIM : National Institute of Metrology
  - CNCA : Certification and Accreditation Administration of the people's republic of China
  - CNAS : China National Accreditation Service for Conformity Assessment
- U.S.A.
  - NIST : National Institute of Standards and Technology
  - A2LA : American Association for Laboratory Accreditation
- Canada
  - NRC-INMS : National Research Council Canada / Institute for National Measurement Standards
  - CLAS/SCC : Calibration Laboratory Assessment Service / Standards Council of Canada
- Mexico
  - CENAM : Centro Nacional de Metrologia
  - EMA : Entidad Mexicana de Acreditación, a.c.
- Germany
  - PTB : Physikalisch-Technische Bundesanstalt
  - DAkKS : Deutsche Akkreditierungsstelle GmbH
- UK
  - NPL : National Physical Laboratory
  - UKAS : United Kingdom Accreditation Service

Note: The above are domestic and international locations where Mitutoyo provides ISO/IEC 17025 accredited calibration services.  
(As of September, 2018)



- Italy  
INRIM : Istituto Nazionale di Ricerca Metrologica  
ACCREDIA : L'ENTE ITALIANO DI ACCREDITAMENTO

- The Netherlands  
VSL : Van Swinden Laboratorium  
RvA : Raad voor Accreditatie

- Sweden  
RISE : RISE Research Institutes of Sweden AB  
SWEDAC : Swedish Board for Accreditation and Conformity Assessment

- Switzerland  
METAS : The Federal Institute of Metrology  
SAS : Swiss Accreditation Service

- Czech Republic  
CMI : Český Metrologický Institut  
NA : Národní Akreditační Organ

- Brazil  
INMETRO : Instituto Nacional de Metrologia Qualidade e Tecnologia  
CGCRE : Coordenação Geral de Acreditação do INMETRO

- Argentina  
INTI : Instituto Nacional de Tecnología Industrial  
OAA : Organismo Argentino de Acreditación

- ILAC : International Laboratory Accreditation Cooperation
- APLAC : Asia-Pacific Laboratory Accreditation Cooperation
- MLA : Multilateral Agreement
- MRA : Mutual Recognition Arrangement
- EA : European co-operation for Accreditation



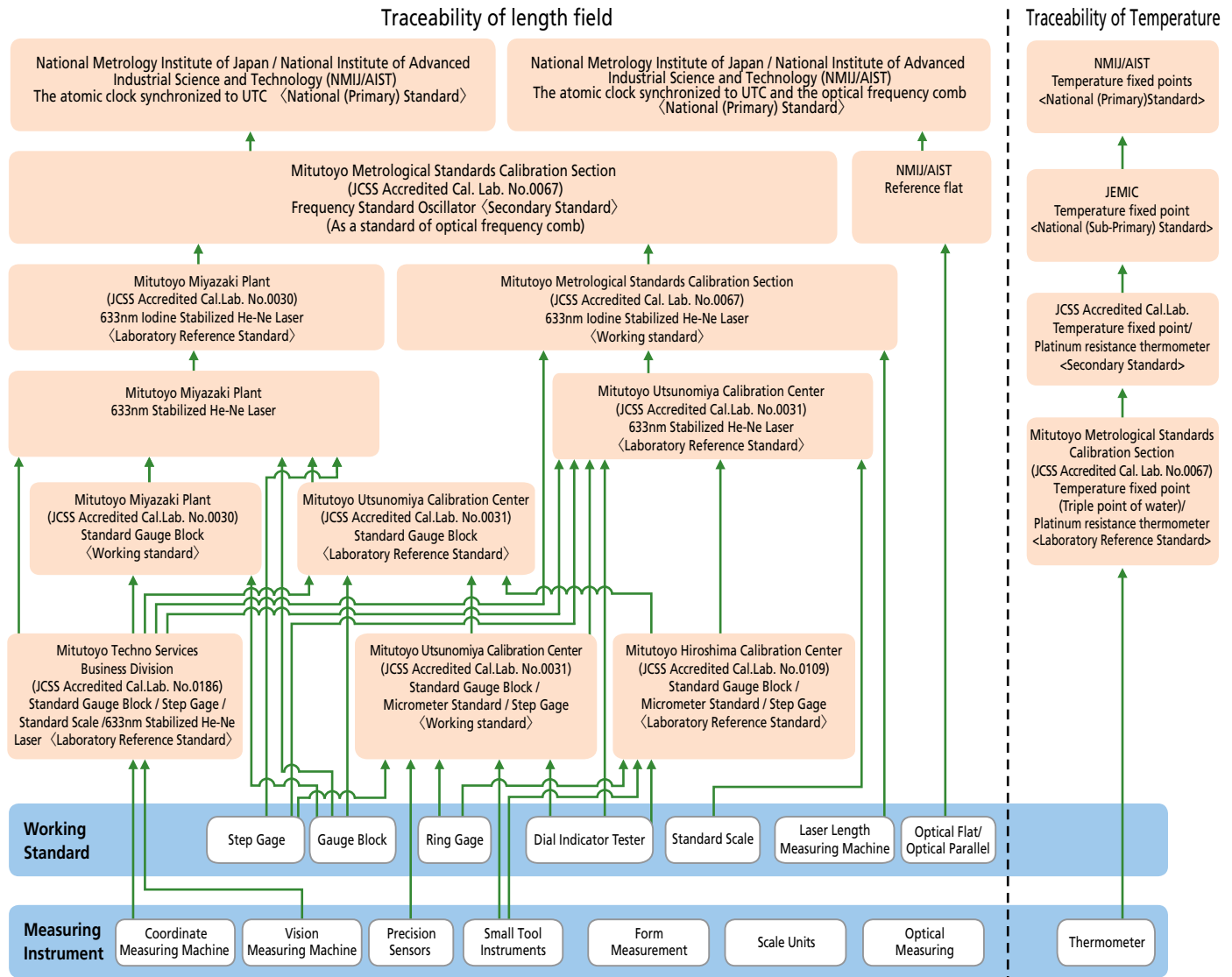
# Offering Reliable Traceability

## Mitutoyo's Traceability System

Mitutoyo's length standards are directly traceable to Japan's national standards. Mitutoyo performs calibration of standards used for calibrating measuring instruments. In this way, the establishment and maintenance of traceability for various measuring instruments used by customers is achieved. Furthermore, Mitutoyo executes the temperature calibrations that are essential for high-accuracy length measurement. In addition, the establishment and maintenance of traceability for test equipment such as hardness and vibration are achieved as well.



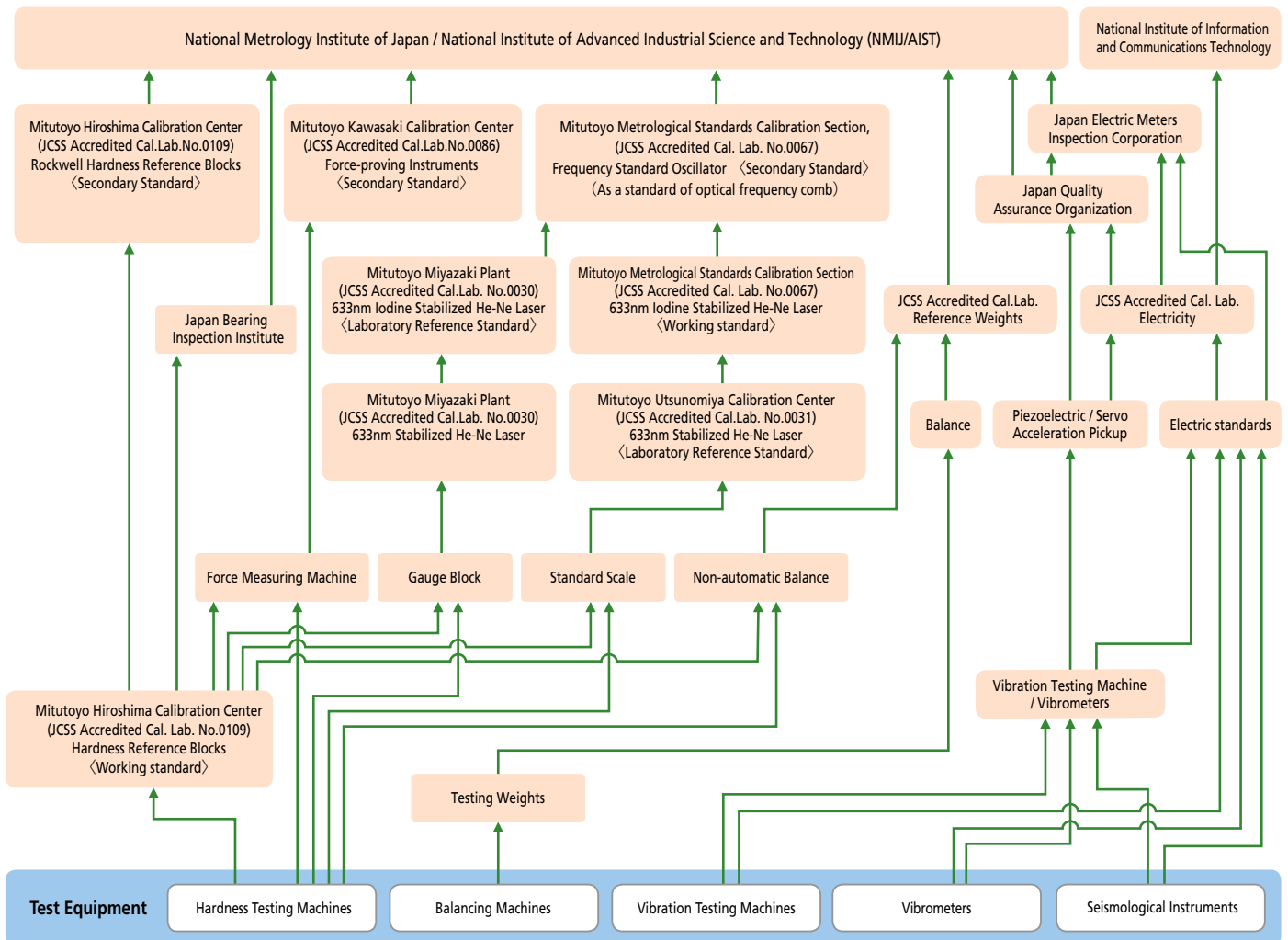
Certificate of JCSS accredited laboratory (Mitutoyo Metrological Standards Calibration Section)



Note: This chart shows a simplified traceability system of Mitutoyo. Detailed traceability charts are published for each product.



## Traceability of Test Equipment

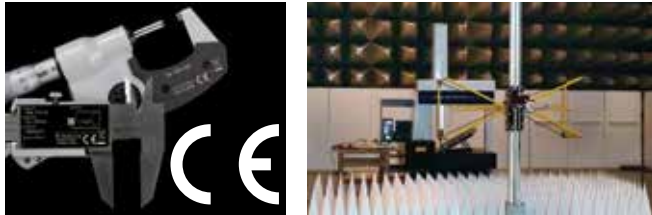


Note: This chart shows a simplified traceability system of Mitutoyo. Detailed traceability charts are published for each product. (As of September, 2018)

# Conformance to CE Marking

## Conformance to CE Marking

In order to improve safety, each plant has programs to comply with the Machinery Directive, the EMC Directive, and the Low Voltage Directive. Compliance to CE marking is also met. CE stands for "Conformité Européenne". CE marking indicates that a product complies with the essential requirements of the relevant European health, safety and environmental protection legislation.



Conformity evaluation for CE marking (EMC Directives)

## Major EU Directives relating to Mitutoyo products

| Name of EU Directive                                    | Applicable range  |
|---|---|
| Machinery Directive                                     | At least one part of a machine that may cause injury to the human body if it moves due to movement of an actuator such as a motor.  |
| EMC Directive (Electromagnetic Compatibility Directive) | A product that may produce electromagnetic radiation or which is influenced by electromagnetic radiation from outside.  |
| Low Voltage Directive                                   | Equipment (device) that uses AC voltage of 50 to 1000V or DC voltage of 75 to 1500V.  |
| Radio Equipment Directive                               | All electrical and electronic equipment that intentionally transmits and receives radio waves at frequencies below 3000 GHz.  |
| RoHS Directive  | Restriction of the use of certain hazardous substances in electrical and electronic equipment.<br>Restricted substances and maximum concentration values tolerated by weight:<br><ul style="list-style-type: none"> <li>· Lead (0.1 %)</li> <li>· Cadmium (0.01 %)</li> <li>· Hexavalent chromium (0.1 %)</li> <li>· Polybrominated biphenyls (PBB) (0.1 %)</li> <li>· Polybrominated diphenyl ethers (PBDE) (0.1 %)</li> </ul> |

## Response to WEEE Directive

The WEEE Directive\*<sup>1</sup> is a directive that mandates appropriate collection and recycling of electrical and electronic equipment waste.

The purpose of this directive is to increase the reuse and recycling of these products, and seeks eco-friendly product design. To differentiate between equipment waste and household waste, a crossed-out wheeled-bin symbol  is marked on a product. We will promote eco-friendly design for our products.

\*1 WEEE Directive: Directive 2012/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment.

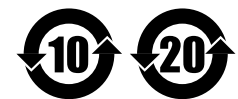
## Response to REACH Regulation

REACH Regulation\*<sup>2</sup> is a regulation governing registration, evaluation, authorization and restriction of chemical substances in Europe, and all products such as substances, mixtures and molded products (including accessories and packaging materials) are regulated. Chemical substances scientifically proven to be substances that are hazardous to human health and the global environment (a substance of very high concern (SVHC)) are prohibited to be sold or information concerning them disclosed is mandated in Europe. We will actively disclose information about our products and provide replacement if we find our products contain any of the listed substances.

\*2 REACH Regulation: Regulation (EC) No1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals

## Response to Management Methods for Controlling Pollution by Electronic Information Products (China RoHS)

We set the environmental protection use period regulated by China RoHS per product and label with the marks shown on the right, together with a list of the contained substances.



"Environmental Protection Use Period" mark\*<sup>3</sup>

\*3 The environmental protection use period does not indicate the product warranty period.

## Regarding the use of Silver Oxide batteries, please follow these precautions:

### Warning

- Do not heat, disassemble nor dispose of in fire.  
Doing so damages the insulation materials and may cause fire, heat generation, leakage or bursting.
- Do not short circuit.  
If the (+) and (-) terminals are connected together through a very low resistance path, such as a metal casing, a short circuit occurs.  
As a result, fire, heat generation, leakage or bursting may occur.
- Keep batteries out of children's reach.  
A young child may swallow a battery and risk danger to health.

When you design mechanical hardware around a battery, ensure that the battery is securely contained in order to prevent children from removing it.  
When you store batteries, keep the batteries out of children's reach.  
If a battery is swallowed, consult a physician immediately.

- If leaked liquid contacts the eyes, do not rub them but immediately, wash them with clean water and consult a physician as soon as possible.
- If leaked liquid contacts clothing, to protect against irritation, wash them with clean water immediately.

### Caution

- Do not install in reverse polarity. Take care to identify the (+) and (-) terminals correctly.
- Do not solder directly to a battery.
- Do not use new and used batteries together. Do not use different types of batteries together.
- Do not charge.
- Do not use nor leave batteries in direct sunlight nor in high-temperature areas.
- Keep batteries away from direct sunlight, high temperature and humidity.

- Avoid letting batteries contact water.
- Ensure batteries are inserted without coming into contact with metal parts of equipment.
- Read the equipment instruction manual and precautions carefully before using.
- Remove batteries from equipment that will not be used for a prolonged period.
- In case of disposal, insulate (+) and (-) terminals of a battery by applying an insulating material.

# A

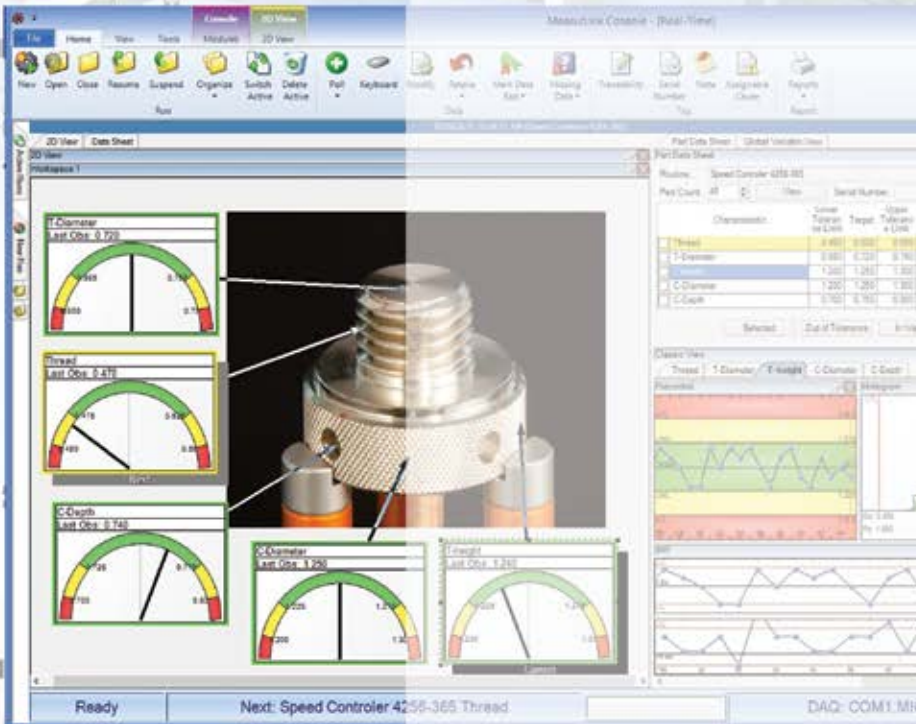
## Small Tool Instruments and Data Management

### Measurement Data Management

#### INDEX

##### Data Management (SPC)

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# MeasurLink®

An Integrated Solution for Quality Data Management

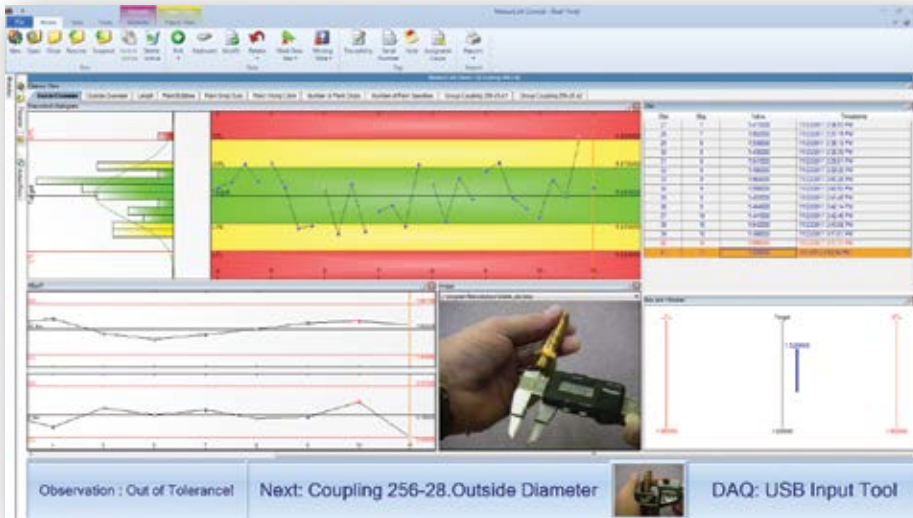
MeasurLink® meets the challenge of centralizing your quality data with the most versatile tool and instrument interface options available. This high-end statistical platform delivers real-time data—when you need it most—with instant message capabilities and comprehensive quality reporting. MeasurLink® provides part inspection visualizations that are second to none, ensuring a clear view of your inspection process and your measurement results.

Whether used as an enterprisewide quality data solution or as a stand-alone quality data station, MeasurLink® provides the complete situational awareness that you need to successfully manage your process improvement and defect prevention efforts.

MeasurLink® is backed by Mitutoyo, the global leader in metrology, combining a full product line of precision measuring tools, instruments and equipment with a worldwide information network that understands the unique precision measurement and quality management needs of every industry that it serves.

Most of Mitutoyo's electronic instruments can output data via optional connecting cables or wireless transmitters and receivers in the form of the Digimatic code. The Digimatic code can also be converted into RS-232C format with 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 Suite of Software

MeasurLink is an easy-to-use, Windows-based family of quality data management software applications. MeasurLink combines real-time data acquisition, on-line statistical analysis, integrated networking and quality information sharing into a comprehensive data management solution.

- **Real-Time**  
Real-time data collection
- **Process Analyzer**  
Analysis of all data
- **Process Manager**  
Network monitoring dashboard
- **Gage R&R**  
Gage repeatability and reproducibility
- **Gage Management**  
Gage inventory and calibration control
- **Report Scheduler**  
Automated report distribution



## MeasurLink 8 System Requirements

### Database Management System (DBMS) Requirements

MeasurLink 8 ships with a copy of Microsoft® SQL Server 2014 SP1, which can be for a standalone or a workgroup installation. MeasurLink 8 also supports:

- Microsoft® SQL Server 2014
- Microsoft® SQL Server 2012
- Microsoft® SQL Server 2008

### Operating System Requirements

All MeasurLink 8 products are supported on the following Microsoft® Windows Operating System versions:

- All Windows® 10 versions
- All Windows® 8 versions
- All Windows® 7 versions
- 32-bit and 64-bit supported

[www.measurlink.com](http://www.measurlink.com)

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# MeasurLink®

An Integrated Solution for Quality Data Management

## User-friendly

Click a gage button and watch the charts update in real-time. This helps the operator stay on top of the process. Begin collecting data in minutes with Inspection Wizard.

## Data acquisition

Collects data from digital micrometers, calipers, indicators, bore gages, etc. Keyboard entry is a snap. Collect data for one or a million parts.

## Comprehensive SPC

Easy-to-use control charts, histograms, capability, detailed statistics, assignable causes, corrective actions and traceability make this software best in class.

## Variable data

Collect dimensional data (length, width, height, outside diameter, inside diameter weight, etc.). Supports derived features (calculations for run out, volume, true position, etc.)

## Attribute data

Collect data from visual inspections (burrs, cracks, dents, missing holes, etc.) to determine the fitness of a part. Track failures using a go/no-go style or count the defects on a characteristic to determine if a part is defective. There is complete flexibility to study the individual characteristics and as a group.

## Engineering specifications

Attach drawings to parts, routines or individual characteristics for viewing. Most file formats are supported as an attachment (e.g. Word, PDF, CAD).

## Multimedia aids

Attach movies (AVI, MOV, MPG), sound (WAV) and images (BMP, JPG, TIF) to parts, routines or individual characteristics as instructional aids for an operator.

## Revision history

Track specification adjustments and preserve historical data.

## Mathematically derived characteristics

Full functioning real-time calculator with standard math functions including square root, exponential, trigonometric, sum, average, max, min, calculations.

## Variable collection frequency

Allows characteristics of the same routine to be measured at different intervals while maintaining appropriate prompted guided sequencing.

## Part pictures

View scanned blueprints and digital photographs at a glance. On-screen guided sequencing keeps the operator moving to the right feature.

## Data tests

Full support of Western Electric and Nelson Tests for pattern recognition in control charts (e.g. extreme point, trend, stratification, oscillation, etc.) along with various alerts for each failed test.

## Forced assignable cause

Force assignable cause tags on inspector during collection if process is out of control. Empower operator to build on existing pick list.

## Corrective action plans

Operators choose corrective action as applied to the part or process. Multiple corrective actions can be applied to any subgroup. Empower operator to build on existing corrective action list.

## Sequenced and random gage input

Flexible data input. Collect data by feature, by part or randomly. Guided sequencing minimizes inspection errors.

## Time-stamped data

All observation data is marked with the data and time from the computer clock.

## Flexible reporting

Build report templates with company logos and free form text. Select and position chart types to customer specification.

## Mixed variable/attribute data

Mix your dimensions and non-conformances in the same inspection routine. Track defects and defectives along with your dimensional data.

## Crystal Reports

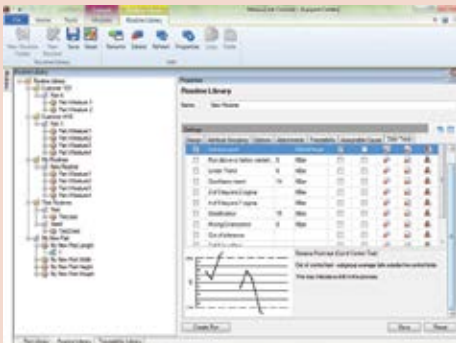
Create your own customized Crystal Reports for use with part or run data.

## FDA 21CFR Part11 support

Provides support for medical and pharmaceutical manufacturers electronic records, including audit trails, e-signatures (Process Analyzer Professional only) and advanced security.

## Inspection wizard

Begin collecting data in 60 seconds with a "Quick Run" by defining features, tolerances and input method.



**Easy-to-use** MeasurLink® provides you the most intuitive interface with complete SPC functionality to help monitor and manage your manufacturing processes. With MeasurLink®, you can easily manage the quality levels of your parts, identify problem areas and apply corrective action to areas in need of attention.



Refer to Bulletin No. (2188) for more details.

[www.measurlink.com](http://www.measurlink.com)



# MeasurLink® Real-Time

## On-line Real-Time Data Collection

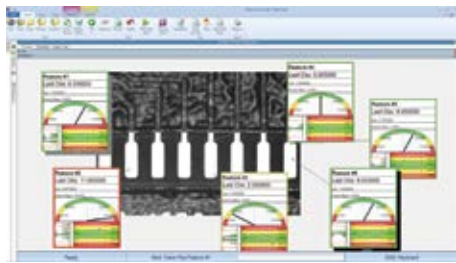
### FEATURES

MeasurLink Real-Time performs as a data acquisition clearinghouse by enabling you to connect and acquire data from virtually any measuring device. It supports the full range of metrology technology, including calipers, micrometers, indicators, CMMs, vision systems and more. Select the edition to fit the device and the needs.

### Real-Time Standard Edition

Designed for customers who want to acquire and analyze data in real-time and check variable and attribute inspection to maximize production and minimize defects. It has views to allow the user to create parts, characteristics with nominal and tolerance, and traceability lists. The data collection interface provides real-time graphics for Run charts, Control charts, Histograms and Statistics. Standard views include Datasheet (observations and charts), Classic View (chart windows), and 2D view (part images with callouts that include charts and statistical data) along with a customizable Info View and additional Manager views. Full reporting template functionality is provided.

**Supported data sources:** keyboard, RS232 and USB devices.



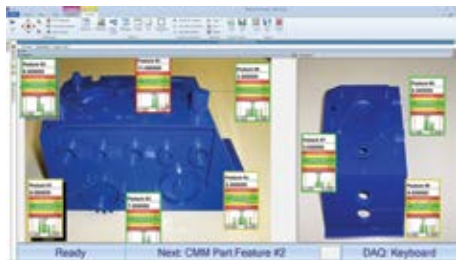
### SPECIFICATIONS

| Order No. | Description                             |
|-----------|---|
| 64AAB470  | MeasurLink 8 Real-Time Standard Edition |

### Real-Time Professional Edition

Enables customers to connect and acquire data from Mitutoyo coordinate measuring machines, vision and form measuring systems via native integration (DDE). ASCII and QMD (xml-based) file import are also supported. In addition to all of the features supported by **MeasurLink 8 Real-Time Standard Edition**, this application also supports data filters. Full reporting functionality with templates is also provided.

**Supported data sources:** keyboard, RS232 and USB devices, native Mitutoyo integration (DDE), ASCII and QMD (xml-based) file import.



### Import templates

Easily create an import template that maps data in a text file to MeasurLink information. Templates are saved to the database for everyone to use and can be added as data sources to data collection stations. An import template can be verified against the source file without adding data to the system.

### SPECIFICATIONS

| Order No. | Description                                 |
|-----------|---|
| 64AAB471  | MeasurLink 8 Real-Time Professional Edition |

### Direct data transfer

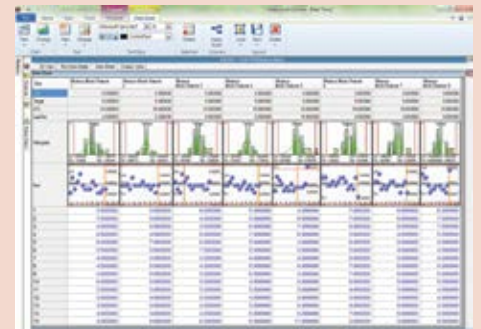
Collect data into MeasurLink from MeasurLink enabled Mitutoyo capital equipment. This provides a tighter and more robust interface than importing data from files.

### Filter data

All data collected within a Real-Time run is related. Often, especially for runs containing a large volume of subgroups, requests are made for subsets of data that are further related from the entire run's population. MeasurLink provides robust filtering capabilities to comply with these requests.

### Import data

When set up as a data source, import templates are readily available to the operator, or periodic imports can be executed.



MeasurLink is designed to detect and display patterns and provide additional statistical information. Many patterns can be seen appearing on SPC charts, including:

- Cycles
- Trends
- Freaks
- Mixtures
- Grouping or "bunching" of measurements
- Gradual change in level
- Sudden shift in level
- Instability (abnormally large fluctuations)
- Stratification (abnormally small fluctuations)
- Interactions (two or more variables acting together)
- Systematic variation
- Tendency of one chart to follow another
- Attribute data tests



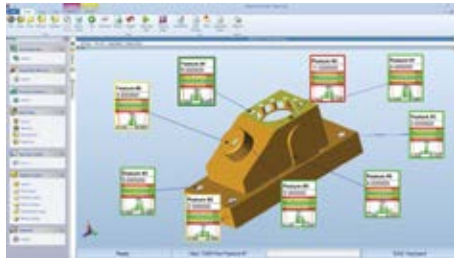
Refer to Bulletin No. (2188) for more details.

[www.measurlink.com](http://www.measurlink.com)

## Real-Time Professional 3D Edition

Designed for customers who wish to collect data using the Hoops 3D graphics view, in addition to all features offered by MeasurLink 8 Real-Time Professional Edition. Hoops 3D files can be exported from most CAD systems and provides the operator with a real view of the part. Camera angle and position can be saved for each characteristic providing for an intuitive prompted guided sequencing for the inspector.

**Supported data sources:** keyboard, RS232, and USB devices, native Mitutoyo integration (DDE), ASCII and QMD (xml-based) file import.



### 3D view

True three-dimensional model support with Hoops streaming files (\*.HSF). Export your part's model from Catia, Solidworks or other CAD software and place callouts in the 3D space.

### Flexible callout design

Callouts provide part acceptability at a glance. You can design them the same way as for the two-dimensional view to include charts or statistical information with the ability to size any element inside the callout.

### Guided sequence

The display can automatically change during data collection to show the next or last observation point, providing a simple guided sequence for the inspection procedure. By saving a different view for each characteristic to be inspected, you can have the model rotate, pan or zoom to show the operator details of the part.

## SPECIFICATIONS

| Order No. | Description                                    |
|-----------|--|
| 64AAB472  | MeasurLink 8 Real-Time Professional 3D Edition |

## Edition Definitions

| Function                     | Real-Time Standard | Real-Time Professional | Real-Time Professional | Process Analyzer Lite | Process Analyzer Professional |
|------------------------------|--------------------|------------------------|------------------------|-----------------------|-------------------------------|
|                              | Edition            | Edition                | 3D Edition             | Edition               | Edition                       |
| Classic SPC views            | x                  | x                      | x                      | x                     | x                             |
| Datasheet                    | x                  | x                      | x                      | x                     | x                             |
| 2D View                      | x                  | x                      | x                      | x                     | x                             |
| Manager Views                | x                  | x                      | x                      |                       |                               |
| Hoops 3D View                |                    |                        | x                      |                       |                               |
| Filter                       |                    | x                      | x                      |                       | x                             |
| CMM/Vision/Form connectivity |                    | x                      | x                      |                       |                               |
| Import (ASCII)               |                    | x                      | x                      |                       |                               |
| Audit Trails                 | x                  | x                      | x                      | x                     | x                             |
| Merge, Copy and Edit Data    |                    |                        |                        |                       | x                             |
| Scatter Chart                |                    |                        |                        |                       | x                             |
| Archive Data                 |                    |                        |                        |                       | x                             |
| Electronic Signatures        |                    |                        |                        |                       | x                             |
| Summary Analysis             |                    |                        |                        |                       | x                             |
| Test for Normality           |                    |                        |                        |                       | x                             |

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# MeasurLink® Process Analyzer

## Data Analysis Software for Windows

### FEATURES

Process Analyzer is an invaluable tool for your quality team. It gives you the flexibility to analyze your processes, identify problem areas and take corrective action to improve your product's quality. Inspection runs can be sorted by inspection station, routine or part, and are displayed with the look and feel of the Windows Explorer. Inspection data can be merged, filtered, grouped, charted and printed to the user's preferences.

### Process Analyzer Lite Edition

Designed for offline viewing of real-time data in a networked environment. All views that are available in Real-Time Standard Edition are supported, with the exception of the Manager Views. Full reporting template functionality is also provided.



#### Review inspection data

Analyze inspection data, view notes and traceability. Open data from different runs to compare the data and process behavior.

#### Switch between databases

For larger installations that use different databases, the ability to switch the connection allows an engineer to analyze data from all sources.

#### Tree control navigation

Self-organized inspection data provided in an easy to use navigation tree. Sort data by station or inspection routine, part, year, month or day.

#### Reporting

Reporting is made easy through the use of a "what you see is what you get" style of template creation that allows you to pick chart and data through drag and drop with resizing. Several standard report templates are provided out of the box.

### SPECIFICATIONS

| Order No. | Description                                |
|-----------|--|
| 64AAB474  | MeasurLink 8 Process Analyzer Lite Edition |



Refer to Bulletin No. (2188) for more details.

### Process Analyzer Professional Edition

Designed for more robust manipulation of real-time data in a networked environment using advanced features not available in MeasurLink Process Analyzer Lite Edition. It enables quality engineering to slice and dice data in meaningful ways that contribute to quality control initiatives.

For larger installations that use different databases, the ability to switch the connection allows an engineer to analyze data from all sources.

#### Group, Search and Sort data

View data by part, routine, station, year, month, day. Apply saved filters to data and search for specific traceability or serial number criteria.

#### Merge Data

Combine lot based or just in time collected data to get a bigger picture of process variation and production quality.

#### Scatter Plots

Perform correlation studies to identify process interactions.

#### Summary Analysis

Use wizard to view and print a grid with capability and statistical information.

#### Electronic Signatures

The e-signatures can be applied to runs only in Process Analyzer Professional. When combined with audit trails available in Real-Time, and security is implemented, then MeasurLink provides support for FDA requirements for the medical and pharmaceutical manufacturers.

#### Filter Data

Robust filtering capabilities are provided. Often, for runs containing a large volume of data, requests are made for subsets of data.

#### Compare Capability to Traceability

Easily view charts showing the capability of a characteristic based on the traceability, subgroup or time. Compare the capability of machines, for example. The Cpk shows green for exceeding requirements and red for failing.

Process Analyzer Professional is known as the quality manager's favorite tool. Analyze and report on data collected across all machines. For example, merge three months of data together and easily compare operators, suppliers or machines.



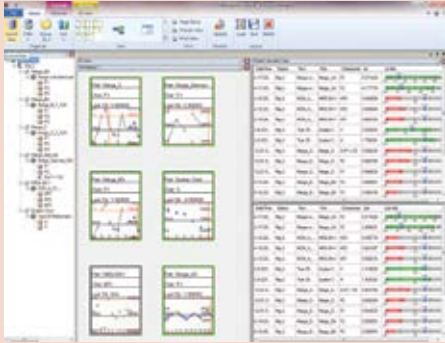
### SPECIFICATIONS

| Order No. | Description  |
|-----------|--|
| 64AAB475  | MeasurLink 8 Process Analyzer Professional Edition |



# MeasurLink® Process Manager

## Network Monitoring Software for Windows



**Plant View** allows users the highest level view of their shop floor processes. Callouts have a meaningful border color related to tests for capability that have been enabled in each routine's properties.

### FEATURES

Real-time monitoring of data as it is collected. Provides the QC/production manager with the perfect tool to organize and maintain a shop-wide quality program at a glance.

#### Process Manager Standard Edition

Process Manager provides a method to audit the entire shop floor inspection activity from a single PC. Easily see process information without walking from one inspection area to another by viewing current production across all machines. Show clients your quality operation for the entire facility.

#### Log View

Designed to display information from multiple stations in a tabular view format. The user can select the type of events to be monitored.

#### Group, Search and Sort Data

View data by part, routine, or station. Apply saved filters to data so you monitor only the data that you are responsible for.

#### Manager View

Display a snapshot window of characteristics that are currently being collected in MeasurLink Real-Time. The data can be sorted by station, capability or timestamp.

#### Global Variable View

Display process capability across all operations in your plant.

#### Remote viewing

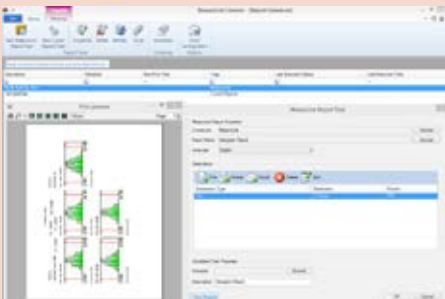
See what the operators see and what your customers will see before product is delivered. Drill down through data to see detailed information. View traceability, assignable causes, corrective action, notes and raw data for current production across all machines.

#### Ticker View

Display capability values that continuously scroll on the screen.

### SPECIFICATIONS

| Order No. | Description                                   |
|-----------|---|
| 64AAB476  | MeasurLink 8 Process Manager Standard Edition |



**MeasurLink Report Scheduler** allows users to schedule Crystal Reports and MeasurLink Reports. Can be used to promote a paperless environment.

# MeasurLink® Report Scheduler

## Automated Report Distribution

### FEATURES

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.

#### Report Scheduler Standard Edition

##### 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.

### SPECIFICATIONS

| Order No. | Description                                    |
|-----------|--|
| 64AAB538  | MeasurLink 8 Report Scheduler Standard Edition |

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# MeasurLink® Gage R&R

## Measurement Systems Analysis

### FEATURES

Determines the repeatability and reproducibility, linearity, bias and stability of inspection systems, allowing you to isolate gaging problems.

### Gage R&R

Measure the capability of a measurement system for a measurement task. These techniques provide information about a measurement system's reproducibility, repeatability, location or stability. Graphical tools allow for isolation of gaging problems including inconsistencies in technique between operators or inspectors.

### Study Wizard

User-guided study setup helps the user define the study that needs to be performed in order to determine the measurement system's capabilities. All elements required for the selected study are captured before the study is created, and the user is warned to provide any missing information before beginning the study.

### Data Input

The data for the study can be collected directly from a gage connected to the system or transferred from Mitutoyo coordinate measuring machines, vision and form measuring systems via native integration (DDE). Users can also key in data.

### Group Studies

All studies in the database are visible and can be organized using different criteria.

### Randomized Collection Sequence

As recommended by the academic community, the collection sequence can be automatically randomized.

### Study Types

MeasurLink Gage R&R uses calculation methods based on AIAG's Measurement Systems Analysis, Fourth Edition (commonly known as MSA 4). The following study types are supported:

#### Location

- Bias
- Linearity

#### Reproducibility

- Type I
- Variable Range Method

#### Repeatability & Reproducibility

- Crossed ANOVA
- Crossed Average & Range
- Nested ANOVA
- Nested Average & Range

#### Stability

- Stability

#### Attribute Studies

- Attribute MSA 4
- Attribute Short Method

# MeasurLink®

An Integrated Solution for Quality Data Management



In addition to the standard calculations this software also provides graphical tools for analysis of the measurement system. The Xbar and R chart can show whether there is adequate gage discrimination to record part-to-part variation in production and operator consistency. The Part-by-Appraiser plot can show a lack of consistency between operator inspection techniques.

### SPECIFICATIONS

| Order No. | Description           |
|-----------|-----------------------|
| 64AAB477  | MeasurLink 8 Gage R&R |

# MeasurLink® Gage Management

## Gage Inventory and Calibration Control

### FEATURES

Gage Management is essential for monitoring the calibration history of a gage. Periodic adjustments may be required to bring a gage into specification.

### Gage Management Standard Edition

#### Gage Inventory Management

Easily enter and view details on all gages in a grid that can be grouped, filtered and sorted.

#### Email List of Gages Due or Overdue

Once the gage calibrations are scheduled, the list of gages due or overdue for calibration can be viewed as a report, and those lists are available for scheduled email notifications. Also available for gages due for Gage R&R studies (requires purchase of Gage R&R).

#### Gage Calibration

Perform and track calibrations using customizable gage calibration procedures. Also track outside calibration results. A "smart" calendar allows definition of working days.

#### Gage Tracking and History

Track gage movement as gages are transferred to various activities, locations and users. Supports vendor contact and user lists.

#### Print Gage Labels

Interface with a Brother's P-touch printer for printing labels for gages.



- Gage inventory management
- Gage calibration recall system
- Gage calibration procedure
- Assessment and reporting
- Gage vendor management
- Gage location management
- Gage R&R history

### SPECIFICATIONS

| Order No. | Description                  |
|-----------|------------------------------|
| 64AAB478  | MeasurLink 8 Gage Management |

## MeasurLink® Workgroup and Site License Packages

### Packages and Bundles

The MeasurLink suite is best acquired as a Workgroup or Site License. These packages are a mix and match bundle of any module. Workgroups are 5, 10 and 15 licenses. A site license is 30 or more licenses of MeasurLink. The package can be any combination of Real-Time\*, Process Analyzer, Process Manager, Gage R&R, Gage Management and/or Report Scheduler modules. All of the stations in the installation store their data in an SQL database located on the user's network.

\*Real-Time Professional 3D Edition has an additional surcharge per license.

### MeasurLink Group Licensing

#### SPECIFICATIONS

| Order No. | Description               |
|-----------|---------------------------|
| 64AAB479  | MeasurLink 8 Site License |

MeasurLink 8 Site License is a bundle package that provides the customer with the ability to install up to and including 30 copies (any combination) of any application in the MeasurLink 8 suite.

| Order No. | Description                    |
|-----------|--------------------------------|
| 64AAB480  | MeasurLink 8 Workgroup License |

MeasurLink 8 Workgroup License is a bundle package that provides the customer with the ability to install up to and including 15 copies (any combination) of any application in the MeasurLink 8 suite.

| Order No. | Description                              |
|-----------|--|
| 64AAB482  | MeasurLink 8 Workgroup License – 10 Pack |

MeasurLink 8 Workgroup License – 10 Pack is a bundle package that provides the customer with the ability to install up to and including 10 copies (any combination) of any application in the MeasurLink 8 suite.

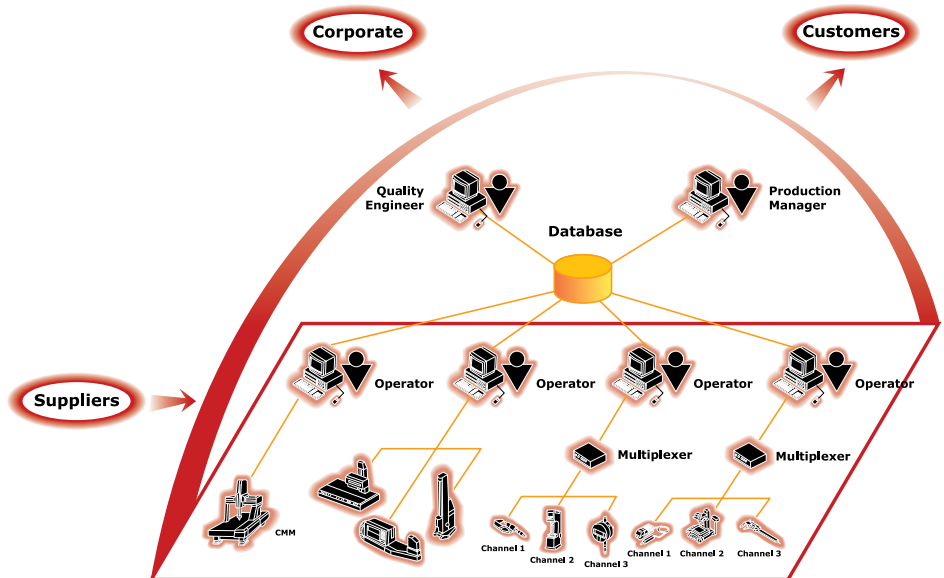
| Order No. | Description                             |
|-----------|---|
| 64AAB483  | MeasurLink 8 Workgroup License – 5 Pack |

MeasurLink 8 Workgroup License – 5 Pack is a bundle package that provides the customer with the ability to install up to and including 5 copies (any combination) of any application in the MeasurLink 8 suite.

| Order No. | Description                   |
|-----------|-------------------------------|
| 64AAB484  | MeasurLink 8 Academic License |

MeasurLink 8 Academic License a bundle package that provides universities and technical colleges with the ability to install up to and including 20 copies (any combination) of any application in the MeasurLink 8 suite for educational purposes.

Note: Upgrade packages are also available. Please contact our sales department for details.



The Manufacturing Process with MeasurLink®



www.measurlink.com

#### Benefits include:

- Better unit cost.
- Mix and match desired modules.
- Site licenses can be shared among multiple facilities.
- Security center can manage users access with each module.
- Support Center allows users to manage the suite through the network, eliminating interruption in data collection.

# MeasurLink® Floating License

## Floating License Upgrade Option

Users who want to use MeasurLink in a terminal server environment or want to have a number of concurrent users should consider the Floating License add-on. This upgrade is available in packs of 5, 10, 15 and 30. This upgrade includes a licensing server that manages the number of licenses available.



This type of installation is common in modern IT infrastructure. Thin-Client hardware or traditional PCs can utilize this option. A user could choose to upgrade a portion of or their entire number of licenses to the Floating License upgrade option.

### Benefits include:

- Easier maintenance of installations.
- Most flexible use of modules.
- Cost-effective way to include more users without purchasing additional licenses.
- Can be added to an existing installation or integrated during the initial installation.

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## MeasurLink Floating Option

### SPECIFICATIONS

| Order No.        | Description                             |
|------------------|---|
| <b>64AAB479F</b> | MeasurLink 8 Floating License Option 30 |

MeasurLink 8 Floating License Option 30 adds the Floating Option to a new or an existing installation. Must already have a minimum of 30 licenses to add this option.

| Order No.        | Description                             |
|------------------|---|
| <b>64AAB480F</b> | MeasurLink 8 Floating License Option 15 |

MeasurLink 8 Floating License Option 15 adds the Floating Option to a new or an existing installation. Must already have a minimum of 15 licenses to add this option.

| Order No.        | Description                             |
|------------------|---|
| <b>64AAB482F</b> | MeasurLink 8 Floating License Option 10 |

MeasurLink 8 Floating License Option 10 adds the Floating Option to a new or an existing installation. Must already have a minimum of 10 licenses to add this option.

| Order No.        | Description                            |
|------------------|--|
| <b>64AAB483F</b> | MeasurLink 8 Floating License Option 5 |

MeasurLink 8 Floating License Option 5 adds the Floating Option to a new or an existing installation. Must already have a minimum of 5 licenses to add this option.

*Note: Upgrade packages are also available. Please contact our sales department for details.*



Refer to Bulletin No. (2188) for more details.

# Input Tools

## SERIES 264 — Digimatic Gage/PC Data Input Device

### FEATURES

- The input tool allows you to connect any Mitutoyo gage, with SPC output, directly to your PC.
- An USB keyboard signal conversion input tool, IT-016U converts measurement data to keyboard signals and directly inputs them to cells in off-the-shelf spreadsheet software such as Excel.
- An RS-232C communication input tool, IT-007R is also available to input data through RS-232C communication.
- More accurate measurement is possible using an optional foot switch.

### SPECIFICATIONS

| Product Code No.           | Input Tool for RS-232C<br><b>264-007</b>   | Input Tool for USB<br><b>264-016-10</b>                     |
|----------------------------|--|---|
| Measuring Tools Required*1 | Mitutoyo Digimatic measuring tools with SPC output   |   |
| PC Requirement             | PC Compatible, (including laptops) with RS-232C Interface<br>Connects to RS-232C port on CPU (D-sub 9-pin connector) | PC Compatible, (including laptops) with USB 2.0 or 1.1 port |
| Outside Dimensions HxWxD   | 2.8" x 1.7" x .9"<br>(72 x 44 x 23.5 mm)   | 2.5" x 1.5" x .83"<br>(64 x 38 x 21 mm)                     |
| Mass                       | 3.2oz. (91g)(including cable and connector)  | 2.0oz (56g)   |

\*1: Connecting cable (optional accessory) is required for a connection to a digimatic measuring tool.



264-016-10



264-007

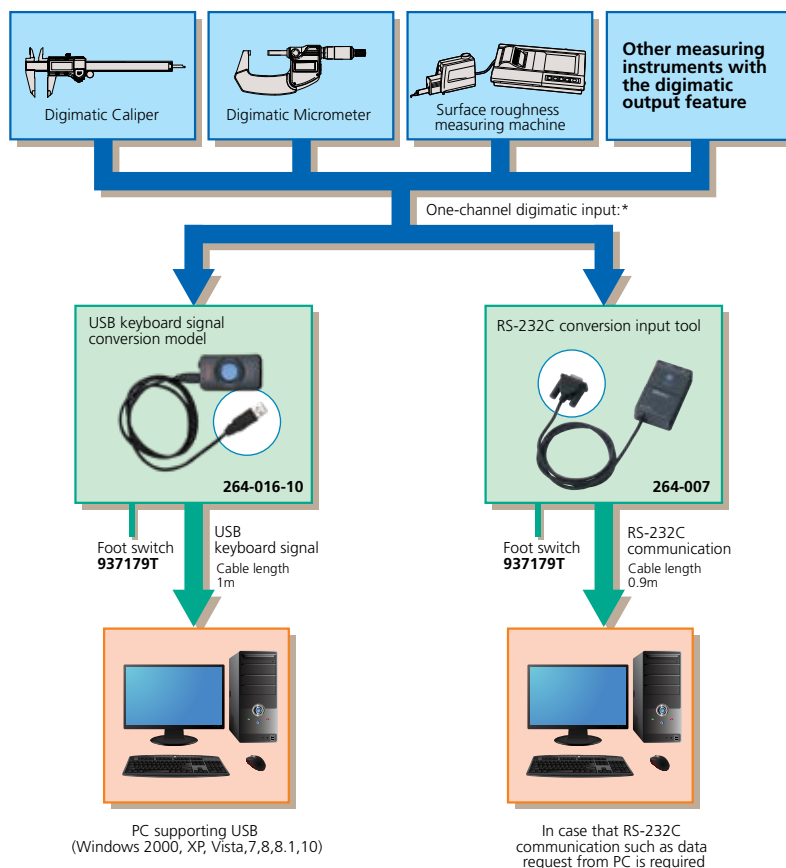
### Optional Accessories

- 937179T:** Foot switch  
**939039:** Gage selector

SPC connecting cables refer to page A-20.



"d2" is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.



\* When you use an optional gage selector 3, you can connect up to three measuring gages and select an input by switching them. When using **264-016-10**, you can connect multiple input tools at the same time with an off-the-shelf USB hub. Simultaneous input, however, is not supported. For cables used to connect each measuring gage and input tool, refer to page A-15.

# USB Input Tool Direct: USB-ITN

Our USB Input Tool Direct has been streamlined into a range of dedicated models for each type of measuring instrument.

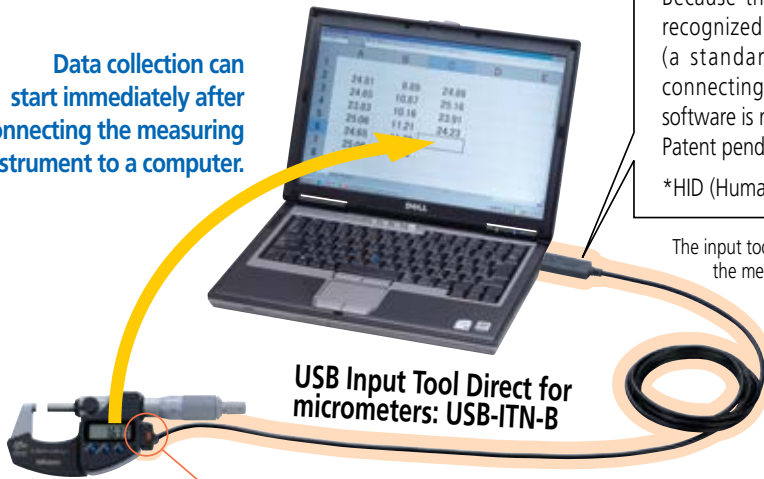
**MeasurLink**® **ENABLED**

Data Management Software by Mitutoyo

Data collection can start immediately after connecting the measuring instrument to a computer.

Because the input tool is automatically recognized as an \*HID keyboard device (a standard Windows driver) just by connecting it to a USB port, no special software is required.  
Patent pending (Japan)  
\*HID (Human Interface Device)

The input tool directly connects the measuring instrument to a USB port on a computer.



USB Input Tool Direct for micrometers: USB-ITN-B

The values displayed on the measuring instrument can be sent to the computer just by pressing the data switch.



This is the same result as that of typing numbers using the keyboard and then pressing Enter.

## Note on using a foot switch with USB-ITN

The USB-ITPAK and USB-FSW options are required (see below).

If not using optional software the IT-016U input tool can be used with a foot switch.

Although measurement data can be simply loaded directly into an Excel spreadsheet by connecting the instrument and input tool to a computer, using the optional USB-ITPAK software enables time-saving operations and procedures that significantly improve reliability and efficiency.



\*d2\* is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.

## Measurement data collection software: USB-ITPAK 2.101 Order No. 06AFM387

This setup and data collection software is used to input data from one or more measuring instruments (connected by way of USB-ITN) to any Excel sheet. Supports U-Wave. (This software package cannot be used with IT-016U.)

### USB-ITN 2.1



### USB dongle



Software use requires USB dongle.

### Major features

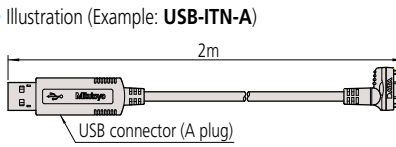
- Excel input settings: The input destination (a workbook, sheet, or cell), cell-fill direction (right or down), cell-fill interval, and other settings can be specified.
- Measurement method selection: Any of the following three methods can be selected: Sequential measurement, batch measurement, or individual measurement.
- Data input control: Data can be requested, canceled, or skipped by using mouse buttons, function keys, or foot switch.
- Character string input by the USB foot switch adapter, USB-FSW: Any previously specified character string can be input using the foot switch. Examples: *pass* or *fail*
- Number of units that can be connected (total number for both USB-ITN and USB-FSW): Up to 20 units for Windows Vista, Windows 7 and Windows 8/8.1, and up to 100 units for Windows 2000 or Windows XP. However, the above numbers might be less depending on the system configuration.
- Data importation time: About 0.2 to 0.3 seconds per unit. However, this value differs depending on the connected measuring instruments and measurement environment.
- Driver software: The VCP (virtual COM port) drivers for USB-ITN and USB-FSW are individually recognized using a built-in COM number. • Patent pending (Japan)

Optional:  
USB-FSW  
06ADV384



## Major specifications of USB Input Tool Direct

- Output specifications: USB 2.0 or 1.1
- Communication speed: 12 Mbps (full speed)
- Power supply: USB bus power
- Mass: 59 g
- USB 2.0 certification obtained
- Complies with the EMC Directive



Note: It is recommended to use a commercially available USB hub that has USB certification.

## USB-ITPAK usage environment

|                             |   |
|-----------------------------|---|
| Supported operating systems | Windows 2000 SP4, Windows XP SP2 or later, Windows Vista, Windows 7, 8 and 10 |
| Supported Excel versions    | Excel 2000, 2002, 2003, 2007 and 2013   |
| Hard disk                   | At least 20 MB of free space (required for installation)                      |
| CD-ROM drive                | Required for installation   |
| USB ports                   | At least two ports (for the USB dongle and USB-ITN)                           |
| Resolution                  | At least 800 x 600 pixels, and at least 256 displayable colors                |

- The natural language selected in USB-ITPAK must be the same as that used in the operating system.

## Codes for the main measuring instruments classified according to the USB Input Tool Direct code, part number, and plug type

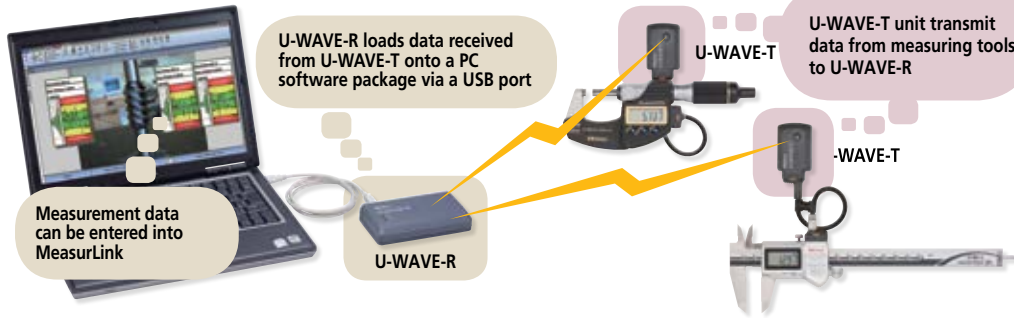
Determine the plug type suitable for your measuring instrument (one of the seven types from **A** to **G**) in the following table, and then select the corresponding USB Input Tool Direct.

| Model  | USB-ITN-A  | USB-ITN-B                        | USB-ITN-C            | USB-ITN-D  | USB-ITN-E  | USB-ITN-F               | USB-ITN-G   |   |  |                         |  |  |
|--|--|----------------------------------|----------------------|--|--|-------------------------|---|---|--|-------------------------|--|--|
| Order No.  | 06AFM380A  | 06AFM380B                        | 06AFM380C            | 06AFM380D  | 06AFM380E  | 06AFM380F               | 06AFM380G   |   |  |                         |  |  |
| Whether the existence of a data switch affects usability           | Incorporates a data switch, so the tool is usable regardless of whether or not the measuring instrument has a switch.  |                                  |                      | Does not incorporate a data switch, so an instrument fitted with a switch is required in order to use the instrument alone. (However, the tool can be used with USB-ITPAK.)  |  |                         |   |   |  |                         |  |  |
| Cable type   | <b>A</b> Water-proof with switch   | <b>B</b> Water-proof with switch | <b>C</b> With switch | <b>D</b> 10-pin plain  | <b>E</b> 6-pin round   | <b>F</b> Straight type  | <b>G</b> Water-proof straight type  |   |  |                         |  |  |
| Illustration of the plug that connects to the measuring instrument |  |                                  |                      |  |  |                         |   |   |  |                         |  |  |
| Socket type on the measuring instrument                            |  |                                  |                      |  |  |                         |   |   |  |                         |  |  |
| Codes of major compatible measuring instruments                    | [Digimatic Caliper /Super Caliper]<br>-500 series<br>CD67-S_PM<br>CD-PMX/PM/GM<br>-550/551 series<br>CDC-P_PMX<br>CDN-P_PMX<br>[Digimatic Carbon Fiber Caliper]<br>-552 series<br>CFC-G/GL/GC/GU<br>[Digimatic Depth Gage]<br>-571 series<br>VDS-PMX<br>[Digimatic Scale Unit]<br>-572 series<br>SD-G<br>[Digimatic Exclusive Caliper]<br>-573 series<br>NTD-PMX/PM                                      |                                  |                      | [Digimatic Micrometer, QuantuMike]<br>-293 series<br>MDC-MJ/MJB/MJT<br>MDE-MJ<br>[Tubular Inside Micrometer]<br>-337 series<br>IMZ-MJ<br>-339 series<br>IMJ-MJ<br>[Digimatic Micrometer Head]<br>-350 series<br>MHN-MB/MJB/MJNB<br>[Digimatic Exclusive Micrometer]<br>(The end of the mark is -MJ/MJB/M/MB/PM/PMB)<br>[Digimatic Holtest]<br>-468 series<br>HTD-R |  |                         | [Digimatic Micrometer Head]<br>-164 series<br>MHD-MB<br>[Digimatic Caliper]<br>-500 series<br>CD-CX/C/S_C<br>- 550/ 551<br>CDC-C/CX, CDN-C/CX<br>[Digimatic Depth Gage]<br>-571 series<br>VDS-DCX/DC<br>[Digimatic Scale Unit]<br>-572 series<br>SD-D/SDV-D<br>[Digimatic Exclusive Caliper]<br>-573 series<br>The end of the mark is -CX/C   |   | Measuring instrument models that incorporate a data switch |                         |  |  |
|  | [Surface Roughness Tester]<br>-178 series<br>SJ-201/210/301/400/500<br>[Coating Thickness Gage]<br>-179 series<br>DGE-745/755<br>[Linear Height]<br>-518 series<br>QMH-S<br>[Reference Gage]<br>-515 series<br>HMD-C<br>[Digimatic Indicator]<br>-543 series<br>ID-H<br>[Laser Scan Micrometer]<br>-544 series<br>LSM-9506/6100/6200/6900<br>[μ-checker]<br>Digital μ-checker<br>(Using the foot switch) |                                  |                      |  | [Digimatic Micrometer]<br>-121 series<br>BD<br>-164 series<br>MHD-M<br>-227 series<br>CLM<br>-293 series<br>MDQ-M<br>MDC-M<br>[Tubular Inside Micrometer]<br>-337 series<br>IMZ-M<br>[Tubular Inside Micrometer]<br>-339 series<br>IMJ-M<br>[Digimatic Holtest]<br>-468 series<br>HTD<br>[Reference Gage]<br>-515 series<br>HME-DM<br>[Borematic]<br>-568 series<br>SBM-C<br>[Hardness Testing Machines]<br>-810 series<br>HM-100/200<br>HV-100/HH-411<br>HR-500 |                         | [Digimatic Height Gage]<br>-192/570/574 series<br>HDM-A/AX, HD-A/AX<br>HDS-H_C/C<br>HDF-N<br>[Digimatic Caliper]<br>-500/550/551 series<br>CD/CDC/CDN<br>[Digimatic Bore Gage]<br>-511 series<br>CG-D<br>[Digimatic Indicator]<br>-543 series<br>ID-C_X/_RB/_GB<br>-339 series<br>[Digimatic Depth Gage/<br>Digimatic Thickness Gage]<br>-547 series<br>Digimatic model (ID-CX)<br>[Digimatic Carbon Fiber Caliper]<br>-552 series<br>CFC-P/-L/-C/-U<br>[Digimatic Scale Unit]<br>-572 series<br>SD-E, SDV-E<br>SD-F, SDV-F<br>[Portable Hardness Testing Instruments]<br>-811 series<br>HH-300 |   | [Digimatic Indicator]<br>-543 series<br>ID-N<br>ID-B       |                         |  |  |
|  |  |                                  |                      | Measuring instrument models that do not have a data switch   |  |                         |   |   |  |                         |  |  |
|  |  |                                  |                      | [Digimatic Indicator]<br>-543 series<br>ID-F<br>[Linear Gage/Counter]<br>-542 series<br>EF-PRH/ZR,<br>EH-P/Z/S/D<br>EB-P/Z/D<br>EC-D<br>[Litematic]<br>-318 series<br>VL-A/AS/AH   |  | No corresponding models |   | [Digimatic Indicator]<br>-543 series<br>ID-C/S/C_A<br>[Digimatic Depth Gage/<br>Digimatic Thickness Gage]<br>-547 series<br>Digimatic model (ID-C)<br>-575 series<br>ID-U |  | No corresponding models |  |  |

# U-WAVE

## Measurement Data Wireless Communication System

**MeasurLink**® ENABLED  
Data Management Software by Mitutoyo



The **U-WAVE** system enables easy wireless data communication from a measuring tool to a PC using the digimatic protocol. Measurement efficiency is improved by eliminating the long and cumbersome data cables. The user-friendly interface allows data to be loaded into any software product that accepts keyboard input, such as Excel\* or Notepad.

### 1 U-WAVE-R · Registered Design (Japan)

Major Specifications of U-WAVE-R

| Model Order No.   | U-WAVE-R<br>02AZD810D*                       |
|---|--|
| Power supply  | USB bus power system                         |
| Number of <b>U-WAVE-R</b> units that can be connected to one PC | Up to 15                                     |
| Number of <b>U-WAVE-T</b> units that can be connected           | Up to 100                                    |
| External dimensions   | 5.51" x 3.15" x 1.24"<br>(140 x 80 x 31.6mm) |
| Mass  | .29 lbs (130g)                               |



\*Detailed information on conformity standards of wireless communication specification is given below.

### 2 U-WAVE-T · Registered Design (Japan)

U-WAVE-T sends measurement data to U-WAVE-R.

#### Actual size



Standard accessory: screwdriver

#### Major specifications of U-WAVE-T

| Model Order No.           | U-WAVE-T (IP67 model)<br>02AZD730G*           | U-WAVE-T (Buzzer)<br>02AZD880G* |
|---------------------------|---|---------------------------------|
| Protection Rating         | IP67  | -                               |
| Data reception indication | LEDs  | LEDs and Buzzer                 |
| Power supply              | Lithium battery CR2032★1                      |                                 |
| Battery life              | Approx. 400,000 transmissions                 |                                 |
| External dimensions       | 1.73" x 1.17" x .73"<br>(44 x 29.6 x 18.5 mm) |                                 |
| Mass                      | .05 lbs (23g)                                 |                                 |

\*Detailed information on conformity standards of wireless communication specification is given below.

### ■ Installation Bracket Kit Order No. 02AZE200



\*d2" is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.



(optional)



500 Series  
Caliper



293 Series  
Micrometer



543 Series  
Indicator

### Specifications of wireless communication

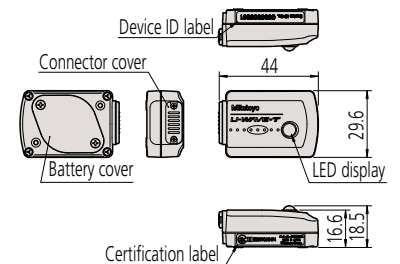
|                      |   |                                 |   |
|----------------------|---|---------------------------------|---|
| Conformity standards | European conformity standards*<br>EN 50371:2002<br>EN 300 440-1 V1.3.1<br>EN 300 440-2 V1.1.2<br>EN 301 489-01 V1.6.1<br>EN 301 489-03 V1.4.1 | Wireless standards              | Conform to IEEE802.15.4   |
|                      | U.S.A. conformity standards<br>47 CFR Part 15.247:(Subpart :C)<br>47 CFR Part 15,(Subpart :B)   | Wireless communication distance | Approx. 60ft (within visible range)   |
|                      | Canada conformity standards<br>RSS-210 (Issue 7)<br>RSS-Gen (Issue 2)<br>ICES 003 (Issue 4)   | Wireless communication speed    | 250 kbps  |
|                      |   | Transmission output             | 1 mW (0 dBm) or less  |
|                      |   | Modulation method               | DS-SS (direct sequence spread spectrum)<br>Resistant to interfering signal or noise.  |
|                      |   | Communication frequency         | 2.4 GHz band<br>(ISM band: universal frequency)   |
|                      |   | Used band                       | 15 channels<br>(2.405 to 2.475GHz at intervals of 5MHz)<br>The noise search function can avoid interference with other communication devices. |
|                      |   |                                 |   |
|                      |   |                                 |   |
|                      |   |                                 |   |

Note: In accordance with wireless regulations the use of this product is permitted in Japan, Europe (a total of 32 countries including 27 EU members, 4 EFTA members and Turkey), U.S.A. and Canada. This product must not be used in other countries or areas.  
\* This product is not compatible with the conventional Mu-WAVE, for which communication specifications are different.  
\* Japan conformity standards: ARIB STD-T66

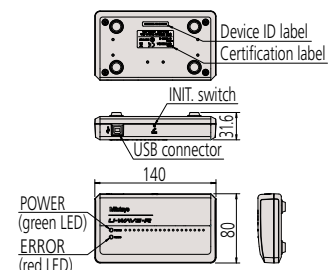
### ■ Dimensions of Each Part

Unit: mm

#### U-WAVE-T



#### U-WAVE-R





# U-WAVE

## Measurement Data Wireless Communication System

### List of U-WAVE-T Connecting Cables

Select one from cables **A** to **G**, referring to the part number of connecting cable for wired connection in your measuring tool catalog or manual. If you are unsure which cable is appropriate, check the cable connectors, the shapes of terminal on the measuring tool side, or the codes of compatible measuring tool for cables **A** to **G** below.

It is not possible to connect to EF and EH counters.

**When connected with U-WAVE-T** Select one of the USB input tool direct from table below to fit the connector (A to G) and also select either standard type (fig.1) or foot switch type (fig.2) dependent on usage.

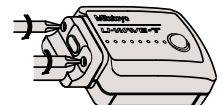
Note: Not connectable to these Mitutoyo products: Litematic VL, Linear Gage Counter EF/EH, Surftest SJ-500.

From seven types of cables (**A** to **G**), select one compatible with your measuring tool.

#### Measuring tool



#### U-WAVE-T



Fasten the connector to **U-WAVE-T** with two screws.



Fig.1 Standard type connecting cable

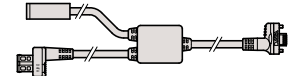


Fig.2 Connecting cable for foot switch

|   |    |          |          |        |        |        |        |          |
|---|----|----------|----------|--------|--------|--------|--------|----------|
| Reference Order No. of connecting cable | 1m | 05CZA624 | 05CZA662 | 959149 | 936937 | 937387 | 905338 | 21EAA194 |
|   | 2m | 05CZA625 | 05CZA663 | 959150 | 965014 | 965013 | 905409 | 21EAA190 |

|                 |           |           |           |           |           |           |           |           |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| For standard    | Order No. | 02AZD790A | 02AZD790B | 02AZD790C | 02AZD790D | 02AZD790E | 02AZD790F | 02AZD790G |
| For foot switch | Order No. | 02AZE140A | 02AZE140B | 02AZE140C | 02AZE140D | 02AZE140E | 02AZE140F | 02AZE140G |



| Cable type  | A Water-proof model with output button   | B Water-proof model with output button  | C With data-out button type   | D 10-pin plain type  | E 6-pin round   | F Plain type straight  | G Plain type straight water-proof model |
|---|--|---|---|--|---|--|---|
| Connector shape on the measuring tool side                |  |   |   |  |   |  |   |
| Socket shape on the measuring tool                        |  |   |   |  |   |  |   |
| Codes of major compatible measuring tools and instruments | [Digimatic Caliper]<br>CD67-S_PM<br>CD-PMX<br>CD-PM/GM<br>CDC-P_PMX<br>CDN-P_PMX<br>CFC-G/GL/GC/GU<br>[Digimatic Caliper]<br>NTD-PMX<br>[Digimatic Depth Gage]<br>VDS-PMX<br>[Digital Scale and DRO Systems]<br>SD-G | [Digimatic Micrometer]<br>MDE-MJ<br>MDC-MJ/MJT<br>[Digimatic Micrometer]<br>The code suffix is -MJ.<br>BLM-M<br>OMV-M<br>OMP-M<br>PDM-M<br>IMP-M<br>VM-M<br>[Digimatic Micrometer Heads]<br>MHN-M/MJ/MJN<br>[Digimatic Holtest]<br>HTD-R<br>[Digimatic Depth Gage]<br>DMC-M | [Digimatic Caliper]<br>CD-CX/-C<br>CD-S_C<br>CDC-CX/C<br>CDN-CX/C<br>[Digimatic Caliper]<br>NTD-CX/C<br>[Digimatic Depth Gage]<br>VDS-DCX<br>[Digital Scale and DRO Systems]<br>SD-D, SDV-D | [Digimatic Indicator]<br>ID-H/F<br>[Linear Height]<br>QMH-S<br>[Linear Gage/Counter]<br>EB,EC-D<br>[μ-checker]<br>Digital μ-checker<br>[Laser Scan Micrometer]<br>LSM-9506<br>[Reference Gage]<br>HDM-C<br>[Coating Thickness Gage]<br>DGE-745/755<br>[Form Measurement]<br>SJ-201/301/401 | [Digimatic Micrometer]<br>MDQ-M<br>MDC-M<br>CLM1-QM/DK<br>PDM-QM<br>PMU-DM<br>BD-M<br>[Digimatic Holtest]<br>HTD<br>[Reference Gage]<br>HDM-DM<br>[Hardness Testing Machines]<br>HM-100/200<br>HV-100<br>HR-500<br>HH-411 | [Digimatic Caliper]<br>CD, CFC-P/-L/-C/-U<br>[Digimatic Height Gages]<br>HD-AX, HDM-AX<br>HDS-H_C/-C<br>HDM-A<br>HDF-N<br>[Digimatic Indicator]<br>ID-C/_RB/_A/_GB<br>ID-S/U<br>[Digimatic Depth Gage]<br>Digimatic model (ID-C)<br>[Digital Scale and DRO Systems]<br>SD-E, SDV-E<br>SD-F, SDV-F<br>[Portable Hardness Testing Instruments]<br>HH-300 | [Digimatic Indicator]<br>ID-N<br>ID-B   |

### Note on Wireless Communication Environment

Although the communication range for **U-WAVE** is approximately 60 ft. line-of-sight, performance may be affected by obstacles or environmental factors.

#### Cautions

- **Safety caution:** Do not use this device near medical equipment that might malfunction due to radio interference.
- **Caution on radio law:** This device is certified as a 2.4 GHz band wide-band low-power data communication system based on the radio regulations in Japan, Europe, U.S.A. and Canada. It is prohibited by law to disassemble or modify this device or peel off the certification label from it.

| Item  | Contents   |
|---|--|
| Concrete wall   | Communication is not possible in a completely enclosed room.   |
| Metal partition   | Communication speed may drop or communication may be interrupted.  |
| Wireless LAN, communication device such as ZigBee Bluetooth, and microwave oven | Communication speed may drop or communication may be interrupted. Maintain the set frequency and installation distance if at all possible. |
| Medical instrument  | Do not use this product near a medical instrument such as a laser knife or electronic scale.   |

\*d2\* is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.



# U-Wave Fit

## SERIES 264 — Wireless Data Transmitter

### FEATURES

- The transmitter is designed to fit in the space behind the display, and the connecting cable has been replaced by a rigid connector
- Approx. 20 m transmission range (within visible range)
- 2.4GHz wireless system for reliable and secure data transmission
- Easy data export to Microsoft® Excel® or SPC software applications
- Transmitter confirms data transfer by an LED signal and optional buzzer
- An IP67 transmitter is available to ensure a coolant-proof gaging system
- Low power consumption: 400,000 data transmissions with a single battery

### SPECIFICATIONS

|                                 |  |
|---------------------------------|--|
| Wireless communication protocol | IEEE 802. 15. 4  |
| Modulation method               | DS-SS (Direct Sequence Spread Spectrum)  |
| Communication distance          | Approx. 20 m (within visible range)  |
| Communication speed             | 250 kbps   |
| Communication frequency         | 2.4 GHz (ISM: universal frequency band)  |
| User band                       | 15 channels (2.405 to 2.475GHz at intervals of 5 MHz)  |
| 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) |



### U-WAVE-T (Transmitter)

| Order No. | Model           | Measuring Instrument                           | Remarks         | Data reception indication |
|-----------|-----------------|--|-----------------|---------------------------|
| 264-620   | U-WAVE-TC       | 4", 6", 8", 12", IP67 caliper/standard caliper | IP67 type       | LED                       |
| 264-621   | U-WAVE-TC       | 4", 6", 8", 12", IP67 caliper/standard caliper | Buzzer type     | Buzzer/LED                |
| 264-622   | U-WAVE-TM       | COOLANT-PROOF (IP65) micrometer                | IP67 type       | LED                       |
| 264-623   | U-WAVE-TM       | COOLANT-PROOF (IP65) micrometer                | Buzzer type     | Buzzer/LED                |
| 02AZF310* | Connection unit | IP67 caliper/COOLANT-PROOF (IP65) micrometer   | Waterproof type | —                         |
| 02AZF300* | Connection unit | Standard caliper                               | Standard type   | —                         |

\*A connection unit is required when ordering a transmitter



02AZD810D

### U-WAVE-R (Receiver)

| Order No. | 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] | Dimensions (WxDxH) [mm] | Mass [g] |
|-----------|---------------------|------------|--|--|----------------------|-------------------------|----------|
| 02AZD810D | U-WAVE-R + software | U-WAVE PAK | Up to 16   | Up to 100                                      | 1                    | 140 x 80 x 31.6         | 130      |

**MeasurLink® ENABLED**  
Data Management Software by Mitutoyo

## U-WAVE fit



IP65 Micrometer with U-WAVE-TM (buzzer type) and connection unit



For micrometers

**U-WAVE-TM**



Standard caliper with U-WAVE-TC (buzzer type) and connection unit



For calipers

**U-WAVE-TC**



"d2" is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.

# Multiplexers – MIG-8USB, MIG-4USB

## SERIES 982 — Digimatic/RS-232C Interface Unit

### Technical Data

Data output: Via RS-232C interface / USB

### Default Configuration

Data length: 8 bits  
Start bit: 1 bit  
Stop bit: 1 bit  
Parity check: None  
Baud rate: 9600

### Standard Accessory

06AEG302JA: AC Adapter  
RS232C: Cable (1.5m / 5ft)  
USB Cable

### Optional Accessories

937179T: Foot switch

### FEATURES

- A measurement data transfer device, multiplexer MIG-8USB and MIG-4USB converts digimatic output measurement data to RS-232C or USB-HID and outputs it to an external device such as PC.
- Up to eight/four measuring instruments with the digimatic output feature can be connected.
- Units can be daisy-chained to meet any size needs.
- MIG-4USB includes toggle switch for each input.

### MIG-8USB



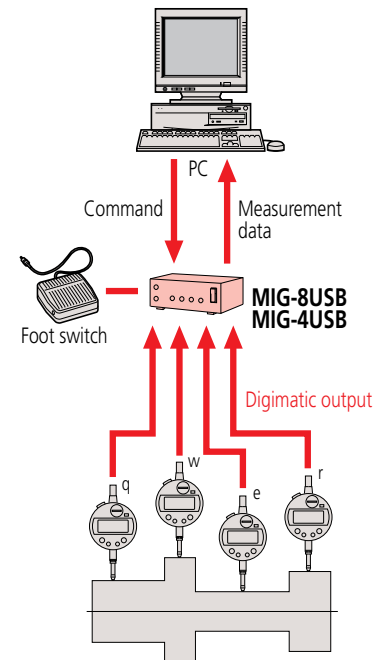
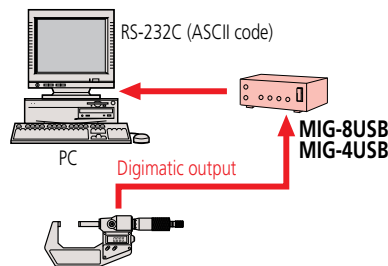
64AAB386  
Front view



64AAB386  
Back view

### SPECIFICATIONS

| Model No.                | MIG-8USB       | MIG-4USB       |
|--------------------------|----------------|----------------|
| Order No.                | 64AAB386       | 64AAB387       |
| Gage Capacity            | 8              | 4              |
| Dimension (mm) W x D x H | 146 x 150 x 70 | 146 x 150 x 45 |
| Mass (g)                 | 710            | 540            |



# Gage Selector 3

## 3-channel Switching Box for Data Transmission

### FEATURES

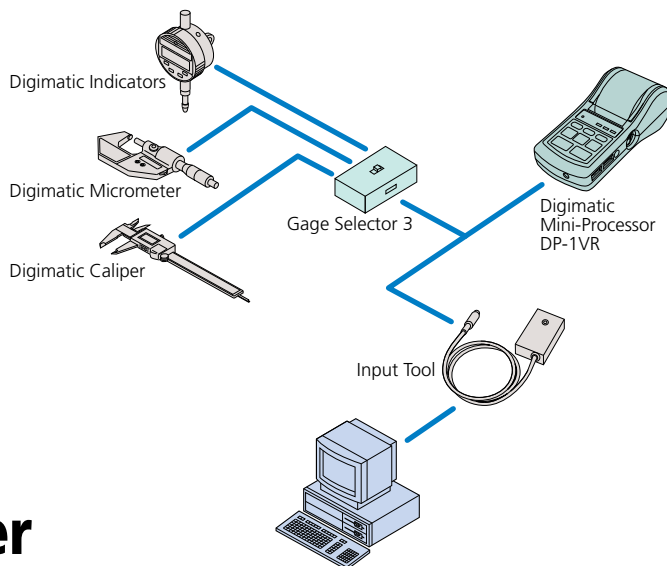
- Three digimatic gages can be connected.
- You can specify the gage which outputs the data with the channel switch.

### SPECIFICATIONS

| Order No. | Description     |
|-----------|-----------------|
| 939039    | Gage Selector 3 |



### Examples of Connections



# EC Counter

## SERIES 542 — Assembly-type Display Unit

### FEATURES

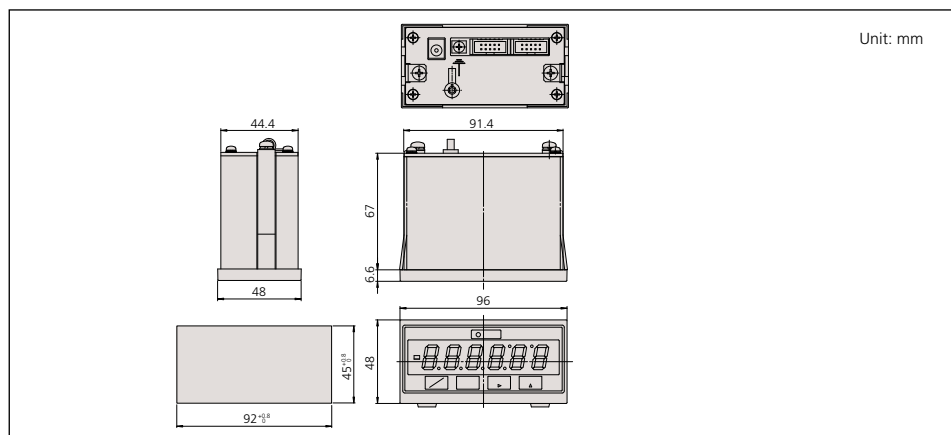
- Compact panel mounting type and DIN size. It can be easily incorporated into each system.

### SPECIFICATIONS

| Order No. | Description |
|-----------|-------------|
| 542-007A  | EC Counter  |



### DIMENSIONS



### Technical Data

Connection: Up to three gages  
 Signal: Digimatic code format  
 Connection: Bidirectional  
 External dimensions (W x D x H): 100 x 70 x 33mm

### Technical Data

Applicable gage: LGD, LGS, All SPC output gages  
 Resolution: .00005"/.0001"/0.001mm,  
 .0005"/.001"/0.01mm  
 No. of gage input: 1  
 Display: 6-digit LED and a negative [-] sign  
 Function: Preset  
 Go-no-go judgment  
 Output (open-collector): 3-step limit signal, Normal signal  
 External control: Preset, Data hold  
 Power supply: Via AC adaptor  
 Dimensions (W x D x H): 96 x 48 x 84.6mm  
 Mass: 50g

### Standard Accessory

06AEG302JA: AC Adaptor



USB connection allows collected data to be easily transferred from the DP-1VA to the PC. The output is HID or VCP so data can be sent directly to Excel or data collection software such as IT-Pak or MeasurLink.



Digimatic 2 function allows the high resolution of the gage to be output in its entirety in metric or inch.

### Standard Accessory

**06AEG302JA:** AC Adapter

### Optional Accessories

**09EAA084\*:** RS-232C changing cable (1m, 9pin)

**965516\*:** GO/±NG judgment cable

**937179T:** Foot switch

**09EAA082:** (10 rolls)

\*It is impossible to use the both RS-232C cable and GO/±NG judgment cable at the same time.

- USB cable (A-microB) (optional)  
06AFZ050



- Foot switch (optional)  
937179T



"d2" is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.

# DP-1VA

## SERIES 264 — Digimatic Mini-Processor

### DP-1VA Data Collection

- A gage with SPC output is connected to the DP-1VA with an SPC cable.
- The data for each part measured is printed or sent directly to a PC through a USB cable.
- This data can be triggered by the button on the gage, cable or the DP-1VA. The footswitch can also be used.

### Data Logger:

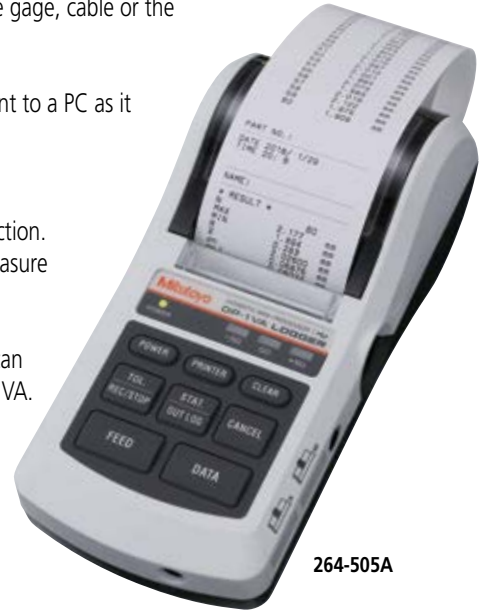
- Data can be stored internally, printed and/or sent to a PC as it is measured or after all data has been collected
- Up to 1,000 measurements can be stored.

### Timer:

- Data collection can be triggered by a timer function. The DP-1VA can collect data unattended to measure changes over time.

### Tolerance and SPC:

- Tolerances can be set in the unit and statistics can be calculated and printed directly from the DP-1VA.
- No additional software is required.









264-505A

## SPECIFICATIONS

| Order No.                   | 264-505A  |
|-----------------------------|---|
| Data input                  | Digimatic, Digimatic 2, RS-232C input (for KA Counter Only)   |
| Printing method             | Thermal Line Printer  |
| Character specifications    | Total dot number: 384 dots/line<br>Dot size: 8 dots/mm<br>Normal font: 24 x 16 dots<br>Large font: 36 x 24 dots   |
| Print speed                 | 0.8 s/line when using AC adapter  |
| Print capacity              | 7,000 lines/roll with Large font<br>10,000 lines/roll with Normal font  |
| Print data                  | Measuring data, go/±no go, number of data, maximum minimum value, range, average, standard deviation, number of defective, function defective, process capability index, histogram, D-chart, control chart generation for X-bar and central limit data, data and time |
| Printer paper               | High durability thermal paper. (one roll included)<br>Width: 58mm. Roll length: 48m   |
| Power supply                | 100 V 50/60 Hz AC adapter (6 V, 2 A)<br>AA alkaline batteries x4 (not included)   |
| Battery life                | About 10,000 lines at 20 C  |
| Data processing capability  | Mode 0: 100,000 data entries<br>Mode 1: 9,999 data entries<br>Mode 3: sample size 10 x subgroup 9,999 =<br>Total number of data entries: 99,990   |
| Tolerance judgement         | 5 sets  |
| Logging of measurement data | Max 1,000 points  |
| Timer input                 | 0.25 s, 1 s, 5 s, 30 s, 1 min, 30 min, 60 min   |
| Data Output                 | USB Output<br>RS-232C output at TTL level<br>Tolerance judgment result output (-NG, GO, +NG)  |
| Clock precision             | +/-2 min max/month  |
| Internal battery life       | 10 years  |
| Operating temperature range | 0 C to 45 C with AC adapter<br>10 C to 45 C with batteries  |
| External Dimensions         | 94mm x 201mm x 75mm   |

# SPC Connecting Cables

- These cables are used to output measurement data from the digimatic gage with the output feature to the digimatic mini processor, digimatic display unit, multiplexer or other device.
- Cables of one or two meters are available.
- Note that the shape of connector differs depending on the model.

| Input plug to Data Processor   |   |  |
|--|---|--|
| Order No.  |   | Applicable gages   |
|  |    |  |
| Straight type  |    | <b>All CALIPERS WITHOUT ABSOLUTE ENCODER</b><br>Height Gage 570-2XX, 192-6XX, 192-67X<br>Indicators 575-XXX, 543-6XX, 543-2XX, 543-4XX<br>Depth Gages 547-21X, 547-25X, 571-2XX<br>Scale Unit 572-XXX<br>Thickness Gages 547-3XX, 547-4XX  |
| 905338: 1m (40")<br>905409: 2m (80")   |   |  |
| Back type  |    |  |
| 905689: 1m (40")<br>905690: 2m (80")   |   |  |
| Right type   |    | <b>ALL DIGIMATIC CALIPERS WITH ABSOLUTE ENCODER</b><br>Height Gage 570-2XX<br>Depth Gages 571-2XX<br>Scale Unit 572-XXX<br>Micrometers over 12"/300mm  |
| 905691: 1m (40")<br>905692: 2m (80")   |   |  |
| Left type  |    | <b>Coolant-Proof Caliper</b><br>500-68X, 500-76X, 500-78X.<br><b>Coolant-Proof Digimatic scale units</b><br>572-61X.   |
| 905693: 1m (40")<br>905694: 2m (80")   |   |  |
| With data out switch type  |   | <b>Digimatic Micrometer IP65</b>   |
| 959149: 1m (40")<br>959150: 2m (80")<br>04AZB512: 1m (40") L-Type<br>04AZB513: 2m (80") L-Type |   |  |
| With data out switch type  |  | <b>ALL MICROMETERS (not for IP65 mics)</b><br>Indicators 543-11X, 543-13X, 543-14X, 543-18X,<br>543-17X<br>Holtest 468-2XX, 468-9XX<br>Micrometer Head 164-162, 164-172, 350-71X,<br>329-71X<br>Boremetrics 568-XXX<br>Others Mikematic, Quickmike<br>Bench Mike 121-XXX                                     |
| 05CZA624: 1m (40")<br>05CZA625: 2m (80")   |   |  |
| With data out switch type  |  | Indicators 543-5XX<br>MU-Checkers 519-4XX, 519-621A<br>MU-Gages 179-204, 179-205, 179-206<br>Display 542-022-5A, 542-032-5A, 542-036-5A<br>Display 572-011A, 572-031A<br>Linear Height 518-3XX<br>Litematic 318-2XX<br>Heightmatic 57X SERIES.<br>Digi Derm 179-7XX<br>Hardness Tester (Micro Hardness Type) |
| 05CZA662: 1m (40")<br>05CZA663: 2m (80")   |   |  |
| 6 pins type  |  | Flat straight type<br>21EAA194: SPC cable (40" / 1m)<br>21EAA190: SPC cable (80" / 2m)   |
| 937387: 1m (40")<br>965013: 2m (80")   |   |  |
| 10 pins type   |  |  |
| 936937: 1m (40")<br>965014: 2m (80")   |   |  |
| Flat straight type   |  |  |
| 21EAA194: SPC cable (40" / 1m)<br>21EAA190: SPC cable (80" / 2m)                               |   |  |

# B

## Small Tool Instruments Micrometers Micrometers Heads



### Micrometers



### Micrometer Heads



MDC Micrometer



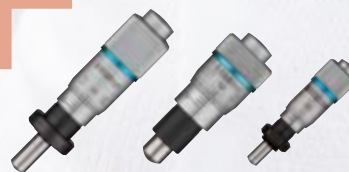
MDH Micrometer



QuantuMike



Digimatic Outside  
Micrometer



Micrometer Heads  
fine spindle feed

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# Coolant-proof Micrometer

**SERIES 293 — with Dust/Water Protection Conforming to IP65 Level**

## FEATURES

- IP65 protection level, enabling use in environments exposed to cutting oil, etc\*.  
\*Anti-corrosion treatment is required after use.
- Measurement data output function is available with a water-resistant connection cable.
- Auto power ON/OFF function.
- A nonslip surface is employed for the frame cover and surface panel to achieve stable handheld measurement.
- Certificate of inspection\* is included. (2" /50mm or less range models)\*\*  
\*It is not the type used to obtain calibration certificates.  
\*\* except 293-349-30
- With a standard bar except for 0-1"/0-25mm model.
- Supplied in fitted case. Plastic case up to 6"/150mm, wooden box over 6"/150mm.



293-330-30



293-252-30



Oil-resistant materials are used in all plastic components.



Measurement data output function is available with a water-resistant connection cable.



Employed nonslip surface



Certificate of inspection

## Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution: .00005"/0.001mm or 0.001mm (up to 4" models)  
 .0001" / 0.001mm (over 4" models)  
 Flatness: .000012"/0.3µm  
 Parallelism: .00004"/1µm for models up to 2"/50mm  
 .00008"/2µm for models up to 4"/100mm  
 .00012"/3µm for models up to 7"/175mm  
 .00016"/4µm for models up to 11"/275mm  
 .0002"/5µm for models over 12"/300mm  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2.4 years under normal use  
 Dust/Water protection level: IP65

## Function

Origin-set, Zero / ABS, Hold, Auto power on/off,  
 Data output (output models),  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

- 05CZA662:** SPC cable with data switch (40"/1m)
- 05CZA663:** SPC cable with data switch (80"/2m)



SPC cable with data switch



## SPECIFICATIONS

**Metric** With ratchet stop

| Range       | Resolution | Order No.                       | Accuracy |
|-------------|------------|---------------------------------|----------|
| 0 - 25mm    | 0.001mm    | <b>293-230-30 / 293-240-30*</b> | ±1µm     |
| 25 - 50mm   | 0.001mm    | <b>293-231-30 / 293-241-30*</b> | ±1µm     |
| 50 - 75mm   | 0.001mm    | <b>293-232-30 / 293-242-30*</b> | ±1µm     |
| 75 - 100mm  | 0.001mm    | <b>293-233-30 / 293-243-30*</b> | ±2µm     |
| 100 - 125mm | 0.001mm    | <b>293-250-30</b>               | ±2µm     |
| 125 - 150mm | 0.001mm    | <b>293-251-30</b>               | ±2µm     |
| 150 - 175mm | 0.001mm    | <b>293-252-30</b>               | ±3µm     |
| 175 - 200mm | 0.001mm    | <b>293-253-30</b>               | ±3µm     |
| 200 - 225mm | 0.001mm    | <b>293-254-30</b>               | ±3µm     |
| 225 - 250mm | 0.001mm    | <b>293-255-30</b>               | ±4µm     |
| 250 - 275mm | 0.001mm    | <b>293-256-30</b>               | ±4µm     |
| 275 - 300mm | 0.001mm    | <b>293-257-30</b>               | ±4µm     |

\*without SPC data output

**Metric** With ratchet thimble

| Range      | Resolution | Order No.                       | Accuracy |
|------------|------------|---------------------------------|----------|
| 0 - 25mm   | 0.001mm    | <b>293-234-30 / 293-244-30*</b> | ±1µm     |
| 25 - 50mm  | 0.001mm    | <b>293-235-30 / 293-245-30*</b> | ±1µm     |
| 50 - 75mm  | 0.001mm    | <b>293-236-30 / 293-246-30*</b> | ±1µm     |
| 75 - 100mm | 0.001mm    | <b>293-237-30 / 293-247-30*</b> | ±2µm     |

\*without SPC data output

**Metric** Micrometer Set

| Range                  | Order No.         | Included in set   |
|------------------------|-------------------|---|
| 0-50mm<br>(2pcs. Set)  | <b>293-966-30</b> | 293-230-30, 293-231-30, 25mm CERA block, plastic case                       |
| 0-75mm<br>(3pcs. Set)  | <b>293-962-30</b> | 293-230-30, 293-231-30, 293-232-30, 2 standard bars, plastic case           |
| 0-100mm<br>(4pcs. Set) | <b>293-963-30</b> | 293-230-30, 293-231-30, 293-232-30, 293-233-30, 3 standard bars, wooden box |

**Inch/Metric** With ratchet stop

| Range                       | Resolution        | Order No.                       | Accuracy |
|-----------------------------|-------------------|---------------------------------|----------|
| 0 - 1" / 0 - 25.4mm         | .00005" / 0.001mm | <b>293-330-30 / 293-340-30*</b> | ±.00005" |
| 1" - 2" / 25.4 - 50.8mm     | .00005" / 0.001mm | <b>293-331-30 / 293-341-30*</b> | ±.00005" |
| 2" - 3" / 50.8 - 76.2mm     | .00005" / 0.001mm | <b>293-332-30 / 293-342-30*</b> | ±.00005" |
| 3" - 4" / 76.2 - 101.6mm    | .00005" / 0.001mm | <b>293-333-30 / 293-343-30*</b> | ±.0001"  |
| 4" - 5" / 101.6 - 127.0mm   | .0001" / 0.001mm  | <b>293-350-30</b>               | ±.0001"  |
| 5" - 6" / 127.0 - 152.4mm   | .0001" / 0.001mm  | <b>293-351-30</b>               | ±.0001"  |
| 6" - 7" / 152.4 - 177.8mm   | .0001" / 0.001mm  | <b>293-352-30</b>               | ±.00015" |
| 7" - 8" / 177.8 - 203.2mm   | .0001" / 0.001mm  | <b>293-353-30</b>               | ±.00015" |
| 8" - 9" / 203.2 - 228.6mm   | .0001" / 0.001mm  | <b>293-354-30</b>               | ±.00015" |
| 9" - 10" / 228.6 - 254.0mm  | .0001" / 0.001mm  | <b>293-355-30</b>               | ±.0002"  |
| 10" - 11" / 254.0 - 279.4mm | .0001" / 0.001mm  | <b>293-356-30</b>               | ±.0002"  |
| 11" - 12" / 279.4 - 304.8mm | .0001" / 0.001mm  | <b>293-357-30</b>               | ±.0002"  |

\*without SPC data output

**Inch/Metric** With ratchet thimble

| Range                    | Resolution        | Order No.                       | Accuracy |
|--------------------------|-------------------|---------------------------------|----------|
| 0 - 1" / 0 - 25.4mm      | .00005" / 0.001mm | <b>293-334-30 / 293-344-30*</b> | ±.00005" |
| 0 - 1" / 0 - 25.4mm      | .0001" / 0.001mm  | <b>293-349-30*</b>              | ±.0001"  |
| 1" - 2" / 25.4 - 50.8mm  | .00005" / 0.001mm | <b>293-345-30*</b>              | ±.00005" |
| 2" - 3" / 50.8 - 76.2mm  | .00005" / 0.001mm | <b>293-346-30*</b>              | ±.00005" |
| 3" - 4" / 76.2 - 101.6mm | .00005" / 0.001mm | <b>293-347-30*</b>              | ±.0001"  |

\*without SPC data output

**Inch/Metric** With friction thimble

| Range                   | Resolution        | Order No.                       | Accuracy |
|-------------------------|-------------------|---------------------------------|----------|
| 0 - 1" / 0 - 25.4mm     | .00005" / 0.001mm | <b>293-335-30 / 293-348-30*</b> | ±.00005" |
| 1" - 2" / 25.4 - 50.8mm | .00005" / 0.001mm | <b>293-336-30</b>               | ±.00005" |

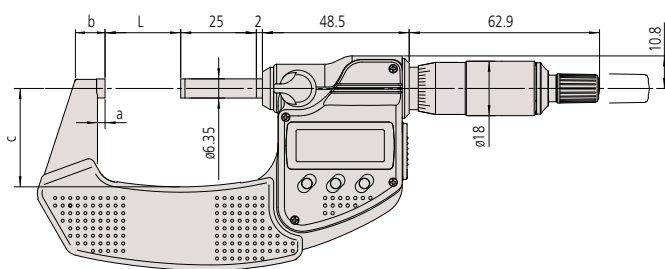
\*without SPC data output

**Inch/Metric** Micrometer Set .00005" / 0.001mm graduation model

| Range                                | Order No.         | Included in set   |
|--------------------------------------|-------------------|---|
| 0 - 3" / 0 - 76.2mm<br>(3 pcs. set)  | <b>293-960-30</b> | 293-330-30, 293-331-30, 293-332-30, 2 standard bars, plastic case           |
| 0 - 4" / 0 - 101.6mm<br>(4 pcs. set) | <b>293-961-30</b> | 293-330-30, 293-331-30, 293-332-30, 293-333-30, 3 standard bars, wooden box |

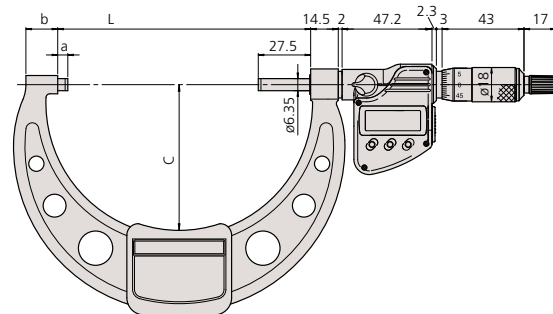
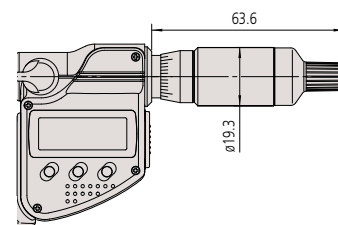
## DIMENSIONS AND MASS

Ratchet-stop type (up to 100mm/4")



Ratchet-thimble type and friction-thimble type

Unit: mm



Ratchet stop type (over 100mm/4" to 300mm/12")

| Range (Metric / Inch) | L     | a   | b    | c       | Mass (g) |
|-----------------------|-------|-----|------|---------|----------|
| 0 - 25mm / 0-1"       | 0     | 2.5 | 9    | (25)    | 270      |
| 25 - 50mm / 1-2"      | 25    | 2.5 | 9.8  | (32.5)  | 330      |
| 50 - 75mm / 2-3"      | 50    | 2.5 | 12.6 | (47)    | 470      |
| 75 - 100mm / 3-4"     | 75    | 2.5 | 14   | (60)    | 625      |
| 100 - 125mm / 4-5"    | 132.8 | 5.3 | 16.7 | (76.5)  | 600      |
| 125 - 150mm / 5-6"    | 158.2 | 5.7 | 18.8 | (91)    | 740      |
| 150 - 175mm / 6-7"    | 183.6 | 6.1 | 19.1 | (103.1) | 800      |
| 175 - 200mm / 7-8"    | 208.8 | 6.3 | 18.2 | (115.3) | 970      |
| 200 - 225mm / 8-9"    | 234.2 | 6.7 | 16.8 | (126.8) | 1100     |
| 225 - 250mm / 9-10"   | 258   | 5.5 | 18   | (139.8) | 1270     |
| 250 - 275mm / 10-11"  | 284   | 18  | 28   | (152.3) | 1340     |
| 275 - 300mm / 11-12"  | 309   | 18  | 28   | (166)   | 1540     |

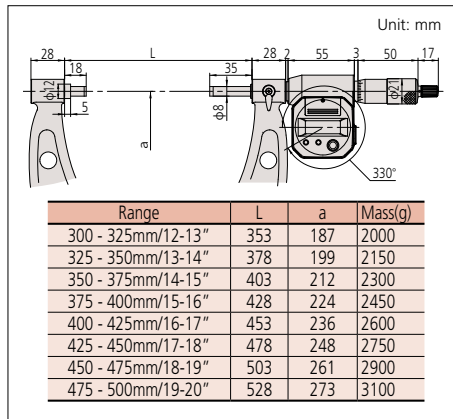
# Digimatic Micrometer

**SERIES 293**



293-582

## DIMENSIONS



## SPECIFICATIONS

| Metric  With ratchet stop |            |                |          |
|---------------------------|------------|----------------|----------|
| Range                     | Resolution | Order No.      | Accuracy |
| 300 - 325mm               | 0.001mm    | <b>293-582</b> | ±6μm     |
| 325 - 350mm               | 0.001mm    | <b>293-583</b> | ±6μm     |
| 350 - 375mm               | 0.001mm    | <b>293-584</b> | ±6μm     |
| 375 - 400mm               | 0.001mm    | <b>293-585</b> | ±7μm     |
| 400 - 425mm               | 0.001mm    | <b>293-586</b> | ±7μm     |
| 425 - 450mm               | 0.001mm    | <b>293-587</b> | ±7μm     |
| 450 - 475mm               | 0.001mm    | <b>293-588</b> | ±8μm     |
| 475 - 500mm               | 0.001mm    | <b>293-589</b> | ±8μm     |

| Inch/Metric  With ratchet stop |                  |                |          |
|--------------------------------|------------------|----------------|----------|
| Range                          | Resolution       | Order No.      | Accuracy |
| 12" - 13" / 304.8 - 330.2mm    | .0001" / 0.001mm | <b>293-782</b> | ±.0003"  |
| 13" - 14" / 330.2 - 355.6mm    | .0001" / 0.001mm | <b>293-783</b> | ±.0003"  |
| 14" - 15" / 355.6 - 381.0mm    | .0001" / 0.001mm | <b>293-784</b> | ±.0003"  |
| 15" - 16" / 381.0 - 406.4mm    | .0001" / 0.001mm | <b>293-785</b> | ±.00035" |
| 16" - 17" / 406.4 - 431.8mm    | .0001" / 0.001mm | <b>293-786</b> | ±.00035" |
| 17" - 18" / 431.8 - 457.2mm    | .0001" / 0.001mm | <b>293-787</b> | ±.00035" |
| 18" - 19" / 457.2 - 482.6mm    | .0001" / 0.001mm | <b>293-788</b> | ±.0004"  |
| 19" - 20" / 482.6 - 508.0mm    | .0001" / 0.001mm | <b>293-789</b> | ±.0004"  |

## Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution: .0001"/0.001mm or 0.001mm  
 Flatness: .000024" / 0.6μm  
 Parallelism: .0002"/5μm for models up to 15"/375mm  
 .00024"/6μm for models up to 19"/475mm  
 .00028"/7μm for models over 20"/500mm  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (2 pcs.), **938882**  
 Battery life: Approx. 1.8 years under normal use

## Function

Preset, Zero-setting, Power ON/OFF, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

**959149:** SPC cable (40"/1m) Straight type  
**959150:** SPC cable (80"/2m) Straight type  
**04AZB512:** SPC cable L-type (40"/1m)  
**04AZB513:** SPC cable L-type (80"/2m)



# Digimatic Micrometer

**SERIES 293 MDC-Lite**

## FEATURES

- Provided only with zero set and in/mm (inch/metric models only) keys.
- A ratchet stop or friction thimble for a constant measuring force.
- Measurement readout with large characters on the LCD.
- No spindle clamp. No data output.
- Supplied in fitted plastic case.



293-831-30



## SPECIFICATIONS

| Metric  With ratchet stop |            |                   |          |
|---------------------------|------------|-------------------|----------|
| Range                     | Resolution | Order No.         | Accuracy |
| 0 - 25mm                  | 0.001mm    | <b>293-821-30</b> | ±2μm     |

| Inch/Metric  With ratchet stop |                   |                   |          |
|--------------------------------|-------------------|-------------------|----------|
| Range                          | Resolution        | Order No.         | Accuracy |
| 0 - 1" / 0 - 25.4mm            | .00005" / 0.001mm | <b>293-831-30</b> | ±.0001"  |

| Inch/Metric  With friction thimble |                   |                   |          |
|------------------------------------|-------------------|-------------------|----------|
| Range                              | Resolution        | Order No.         | Accuracy |
| 0 - 1" / 0 - 25.4mm                | .00005" / 0.001mm | <b>293-832-30</b> | ±.0001"  |

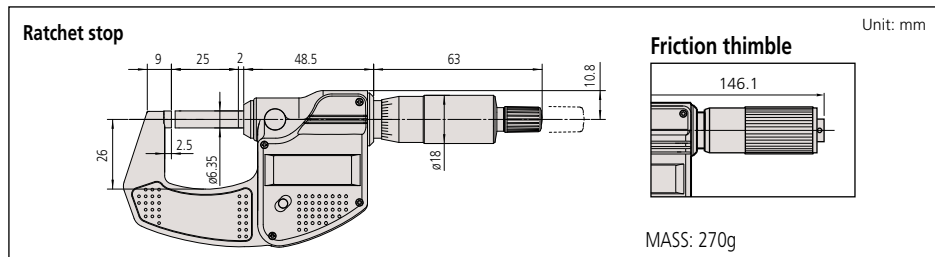
## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .00005"/0.001mm or 0.001mm  
 Flatness: .000012" / 0.3μm  
 Parallelism: .00008" / 2μm  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2.4 years under normal use

## Function

Origin-set, Automatic power on/off, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## DIMENSIONS AND MASS



# MDH Micrometer

## SERIES 293 — High-Accuracy Sub-Micron Digimatic Micrometer

### Technical Data

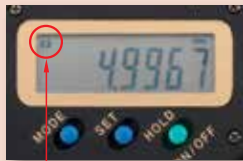
Flatness: 0.3µm/0.00012"  
 Parallelism: 0.6µm/0.00024  
 Measuring force: 7 to 9N

### Functions

Preset (ABS measurement system)  
 Zero-setting (INC measurement system)  
 Hold, Resolution switching, Function lock, On/off, Auto power off, Measurement data output, Error alarm

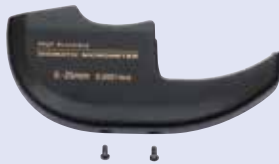
### Optional Accessories

05CZA662: SPC cable with data switch (1m/40")  
 05CZA663: SPC cable with data switch (2m/80")



Function lock

Heat shield



### FEATURES

- Enabling .000005"/0.1µm resolution measurement, this micrometer is ideal for customers who need to make highly accurate measurements with a handheld tool.
- A highly rigid frame and high-performance constant-force mechanism\* enable more stable measurements, while the clicks emitted while the workpiece is being measured assure the operator that measurement is proceeding normally.

\* Patent pending in Japan, the United States of America, the European Union and China.

- Body heat transferred to the instrument is reduced by a (removable) heat shield, minimizing the error caused by thermal expansion of the frame when performing handheld measurements.
- The ABS (absolute) rotary sensor also eliminates the need to perform origin setting each time the power is turned on, letting you start measuring right away. With no possibility of overspeed errors, the High-Accuracy Digimatic Micrometer also delivers a high level of reliability.



293-130-10



"d2" is the name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.

### SPECIFICATIONS

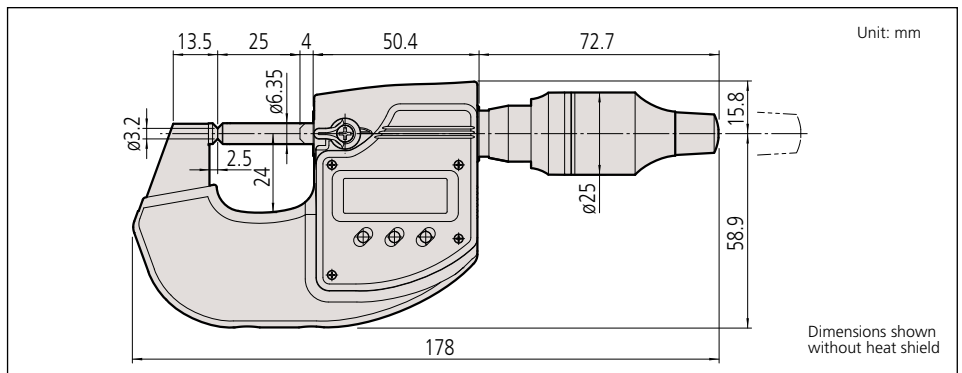
#### Metric

| Order No.  | Range    | Resolution                     | Accuracy | Measuring surface | Mass                      |
|------------|----------|--------------------------------|----------|-------------------|---------------------------|
| 293-100-10 | 0 - 25mm | 0.0001mm/0.0005mm (switchable) | ±0.5µm   | ø3.2mm            | 400g (440g w/Heat shield) |

#### Inch/Metric

| Order No.  | Range               | Resolution  | Accuracy | Measuring surface | Mass                      |
|------------|---------------------|---|----------|-------------------|---------------------------|
| 293-130-10 | 0 - 1" / 0 - 25.4mm | .000005"/.00002" / 0.0001mm/0.0005mm (switchable) | ±.00002" | ø3.2mm            | 400g (440g w/Heat shield) |

### DIMENSIONS



# QuantuMike

## SERIES 293 — Coolant-proof Micrometer

### FEATURES

- Faster measurement with 2mm per revolution instead of the standard 0.5mm.
- A patented ratchet thimble mechanism helps ensure repeatability.
- A function lock helps prevent error.
- IP-65 protection level.
- Certificate of inspection provided.
- With a standard bar except for 0-25mm/0-1" model.
- Supplied in fitted plastic case.



293-180-30



293-187-30

### SPECIFICATIONS

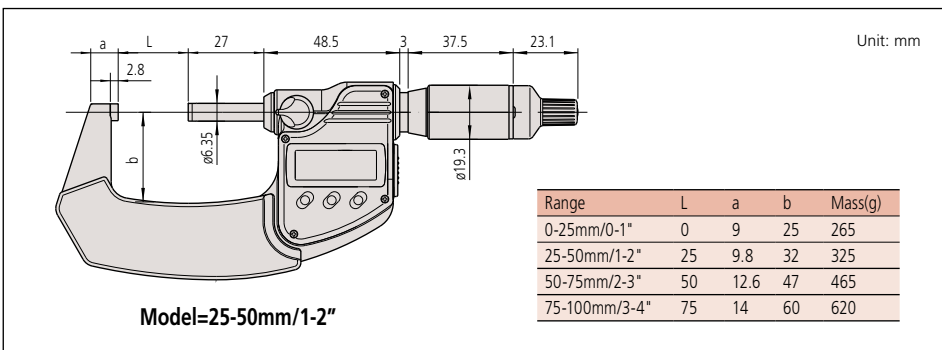
| Metric   |            |             |          |
|----------|------------|-------------|----------|
| Range    | Resolution | Order No.   | Accuracy |
| 0-25mm   | 0.001mm    | 293-140-30  | 1µm      |
| 0-25mm   | 0.001mm    | 293-145-30* | 1µm      |
| 25-50mm  | 0.001mm    | 293-141-30  | 1µm      |
| 25-50mm  | 0.001mm    | 293-146-30* | 1µm      |
| 50-75mm  | 0.001mm    | 293-142-30  | 2µm      |
| 50-75mm  | 0.001mm    | 293-147-30* | 2µm      |
| 75-100mm | 0.001mm    | 293-143-30  | 2µm      |
| 75-100mm | 0.001mm    | 293-148-30* | 2µm      |

\* without SPC data output

| Inch/Metric           |                   |             |          |
|-----------------------|-------------------|-------------|----------|
| Range                 | Resolution        | Order No.   | Accuracy |
| 0-1" / 0 - 25.4mm     | .00005" / 0.001mm | 293-180-30  | .00005"  |
| 0-1" / 0 - 25.4mm     | .00005" / 0.001mm | 293-185-30* | .00005"  |
| 1-2" / 25.4 - 50.8mm  | .00005" / 0.001mm | 293-181-30  | .00005"  |
| 1-2" / 25.4 - 50.8mm  | .00005" / 0.001mm | 293-186-30* | .00005"  |
| 2-3" / 50.8 - 76.2mm  | .00005" / 0.001mm | 293-182-30  | .0001"   |
| 2-3" / 50.8 - 76.2mm  | .00005" / 0.001mm | 293-187-30* | .0001"   |
| 3-4" / 76.2 - 101.6mm | .00005" / 0.001mm | 293-183-30  | .0001"   |
| 3-4" / 76.2 - 101.6mm | .00005" / 0.001mm | 293-188-30* | .0001"   |

\* without SPC data output

### DIMENSIONS AND MASS



Certificate of inspection provided for 0-1" and 1-2" models only.

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.001mm or .00005" / 0.001mm  
 Flatness: 0.3µm / .000012"  
 Parallelism: 1µm / .00004" for models up to 50mm/2"  
 2µm / .00008" for models up to 100mm/4"  
 Measuring force: 7-12N  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), 938882  
 Battery life: Approx. 2.4 years under normal use  
 Dust/Water protection level: IP65

### Function

Origin-set, Zero / ABS, Hold, Function lock, Auto power on/off, Data output (output models), inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

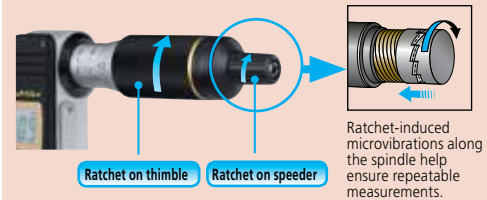
- 05CZA662: SPC cable with data switch (1m/40")
- 05CZA663: SPC cable with data switch (2m/80")



SPC cable with data switch

516-529-26 Inspection Gage Block Set  
 Rectangular Steel Gage Block  
 10 pc. blocks and 1 pc. optical parallel

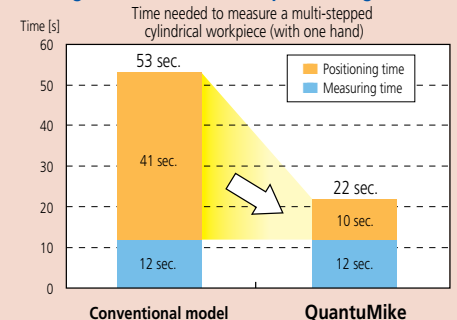
516-319-26 Inspection Gage Block Set  
 Rectangular Cera Gage Block  
 10 pc. blocks and 1 pc. optical parallel



Ratchet on thimble Ratchet on speeder

Ratchet-induced microvibrations along the spindle help ensure repeatable measurements.

### Significant reduction in positioning time



Conventional model QuantuMike



# ABSOLUTE Digimatic Micrometers

## SERIES 227 — with Adjustable Measuring Force

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .00005"/0.001mm or 0.001mm  
 Flatness: .000012" / 0.3µm  
 Parallelism: .00008" / 2µm  
 Accuracy of selected measuring force:  
 ± (0.1+selected measuring force/10)N  
 for 0.5-2.5N models  
 ± (0.4+selected measuring force/10)N  
 for 2-10N models

Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3 years under normal use  
 (1 year for .6 - 1.2" / 15-30mm, .4 - .8" /  
 10-20mm, .8-1.2" / 20-30mm range model)

### Function

Origin, Hold / Data, ON/OFF, Zero / ABS,  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

**937387:** SPC cable (40" / 1m)  
**965013:** SPC cable (80" / 2m)



### FEATURES

- Constant and low measuring force mechanism in the thimble.
- Adjustable measuring force\* accommodates various types of work materials.  
 \*0.5-2.5N or 2-10N
- The measurement-value hold function automatically retains the data at a specified measuring force, ensuring accuracy.
- Non-rotating spindle and the new ratchet friction thimble.
- Speedy spindle feed by .4"/rev and 10mm/rev for inch/metric model.
- With absolute linear scale.
- With SPC data output.
- With a standard bar to set the origin point (except for 0-15mm, 0-10mm, 0-.6", and 0-.4" models).
- Supplied in fitted plastic case.



227-201

### SPECIFICATIONS

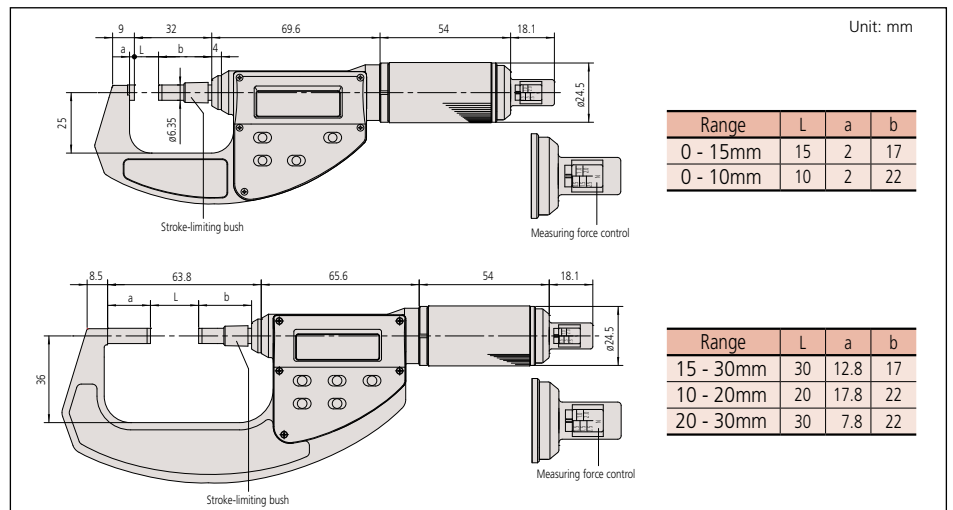
#### Metric

| Order No. | Range   | Resolution | Accuracy | Measuring Force                   | Mass(g) |
|-----------|---------|------------|----------|-----------------------------------|---------|
| 227-201   | 0-15mm  | 0.001mm    | ±2µm     | 0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N | 300     |
| 227-203   | 15-30mm | 0.001mm    | ±2µm     | 0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N | 380     |
| 227-205   | 0-10mm  | 0.001mm    | ±2µm     | 2-10 (2, 4, 6, 8, 10) N           | 340     |
| 227-206   | 10-20mm | 0.001mm    | ±2µm     | 2-10 (2, 4, 6, 8, 10) N           | 425     |
| 227-207   | 20-30mm | 0.001mm    | ±2µm     | 2-10 (2, 4, 6, 8, 10) N           | 415     |

#### Inch/Metric

| Order No. | Range   | Resolution      | Accuracy | Measuring Force                   | Mass(g) |
|-----------|---------|-----------------|----------|-----------------------------------|---------|
| 227-211   | 0-.6"   | .00005"/0.001mm | ±.0001"  | 0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N | 300     |
| 227-213   | .6-1.2" | .00005"/0.001mm | ±.0001"  | 0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N | 380     |
| 227-215   | 0-.4"   | .00005"/0.001mm | ±.0001"  | 2-10 (2, 4, 6, 8, 10) N           | 340     |
| 227-216   | .4-.8"  | .00005"/0.001mm | ±.0001"  | 2-10 (2, 4, 6, 8, 10) N           | 425     |
| 227-217   | .8-1.2" | .00005"/0.001mm | ±.0001"  | 2-10 (2, 4, 6, 8, 10) N           | 415     |

### DIMENSIONS AND MASS



# Quickmike

## SERIES 293 — IP-54 ABSOLUTE Digimatic Micrometers

The Quickmike provides a speedy spindle feed of 10mm / .4" per thimble rotation as compared to the conventional micrometer with 0.5mm / .025" per rotation. Its wide 30mm / 1.2" measuring range allows various workpieces with different shapes to be measured quickly.

### FEATURES

- Non-rotating spindle and the new ratchet friction thimble.
- Speedy spindle feed by 10mm/rev and .4"/rev for inch/metric models.
- With absolute linear scale.
- IP54 dust/water protection (when not connected with data output cable).
- With SPC data output.
- With a standard bar to set the origin point (for models with a range over 30mm / 1.2").
- Supplied in fitted plastic case.



293-676



293-677



293-678



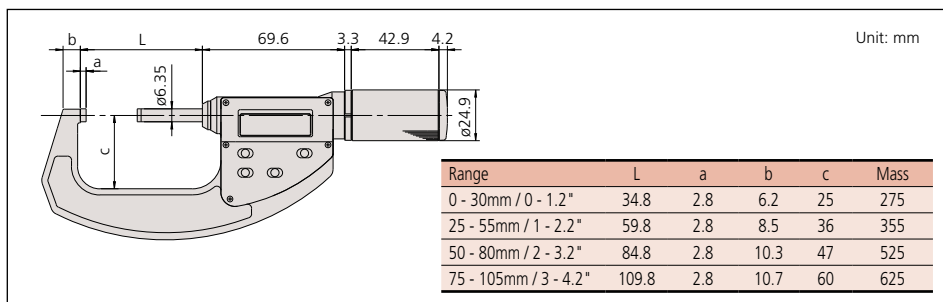
293-679

### SPECIFICATIONS

| Metric     |            |           |          |
|------------|------------|-----------|----------|
| Range      | Resolution | Order No. | Accuracy |
| 0 - 30mm   | 0.001mm    | 293-666   | ±2µm     |
| 25 - 55mm  | 0.001mm    | 293-667   | ±2µm     |
| 50 - 80mm  | 0.001mm    | 293-668   | ±3µm     |
| 75 - 105mm | 0.001mm    | 293-669   | ±3µm     |

| Inch/Metric                    |                      |           |          |
|--------------------------------|----------------------|-----------|----------|
| Range                          | Resolution           | Order No. | Accuracy |
| 0 - 1.2" /<br>0 - 30.48mm      | .00005" /<br>0.001mm | 293-676   | ±.0001"  |
| 1" - 2.2" /<br>25.4 - 55.88mm  | .00005" /<br>0.001mm | 293-677   | ±.0001"  |
| 2" - 3.2" /<br>50.8 - 81.28mm  | .00005" /<br>0.001mm | 293-678   | ±.00015" |
| 3" - 4.2" /<br>76.2 - 106.68mm | .00005" /<br>0.001mm | 293-679   | ±.00015" |

### DIMENSIONS AND MASS

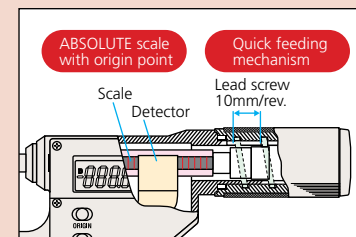


### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.001mm or .00005"/0.001mm  
 Flatness: 0.3µm / .000012"  
 Parallelism: 2µm / .00008" for models up to 80mm / 3.2"  
 3µm / .00012" for models up to 105mm / 4.2"  
 Measuring force: 5-10N  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), 938882  
 Battery life: Approx. 3 years under normal use  
 (1 year for models over 30mm / 1.2")  
 Dust/Water protection level: IP54

### Function

Origin, Hold / Data, ON/OFF, Zero / ABS,  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error



### Optional Accessories

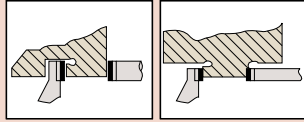
- 937387: SPC cable (1m / 40")
- 965013: SPC cable (2m / 80")

# Outside Micrometers

## SERIES 101

### Technical Data

Graduation: .0001"  
 Flatness: .000024"  
 Parallelism: .00008" for models up to 3"  
 .00012" for models over 3"  
 Measuring faces: Carbide tipped



### FEATURES

- Satin chrome-finished frame, tapered (on the anvil side) for hard-to-reach places.
- With a standard bar except for 0 - 1" models.
- Supplied in fitted plastic case.



101-113



101-114

### SPECIFICATIONS

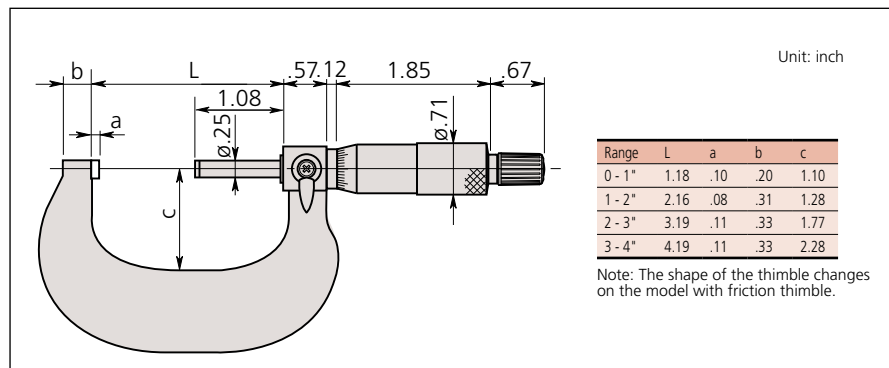
| Inch   |            | With friction thimble |          |          |
|--------|------------|-----------------------|----------|----------|
| Range  | Graduation | Order No.             | Accuracy | Mass (g) |
| 0 - 1" | .0001"     | <b>101-117*</b>       | ±.0001"  | 180      |
| 1 - 2" | .0001"     | <b>101-118*</b>       | ±.0001"  | 245      |

\*.0001" reading is obtained with vernier.

| Inch   |            | With ratchet stop |          |          |
|--------|------------|-------------------|----------|----------|
| Range  | Graduation | Order No.         | Accuracy | Mass (g) |
| 0 - 1" | .0001"     | <b>101-113*</b>   | ±.0001"  | 180      |
| 1 - 2" | .0001"     | <b>101-114*</b>   | ±.0001"  | 245      |
| 2 - 3" | .0001"     | <b>101-119*</b>   | ±.0001"  | 410      |
| 3 - 4" | .0001"     | <b>101-120*</b>   | ±.00015" | 550      |

\*.0001" reading is obtained with vernier.

### DIMENSIONS



# Ratchet Thimble Micrometer

**SERIES 102 — New smoother action ratchet thimble**

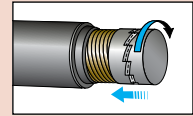
## FEATURES

- Ratchet function works both from the thimble and the speeder, allowing easy one-handed operation.
- Clearly audible ratchet operation for reassurance that measurement is being performed at constant, preset force.
- Heat insulating frame minimizes thermal expansion.
- Provided with a Certificate of Inspection.
- With a standard bar except for 0 - 25mm and 0 - 1" models.
- Supplied in fitted plastic case.

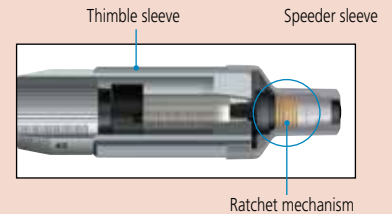


## Technical Data

Graduation: 0.01mm, 0.001mm, .001" or .0001"  
 Flatness: 0.6µm / .000024"  
 Parallelism: 2µm / .00008"  
 Measuring faces: Carbide tipped  
 Measuring force: 5-10N



Rotating the thimble/speeder sleeve when the workpiece is between the anvil and spindle causes the ratchet mechanism to tap the spindle and apply a constant measuring force to the workpiece.



## SPECIFICATIONS

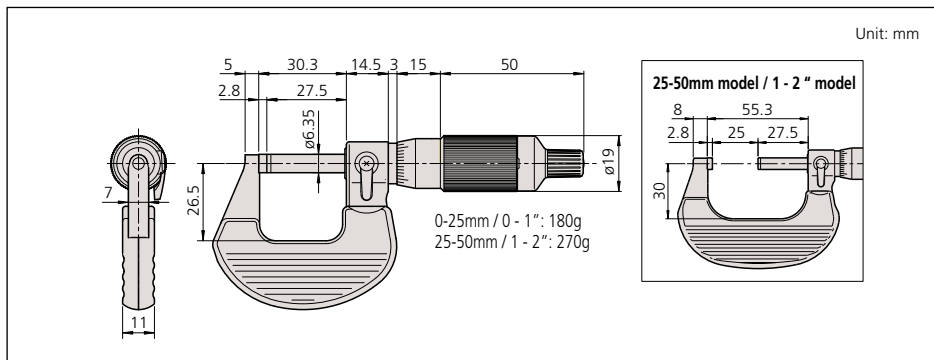
| Metric    |            |                 |          |
|-----------|------------|-----------------|----------|
| Range     | Graduation | Order No.       | Accuracy |
| 0 - 25mm  | 0.01mm     | <b>102-701</b>  | ±2µm     |
| 0 - 25mm  | 0.001mm    | <b>102-707*</b> | ±2µm     |
| 25 - 50mm | 0.01mm     | <b>102-702</b>  | ±2µm     |
| 25 - 50mm | 0.001mm    | <b>102-708*</b> | ±2µm     |

| Inch   |            |                 |          |
|--------|------------|-----------------|----------|
| Range  | Graduation | Order No.       | Accuracy |
| 0 - 1" | .0001"     | <b>102-717*</b> | ±.0001"  |
| 1 - 2" | .0001"     | <b>102-718*</b> | ±.0001"  |

\*.0001" reading is obtained with vernier.

\*0.001mm reading is obtained with vernier.

## DIMENSIONS AND MASS







# Outside Micrometers

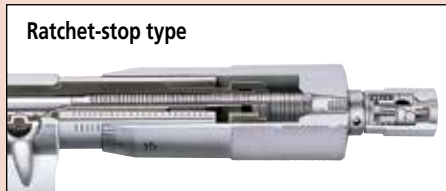
## SERIES 102

### FEATURES

- Heat-insulated frame, tapered (on the anvil side) for hard-to-reach places.
- With a standard bar except for 0 - 25mm model.
- A ratchet stop for a constant measuring force.
- Supplied in a fitted plastic case.

### Technical Data

Graduation: 0.01mm  
 Flatness: 0.3µm  
 Parallelism: 1µm for 25mm model  
                   3µm for models up to 100mm  
 Measuring faces: Carbide tipped



Ratchet-stop type



102-301

### SPECIFICATIONS

| Metric — With ratchet stop |            |                |          |
|----------------------------|------------|----------------|----------|
| Range                      | Graduation | Order No.      | Accuracy |
| 0 - 25mm                   | 0.01mm     | <b>102-301</b> | ±2µm     |
| 25 - 50mm                  | 0.01mm     | <b>102-302</b> | ±2µm     |
| 50 - 75mm                  | 0.01mm     | <b>102-303</b> | ±2µm     |
| 75 - 100mm                 | 0.01mm     | <b>102-304</b> | ±3µm     |

| Metric — Micrometer set 0.01mm Graduation model |                   |  |
|---|-------------------|--|
| Range   | Order No.         | Included in set  |
| 0 - 100mm<br>(4 pcs/set)                        | <b>102-911-40</b> | <ul style="list-style-type: none"> <li>• 102-301</li> <li>• 102-302</li> <li>• 102-303</li> <li>• 102-304</li> <li>• 3 micrometer standards</li> </ul> |

### DIMENSIONS AND MASS

Unit: mm

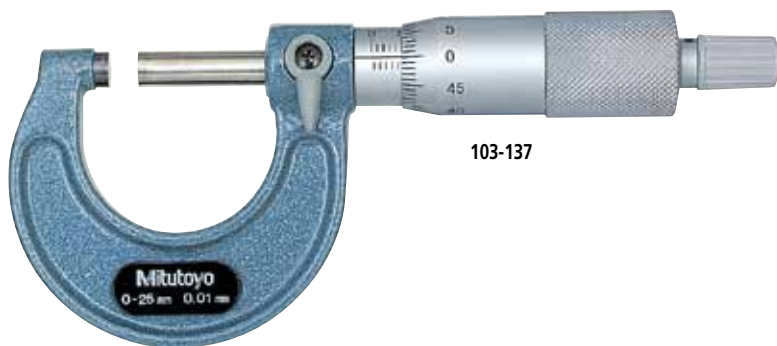
| Range      | L     | a   | b  | c  | d    | Mass (g) |
|------------|-------|-----|----|----|------|----------|
| 0 - 25mm   | 30.3  | 2.8 | 5  | 26 | 6.35 | 180      |
| 25 - 50mm  | 55.3  | 2.8 | 8  | 32 | 6.35 | 270      |
| 50 - 75mm  | 80.3  | 2.8 | 9  | 45 | 6.35 | 375      |
| 75 - 100mm | 105.3 | 2.8 | 10 | 58 | 6.35 | 490      |

# Outside Micrometers

## SERIES 103

### FEATURES

- Hammertone, baked-enamel-finished frame.
- Ratchet stop for exact repetitive readings.
- With a standard bar except for 0-25mm model.



103-137



### Technical Data

Graduation: 0.01mm, 0.001mm  
 Flatness: 0.6 μm for models up to 300mm/12"  
 1 μm for models over 300mm/12"  
 Parallelism: (2+R/100)μm, R=max. range (mm)  
 Measuring faces: Carbide tipped

### SPECIFICATIONS

**Metric** With ratchet stop

| Range       | Order No.  | Accuracy | Mass (g) |
|-------------|------------|----------|----------|
| 0 - 25mm    | 103-137    | ±2μm     | 175      |
|             | 103-129*   | ±2μm     | 175      |
| 25 - 50mm   | 103-138    | ±2μm     | 215      |
|             | 103-130*   | ±2μm     | 215      |
| 50 - 75mm   | 103-139-10 | ±2μm     | 315      |
| 75 - 100mm  | 103-140-10 | ±3μm     | 375      |
| 100 - 125mm | 103-141-10 | ±3μm     | 515      |
| 125 - 150mm | 103-142-10 | ±3μm     | 665      |
| 150 - 175mm | 103-143-10 | ±4μm     | 720      |
| 175 - 200mm | 103-144-10 | ±4μm     | 920      |
| 200 - 225mm | 103-145-10 | ±4μm     | 1080     |
| 225 - 250mm | 103-146-10 | ±5μm     | 1255     |
| 250 - 275mm | 103-147-10 | ±5μm     | 1405     |
| 275 - 300mm | 103-148-10 | ±5μm     | 1565     |
| 300 - 325mm | 103-149    | ±6μm     | 1985     |
| 325 - 350mm | 103-150    | ±6μm     | 2155     |
| 350 - 375mm | 103-151    | ±6μm     | 2305     |
| 375 - 400mm | 103-152    | ±7μm     | 2455     |
| 400 - 425mm | 103-153    | ±7μm     | 2715     |
| 425 - 450mm | 103-154    | ±7μm     | 2965     |
| 450 - 475mm | 103-155    | ±8μm     | 3215     |
| 475 - 500mm | 103-156    | ±8μm     | 3450     |

(Models with a range up to 1000mm are available.)

\*0.001mm reading is obtained with vernier.

### DIMENSIONS AND MASS

Up to 300mm / 12"

Over 300mm / 12"

| Range                  | L     | a   | b  | c   |
|------------------------|-------|-----|----|-----|
| 0 - 25mm / 0 - 1"      | 30.3  | 2.8 | 9  | 28  |
| 25 - 50mm / 1 - 2"     | 55.3  | 2.8 | 10 | 38  |
| 50 - 75mm / 2 - 3"     | 80.3  | 2.8 | 12 | 49  |
| 75 - 100mm / 3 - 4"    | 105.3 | 2.8 | 14 | 60  |
| 100 - 125mm / 4 - 5"   | 132.8 | 5.3 | 17 | 79  |
| 125 - 150mm / 5 - 6"   | 158.2 | 5.7 | 19 | 94  |
| 150 - 175mm / 6 - 7"   | 183.6 | 6.1 | 20 | 106 |
| 175 - 200mm / 7 - 8"   | 208.8 | 6.3 | 19 | 118 |
| 200 - 225mm / 8 - 9"   | 234.2 | 6.7 | 18 | 130 |
| 225 - 250mm / 9 - 10"  | 258   | 5.5 | 18 | 143 |
| 250 - 275mm / 10 - 11" | 284   | 6.5 | 18 | 156 |
| 275 - 300mm / 11 - 12" | 309   | 6.5 | 18 | 169 |

| Range                | L   | a  | b  | c   |
|----------------------|-----|----|----|-----|
| 300 - 325mm / 12-13" | 353 | 18 | 28 | 187 |
| 325 - 350mm / 13-14" | 378 | 18 | 28 | 199 |
| 350 - 375mm / 14-15" | 403 | 18 | 28 | 212 |
| 375 - 400mm / 15-16" | 428 | 18 | 28 | 224 |
| 400 - 425mm / 16-17" | 453 | 18 | 28 | 236 |
| 425 - 450mm / 17-18" | 478 | 18 | 28 | 248 |
| 450 - 475mm / 18-19" | 503 | 18 | 28 | 261 |
| 475 - 500mm / 19-20" | 528 | 18 | 28 | 273 |

**Metric** Micrometer set

| Range                   | Order No.  | Included in set  | Mass (g) |
|-------------------------|------------|--|----------|
| 0 - 75mm (3 pc. set)    | 103-927-10 | 103-137, 103-138, 103-139-10, 2 micrometer standards   | 750      |
| 0 - 150mm (6 pc. set)   | 103-913-50 | 103-137, 103-138, 103-139-10, 103-140-10, 103-141-10, 103-142-10, 5 micrometer standards       | 2260     |
| 150 - 300mm (6 pc. set) | 103-915-10 | 103-143-10, 103-144-10, 103-145-10, 103-146-10, 103-147-10, 103-148-10, 6 micrometer standards | 7695     |
| 0 - 300mm (12 pc. set)  | 103-914-50 | All micrometers of 103-913-50 and 103-915-10 in one set, 11 micrometer standards               | 9300     |



# Outside Micrometers

## SERIES 103— Inch Models

### FEATURES

- Hammertone, baked-enamel-finished frame.
- Ratchet stop or friction thimble for exact repetitive readings.
- With a standard bar except for 0-1" model.



### Technical Data (Inch Model)

Accuracy: Refer to the list of specifications

Graduation: .001" or .0001"

Flatness: .000024" for models up to 12"  
.00004" for models over 12"

Parallelism: [.00008 + .00004 (L/4)]" L= max range (inch)

Measuring faces: Carbide tipped

### SPECIFICATIONS

**Inch** \_\_\_\_\_ With ratchet stop

| Range    | Graduation | Order No.      | Accuracy | Mass (g) |
|----------|------------|----------------|----------|----------|
| 0 - 1"   | .001"      | <b>103-177</b> | ±.0001"  | 175      |
| 1 - 2"   | .001"      | <b>103-178</b> | ±.0001"  | 215      |
| 2 - 3"   | .001"      | <b>103-179</b> | ±.0001"  | 315      |
| 3 - 4"   | .001"      | <b>103-180</b> | ±.00015" | 375      |
| 4 - 5"   | .001"      | <b>103-181</b> | ±.00015" | 515      |
| 5 - 6"   | .001"      | <b>103-182</b> | ±.00015" | 665      |
| 6 - 7"   | .001"      | <b>103-183</b> | ±.0002"  | 720      |
| 7 - 8"   | .001"      | <b>103-184</b> | ±.0002"  | 920      |
| 8 - 9"   | .001"      | <b>103-185</b> | ±.0002"  | 1080     |
| 9 - 10"  | .001"      | <b>103-186</b> | ±.00025" | 1255     |
| 10 - 11" | .001"      | <b>103-187</b> | ±.00025" | 1405     |
| 11 - 12" | .001"      | <b>103-188</b> | ±.00025" | 1565     |
| 12 - 13" | .001"      | <b>103-189</b> | ±.0003"  | 1985     |
| 13 - 14" | .001"      | <b>103-190</b> | ±.0003"  | 2155     |
| 14 - 15" | .001"      | <b>103-191</b> | ±.0003"  | 2305     |
| 15 - 16" | .001"      | <b>103-192</b> | ±.00035" | 2455     |
| 16 - 17" | .001"      | <b>103-193</b> | ±.00035" | 2715     |
| 17 - 18" | .001"      | <b>103-194</b> | ±.00035" | 2965     |
| 18 - 19" | .001"      | <b>103-195</b> | ±.0004"  | 3215     |
| 19 - 20" | .001"      | <b>103-196</b> | ±.0004"  | 3450     |
| 20 - 21" | .001"      | <b>103-197</b> | ±.0004"  | 4060     |
| 21 - 22" | .001"      | <b>103-198</b> | ±.00045" | 4080     |
| 22 - 23" | .001"      | <b>103-199</b> | ±.00045" | 4500     |
| 23 - 24" | .001"      | <b>103-200</b> | ±.00045" | 4525     |
| 24 - 25" | .001"      | <b>103-201</b> | ±.0005"  | 4915     |
| 25 - 26" | .001"      | <b>103-202</b> | ±.0005"  | 4930     |
| 26 - 27" | .001"      | <b>103-203</b> | ±.0005"  | 5200     |
| 27 - 28" | .001"      | <b>103-204</b> | ±.00055" | 5215     |
| 28 - 29" | .001"      | <b>103-205</b> | ±.00055" | 5835     |
| 29 - 30" | .001"      | <b>103-206</b> | ±.00055" | 5860     |
| 30 - 31" | .001"      | <b>103-207</b> | ±.0006"  | 6385     |
| 31 - 32" | .001"      | <b>103-208</b> | ±.0006"  | 6410     |
| 32 - 33" | .001"      | <b>103-209</b> | ±.0006"  | 6925     |
| 33 - 34" | .001"      | <b>103-210</b> | ±.00065" | 6940     |
| 34 - 35" | .001"      | <b>103-211</b> | ±.00065" | 7565     |
| 35 - 36" | .001"      | <b>103-212</b> | ±.00065" | 7590     |
| 36 - 37" | .001"      | <b>103-213</b> | ±.0007"  | 8215     |
| 37 - 38" | .001"      | <b>103-214</b> | ±.0007"  | 8240     |
| 38 - 39" | .001"      | <b>103-215</b> | ±.0007"  | 8860     |
| 39 - 40" | .001"      | <b>103-216</b> | ±.00075" | 8880     |

**Inch** \_\_\_\_\_ With friction thimble

| Range  | Graduation | Order No.       | Accuracy | Mass (g) |
|--------|------------|-----------------|----------|----------|
| 0 - 1" | .0001"     | <b>103-135*</b> | ±.0001"  | 175      |
| 1 - 2" | .0001"     | <b>103-136*</b> | ±.0001"  | 215      |

\* .0001" Reading is obtained with vernier

**Inch** \_\_\_\_\_ With ratchet stop

| Range    | Graduation | Order No.       | Accuracy | Mass (g) |
|----------|------------|-----------------|----------|----------|
| 0 - 1"   | .0001"     | <b>103-131*</b> | ±.0001"  | 175      |
| 1 - 2"   | .0001"     | <b>103-132*</b> | ±.0001"  | 215      |
| 2 - 3"   | .0001"     | <b>103-217*</b> | ±.0001"  | 315      |
| 3 - 4"   | .0001"     | <b>103-218*</b> | ±.00015" | 375      |
| 4 - 5"   | .0001"     | <b>103-219*</b> | ±.00015" | 515      |
| 5 - 6"   | .0001"     | <b>103-220*</b> | ±.00015" | 665      |
| 6 - 7"   | .0001"     | <b>103-221*</b> | ±.0002"  | 720      |
| 7 - 8"   | .0001"     | <b>103-222*</b> | ±.0002"  | 920      |
| 8 - 9"   | .0001"     | <b>103-223*</b> | ±.0002"  | 1080     |
| 9 - 10"  | .0001"     | <b>103-224*</b> | ±.00025" | 1255     |
| 10 - 11" | .0001"     | <b>103-225*</b> | ±.00025" | 1405     |
| 11 - 12" | .0001"     | <b>103-226*</b> | ±.00025" | 1565     |

\* .0001" Reading is obtained with vernier

**Inch** \_\_\_\_\_ With Tapered Frame and Ratchet Stop

| Range | Graduation | Order No.       | Accuracy | Mass (g) |
|-------|------------|-----------------|----------|----------|
| 0-1"  | .001"      | <b>103-259</b>  | ±.0001"  | 175      |
| 0-1"  | .0001"     | <b>103-260*</b> | ±.0001"  | 175      |
| 1-2"  | .0001"     | <b>103-262*</b> | ±.0001"  | 215      |

\* .0001" Reading is obtained with vernier

# Outside Micrometers

## SERIES 103 — Inch model set

| Inch                 |                   | Micrometer Set .001" Graduation Model   |          |
|----------------------|-------------------|---|----------|
| Range                | Order No.         | Included in set   | Mass (g) |
| 0 - 3" (3pcs./set)   | <b>103-929</b>    | 103-177, 103-178, 103-179, 2 Micrometer Standards   | 750      |
| 0 - 4" (4pcs./set)   | <b>103-930</b>    | 103-177, 103-178, 103-179, 103-180, 3 Micrometer Standards  | 1600     |
| 0 - 6" (6pcs./set)   | <b>103-904-10</b> | 103-177, 103-178, 103-179, 103-180, 103-181, 103-182, 5 Micrometer Standards  | 2200     |
| 0 - 12" (12pcs./set) | <b>103-905-10</b> | 103-177, 103-178, 103-179, 103-180, 103-181, 103-182, 103-183, 103-184, 103-185, 103-186, 103-187, 103-188, 11 Micrometer Standards | 9000     |
| 6 - 12" (6pcs./set)  | <b>103-906</b>    | 103-183, 103-184, 103-185, 103-186, 103-187, 103-188, 6 Micrometer Standards  | 7695     |



103-905-10

| Inch                 |                   | Micrometer Set .0001" Graduation Model  |          |
|----------------------|-------------------|---|----------|
| Range                | Order No.         | Included in set   | Mass (g) |
| 0 - 3" (3pcs./set)   | <b>103-922</b>    | 103-135, 103-136, 103-217, 2pcs. Micrometer Standards   | 705      |
| 0 - 4" (4pcs./set)   | <b>103-931</b>    | 103-135, 103-136, 103-217, 103-218, 3pcs. Micrometer Standards  | 1600     |
| 0 - 6" (6pcs./set)   | <b>103-907-40</b> | 103-135, 103-136, 103-217, 103-218, 103-219, 103-220, 5 Micrometer Standards  | 2200     |
| 0 - 12" (12pcs./set) | <b>103-908-40</b> | 103-135, 103-136, 103-217, 103-218, 103-219, 103-220, 103-221, 103-222, 103-223, 103-224, 103-225, 103-226, 11pcs. Micrometer Standards | 9000     |
| 6 - 12" (6pcs./set)  | <b>103-909</b>    | 103-221, 103-222, 103-223, 103-224, 103-225, 103-226, 6pcs. Micrometer Standards  | 6945     |



103-904-10



# Outside Micrometers

**SERIES 340, 104 — with Interchangeable Anvils, Inch model**

## FEATURES

- IP65 water/dust protection (Series 340\*).  
\*Models with a range up to 12" / 300mm.
- Wide measuring range with interchangeable anvils.
- With a ratchet stop for constant force.
- Supplied with zero-setting standards bar for each range.
- With SPC output (Series 340).
- Supplied in fitted wooden case.

## Technical Data

Accuracy:  $\pm[.00016" + .00004 (L/3)"]$  L = Max Range (Inch)  
 Resolution\*: .0001"/0.001mm  
 (340-351-30: .00005"/0.001mm)  
 Graduation\*\*: .001" (104-165: is .0001")  
 Flatness: .000024" for models up to 12"  
 .00004" for models over 12"  
 Parallelism: .00008" for models up to 3"  
 .00012" for models up to 6"  
 $\pm[.00008" + .00004 (L/4)"]$  L = Max range (inch)  
 Measuring faces: Carbide tipped (spindle only)  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years (1.8 years for models over 300mm) years under normal use  
 Dust/Water protection level\*: IP65 (up to 12" / 300mm)  
 \*Digital models \*\*Analog models

## Function of Digital Model

Zero / ABS, Data hold, Preset, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)  
**959149**: SPC cable Straight type (40"/1m)\*  
**959150**: SPC cable Straight type (80"/2m)\*  
**04AZB512**: SPC cable L-type (40"/1m)\*  
**04AZB513**: SPC cable L-type (80"/2m)\*  
 \* models over 300mm



## SPECIFICATIONS

| Inch/Metric                 |                      | Digital model     |           |                             |
|-----------------------------|----------------------|-------------------|-----------|-----------------------------|
| Range                       | Resolution           | Order No.         | Mass (kg) | Remarks                     |
| 0-6" /<br>0-152.4mm         | .00005" /<br>0.001mm | <b>340-351-30</b> | 0.96      | with 6 anvils & 5 standards |
| 6-12" /<br>152.4 - 304.8mm  | .0001" /<br>0.001mm  | <b>340-352-30</b> | 1.88      | with 6 anvils & 6 standards |
| 12-18" /<br>304.8 - 457.2mm | .0001" /<br>0.001mm  | <b>340-720</b>    | 4.75      | with 6 anvils & 6 standards |
| 18-24" /<br>457.2 - 609.6mm | .0001" /<br>0.001mm  | <b>340-721</b>    | 6.62      | with 6 anvils & 6 standards |
| 24-30" /<br>609.6 - 762.0mm | .0001" /<br>0.001mm  | <b>340-722</b>    | 10.06     | with 6 anvils & 6 standards |
| 30-36" /<br>762.0 - 914.4mm | .0001" /<br>0.001mm  | <b>340-723</b>    | 11.98     | with 6 anvils & 6 standards |

| Inch   |            |                 |          |                             |
|--------|------------|-----------------|----------|-----------------------------|
| Range  | Graduation | Order No.       | Mass(kg) | Remarks                     |
| 0-2"   | .0001"     | <b>104-165*</b> | 0.32     | with 1" anvil & 1 standard  |
| 0-6"   | .001"      | <b>104-137</b>  | 1.35     | with 6 anvils & 5 standards |
| 6-12"  | .001"      | <b>104-138</b>  | 2.65     | with 6 anvils & 6 standards |
| 12-16" | .001"      | <b>104-152</b>  | 3.31     | with 4 anvils & 4 standards |
| 12-18" | .001"      | <b>104-201</b>  | 4.69     | with 6 anvils & 6 standards |
| 16-20" | .001"      | <b>104-153</b>  | 4.81     | with 4 anvils & 4 standards |
| 18-24" | .001"      | <b>104-202</b>  | 6.51     | with 6 anvils & 6 standards |
| 20-24" | .001"      | <b>104-154</b>  | 6.35     | with 4 anvils & 4 standards |
| 24-28" | .001"      | <b>104-155</b>  | 7.72     | with 4 anvils & 4 standards |
| 24-30" | .001"      | <b>104-203</b>  | 9.95     | with 6 anvils & 6 standards |
| 28-32" | .001"      | <b>104-156</b>  | 9.08     | with 4 anvils & 4 standards |
| 30-36" | .001"      | <b>104-204</b>  | 11.87    | with 6 anvils & 6 standards |
| 32-36" | .001"      | <b>104-157</b>  | 10.41    | with 4 anvils & 4 standards |
| 36-40" | .001"      | <b>104-158</b>  | 11.78    | with 4 anvils & 4 standards |
| 36-42" | .001"      | <b>104-205</b>  | 13.68    | with 6 anvils & 6 standards |

\*.0001" reading is obtained with vernier.

# Outside Micrometers

**SERIES 340, 104 — with Interchangeable Anvils, Metric Model**



## FEATURES

- IP65 water/dust protection (Series 340\*).  
\*Models with a range up to 300mm.
- Wide measuring range with interchangeable anvils.
- With a ratchet stop for constant force.
- Supplied with zero-setting standards bar for each range.
- With SPC output (Series 340).
- Supplied in fitted wooden case.

### Digital model



## SPECIFICATIONS

**Metric** Digital model

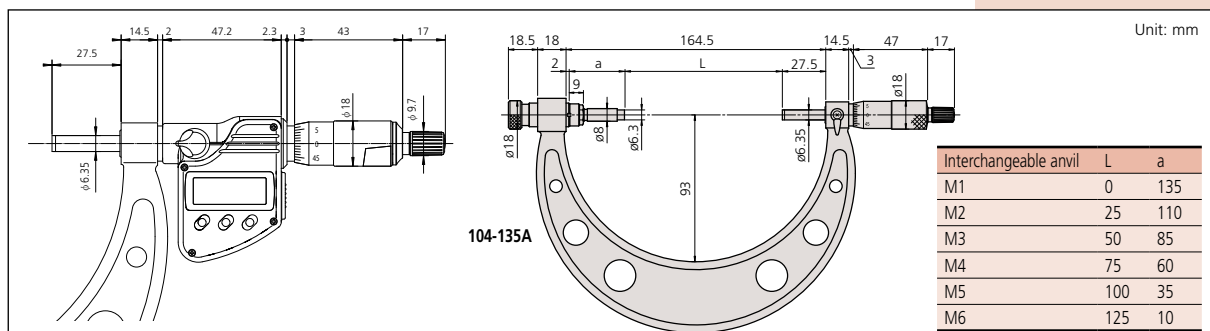
| Range        | Resolution | Order No.         | Mass (kg) | Remarks                     |
|--------------|------------|-------------------|-----------|-----------------------------|
| 0 - 150mm    | 0.001mm    | <b>340-251-30</b> | 0.96      | with 6 anvils & 5 standards |
| 150 - 300mm  | 0.001mm    | <b>340-252-30</b> | 1.88      | with 6 anvils & 6 standards |
| 300 - 400mm  | 0.001mm    | <b>340-520</b>    | 3.31      | with 4 anvils & 4 standards |
| 400 - 500mm  | 0.001mm    | <b>340-521</b>    | 4.81      | with 4 anvils & 4 standards |
| 500 - 600mm  | 0.001mm    | <b>340-522</b>    | 6.35      | with 4 anvils & 4 standards |
| 600 - 700mm  | 0.001mm    | <b>340-523</b>    | 7.72      | with 4 anvils & 4 standards |
| 700 - 800mm  | 0.001mm    | <b>340-524</b>    | 9.08      | with 4 anvils & 4 standards |
| 800 - 900mm  | 0.001mm    | <b>340-525</b>    | 10.41     | with 4 anvils & 4 standards |
| 900 - 1000mm | 0.001mm    | <b>340-526</b>    | 11.78     | with 4 anvils & 4 standards |

**Metric**

| Range        | Graduation | Order No.       | Mass (kg) | Remarks                     |
|--------------|------------|-----------------|-----------|-----------------------------|
| 0 - 50mm     | 0.01mm     | <b>104-171*</b> | 0.32      | with 2 anvils & 1 standard  |
| 0 - 100mm    | 0.01mm     | <b>104-139A</b> | 0.79      | with 4 anvils & 3 standards |
| 0 - 150mm    | 0.01mm     | <b>104-135A</b> | 1.35      | with 6 anvils & 5 standards |
| 50 - 150mm   | 0.01mm     | <b>104-161A</b> | 1.35      | with 4 anvils & 4 standards |
| 100 - 200mm  | 0.01mm     | <b>104-140A</b> | 1.38      | with 4 anvils & 4 standards |
| 150 - 300mm  | 0.01mm     | <b>104-136A</b> | 2.65      | with 6 anvils & 6 standards |
| 200 - 300mm  | 0.01mm     | <b>104-141A</b> | 2.22      | with 4 anvils & 4 standards |
| 300 - 400mm  | 0.01mm     | <b>104-142A</b> | 3.31      | with 4 anvils & 4 standards |
| 400 - 500mm  | 0.01mm     | <b>104-143A</b> | 4.81      | with 4 anvils & 4 standards |
| 500 - 600mm  | 0.01mm     | <b>104-144A</b> | 6.35      | with 4 anvils & 4 standards |
| 600 - 700mm  | 0.01mm     | <b>104-145A</b> | 7.72      | with 4 anvils & 4 standards |
| 700 - 800mm  | 0.01mm     | <b>104-146A</b> | 9.08      | with 4 anvils & 4 standards |
| 800 - 900mm  | 0.01mm     | <b>104-147A</b> | 10.41     | with 4 anvils & 4 standards |
| 900 - 1000mm | 0.01mm     | <b>104-148A</b> | 11.78     | with 4 anvils & 4 standards |

\*The frame is in a heat-insulated cover.

## DIMENSIONS



### Technical Data

Accuracy:  $\pm(4+R/75)\mu\text{m}$ , R=max. range (mm)  
 Resolution\*: 0.001mm  
 Graduation\*\*\*: 0.01mm  
 Flatness: 0.6 $\mu\text{m}$  for models up to 300mm  
 1 $\mu\text{m}$  for models over 300mm  
 Parallelism: 2 $\mu\text{m}$  for models up to 75mm  
 3 $\mu\text{m}$  for models up to 150mm  
 (2+R/100) $\mu\text{m}$  for models over 150mm, R=max. range (mm)

Measuring faces: Carbide tipped (spindle only)  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years (1.8 years for models over 300mm) years under normal use  
 Dust/Water protection level\*: IP65 (up to 300mm)  
 \*Digital models \*\*Analog models

### Function of Digital Model

Zero / ABS, Data hold, Preset, Data output, inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)  
**959149**: SPC cable Straight type (40"/1m)\*  
**959150**: SPC cable Straight type (80"/2m)\*  
**04AZB512**: SPC cable L-type (40"/1m)\*  
**04AZB513**: SPC cable L-type (80"/2m)\*  
 \* models over 300mm

# Outside Micrometers

## SERIES 105 — with Extension Anvil Collars

### Technical Data

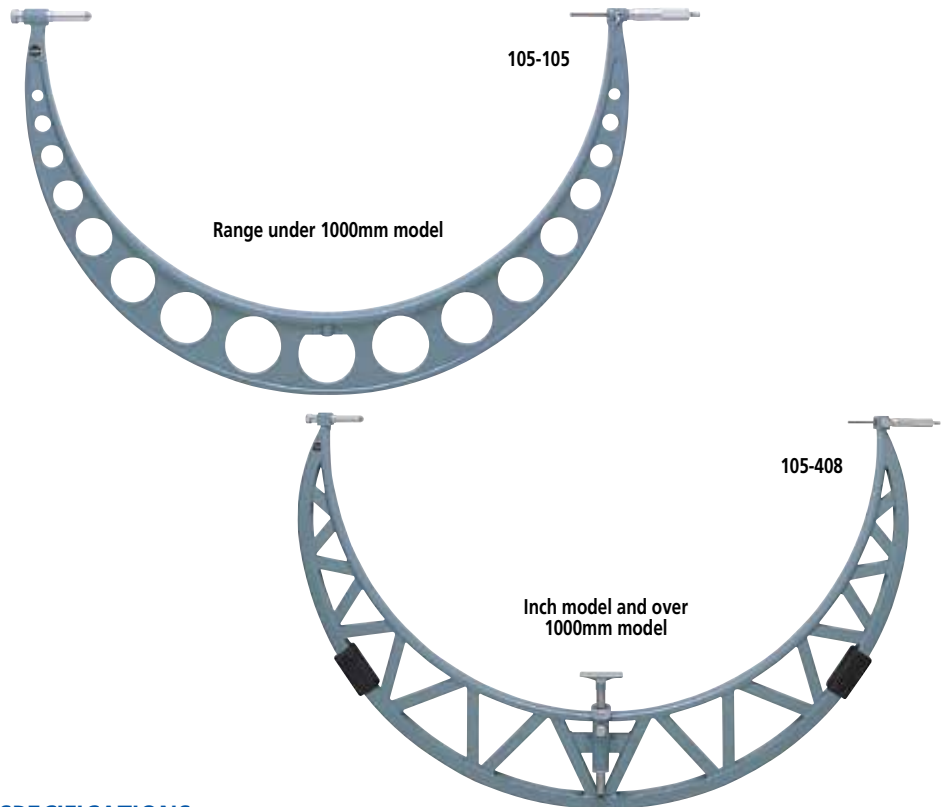
Accuracy:  $\pm(6+R/75)\mu\text{m}$ , R=max. range (mm)  
 Graduation: .001" / 0.01mm  
 Flatness: .000052" / 1.3 $\mu\text{m}$   
 Parallelism: [.00016" + .00004 (L/4)"] L=max. range (inch)  
 (2+R/100) $\mu\text{m}$ , R=max. range (mm)  
 Measuring faces: Carbide tipped

### Extension anvil collar



### FEATURES

- Wide measuring range with extension anvil collars.
- 50mm spindle stroke.
- With ratchet stop for constant force.
- Supplied with zero-setting standards bar for each range.
- Square and round pipes are combined for light weight and rigid frame (for models over 1000mm range).
- Workpiece stopper (for models over 1000mm range).
- Supplied in a fitted wooden case.



### SPECIFICATIONS

| Metric        |                |                   |           |
|---------------|----------------|-------------------|-----------|
| Range         | Order No.      | Extension collars | Mass (kg) |
| 500 - 600mm   | <b>105-103</b> | 50mm              | 5.53      |
| 600 - 700mm   | <b>105-104</b> | 50mm              | 6.35      |
| 700 - 800mm   | <b>105-105</b> | 50mm              | 7.17      |
| 800 - 900mm   | <b>105-106</b> | 50mm              | 7.99      |
| 900 - 1000mm  | <b>105-107</b> | 50mm              | 8.81      |
| 1000 - 1100mm | <b>105-408</b> | 50mm              | 6.37      |
| 1100 - 1200mm | <b>105-409</b> | 50mm              | 7.08      |
| 1000 - 1200mm | <b>105-418</b> | 50mm, 100mm       | 13.77     |
| 1200 - 1300mm | <b>105-410</b> | 50mm              | 7.79      |
| 1300 - 1400mm | <b>105-411</b> | 50mm              | 8.50      |
| 1200 - 1400mm | <b>105-419</b> | 50mm, 100mm       | 15.77     |
| 1400 - 1500mm | <b>105-412</b> | 50mm              | 9.21      |
| 1500 - 1600mm | <b>105-413</b> | 50mm              | 10.17     |
| 1400 - 1600mm | <b>105-420</b> | 50mm, 100mm       | 17.91     |
| 1600 - 1700mm | <b>105-414</b> | 50mm              | 11.13     |
| 1700 - 1800mm | <b>105-415</b> | 50mm              | 12.09     |
| 1600 - 1800mm | <b>105-421</b> | 50mm, 100mm       | 20.80     |
| 1800 - 1900mm | <b>105-416</b> | 50mm              | 13.05     |
| 1900 - 2000mm | <b>105-417</b> | 50mm              | 14.01     |
| 1800 - 2000mm | <b>105-422</b> | 50mm, 100mm       | 22.76     |

| Inch     |                |                   |           |
|----------|----------------|-------------------|-----------|
| Range    | Order No.      | Extension collars | Mass (kg) |
| 40 - 44" | <b>105-428</b> | 2"                | 10.0      |
| 44 - 48" | <b>105-429</b> | 2"                | 10.9      |
| 48 - 52" | <b>105-430</b> | 2"                | 11.4      |
| 52 - 56" | <b>105-431</b> | 2"                | 11.9      |
| 56 - 60" | <b>105-432</b> | 2"                | 12.6      |
| 60 - 64" | <b>105-433</b> | 2"                | 13.2      |
| 64 - 68" | <b>105-434</b> | 2"                | 14.1      |
| 68 - 72" | <b>105-435</b> | 2"                | 14.9      |
| 72 - 76" | <b>105-436</b> | 2"                | 15.8      |
| 76 - 80" | <b>105-437</b> | 2"                | 16.7      |

# Outside Micrometers

## SERIES 406 — Non-Rotating Spindle Type



### FEATURES

- With a standard bar except for 0 - 1" / 0 - 25mm model.
- With SPC output.
- Supplied in a fitted plastic case.
- Non-slip grip finish



### SPECIFICATIONS

| Metric     |            | Digital model with ratchet stop |          |
|------------|------------|---------------------------------|----------|
| Range      | Resolution | Order No.                       | Accuracy |
| 0 - 25mm   | 0.001mm    | <b>406-250-30</b>               | ±3μm     |
| 25 - 50mm  | 0.001mm    | <b>406-251-30</b>               | ±3μm     |
| 50 - 75mm  | 0.001mm    | <b>406-252-30</b>               | ±3μm     |
| 75 - 100mm | 0.001mm    | <b>406-253-30</b>               | ±4μm     |

| Inch/Metric             |                   | Digital model with ratchet stop |          |
|-------------------------|-------------------|---------------------------------|----------|
| Range                   | Resolution        | Order No.                       | Accuracy |
| 0 - 1" / 0 - 25.4mm     | .00005" / 0.001mm | <b>406-350-30</b>               | ±.00015" |
| 1 - 2" / 25.4 - 50.8mm  | .00005" / 0.001mm | <b>406-351-30</b>               | ±.00015" |
| 2 - 3" / 50.8 - 72.6mm  | .00005" / 0.001mm | <b>406-352-30</b>               | ±.00015" |
| 3 - 4" / 76.2 - 101.6mm | .00005" / 0.001mm | <b>406-353-30</b>               | ±.0002"  |

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .00005" / 0.001mm or 0.001mm  
 Flatness: 0.3μm / .000012"  
 Parallelism: .00012" / 3μm for models up to 3" / 75mm  
 .00016" / 4μm for 4" / 100mm models  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2.4 years under normal use

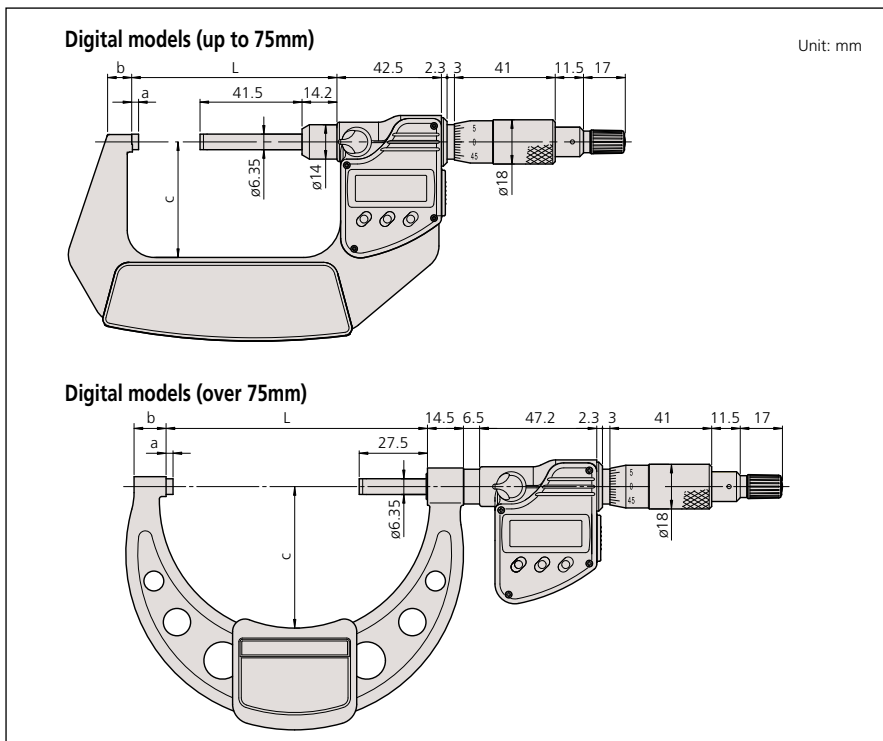
### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)

### DIMENSIONS AND MASS





# Outside Micrometers

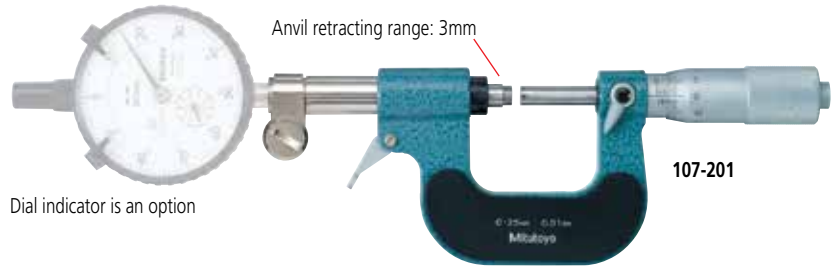
## SERIES 107

### FEATURES

- Uses dial indicator for direct go/no-go judgment for mass-produced parts.
- Anvil retracting trigger for quick measurement.
- With a standard bar except for 0 - 25mm models.
- Supplied in fitted plastic case.

### Technical Data

Graduation: 0.01mm (thimble)  
 Flatness: 0.6 $\mu$ m  
 Parallelism: (2+R/100) $\mu$ m, R=max. range (mm)  
 Measuring faces: Carbide tipped



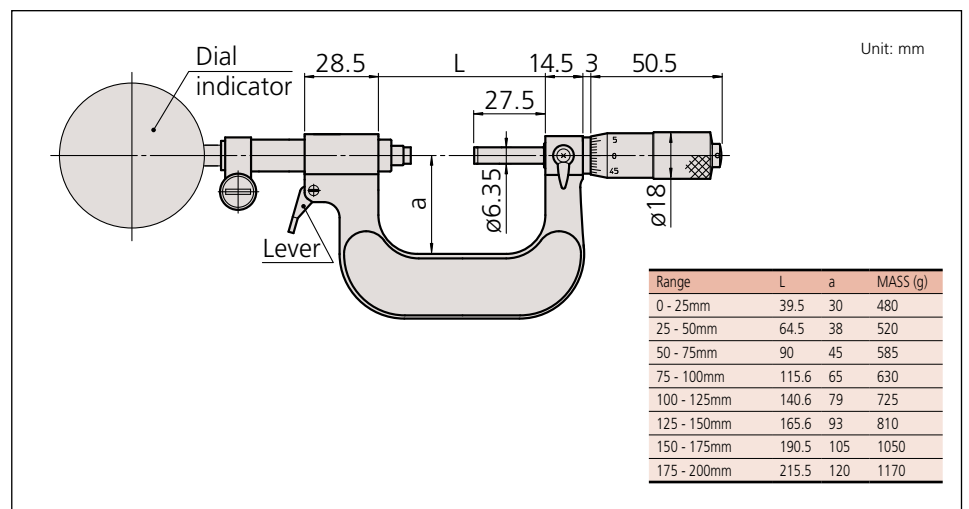
Dial indicator is an option

### SPECIFICATIONS

#### Metric

| Range       | Graduation | Order No.      | Accuracy     |
|-------------|------------|----------------|--------------|
| 0 - 25mm    | 0.01mm     | <b>107-201</b> | $\pm 2\mu$ m |
| 25 - 50mm   | 0.01mm     | <b>107-202</b> | $\pm 2\mu$ m |
| 50 - 75mm   | 0.01mm     | <b>107-203</b> | $\pm 2\mu$ m |
| 75 - 100mm  | 0.01mm     | <b>107-204</b> | $\pm 3\mu$ m |
| 100 - 125mm | 0.01mm     | <b>107-205</b> | $\pm 3\mu$ m |
| 125 - 150mm | 0.01mm     | <b>107-206</b> | $\pm 3\mu$ m |
| 150 - 175mm | 0.01mm     | <b>107-207</b> | $\pm 4\mu$ m |
| 175 - 200mm | 0.01mm     | <b>107-208</b> | $\pm 4\mu$ m |

### DIMENSIONS AND MASS



# Spline Micrometers

**SERIES 331, 111**



## FEATURES

- IP65 water/dust protection (Series 331).
- The anvil and spindle have a small diameter for measuring splined shafts, slots, and keyways.
- Non-slip grip finish (digital models)
- With ratchet stop for constant force.
- With SPC output (Series 331).
- With a standard bar except 0-1" and 0-25mm model.
- Supplied in fitted plastic case.



## SPECIFICATIONS

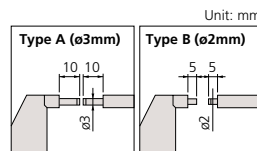
| Metric     |            | Digital model |          |         |          |
|------------|------------|---------------|----------|---------|----------|
| Range      | Resolution | Order No.     | Accuracy | Remarks | Mass (g) |
| 0 - 25mm   | 0.001mm    | 331-251-30    | ±2µm     | Type A  | 330      |
|            |            | 331-261-30    | ±2µm     | Type B  | 330      |
| 25 - 50mm  | 0.001mm    | 331-252-30    | ±2µm     | Type A  | 470      |
|            |            | 331-262-30    | ±2µm     | Type B  | 470      |
| 50 - 75mm  | 0.001mm    | 331-253-30    | ±2µm     | Type A  | 625      |
|            |            | 331-263-30    | ±2µm     | Type B  | 625      |
| 75 - 100mm | 0.001mm    | 331-254-30    | ±3µm     | Type A  | 565      |
|            |            | 331-264-30    | ±3µm     | Type B  | 565      |

| Metric      |            |           |          |         |          |
|-------------|------------|-----------|----------|---------|----------|
| Range       | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
| 0 - 25mm    | 0.01mm     | 111-115   | ±3µm     | Type A  | 205      |
|             |            | 111-215   | ±3µm     | Type B  | 205      |
| 25 - 50mm   | 0.01mm     | 111-116   | ±3µm     | Type A  | 305      |
|             |            | 111-117   | ±3µm     | Type A  | 370      |
| 50 - 75mm   | 0.01mm     | 111-118   | ±4µm     | Type A  | 500      |
|             |            | 111-119   | ±4µm     | Type A  | 655      |
| 75 - 100mm  | 0.01mm     | 111-120   | ±4µm     | Type A  | 710      |
|             |            | 111-121   | ±5µm     | Type A  | 900      |
| 175 - 200mm | 0.01mm     | 111-122   | ±5µm     | Type A  | 1040     |

| Inch/Metric              |                      | Digital model |          |         |          |
|--------------------------|----------------------|---------------|----------|---------|----------|
| Range                    | Resolution           | Order No.     | Accuracy | Remarks | Mass (g) |
| 0 - 1" /<br>0 - 25.4mm   | .00005" /<br>0.001mm | 331-351-30    | ±.0001"  | Type A  | 330      |
|                          |                      | 331-361-30    | ±.0001"  | Type B  | 330      |
| 1 - 2" /<br>25.4-50.8mm  | .00005" /<br>0.001mm | 331-352-30    | ±.0001"  | Type A  | 470      |
|                          |                      | 331-362-30    | ±.0001"  | Type B  | 470      |
| 2 - 3" /<br>50.8-76.2mm  | .00005" /<br>0.001mm | 331-353-30    | ±.0001"  | Type A  | 625      |
|                          |                      | 331-363-30    | ±.0001"  | Type B  | 625      |
| 3 - 4" /<br>76.2-101.6mm | .00005" /<br>0.001mm | 331-354-30    | ±.00015" | Type A  | 565      |
|                          |                      | 331-364-30    | ±.00015" | Type B  | 565      |

| Inch   |            |           |          |         |          |
|--------|------------|-----------|----------|---------|----------|
| Range  | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
| 0 - 1" | .0001"     | 111-166*  | ±.00015" | Type A  | 205      |

\*.0001" reading is obtained with vernier.



## Technical Data

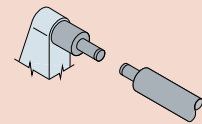
Accuracy: Refer to the list of specifications  
 Resolution\*: .00005"/0.001mm or 0.001mm  
 Graduation\*: .0001" or 0.01mm, .001"  
 Flatness: .000012" / 0.3µm  
 Parallelism: (2+R/100)µm, R=max. range (mm) [0.00008" + .00004" (L/4")]  
 L = max. range (inch)  
 Measuring faces: Carbide tipped  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)



## DIMENSIONS

**Models up to 75mm**

**Digital model**

**Models over 75mm**

**Digital model**

| Range      | L             | a           | b         | c         |
|------------|---------------|-------------|-----------|-----------|
| 0 - 25mm   | 58.2 (55.3)   | 17.5 (17.8) | 7.3 (10)  | 32 (38)   |
| 25 - 50mm  | 83.2 (80.3)   | 17.5 (17.8) | 10.1 (12) | 47 (49)   |
| 50 - 75mm  | 108.2 (105.3) | 20.3 (17.8) | 11.5 (14) | 60 (60)   |
| 75 - 100mm | 132.8 (132.8) | 20.3 (20.3) | 16.7 (17) | 76.5 (79) |

Unit: mm



# Point Micrometers

**SERIES 342, 142, 112**

## Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*\*: .001" or 0.01mm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero / ABS, Data hold,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662:** SPC cable with data switch (40" / 1m)  
**05CZA663:** SPC cable with data switch (80" / 2m)

## FEATURES

- IP65 water/dust protection (Series 342).
- Pointed spindle and anvil for measuring the web thickness of drills, small grooves, keyways, and other hard-to-reach dimensions.
- 15 degree and 30 degree measuring points are available.
- Non-slip grip finish (digital models).
- The measuring points have approximately 0.3mm / .012" radius.
- With ratchet stop for constant force.
- With SPC output (Series 342).
- With digit counter (Series 142).
- With a standard bar except 0 - 1" and 0 - 25mm model.
- Supplied in fitted plastic case.



342-351-30



112-201

## SPECIFICATIONS

| Metric     |            | Digital model (with carbide tip) |          |       |          |  |
|------------|------------|----------------------------------|----------|-------|----------|--|
| Range      | Resolution | Order No.                        | Accuracy | Point | Mass (g) |  |
| 0 - 25mm   | 0.001mm    | <b>342-251-30</b>                | ±2µm     | 15°   | 330      |  |
|            |            | <b>342-261-30</b>                | ±2µm     | 30°   | 330      |  |
| 25 - 50mm  | 0.001mm    | <b>342-252-30</b>                | ±2µm     | 15°   | 470      |  |
|            |            | <b>342-262-30</b>                | ±2µm     | 30°   | 470      |  |
| 50 - 75mm  | 0.001mm    | <b>342-253-30</b>                | ±2µm     | 15°   | 625      |  |
|            |            | <b>342-263-30</b>                | ±2µm     | 30°   | 625      |  |
| 75 - 100mm | 0.001mm    | <b>342-254-30</b>                | ±3µm     | 15°   | 565      |  |
|            |            | <b>342-264-30</b>                | ±3µm     | 30°   | 565      |  |

| Inch/Metric                 |                      | Digital model (with carbide tip) |          |       |          |  |
|-----------------------------|----------------------|----------------------------------|----------|-------|----------|--|
| Range                       | Resolution           | Order No.                        | Accuracy | Point | Mass (g) |  |
| 0 - 1" /<br>0 - 25.4mm      | .00005" /<br>0.001mm | <b>342-351-30</b>                | ±.0001"  | 15°   | 330      |  |
|                             |                      | <b>342-361-30</b>                | ±.0001"  | 30°   | 330      |  |
| 1" - 2" /<br>25.4 - 50.8mm  | .00005" /<br>0.001mm | <b>342-352-30</b>                | ±.0001"  | 15°   | 470      |  |
|                             |                      | <b>342-362-30</b>                | ±.0001"  | 30°   | 470      |  |
| 2" - 3" /<br>50.8 - 76.2mm  | .00005" /<br>0.001mm | <b>342-353-30</b>                | ±.0001"  | 15°   | 625      |  |
|                             |                      | <b>342-363-30</b>                | ±.0001"  | 30°   | 625      |  |
| 3" - 4" /<br>76.2 - 101.6mm | .00005" /<br>0.001mm | <b>342-354-30</b>                | ±.00015" | 15°   | 565      |  |
|                             |                      | <b>342-364-30</b>                | ±.00015" | 30°   | 565      |  |

| Metric   |            | Mechanical Counter Model |          |       |          |  |
|----------|------------|--------------------------|----------|-------|----------|--|
| Range    | Graduation | Order No.                | Accuracy | Point | Mass (g) |  |
| 0 - 25mm | 0.01mm     | <b>142-153*</b>          | ±3µm     | 15°   | 260      |  |
|          |            | <b>142-201*</b>          | ±3µm     | 30°   | 260      |  |

| Inch   |            | Mechanical Counter Model |          |       |          |  |
|--------|------------|--------------------------|----------|-------|----------|--|
| Range  | Graduation | Order No.                | Accuracy | Point | Mass (g) |  |
| 0 - 1" | .001"      | <b>142-177*</b>          | ±.00015" | 15°   | 260      |  |
|        |            | <b>142-225*</b>          | ±.00015" | 30°   | 260      |  |

\*The points don't have carbide tips.

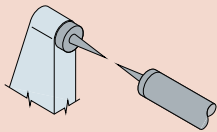
\*The points don't have carbide tips.

| Metric     |            | Mechanical Counter Model |          |       |          |  |
|------------|------------|--------------------------|----------|-------|----------|--|
| Range      | Graduation | Order No.                | Accuracy | Point | Mass (g) |  |
| 0 - 25mm   | 0.01mm     | <b>112-165</b>           | ±3µm     | 15°   | 205      |  |
|            |            | <b>112-153*</b>          | ±3µm     | 15°   | 205      |  |
|            |            | <b>112-213</b>           | ±3µm     | 30°   | 205      |  |
|            |            | <b>112-201*</b>          | ±3µm     | 30°   | 205      |  |
| 25 - 50mm  | 0.01mm     | <b>112-166</b>           | ±3µm     | 15°   | 305      |  |
|            |            | <b>112-154*</b>          | ±3µm     | 15°   | 305      |  |
|            |            | <b>112-214</b>           | ±3µm     | 30°   | 305      |  |
|            |            | <b>112-202*</b>          | ±3µm     | 30°   | 305      |  |
| 50 - 75mm  | 0.01mm     | <b>112-167</b>           | ±3µm     | 15°   | 370      |  |
|            |            | <b>112-155*</b>          | ±3µm     | 15°   | 370      |  |
|            |            | <b>112-215</b>           | ±3µm     | 30°   | 370      |  |
|            |            | <b>112-203*</b>          | ±3µm     | 30°   | 370      |  |
| 75 - 100mm | 0.01mm     | <b>112-168</b>           | ±4µm     | 15°   | 500      |  |
|            |            | <b>112-156*</b>          | ±4µm     | 15°   | 500      |  |
|            |            | <b>112-216</b>           | ±4µm     | 30°   | 500      |  |
|            |            | <b>112-204*</b>          | ±4µm     | 30°   | 500      |  |

| Inch   |            | Mechanical Counter Model |          |       |          |  |
|--------|------------|--------------------------|----------|-------|----------|--|
| Range  | Graduation | Order No.                | Accuracy | Point | Mass (g) |  |
| 0 - 1" | .001"      | <b>112-189</b>           | ±.00015" | 15°   | 205      |  |
|        |            | <b>112-177*</b>          | ±.00015" | 15°   | 205      |  |
|        |            | <b>112-237</b>           | ±.00015" | 30°   | 205      |  |
|        |            | <b>112-225*</b>          | ±.00015" | 30°   | 205      |  |
| 1 - 2" | .001"      | <b>112-190</b>           | ±.00015" | 15°   | 305      |  |
|        |            | <b>112-178*</b>          | ±.00015" | 15°   | 305      |  |
|        |            | <b>112-238</b>           | ±.00015" | 30°   | 305      |  |
|        |            | <b>112-226*</b>          | ±.00015" | 30°   | 305      |  |
| 2 - 3" | .001"      | <b>112-191</b>           | ±.00015" | 15°   | 370      |  |

\*The points don't have carbide tips.

\*The points don't have carbide tips.



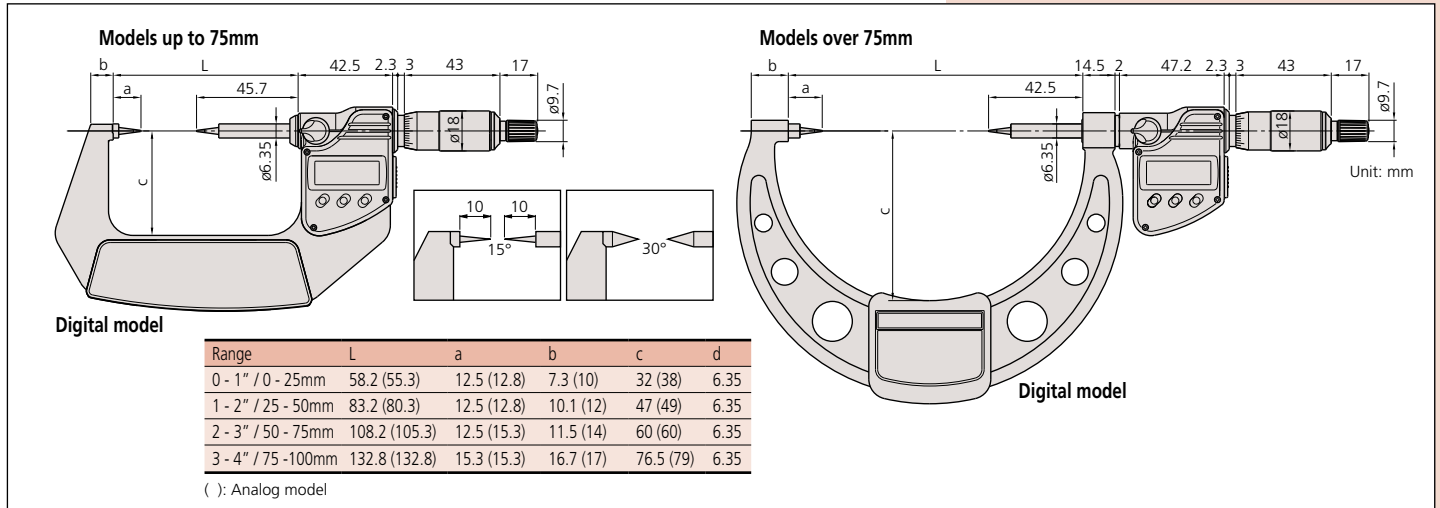
Tip angle: 15° (R0.3mm)



Tip angle: 30° (R0.3mm)



## DIMENSIONS



# Crimp Height Micrometers

**SERIES 342, 142, 112 — Point Spindle and Blade Anvil**

## FEATURES

- IP54/65 water/dust protection (Series 342).
- Measures the height of crimp contacts.
- With ratchet stop for constant force.
- Non-slip grip finish (digital models)
- With SPC output (Series 342).
- With digit counter (Series 142).
- Supplied in fitted plastic case.



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: 0.01mm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 (3 years: Quickmike type)  
 Dust/Water protection level\*: IP65 / IP54  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero / ABS (342-271-30, 342-371-30),  
 Data hold, Data output, inch/mm conversion  
 (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)
- 937387**: SPC cable for Quickmike type (40" / 1m)
- 965013**: SPC cable for Quickmike type (80" / 2m)



## SPECIFICATIONS

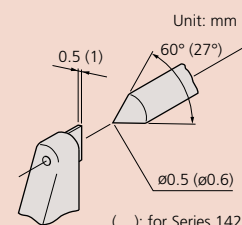
| Metric   |            | Digital model     |          |          |  |
|----------|------------|-------------------|----------|----------|--|
| Range    | Resolution | Order No.         | Accuracy | Mass (g) |  |
| 0 - 20mm | 0.001mm    | <b>342-271-30</b> | ±3µm     | 270      |  |

| Metric   |            | Quickmike type |          |          |  |
|----------|------------|----------------|----------|----------|--|
| Range    | Resolution | Order No.      | Accuracy | Mass (g) |  |
| 0 - 15mm | 0.001mm    | <b>342-451</b> | ±3µm     | 275      |  |

| Metric   |            | Mechanical counter model |          |          |  |
|----------|------------|--------------------------|----------|----------|--|
| Range    | Graduation | Order No.                | Accuracy | Mass (g) |  |
| 0 - 25mm | 0.01mm     | <b>142-402</b>           | ±3µm     | 200      |  |
| 0 - 25mm | 0.001mm    | <b>142-403*</b>          | ±3µm     | 200      |  |

| Inch/Metric         |                   | Digital model     |          |          |  |
|---------------------|-------------------|-------------------|----------|----------|--|
| Range               | Resolution        | Order No.         | Accuracy | Mass (g) |  |
| 0 - 0.8" / 0 - 20mm | .00005" / 0.001mm | <b>342-371-30</b> | ±.00015" | 270      |  |

| Metric   |            |                |          |          |  |
|----------|------------|----------------|----------|----------|--|
| Range    | Graduation | Order No.      | Accuracy | Mass (g) |  |
| 0 - 25mm | 0.01mm     | <b>112-401</b> | ±3µm     | 165      |  |



( ) : for Series 142

\* 0.001mm reading is obtained with vernier.



# V-Anvil Micrometers

**SERIES 314, 114 — 3 Flutes and 5 Flutes**

## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: .001" or .0001", 0.01mm  
 Flatness (spindle/anvil):  
 Analog model: .000024" / 0.6µm, .00005" / 1.3µm  
 Digital Model: .000012" / 0.3µm, .00004" / 1µm  
 Spindle face: Carbide tipped  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

## Function of Digital Model

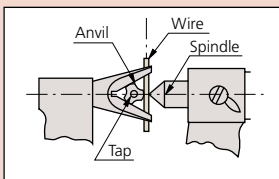
Zero / ABS, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)  
 Function lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662:** SPC cable with data switch (40" / 1m)  
**05CZA663:** SPC cable with data switch (80" / 2m)



## Pitch Diameter Measurement of Tap by Single-wire Method Inch/Metric



## FEATURES

- Measures the outside diameter of cutting tools (such as taps, reamers, end mills) with an odd number of flutes.
- With ratchet stop for constant force.
- Supplied with setting standard.
- Non-slip grip finish (digital models).
- V-anvils with a centerline groove are available. They are useful for measuring pitch diameters of taps which have a small diameter by using single-wire method.
- With SPC output (Series 314).
- Supplied in fitted plastic case.



314-351-30



114-121



114-202



114-204

## SPECIFICATIONS

**Metric** Digital model for 3 flutes cutting head

| Range     | Resolution | Order No.         | Accuracy | Remarks  | Setting Standard | Mass (g) |
|-----------|------------|-------------------|----------|----------|------------------|----------|
| 1 - 15mm  | 0.001mm    | <b>314-251-30</b> | ±4µm     | w/Groove | ø5mm             | 275      |
|           |            | <b>314-261-30</b> | ±4µm     | —        | ø5mm             | 275      |
| 10 - 25mm | 0.001mm    | <b>314-252-30</b> | ±4µm     | w/Groove | ø10mm            | 410      |
|           |            | <b>314-262-30</b> | ±4µm     | —        | ø10mm            | 410      |
| 25 - 40mm | 0.001mm    | <b>314-253-30</b> | ±5µm     | —        | ø25mm            | 465      |

**Inch/Metric** Digital model for 3 flutes cutting head

| Range                      | Resolution        | Order No.         | Accuracy | Remarks  | Setting Standard | Mass (g) |
|----------------------------|-------------------|-------------------|----------|----------|------------------|----------|
| .05 - .6" / 1.27 - 15.24mm | .00005" / 0.001mm | <b>314-351-30</b> | ±.0002"  | w/Groove | ø.2"             | 275      |
|                            |                   | <b>314-361-30</b> | ±.0002"  | —        | ø.2"             | 275      |
| .4" - 1" / 10.16 - 25.4mm  | .00005" / 0.001mm | <b>314-352-30</b> | ±.0002"  | w/Groove | ø.4"             | 410      |
|                            |                   | <b>314-362-30</b> | ±.0002"  | —        | ø.4"             | 410      |
| 1" - 1.6" / 25.4 - 40.64mm | .00005" / 0.001mm | <b>314-353-30</b> | ±.00025" | —        | ø 1"             | 465      |

## SPECIFICATIONS

### Metric For 3 flutes cutting head

| Range      | Graduation | Order No.       | Accuracy | Setting Standard | Remarks  | Mass (g) |
|------------|------------|-----------------|----------|------------------|----------|----------|
| 1 - 15mm   | 0.01mm     | <b>114-101</b>  | ±4μm     | ø5mm             | w/Groove | 120      |
|            |            | <b>114-161</b>  | ±4μm     | ø5mm             | —        | 120      |
| 10 - 25mm  | 0.01mm     | <b>114-102</b>  | ±4μm     | ø10mm            | w/Groove | 280      |
|            |            | <b>114-162</b>  | ±4μm     | ø10mm            | —        | 280      |
| 2.3 - 25mm | 0.01mm     | <b>114-204*</b> | ±4μm     | ø5mm             | —        | 290      |
| 25 - 40mm  | 0.01mm     | <b>114-103</b>  | ±5μm     | ø25mm            | —        | 400      |
| 40 - 55mm  | 0.01mm     | <b>114-104</b>  | ±6μm     | ø40mm            | —        | 465      |
| 55 - 70mm  | 0.01mm     | <b>114-105</b>  | ±6μm     | ø55mm            | —        | 675      |
| 70 - 85mm  | 0.01mm     | <b>114-106</b>  | ±7μm     | ø70mm            | —        | 910      |

\*Carbide-tipped anvil

### Metric For 5 flutes cutting head

| Range      | Graduation | Order No.       | Accuracy | Setting Standard | Remarks  | Mass (g) |
|------------|------------|-----------------|----------|------------------|----------|----------|
| 5 - 25mm   | 0.01mm     | <b>114-121</b>  | ±4μm     | ø5mm             | w/Groove | 255      |
|            |            | <b>114-165</b>  | ±4μm     | ø5mm             | —        | 255      |
| 2.3 - 25mm | 0.01mm     | <b>114-137*</b> | ±4μm     | ø5mm             | —        | 220      |
| 25 - 45mm  | 0.01mm     | <b>114-122</b>  | ±5μm     | ø25mm            | —        | 400      |
| 45 - 65mm  | 0.01mm     | <b>114-123</b>  | ±6μm     | ø55mm            | —        | 540      |
| 65 - 85mm  | 0.01mm     | <b>114-124</b>  | ±7μm     | ø70mm            | —        | 760      |

\*Carbide-tipped anvil

### Inch For 3 flutes cutting head

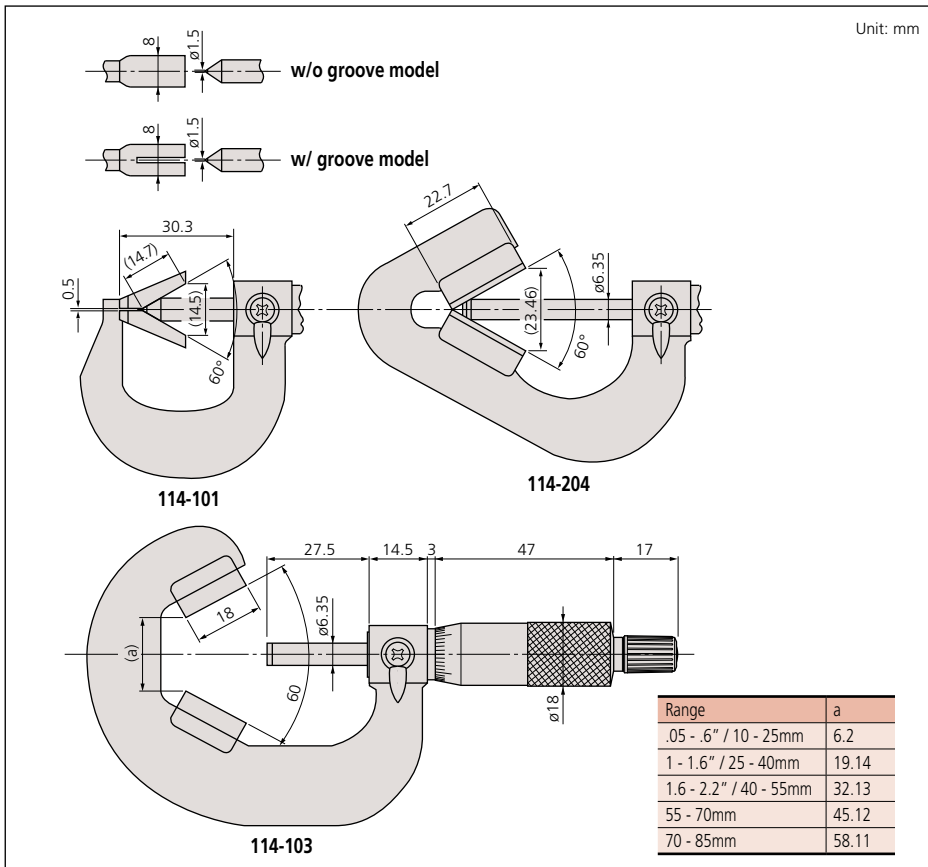
| Range      | Graduation | Order No.       | Accuracy | Setting Standard | Mass (g) |
|------------|------------|-----------------|----------|------------------|----------|
| .05 - .6"  | .001"      | <b>114-163</b>  | ±.0002"  | ø.2"             | 120      |
| .09 - 1"   | .0001"     | <b>114-202*</b> | ±.0002"  | ø.2"             | 280      |
| 1 - 1.6"   | .001"      | <b>114-113</b>  | ±.00025" | ø1"              | 400      |
| 1.6 - 2.2" | .001"      | <b>114-114</b>  | ±.0003"  | ø1.6"            | 465      |

\*Carbide-tipped anvil and .0001" reading is obtained with vernier.

### Inch For 5 flutes cutting head

| Range    | Graduation | Order No.      | Accuracy | Setting Standard | Mass (g) |
|----------|------------|----------------|----------|------------------|----------|
| .09 - 1" | .0001"     | <b>114-135</b> | ±.0002"  | ø.2"             | 255      |

## DIMENSIONS



# Limit Micrometers

## SERIES 113

### FEATURES

- Can be used as a go/no-go gage by setting the upper and lower limits.
- Provided with a standard bar for 25mm - 50mm model.
- Supplied in fitted plastic case.



### Technical Data

Graduation: 0.01mm  
 Flatness: 0.6μm  
 Parallelism: (3+R/100)μm, R=max. range (mm)  
 Measuring faces: Carbide tipped



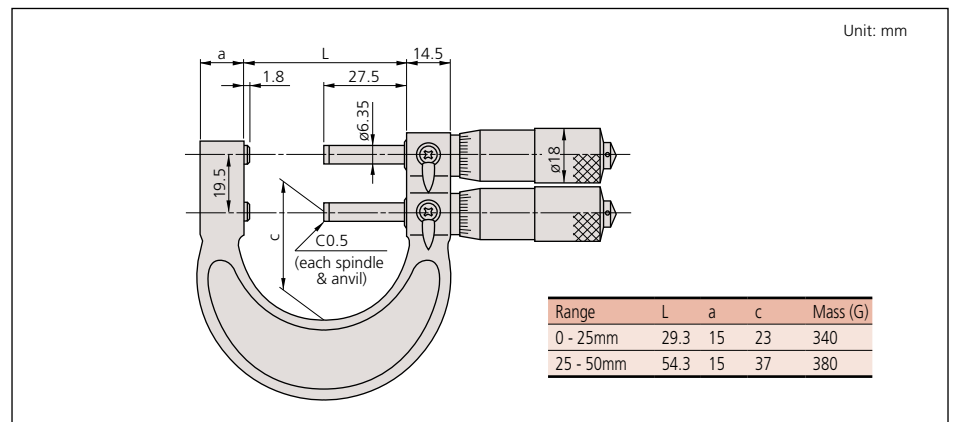
113-102

### SPECIFICATIONS

Metric

| Range     | Graduation | Order No.      | Accuracy |
|-----------|------------|----------------|----------|
| 0 - 25mm  | 0.01mm     | <b>113-102</b> | ±3μm     |
| 25 - 50mm | 0.01mm     | <b>113-103</b> | ±3μm     |

### DIMENSIONS AND MASS



# Pana Micrometers

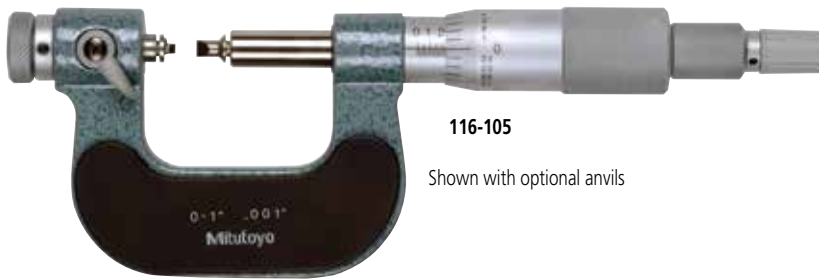
## SERIES 116 — Interchangeable Anvil Type

### FEATURES

- Non-rotating spindle with optional seven interchangeable anvils (flat, spline, spherical, point, knife-edge, disk and blade) for a wide range of applications.
- Interchangeable anvils (pair) are optional.
- With a standard bar except 0-1" and 0 - 25 mm model.
- V-anvils and conical spindle tips (matching pair) for screw thread measurement are also available.
- With ratchet stop for constant force.



116-101



116-105

Shown with optional anvils

### SPECIFICATIONS

| Metric    |            |           |          |
|-----------|------------|-----------|----------|
| Range     | Graduation | Order No. | Accuracy |
| 0 - 25mm  | 0.01mm     | 116-101   | ±4μm     |
| 25 - 50mm | 0.01mm     | 116-102   | ±4μm     |

| Inch    |            |           |          |
|---------|------------|-----------|----------|
| Range   | Graduation | Order No. | Accuracy |
| 0 - 1"  | .001"      | 116-105   | ±.0002"  |
| 1" - 2" | .001"      | 116-106   | ±.0002"  |

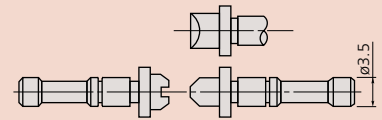
### Technical Data

Graduation: .001" or 0.01mm  
Spindle feed error: .00012" / 3μm

### Optional Accessories

Interchangeable V-anvil and conical spindle tip set:  
For Metric/Unified screw

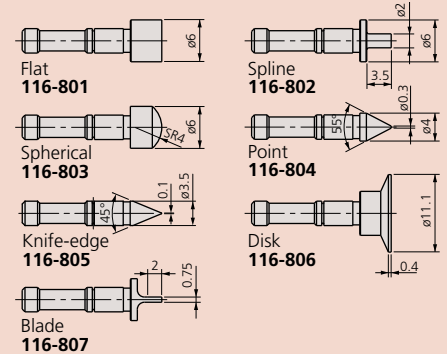
| Order No. | Assortment of anvils and tips  |
|-----------|--|
| 116-830   | 0.4 - 0.5mm/64 - 48TPI (116-831)<br>0.6 - 0.9mm/44 - 28TPI (116-832)<br>1 - 1.75mm/24 - 14TPI (116-833)<br>2 - 3mm/13 - 9TPI (116-834)<br>3.5 - 5mm/8 - 5TPI (116-835)<br>5.5 - 7mm/4.5 - 3.5TPI (116-836) |



116-830

### Interchangeable anvils set

| Order No. | Assortment of anvils   |
|-----------|--|
| 116-800   | Flat anvils (116-801)<br>Spline anvils (116-802)<br>Spherical anvils (116-803)<br>Point anvils (116-804)<br>Knife-edge anvils (116-805)<br>Disk anvils (116-806)<br>Blade anvils (116-807) |







# Spherical Face Micrometers

**SERIES 395, 295, 115**

## Technical Data

Accuracy: Refer to the list of specifications  
 Flatness: .000024" / 0.6µm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

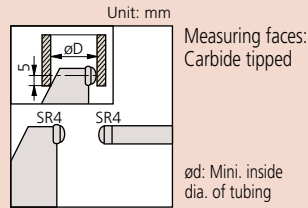
## Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)

Spherical anvil-spindle type



## FEATURES

- IP65 water/dust protection (Series 395).
- Designed to measure the wall thickness of various tubing.
- With ratchet stop for constant force.
- With SPC output (Series 395).
- Non-slip grip finish (digital models).
- With digit counter (Series 295).
- With a standard bar except 0 -1" and 0 - 25mm model.
- Supplied in fitted plastic case.



115-153



395-371-30



## SPECIFICATIONS

| Metric     |            | Digital model with spherical anvil |          |         |          |
|------------|------------|------------------------------------|----------|---------|----------|
| Range      | Resolution | Order No.                          | Accuracy | Remarks | Mass (g) |
| 0 - 25mm   | 0.001mm    | 395-251-30 <sup>S-F</sup>          | ±2µm     | D: 15mm | 270      |
|            |            | 395-271-30 <sup>S-S</sup>          | ±2µm     | D: 15mm | 270      |
| 25 - 50mm  | 0.001mm    | 395-252-30 <sup>S-F</sup>          | ±2µm     | D: 15mm | 330      |
|            |            | 395-272-30 <sup>S-S</sup>          | ±2µm     | D: 15mm | 330      |
| 50 - 75mm  | 0.001mm    | 395-253-30 <sup>S-F</sup>          | ±2µm     | D: 19mm | 470      |
|            |            | 395-273-30 <sup>S-S</sup>          | ±2µm     | D: 19mm | 470      |
| 75 - 100mm | 0.001mm    | 395-254-30 <sup>S-F</sup>          | ±3µm     | D: 20mm | 625      |
|            |            | 395-274-30 <sup>S-S</sup>          | ±3µm     | D: 20mm | 625      |

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

| Metric   |            | Mechanical counter model with spherical anvil |          |         |          |
|----------|------------|---|----------|---------|----------|
| Range    | Graduation | Order No.                                     | Accuracy | Remarks | Mass (g) |
| 0 - 25mm | 0.01mm     | 295-115 <sup>S-F</sup>                        | ±3µm     | D: 10mm | 220      |
|          |            | 295-215 <sup>S-S</sup>                        | ±3µm     | D: 10mm | 220      |

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

| Metric     |            | With spherical anvil   |          |         |          |
|------------|------------|------------------------|----------|---------|----------|
| Range      | Graduation | Order No.              | Accuracy | Remarks | Mass (g) |
| 0 - 25mm   | 0.01mm     | 115-115 <sup>S-F</sup> | ±3µm     | D: 10mm | 180      |
|            |            | 115-215 <sup>S-S</sup> | ±3µm     | D: 10mm | 180      |
| 25 - 50mm  | 0.01mm     | 115-116 <sup>S-F</sup> | ±3µm     | D: 11mm | 240      |
|            |            | 115-216 <sup>S-S</sup> | ±3µm     | D: 11mm | 240      |
| 50 - 75mm  | 0.01mm     | 115-117 <sup>S-F</sup> | ±3µm     | D: 17mm | 315      |
|            |            | 115-217 <sup>S-S</sup> | ±3µm     | D: 17mm | 315      |
| 75 - 100mm | 0.01mm     | 115-118 <sup>S-F</sup> | ±4µm     | D: 18mm | 375      |
|            |            | 115-218 <sup>S-S</sup> | ±4µm     | D: 18mm | 375      |

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

| Inch/Metric                 |                      | Digital model with spherical anvil |          |         |          |
|-----------------------------|----------------------|------------------------------------|----------|---------|----------|
| Range                       | Resolution           | Order No.                          | Accuracy | Remarks | Mass (g) |
| 0 - 1" /<br>0 - 25.4mm      | .00005" /<br>0.001mm | 395-351-30 <sup>S-F</sup>          | ±.0001"  | D: .59" | 270      |
|                             |                      | 395-371-30 <sup>S-S</sup>          | ±.0001"  | D: .59" | 270      |
| 1" - 2" /<br>25.4 - 50.8mm  | .00005" /<br>0.001mm | 395-352-30 <sup>S-F</sup>          | ±.0001"  | D: .59" | 330      |
|                             |                      | 395-372-30 <sup>S-S</sup>          | ±.0001"  | D: .59" | 330      |
| 2" - 3" /<br>50.8 - 76.2mm  | .00005" /<br>0.001mm | 395-353-30 <sup>S-F</sup>          | ±.0001"  | D: .75" | 470      |
|                             |                      | 395-373-30 <sup>S-S</sup>          | ±.0001"  | D: .75" | 470      |
| 3" - 4" /<br>76.2 - 101.6mm | .00005" /<br>0.001mm | 395-354-30 <sup>S-F</sup>          | ±.00015" | D: .79" | 625      |
|                             |                      | 395-374-30 <sup>S-S</sup>          | ±.00015" | D: .79" | 625      |

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

| Inch   |            | Mechanical counter model with spherical anvil |          |         |          |
|--------|------------|---|----------|---------|----------|
| Range  | Graduation | Order No.                                     | Accuracy | Remarks | Mass (g) |
| 0 - 1" | .0001"     | 295-153 <sup>S-F*</sup>                       | ±.00015" | D: .40" | 220      |
|        |            | 295-253 <sup>S-S*</sup>                       | ±.00015" | D: .40" | 220      |

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle  
 \*.0001" reading is obtained with vernier.

| Inch   |            | With spherical anvil    |          |         |          |
|--------|------------|-------------------------|----------|---------|----------|
| Range  | Graduation | Order No.               | Accuracy | Remarks | Mass (g) |
| 0 - 1" | .0001"     | 115-153 <sup>S-F*</sup> | ±.00015" | D: .40" | 180      |
| 0 - 1" | .0001"     | 115-253 <sup>S-S*</sup> | ±.00015" | D: .40" | 180      |
| 1 - 2" | .001"      | 115-242 <sup>S-S</sup>  | ±.00015" | D: .44" | 240      |
| 2 - 3" | .001"      | 115-243 <sup>S-S</sup>  | ±.00015" | D: .67" | 315      |

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle  
 \*.0001" reading is obtained with vernier.

# Tube Micrometers

**SERIES 395, 295, 115— Spherical and Cylindrical Anvils**



## FEATURES

- IP65 water/dust protection (Series 395).
- Designed to measure the wall thickness of various tubing.
- The Tube Micrometers have two combinations of measuring faces (carbide-tipped): spherical-flat type.
- With ratchet stop for constant force.
- With SPC output (Series 395).
- With digit counter (Series 295).
- With a standard bar except 0 -1" and 0 - 25mm model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).

### Pin Anvil Type



395-261-30



## Technical Data

Accuracy: Refer to the list of specifications.  
 Flatness: .000024" / 0.6µm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models

## Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662:** SPC cable with data switch (40" / 1m)  
**05CZA663:** SPC cable with data switch (80" / 2m)



Type A



Type B



Type C



Type D

## SPECIFICATIONS

### Metric Digital model with cylindrical anvil

| Range    | Resolution | Order No.  | Accuracy | Remarks | Mass (g) |
|----------|------------|------------|----------|---------|----------|
| 0 - 25mm | 0.001mm    | 395-261-30 | ±3µm     | Type A  | 270      |
|          |            | 395-262-30 | ±3µm     | Type B  | 270      |
|          |            | 395-263-30 | ±3µm     | Type C  | 310      |
|          |            | 395-264-30 | ±3µm     | Type D  | 310      |

### Inch/Metric Digital model with cylindrical anvil

| Range               | Resolution        | Order No.  | Accuracy | Remarks | Mass (g) |
|---------------------|-------------------|------------|----------|---------|----------|
| 0 - 1" / 0 - 25.4mm | .00005" / 0.001mm | 395-362-30 | ±.00015" | Type B  | 270      |
|                     |                   | 395-363-30 | ±.00015" | Type C  | 310      |
|                     |                   | 395-364-30 | ±.00015" | Type D  | 310      |

### Metric Mechanical counter model

| Range    | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
|----------|------------|-----------|----------|---------|----------|
| 0 - 25mm | 0.01mm     | 295-302   | ±3µm     | Type A  | 210      |

### Inch Mechanical counter model

| Range  | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
|--------|------------|-----------|----------|---------|----------|
| 0 - 1" | .0001"     | 295-313   | ±.00015" | Type C  | 210      |
|        |            | 295-314   | ±.00015" | Type D  | 210      |

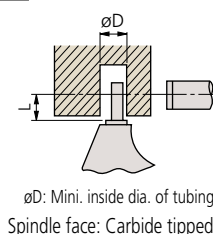
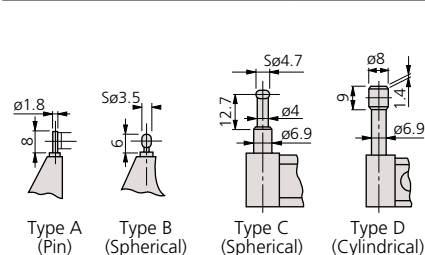
### Metric With cylindrical anvil

| Range     | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
|-----------|------------|-----------|----------|---------|----------|
| 0 - 25mm  | 0.01mm     | 115-302   | ±3µm     | Type A  | 180      |
|           |            | 115-308   | ±3µm     | Type B  | 180      |
|           |            | 115-315   | ±3µm     | Type C  | 180      |
|           |            | 115-316   | ±3µm     | Type D  | 180      |
| 25 - 50mm | 0.01mm     | 115-303   | ±3µm     | Type A  | 240      |
|           |            | 115-309   | ±3µm     | Type B  | 240      |

### Inch With cylindrical anvil

| Range  | Graduation | Order No. | Accuracy | Remarks  | Mass (g) |     |
|--------|------------|-----------|----------|----------|----------|-----|
| 0 - 1" | .0001"     | 115-305   | ±.00015" | Type A   | 180      |     |
|        |            | 115-313*  | ±.00015" | Type C   | 180      |     |
|        |            | .0001"    | 115-314* | ±.00015" | Type D   | 180 |

\*.0001" reading is obtained with vernier.



| Anvil  | D   | L  |
|--------|-----|----|
| Type A | 2   | 4  |
| Type B | 3.6 | 4  |
| Type C | 4.8 | 12 |
| Type D | 8.2 | 22 |



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### Technical Data

Accuracy: Refer to the list of specifications.  
Resolution\*: .00005"/0.001mm or 0.001mm  
Graduation\*\*\*: .0001" or 0.01mm  
Spindle face: Carbide tipped  
Display\*: LCD  
Battery\*: SR44 (1 pc.), **938882**  
Battery life\*: Approx. 2.4 years under normal use  
Dust/Water protection level\*: IP65  
\*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output,  
inch/mm conversion (on inch/metric models only)  
Function Lock  
Alarm: Low voltage, Counting value composition error

### Optional Accessories

**05CZA662**: SPC cable with data switch (40" / 1m)\*  
**05CZA663**: SPC cable with data switch (80" / 2m)\*  
**201218**: V-anvil  
**950758**: Disc. anvil for 1" / 25m models

\*Only for digital models.

### Applications



Using flat anvil (201216)



With the disc. anvil (950758) Shown above, the Uni-Mike is used as a height micrometer.

# "Uni-Mike"

## SERIES 317, 117 — Interchangeable Anvil Type

### FEATURES

- IP65 water/dust protection (Series 317).
- Measures tubing thickness, shoulder-edge distance, rivet head height, etc. with interchangeable anvils (flat anvil, rod anvil, V-anvil).
- Supplied with Flat Anvil (**201216**) and Rod Anvil: .118"/ø3mm dia. rod anvil (**201217**) for 0-1"/0-25mm models, .197"/ø5mm (**201379**) for 1-2" / 25-50mm model.
- With special Disk Anvils. The Uni-Mike is used as a height micrometer. The disks have a lapped, mirror surface.
- With a standard bar except 0-1" and 0-25mm model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models)



317-351-30



117-107

### SPECIFICATIONS

**Metric** Digital model with ratchet stop

| Range     | Resolution | Order No.         | Accuracy | Mass (g) |
|-----------|------------|-------------------|----------|----------|
| 0 - 25mm  | 0.001mm    | <b>317-251-30</b> | ±4µm     | 335      |
| 25 - 50mm | 0.001mm    | <b>317-252-30</b> | ±4µm     | 360      |

Excluding quantizing error

**Inch/Metric** Digital model with friction thimble

| Range                  | Resolution        | Order No.         | Accuracy | Mass (g) |
|------------------------|-------------------|-------------------|----------|----------|
| 0 - 1" / 0 - 25.4mm    | .00005" / 0.001mm | <b>317-351-30</b> | ±.0002"  | 340      |
| 1 - 2" / 25.4 - 50.8mm | .00005" / 0.001mm | <b>317-352-30</b> | ±.0002"  | 365      |

Excluding quantizing error

**Metric** With ratchet stop

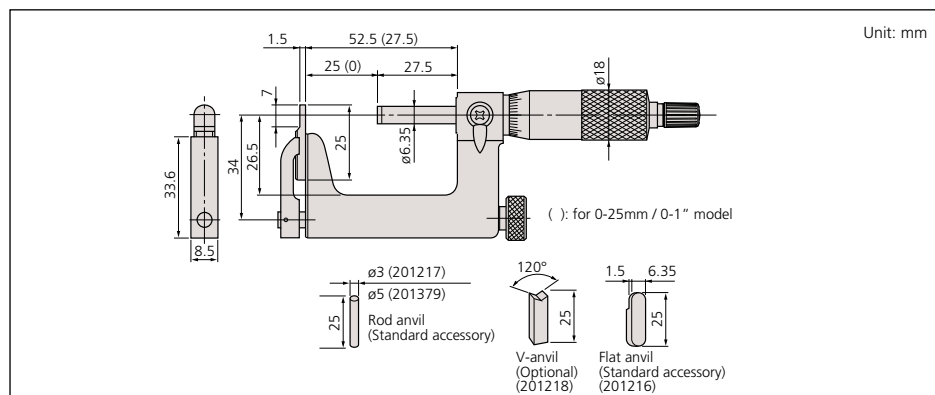
| Range     | Graduation | Order No.      | Accuracy | Mass (g) |
|-----------|------------|----------------|----------|----------|
| 0 - 25mm  | 0.01mm     | <b>117-101</b> | ±4µm     | 255      |
| 25 - 50mm | 0.01mm     | <b>117-102</b> | ±4µm     | 320      |

**Inch** With friction thimble

| Range  | Graduation | Order No.       | Accuracy | Mass (g) |
|--------|------------|-----------------|----------|----------|
| 0 - 1" | .0001"     | <b>117-107*</b> | ±.0002"  | 255      |
| 1 - 2" | .0001"     | <b>117-108*</b> | ±.0002"  | 320      |

\*.0001" reading is obtained with vernier.

### DIMENSIONS



# Sheet Metal Micrometers

**SERIES 389, 119, 118**

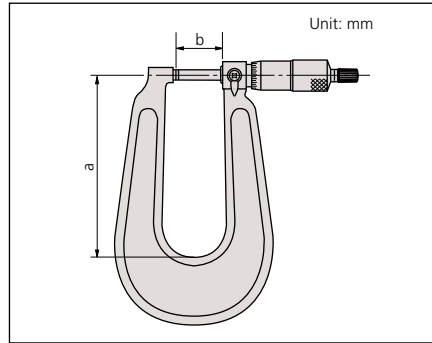


## FEATURES

- Measures thickness of sheet metal, paper, plastic and rubber parts.
- With ratchet stop for constant force.
- With a standard bar except for 0 - 1" / 0 - 25mm model.
- IP65 water/dust protection (Series 389\*).
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



## DIMENSIONS



## SPECIFICATIONS

| Metric    |            | Digital model                   |          |            |  |
|-----------|------------|---------------------------------|----------|------------|--|
| Range     | Resolution | Order No.                       | Accuracy | a/b        |  |
| 0 - 25mm  | 0.001mm    | <b>389-251-30</b>               | ±4µm     | 160/27.5mm |  |
| 0 - 25mm  | 0.001mm    | <b>389-261-30<sup>S-F</sup></b> | ±4µm     | 160/27.5mm |  |
| 0 - 25mm  | 0.001mm    | <b>389-271-30<sup>S-S</sup></b> | ±4µm     | 160/27.5mm |  |
| 0 - 25mm  | 0.001mm    | <b>389-514</b>                  | ±5µm     | 330/35mm   |  |
| 25 - 50mm | 0.001mm    | <b>389-252-30</b>               | ±4µm     | 165/27.5mm |  |
| 25 - 50mm | 0.001mm    | <b>389-262-30<sup>S-F</sup></b> | ±4µm     | 165/27.5mm |  |
| 25 - 50mm | 0.001mm    | <b>389-272-30<sup>S-S</sup></b> | ±4µm     | 165/27.5mm |  |

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle

| Inch/Metric               |                      | Digital model                   |          |            |  |
|---------------------------|----------------------|---------------------------------|----------|------------|--|
| Range                     | Resolution           | Order No.                       | Accuracy | a/b        |  |
| 0 - 1" /<br>0 - 25.4mm    | .00005" /<br>0.001mm | <b>389-351-30</b>               | ±.0002"  | 6.3"/1.08" |  |
|                           |                      | <b>389-361-30<sup>S-F</sup></b> | ±.0002"  | 6.3"/1.08" |  |
|                           |                      | <b>389-371-30<sup>S-S</sup></b> | ±.0002"  | 6.3"/1.08" |  |
|                           |                      | <b>389-714</b>                  | ±.00025" | 13"/1.38"  |  |
| 1 - 2" /<br>25.4 - 50.8mm | .00005" /<br>0.001mm | <b>389-352-30</b>               | ±.0002"  | 6.5"/1.08" |  |
|                           |                      | <b>389-362-30<sup>S-F</sup></b> | ±.0002"  | 6.5"/1.08" |  |
|                           |                      | <b>389-372-30<sup>S-S</sup></b> | ±.0002"  | 6.5"/1.08" |  |

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle

| Metric    |            | Dial reading model           |          |            |  |
|-----------|------------|------------------------------|----------|------------|--|
| Range     | Graduation | Order No.                    | Accuracy | a/b        |  |
| 0 - 25mm  | 0.01mm     | <b>118-101</b>               | ±4µm     | 110/27.5mm |  |
| 0 - 25mm  | 0.01mm     | <b>118-102</b>               | ±4µm     | 160/27.5mm |  |
| 0 - 25mm  | 0.01mm     | <b>118-114<sup>S-F</sup></b> | ±4µm     | 160/27.5mm |  |
| 0 - 25mm  | 0.01mm     | <b>118-118<sup>S-S</sup></b> | ±4µm     | 160/27.5mm |  |
| 0 - 25mm  | 0.01mm     | <b>118-103</b>               | ±5µm     | 330/35mm   |  |
| 25 - 50mm | 0.01mm     | <b>118-110</b>               | ±4µm     | 165/27.5mm |  |

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle

| Inch    |            | Dial reading model           |          |            |  |
|---------|------------|------------------------------|----------|------------|--|
| Range   | Graduation | Order No.                    | Accuracy | a/b        |  |
| 0 - 1"  | .0001"     | <b>118-129</b>               | ±.0002"  | 6.3"/1.08" |  |
|         |            | <b>118-116<sup>S-F</sup></b> | ±.0002"  | 6.3"/1.08" |  |
|         |            | <b>118-120<sup>S-S</sup></b> | ±.0002"  | 6.3"/1.08" |  |
|         |            | <b>118-107</b>               | ±.00025" | 13"/1.38"  |  |
| 1" - 2" | .001"      | <b>118-112</b>               | ±.0002"  | 6.5"/1.08" |  |

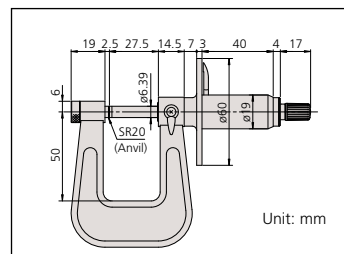
S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle  
\*.0001" reading is obtained with vernier.

| Metric   |            | Dial reading model           |          |        |
|----------|------------|------------------------------|----------|--------|
| Range    | Graduation | Order No.                    | Accuracy | Throat |
| 0 - 25mm | 0.01mm     | <b>119-202<sup>S-F</sup></b> | ±4µm     | 50mm   |

S-F: Spherical anvil and flat spindle



## DIMENSIONS AND MASS



## Technical Data

Accuracy: Refer to the list of specifications  
Resolution\*: .00005"/0.001mm or 0.001mm  
Graduation\*\*: 0.01mm, .001" or .0001"  
Flatness: .000024" / 0.6µm for models with 6" / 150mm throat  
.00004" / 1µm for models with 12" / 300mm throat  
Parallelism: .00012" / 3µm  
Measuring faces: Carbide tipped  
Display\*: LCD  
Battery\*: SR44 [1 pc. (2 pcs.: **389-514** and **389-714**), **938882**]  
Battery life\*: Approx. 2.4 years under normal use (1.8 years: **389-514** and **389-714**)  
Dust/Water protection level\*: IP65  
\*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
Function lock  
Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)
- 04AZB512**: SPC cable for **389-514/389-714** (40" / 1m)
- 04AZB513**: SPC cable for **389-514/389-714** (80" / 2m)

## Anvil-Spindle Combinations



Standard, Flat-Flat



Spherical-Flat (S-F)



Spherical-Spherical (S-S)

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



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: .0001" or 0.01mm  
 Parallelism: .00012" / 3µm for models up to 3" / 75mm  
 (3+R/100)µm for models over 75mm,  
 R=max. range (mm) .00016" for 4" models  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (1m / 40")  
**05CZA663**: SPC cable with data switch (2m / 80")  
**937387**: SPC cable for Quickmike type (1m / 40")  
**965013**: SPC cable for Quickmike type (2m / 80")



# Blade Micrometers

## SERIES 422,122 — Non-Rotating Spindle Type

### FEATURES

- The anvil and the spindle have a blade for measuring the groove diameter of shafts, keyways and other hard-to-reach areas.
- With ratchet stop for constant force.
- Non-slip grip finish (digital models).
- Speedy spindle feed of .4"/10mm /rev. (Quickmike type).
- With a standard bar except 0 - 1" and 0 -25mm model.
- Supplied in fitted plastic case.

### Quickmike type



422-421



422-330-30



122-125

IP54

ABSOLUTE  
 Analog System Invented by MITUTOYO

## SPECIFICATIONS

### Metric Digital model

| Range      | Resolution | Order No.  | Accuracy | Remarks | Mass (g) |
|------------|------------|------------|----------|---------|----------|
| 0 - 25mm   | 0.001mm    | 422-230-30 | ±3µm     | Type A  | 365      |
|            |            | 422-260-30 | ±3µm     | Type B  | 365      |
|            |            | 422-270-30 | ±3µm     | Type C  | 365      |
|            |            | 422-271-30 | ±3µm     | Type D  | 365      |
| 25 - 50mm  | 0.001mm    | 422-231-30 | ±3µm     | Type A  | 565      |
|            |            | 422-261-30 | ±3µm     | Type B  | 565      |
| 50 - 75mm  | 0.001mm    | 422-232-30 | ±3µm     | Type A  | 465      |
| 75 - 100mm | 0.001mm    | 422-233-30 | ±4µm     | Type A  | 580      |

### Metric Quickmike type

| Range     | Resolution | Order No. | Accuracy | Mass (g) |
|-----------|------------|-----------|----------|----------|
| 0 - 30mm  | 0.001mm    | 422-411   | ±3µm     | 350      |
| 25 - 55mm | 0.001mm    | 422-412   | ±3µm     | 490      |

### Metric

| Range       | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
|-------------|------------|-----------|----------|---------|----------|
| 0 - 25mm    | 0.01mm     | 122-101   | ±3µm     | Type A  | 260      |
|             |            | 122-111   | ±3µm     | Type B  | 260      |
|             |            | 122-161   | ±3µm     | Type C  | 275      |
|             |            | 122-141   | ±3µm     | Type D  | 275      |
| 25 - 50mm   | 0.01mm     | 122-102   | ±3µm     | Type A  | 300      |
|             |            | 122-112   | ±3µm     | Type B  | 300      |
|             |            | 122-162   | ±3µm     | Type C  | 315      |
|             |            | 122-142   | ±3µm     | Type D  | 315      |
| 50 - 75mm   | 0.01mm     | 122-103   | ±3µm     | Type A  | 360      |
| 75 - 100mm  | 0.01mm     | 122-104   | ±4µm     | Type A  | 525      |
| 100 - 125mm | 0.01mm     | 122-105   | ±4µm     | Type A  | 670      |
| 125 - 150mm | 0.01mm     | 122-106   | ±4µm     | Type A  | 775      |
| 150 - 175mm | 0.01mm     | 122-107   | ±5µm     | Type A  | 950      |
| 175 - 200mm | 0.01mm     | 122-108   | ±5µm     | Type A  | 1140     |

### Inch/Metric Digital model

| Range                      | Resolution           | Order No.  | Accuracy | Remarks | Mass (g) |
|----------------------------|----------------------|------------|----------|---------|----------|
| 0 - 1" /<br>0 - 25.4mm     | .00005" /<br>0.001mm | 422-330-30 | ±.00015" | Type A  | 365      |
|                            |                      | 422-360-30 | ±.00015" | Type B  | 365      |
|                            |                      | 422-370-30 | ±.00015" | Type C  | 365      |
|                            |                      | 422-371-30 | ±.00015" | Type D  | 365      |
| 1 - 2" /<br>25.4 - 50.8mm  | .00005" /<br>0.001mm | 422-331-30 | ±.00015" | Type A  | 565      |
|                            |                      | 422-361-30 | ±.00015" | Type B  | 565      |
| 2 - 3" /<br>50.8 - 76.2mm  | .00005" /<br>0.001mm | 422-332-30 | ±.00015" | Type A  | 465      |
| 3 - 4" /<br>76.2 - 101.6mm | .00005" /<br>0.001mm | 422-333-30 | ±.0002"  | Type A  | 580      |

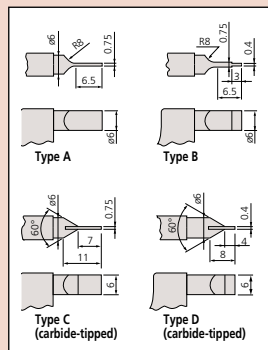
### Inch/Metric Quickmike type

| Range                        | Resolution           | Order No. | Accuracy | Remarks | Mass (g) |
|------------------------------|----------------------|-----------|----------|---------|----------|
| 0 - 1.2" /<br>0 - 30.48mm    | .00005" /<br>0.001mm | 422-421   | ±.00015" | Type A  | 350      |
| 1 - 2.2" /<br>25.4 - 55.88mm | .00005" /<br>0.001mm | 422-422   | ±.00015" | Type A  | 490      |

### Inch

| Range  | Graduation | Order No. | Accuracy | Remarks | Mass (g) |
|--------|------------|-----------|----------|---------|----------|
| 0 - 1" | .0001"     | 122-125   | ±.00015" | Type A  | 260      |
|        |            | 122-135   | ±.00015" | Type B  | 260      |
|        |            | 122-151   | ±.00015" | Type D  | 275      |
| 1 - 2" | .0001"     | 122-126   | ±.00015" | Type A  | 300      |
| 2 - 3" | .0001"     | 122-127   | ±.00015" | Type A  | 360      |
| 3 - 4" | .0001"     | 122-128   | ±.0002"  | Type A  | 525      |

## TYPE AND DIMENSIONS



# Disk Micrometers

## SERIES 323, 223, 123 - Rotating Spindle



### FEATURES

- Diameter of measuring disk: .787" / 20mm.
- .028" / 0.7mm (1mm: models over 100mm) edge thickness to enter narrow recesses.
- With ratchet stop for constant force.
- Non-slip grip finish (digital models).
- With a standard bar except for 0 - 1" / 0 - 25mm model.
- With SPC output (Series 323).
- The Series 223 is provided with a mechanical digit counter for quick reading of measurements.
- Supplied in fitted plastic case. (Over 100mm models supplied wooden cases).



123-125



323-350-30



123-103



223-125

### SPECIFICATIONS

#### Metric Digital model

| Range      | Resolution | Order No.  | Accuracy | Mass (g) |
|------------|------------|------------|----------|----------|
| 0 - 25mm   | 0.001mm    | 323-250-30 | ±4µm     | 290      |
| 25 - 50mm  | 0.001mm    | 323-251-30 | ±4µm     | 355      |
| 50 - 75mm  | 0.001mm    | 323-252-30 | ±6µm     | 555      |
| 75 - 100mm | 0.001mm    | 323-253-30 | ±6µm     | 610      |

#### Metric Mechanical counter model

| Range     | Graduation | Order No. | Accuracy | Mass (g) |
|-----------|------------|-----------|----------|----------|
| 0 - 25mm  | 0.01mm     | 223-101   | ±4µm     | 260      |
| 25 - 50mm | 0.01mm     | 223-102   | ±4µm     | 290      |

#### Metric

| Range       | Graduation | Order No. | Accuracy | Mass (g) |
|-------------|------------|-----------|----------|----------|
| 0 - 25mm    | 0.01mm     | 123-101   | ±4µm     | 200      |
|             |            | 123-113*  | ±4µm     | 230      |
|             |            | 123-114*  | ±4µm     | 270      |
| 25 - 50mm   | 0.01mm     | 123-102   | ±4µm     | 250      |
|             |            | 123-115*  | ±6µm     | 320      |
| 50 - 75mm   | 0.01mm     | 123-103   | ±6µm     | 300      |
|             |            | 123-115*  | ±6µm     | 320      |
| 75 - 100mm  | 0.01mm     | 123-104   | ±6µm     | 375      |
|             |            | 123-116*  | ±6µm     | 390      |
| 100 - 125mm | 0.01mm     | 123-105   | ±7µm     | 520      |
| 125 - 150mm | 0.01mm     | 123-106   | ±7µm     | 570      |
| 150 - 175mm | 0.01mm     | 123-107   | ±8µm     | 730      |
| 175 - 200mm | 0.01mm     | 123-108   | ±8µm     | 890      |
| 200 - 225mm | 0.01mm     | 123-109   | ±8µm     | 1000     |
| 225 - 250mm | 0.01mm     | 123-110   | ±9µm     | 1200     |
| 250 - 275mm | 0.01mm     | 123-111   | ±9µm     | 1410     |
| 275 - 300mm | 0.01mm     | 123-112   | ±9µm     | 1680     |

\*The measuring disks have carbide tips.  
Note: The disk diameter of models over 100mm is 30mm.

#### Inch/Metric Digital model

| Range                   | Resolution        | Order No.  | Accuracy | Mass (g) |
|-------------------------|-------------------|------------|----------|----------|
| 0 - 1" / 0 - 25.4mm     | .00005" / 0.001mm | 323-350-30 | ±.0002"  | 290      |
| 1 - 2" / 25.4 - 50.8mm  | .00005" / 0.001mm | 323-351-30 | ±.0002"  | 355      |
| 2 - 3" / 50 - 76.2mm    | .00005" / 0.001mm | 323-352-30 | ±.0003"  | 555      |
| 3 - 4" / 76.2 - 101.6mm | .00005" / 0.001mm | 323-353-30 | ±.0003"  | 610      |

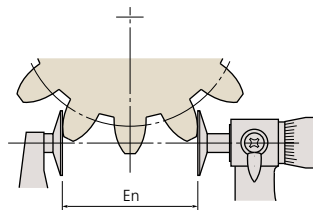
#### Inch Mechanical counter model

| Range  | Graduation | Order No. | Accuracy | Mass (g) |
|--------|------------|-----------|----------|----------|
| 0 - 1" | .001"      | 223-125   | ±.0002"  | 260      |

#### Inch

| Range  | Graduation | Order No. | Accuracy | Mass (g) |
|--------|------------|-----------|----------|----------|
| 0 - 1" | .001"      | 123-125   | ±.0002"  | 200      |
| 1 - 2" | .001"      | 123-126   | ±.0002"  | 250      |
| 2 - 3" | .001"      | 123-127   | ±.0003"  | 300      |
| 3 - 4" | .001"      | 123-128   | ±.0003"  | 375      |

### Root tangent length of gear (En)



Note: Root tangent length measurement is not available for some types of gears.

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: .001" or 0.01mm  
 Flatness: .00004" / 1µm for models up to 4" / 100mm  
 .000063" / 1.6µm for models over 4" / 100mm  
 Parallelism: .00016" / 4µm for models up to 2" / 50mm  
 .00024" for models up to 4"  
 (4+R/50)µm for models up to 100mm  
 (5+R/75)µm for models over 100mm, R=max. range (mm)  
 Measurable module: 0.5-6 (0.7-11: models over 100mm)  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), 938882  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

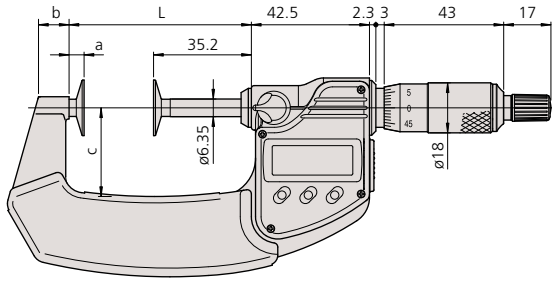
- 05CZA662: SPC cable with data switch (40" / 1m)
- 05CZA663: SPC cable with data switch (80" / 2m)



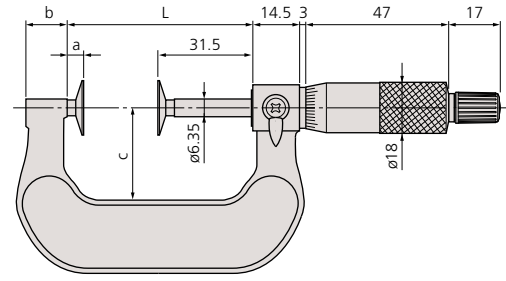
## DIMENSIONS

Unit: mm

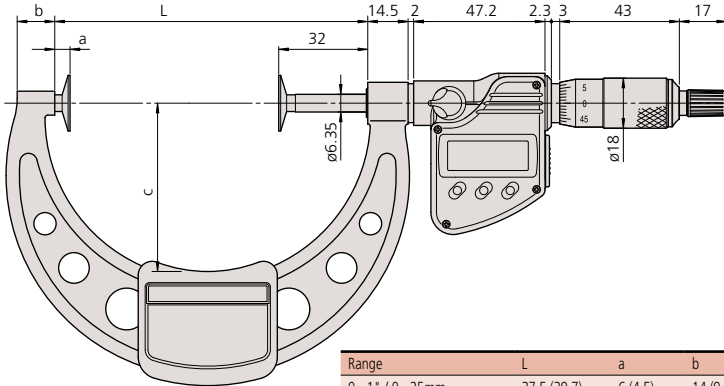
### Digital models up to 75mm



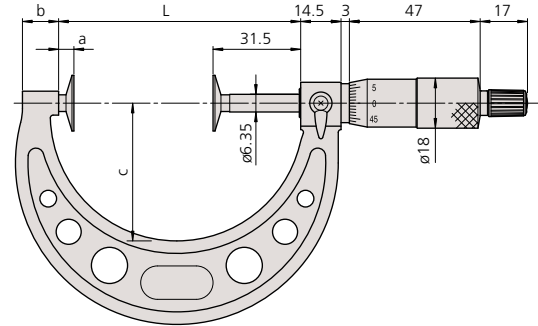
### Analog models up to 50mm



### Digital models up to 75mm

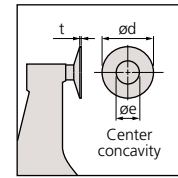


### Analog over 50mm



| Range                  | L           | a         | b         | c         | ød | øe      | t   |
|------------------------|-------------|-----------|-----------|-----------|----|---------|-----|
| 0 - 1" / 0 - 25mm      | 37.5 (39.7) | 6 (4.5)   | 14 (9.2)  | 25 (25.4) | 20 | 8 (9.8) | 0.7 |
| 1 - 2" / 25 - 50mm     | 62.5 (65.6) | 6 (5.4)   | 14 (11)   | 32 (31.9) | 20 | 8 (9.8) | 0.7 |
| 2 - 3" / 50 - 75mm     | 87 (90.7)   | 5.5 (5.5) | 11 (12.2) | 49 (50)   | 20 | 8 (9.8) | 0.7 |
| 3 - 4" / 75 - 100mm    | 112 (112.5) | 5.5 (5.5) | 11 (13.5) | 63 (60.5) | 20 | 8 (9.8) | 0.7 |
| 4 - 5" / 100 - 125mm   | 137.5       | 6         | 12        | 79        | 30 | 12      | 1   |
| 5 - 6" / 125 - 150mm   | 162.5       | 6         | 15        | 94        | 30 | 12      | 1   |
| 6 - 7" / 150 - 175mm   | 187.5       | 6         | 16        | 106       | 30 | 12      | 1   |
| 7 - 8" / 175 - 200mm   | 212.5       | 6         | 15        | 118       | 30 | 12      | 1   |
| 8 - 9" / 200 - 225mm   | 237.5       | 6         | 14        | 130       | 30 | 12      | 1   |
| 9 - 10" / 225 - 250mm  | 262.5       | 6         | 15        | 143       | 30 | 12      | 1   |
| 10 - 11" / 250 - 275mm | 287.5       | 6         | 15        | 156       | 30 | 12      | 1   |
| 11 - 12" / 275 - 300mm | 312.5       | 6         | 15        | 169       | 30 | 12      | 1   |

Data in ( ) applies to those with carbide tipped disks.

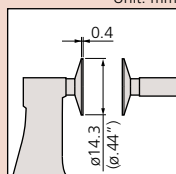


### Technical Data

Graduation: .001" or 0.01mm  
 Flatness: .00004" / 1µm  
 Parallelism: .00012" / 3µm  
 Measuring Force: 8.02 ±0.8N  
 53.9KPa ±4.9 KPa



Unit: mm



( ) : Inch model

# Paper Thickness Micrometers

**SERIES 169 — Non-Rotating Spindle Type Designed for Paper Thickness Measurement**

### FEATURES

- Non-rotating spindle.
- With ratchet stop for constant force.
- Supplied in fitted plastic case.

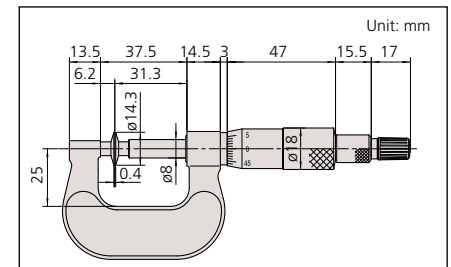


169-101

### SPECIFICATIONS

| Metric   |            |           |          |          |
|----------|------------|-----------|----------|----------|
| Range    | Graduation | Order No. | Accuracy | Mass (g) |
| 0 - 25mm | 0.01mm     | 169-101   | ±4µm     | 230g     |

### DIMENSIONS



Unit: mm

| Inch   |            |           |          |          |
|--------|------------|-----------|----------|----------|
| Range  | Graduation | Order No. | Accuracy | Mass (g) |
| 0 - 1" | .001"      | 169-103   | ±.0002"  | 230g     |

**Mitutoyo**

# Disk Micrometers

## SERIES 369, 227, 169 — Non-Rotating Spindle Type



### FEATURES

- The Disk Micrometer is designed to easily measure root tangent length of spur gears and helical gears.
- Non-rotating spindle eliminates torque on workpiece.
- With standard bar except 0 - 15mm, 0 - .6" 0 - 25mm, 0 - 1", 0 - 30mm & 0 - 1.2" model.
- Speedy spindle feed of 10mm/rev. (Quickmike type).
- Diameter of measuring disk: .787" / 20mm
- With ratchet stop for constant force.
- With SPC output (Series 369).
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



369-350-30



Quickmike type  
369-421

### Quickmike type with adjustable measuring force



227-221



169-201



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: .001" or 0.01mm  
 Flatness: .00004" / 1µm  
 Parallelism: 4µm / .00016" for models up to 2" / 50mm  
 6µm / .00024" for models over 2" / 50mm  
 Measurable module: 0.5-6  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 (1 year: Quickmike type, 3 years: Quickmike type with fine-loading)  
 Series 227: Refer to page B-6 for more information.  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)
- 937387**: SPC cable for Quickmike type (40" / 1m)
- 965013**: SPC cable for Quickmike type (80" / 2m)

### SPECIFICATIONS

| Metric     |            | Digital model     |          |
|------------|------------|-------------------|----------|
| Range      | Resolution | Order No.         | Accuracy |
| 0 - 25mm   | 0.001mm    | <b>369-250-30</b> | ±4µm     |
| 25 - 50mm  | 0.001mm    | <b>369-251-30</b> | ±4µm     |
| 50 - 75mm  | 0.001mm    | <b>369-252-30</b> | ±6µm     |
| 75 - 100mm | 0.001mm    | <b>369-253-30</b> | ±6µm     |

| Inch/Metric             |                   | Digital model     |          |
|-------------------------|-------------------|-------------------|----------|
| Range                   | Resolution        | Order No.         | Accuracy |
| 0 - 1" / 0 - 25.4mm     | .00005" / 0.001mm | <b>369-350-30</b> | ±.0002"  |
| 1 - 2" / 25.4 - 50.8mm  | .00005" / 0.001mm | <b>369-351-30</b> | ±.0002"  |
| 2 - 3" / 50.8 - 76.2mm  | .00005" / 0.001mm | <b>369-352-30</b> | ±.0003"  |
| 3 - 4" / 76.2 - 101.6mm | .00005" / 0.001mm | <b>369-353-30</b> | ±.0003"  |

| Metric    |            | Quickmike type |          |
|-----------|------------|----------------|----------|
| Range     | Resolution | Order No.      | Accuracy |
| 0 - 30mm  | 0.001mm    | <b>369-411</b> | ±4µm     |
| 25 - 55mm | 0.001mm    | <b>369-412</b> | ±4µm     |

| Inch/Metric               |                   | Quickmike type |          |
|---------------------------|-------------------|----------------|----------|
| Range                     | Resolution        | Order No.      | Accuracy |
| 0 - 1.2" / 0 - 30.48mm    | .00005" / 0.001mm | <b>369-421</b> | ±.0002"  |
| 1 - 2.2" / 25.4 - 55.88mm | .00005" / 0.001mm | <b>369-422</b> | ±.0002"  |

| Metric   |            | Quickmike type with adjustable measuring force |          |                 |
|----------|------------|--|----------|-----------------|
| Range    | Resolution | Order No.                                      | Accuracy | Measuring force |
| 0 - 10mm | 0.001mm    | <b>227-223</b>                                 | ±4µm     | 2N - 10N        |
| 0 - 15mm | 0.001mm    | <b>227-221</b>                                 | ±4µm     | 0.5N - 2.5N     |

| Metric     |            |                |          |
|------------|------------|----------------|----------|
| Range      | Graduation | Order No.      | Accuracy |
| 0 - 25mm   | 0.01mm     | <b>169-201</b> | ±4µm     |
| 25 - 50mm  | 0.01mm     | <b>169-202</b> | ±4µm     |
| 50 - 75mm  | 0.01mm     | <b>169-205</b> | ±6µm     |
| 75 - 100mm | 0.01mm     | <b>169-207</b> | ±6µm     |

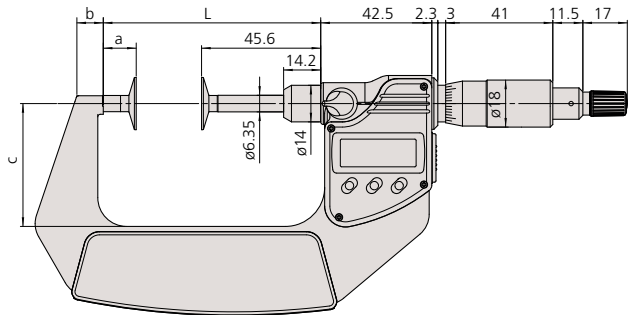
| Inch   |            |                |          |
|--------|------------|----------------|----------|
| Range  | Graduation | Order No.      | Accuracy |
| 0 - 1" | .001"      | <b>169-203</b> | ±.0002"  |
| 1 - 2" | .001"      | <b>169-204</b> | ±.0002"  |
| 2 - 3" | .001"      | <b>169-206</b> | ±.0003"  |
| 3 - 4" | .001"      | <b>169-208</b> | ±.0003"  |



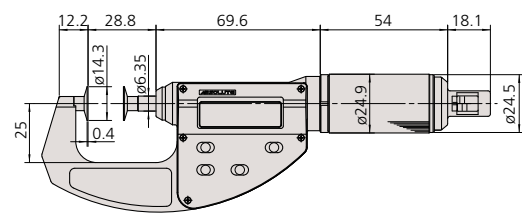
## DIMENSIONS AND MASS

Unit: mm

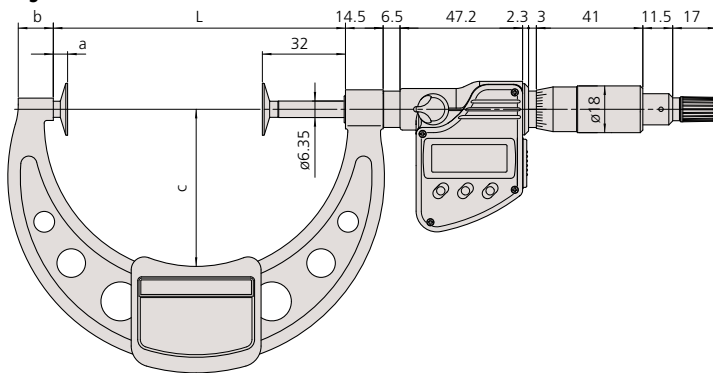
### Digital models up to 75mm



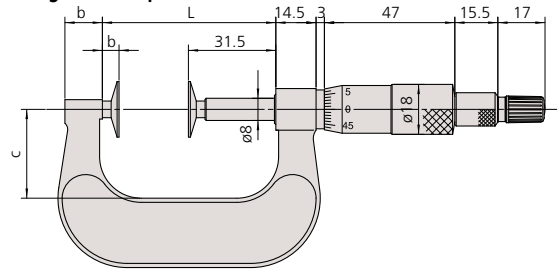
### Adjustable measuring force type



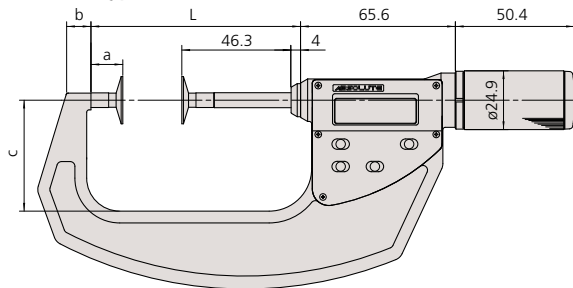
### Digital models over 75mm



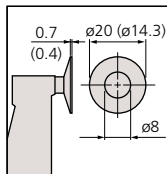
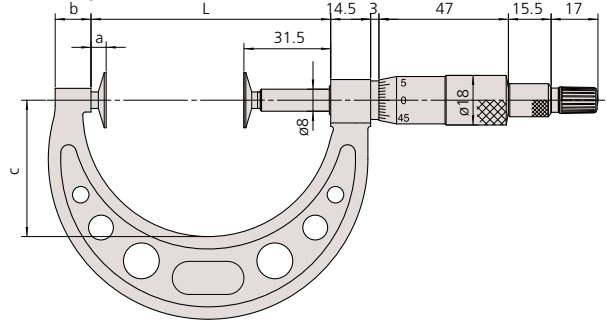
### Analog models up to 50mm



### Quickmike type



### Analog models over 50mm



( ): Adjustable measuring force type

### Digital model

| Range                 | L     | a    | b    | c    | Mass (g) |
|-----------------------|-------|------|------|------|----------|
| 0 - 25mm / 0 - 1"     | 58.5  | 12.9 | 7    | 32   | 340      |
| 25 - 50mm / 1 - 2"    | 83.5  | 12.9 | 9.8  | 47   | 480      |
| 50 - 75mm / 2 - 3"    | 108.5 | 12.9 | 11.2 | 60   | 635      |
| 75 - 100mm / 3 - 4"   | 112.5 | 5.5  | 13.5 | 60.5 | 475      |
| 0 - 30mm* / 0 - 1.2"  | 63.8  | 13.5 | 8.5  | 36   | 360      |
| 25 - 55mm* / 1 - 2.2" | 88.8  | 13.5 | 10.3 | 47   | 490      |

\*Quickmike type

### Analog model

| Range               | L    | a   | b    | c    | Mass (g) |
|---------------------|------|-----|------|------|----------|
| 0 - 25mm / 0 - 1"   | 37.5 | 6   | 13.5 | 25   | 230      |
| 25 - 50mm / 1 - 2"  | 62.5 | 6   | 13.5 | 32   | 280      |
| 50 - 75mm / 2 - 3"  | 87   | 5.5 | 13   | 49.5 | 315      |
| 75 - 100mm / 3 - 4" | 112  | 5.5 | 13   | 63.5 | 400      |

# Gear Tooth Micrometers

## SERIES 324, 124 — Interchangeable Ball Anvil-Spindle Tip Type



### FEATURES

- IP65 water/dust protection (Series 324).
- Measures over-pin diameter of gears with precision steel (carbide) ball-tipped measuring faces.
- With a standard bar except 0 - 25mm and 0 - 1" model
- Non-slip grip finish (digital models)
- Interchangeable ball anvil-spindle tips for various gear modules (0.5 - 5.25) are optional.
- With Ratchet Stop for constant force.
- With SPC output (Series 324).
- Supplied in fitted plastic case (Models over 150mm have wooden case).



### SPECIFICATIONS

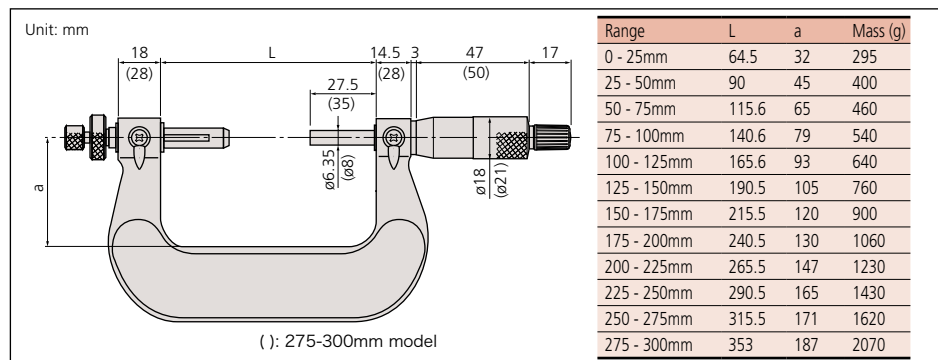
| Metric     |            | Digital model     |          |          |
|------------|------------|-------------------|----------|----------|
| Range      | Resolution | Order No.         | Accuracy | Mass (g) |
| 0 - 25mm   | 0.001mm    | <b>324-251-30</b> | ±4µm     | 400      |
| 25 - 50mm  | 0.001mm    | <b>324-252-30</b> | ±4µm     | 490      |
| 50 - 75mm  | 0.001mm    | <b>324-253-30</b> | ±4µm     | 530      |
| 75 - 100mm | 0.001mm    | <b>324-254-30</b> | ±5µm     | 600      |

| Inch/Metric         |                   | Digital model     |          |          |
|---------------------|-------------------|-------------------|----------|----------|
| Range               | Resolution        | Order No.         | Accuracy | Mass (g) |
| 0 - 1" / 0 - 25mm   | .00005" / 0.001mm | <b>324-351-30</b> | ±.0002"  | 400      |
| 1 - 2" / 25 - 50mm  | .00005" / 0.001mm | <b>324-352-30</b> | ±.0002"  | 490      |
| 2 - 3" / 50 - 75mm  | .00005" / 0.001mm | <b>324-353-30</b> | ±.0002"  | 530      |
| 3 - 4" / 75 - 100mm | .00005" / 0.001mm | <b>324-354-30</b> | ±.00025" | 600      |

| Metric      |            |                |          |          |
|-------------|------------|----------------|----------|----------|
| Range       | Graduation | Order No.      | Accuracy | Mass (g) |
| 0 - 25mm    | 0.01mm     | <b>124-173</b> | ±4µm     | 295      |
| 25 - 50mm   | 0.01mm     | <b>124-174</b> | ±4µm     | 400      |
| 50 - 75mm   | 0.01mm     | <b>124-175</b> | ±4µm     | 460      |
| 75 - 100mm  | 0.01mm     | <b>124-176</b> | ±5µm     | 540      |
| 100 - 125mm | 0.01mm     | <b>124-177</b> | ±5µm     | 640      |
| 125 - 150mm | 0.01mm     | <b>124-178</b> | ±5µm     | 760      |
| 150 - 175mm | 0.01mm     | <b>124-179</b> | ±6µm     | 900      |
| 175 - 200mm | 0.01mm     | <b>124-180</b> | ±6µm     | 1060     |
| 200 - 225mm | 0.01mm     | <b>124-181</b> | ±6µm     | 1230     |
| 225 - 250mm | 0.01mm     | <b>124-182</b> | ±7µm     | 1430     |
| 250 - 275mm | 0.01mm     | <b>124-183</b> | ±7µm     | 1620     |
| 275 - 300mm | 0.01mm     | <b>124-195</b> | ±7µm     | 2070     |



### DIMENSIONS AND MASS



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: 0.001mm or .00005"/0.001mm  
 Graduation\*\*: 0.01mm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

### Function of Digital Model

Zero / ABS, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

**05CZA662**: SPC cable with data switch (1m / 40")\*  
**05CZA663**: SPC cable with data switch (2m / 80")\*  
 \*Only for digital models

### Interchangeable ball anvil-spindle tip set:

| Diameter of ball anvil | Order No.       | Gear module | Diametral pitch |
|------------------------|-----------------|-------------|-----------------|
| 0.8mm                  | <b>124-801*</b> | 0.5 - 0.55  | 50              |
| 1mm                    | <b>124-802*</b> | 0.6 - 0.65  | 45              |
| 1.191mm (3/64")        | <b>124-803*</b> | 0.7 - 0.8   | 35 - 30         |
| 1.5mm                  | <b>124-821*</b> | 0.9 - 1     | 28 - 26         |
| 1.588mm (1/16")        | <b>124-804*</b> | 0.9 - 1     | 28 - 26         |
| 2mm                    | <b>124-805*</b> | 1.25        | 22              |
| 2.381mm (3/32")        | <b>124-806</b>  | 1.5         | 17              |
| 2.5mm                  | <b>124-822</b>  | 1.5         | 17              |
| 3mm                    | <b>124-807</b>  | 1.75        | 15              |
| 3.175mm (1/8")         | <b>124-808</b>  | —           | 14              |
| 3.5mm                  | <b>124-823</b>  | 2           | 13              |
| 3.969mm (5/32")        | <b>124-809</b>  | 2           | 13              |
| 4mm                    | <b>124-810</b>  | 2.25        | 11              |
| 4.5mm                  | <b>124-824</b>  | 2.5         | 10              |
| 4.763mm (3/16")        | <b>124-811</b>  | 2.5         | 10              |
| 5mm                    | <b>124-812</b>  | 2.75        | 9               |
| 5.556mm (7/32")        | <b>124-813</b>  | 3.0 - 3.25  | 8               |
| 6mm                    | <b>124-814</b>  | 3.5         | 7               |
| 6.35mm (1/4")          | <b>124-815</b>  | 3.75        | 7               |
| 7mm                    | <b>124-816</b>  | 4.0         | 6.5             |
| 7.144mm (9/32")        | <b>124-817</b>  | 4.25        | 6               |
| 7.938mm (5/16")        | <b>124-818</b>  | 4.5         | 5.5             |
| 8mm                    | <b>124-819</b>  | 4.75        | 5.5             |
| 8.731mm (11/32")       | <b>124-820</b>  | 5.0 - 5.25  | 5               |

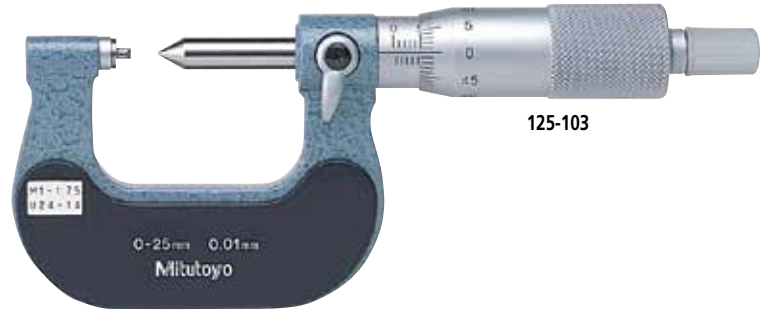
\*Carbide-tipped type

# Screw Thread Micrometers

## SERIES 125

### FEATURES

- Provided with a 60 degree V-anvil and conical spindle for easily measuring pitch diameters of metric or unified screw threads.
- With ratchet stop for constant force.
- With a standard bar for zero point adjustment except 0 - 25mm model.
- Supplied in fitted plastic case.



### Technical Data

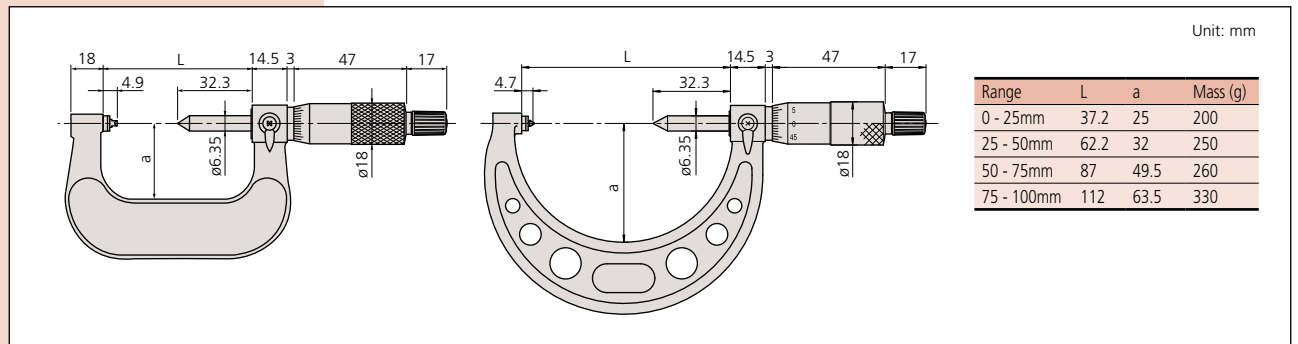
Accuracy:  $\pm(2+R/75)\mu\text{m}$ , R=max. range (mm)  
 Graduation: 0.01mm  
 Spindle feed error: 3 $\mu\text{m}$



### SPECIFICATIONS

| Metric     |            |                |                                       |
|------------|------------|----------------|---------------------------------------|
| Range      | Graduation | Order No.      | Screw to be measured (Metric/Unified) |
| 0 - 25mm   | 0.01mm     | <b>125-101</b> | 0.4 - 0.5mm/64 - 48TPI                |
|            |            | <b>125-102</b> | 0.6 - 0.9mm/44 - 28TPI                |
|            |            | <b>125-103</b> | 1 - 1.75mm/24 - 14TPI                 |
|            |            | <b>125-104</b> | 2 - 3mm/13 - 9TPI                     |
|            |            | <b>125-105</b> | 3.5 - 5mm/8 - 5TPI                    |
| 25 - 50mm  | 0.01mm     | <b>125-106</b> | 0.4 - 0.5mm/64 - 48TPI                |
|            |            | <b>125-107</b> | 0.6 - 0.9mm/44 - 28TPI                |
|            |            | <b>125-108</b> | 1 - 1.75mm/24 - 14TPI                 |
|            |            | <b>125-109</b> | 2 - 3mm/13 - 9TPI                     |
|            |            | <b>125-110</b> | 3.5 - 5mm/8 - 5TPI                    |
| 50 - 75mm  | 0.01mm     | <b>125-111</b> | 0.6 - 0.9mm/44 - 28TPI                |
|            |            | <b>125-112</b> | 1 - 1.75mm/24 - 14TPI                 |
|            |            | <b>125-113</b> | 2 - 3mm/13 - 9TPI                     |
|            |            | <b>125-114</b> | 3.5 - 5mm/8 - 5TPI                    |
|            |            | <b>125-115</b> | 5.5 - 7mm/4.5 - 3.5TPI                |
| 75 - 100mm | 0.01mm     | <b>125-116</b> | 0.6 - 0.9mm/44 - 28TPI                |
|            |            | <b>125-117</b> | 1 - 1.75mm/24 - 14TPI                 |
|            |            | <b>125-118</b> | 2 - 3mm/13 - 9TPI                     |
|            |            | <b>125-119</b> | 3.5 - 5mm/8 - 5TPI                    |
|            |            | <b>125-120</b> | 5.5 - 7mm/4.5 - 3.5TPI                |

### DIMENSIONS AND MASS



# Screw Thread Micrometers

**SERIES 326, 126 — Interchangeable Anvil-Spindle Tip Type**



## FEATURES

- IP65 water/dust protection (Series 326).
- 60 degree or 55 degree V-anvil and conical spindle (interchangeable) are optional, which are made of high-grade steel, hardened and precision ground.
- With ratchet stop for constant force.
- With SPC output (Series 326).
- With a standard bar except 0 - 25mm and 0 - 1" model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



**126-125**  
Shown with optional anvils



**326-351-30**  
**IP65**

## SPECIFICATIONS

| Metric     |            | Digital model     |          |          |
|------------|------------|-------------------|----------|----------|
| Range      | Resolution | Order No.         | Accuracy | Mass (g) |
| 0 - 25mm   | 0.001mm    | <b>326-251-30</b> | ±4µm     | 350      |
| 25 - 50mm  | 0.001mm    | <b>326-252-30</b> | ±4µm     | 380      |
| 50 - 75mm  | 0.001mm    | <b>326-253-30</b> | ±4µm     | 470      |
| 75 - 100mm | 0.001mm    | <b>326-254-30</b> | ±5µm     | 510      |

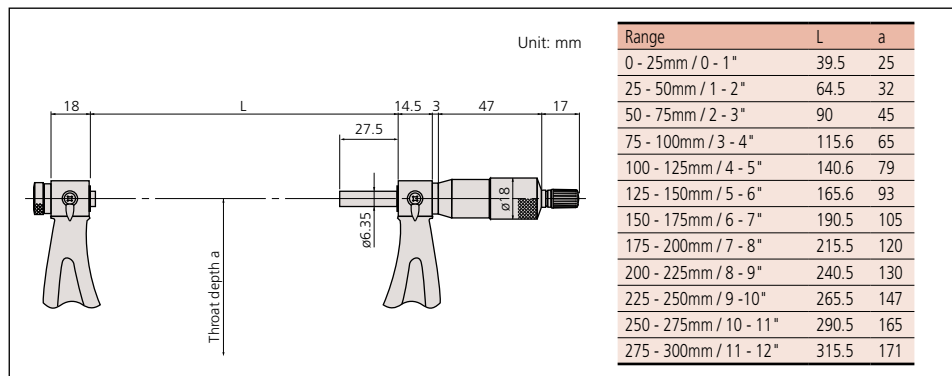
| Inch/Metric             |                   | Digital model     |          |          |
|-------------------------|-------------------|-------------------|----------|----------|
| Range                   | Resolution        | Order No.         | Accuracy | Mass (g) |
| 0 - 1" / 0 - 25.4mm     | .00005" / 0.001mm | <b>326-351-30</b> | ±.0002"  | 350      |
| 1 - 2" / 25.4 - 50.8mm  | .00005" / 0.001mm | <b>326-352-30</b> | ±.0002"  | 380      |
| 2 - 3" / 50.8 - 76.2mm  | .00005" / 0.001mm | <b>326-353-30</b> | ±.0002"  | 470      |
| 3 - 4" / 76.2 - 101.6mm | .00005" / 0.001mm | <b>326-354-30</b> | ±.00025" | 510      |

| Metric      |            |                |          |          |
|-------------|------------|----------------|----------|----------|
| Range       | Graduation | Order No.      | Accuracy | Mass (g) |
| 0 - 25mm    | 0.01mm     | <b>126-125</b> | ±4µm     | 240      |
| 25 - 50mm   | 0.01mm     | <b>126-126</b> | ±4µm     | 290      |
| 50 - 75mm   | 0.01mm     | <b>126-127</b> | ±4µm     | 390      |
| 75 - 100mm  | 0.01mm     | <b>126-128</b> | ±5µm     | 450      |
| 100 - 125mm | 0.01mm     | <b>126-129</b> | ±5µm     | 530      |
| 125 - 150mm | 0.01mm     | <b>126-130</b> | ±5µm     | 620      |
| 150 - 175mm | 0.01mm     | <b>126-131</b> | ±6µm     | 730      |
| 175 - 200mm | 0.01mm     | <b>126-132</b> | ±6µm     | 860      |
| 200 - 225mm | 0.01mm     | <b>126-133</b> | ±6µm     | 1,030    |
| 225 - 250mm | 0.01mm     | <b>126-134</b> | ±7µm     | 1,200    |
| 250 - 275mm | 0.01mm     | <b>126-135</b> | ±7µm     | 1,370    |
| 275 - 300mm | 0.01mm     | <b>126-136</b> | ±7µm     | 1,540    |

| Inch   |            |                |          |          |
|--------|------------|----------------|----------|----------|
| Range  | Graduation | Order No.      | Accuracy | Mass (g) |
| 0 - 1" | .001"      | <b>126-137</b> | ±.0002"  | 240      |
| 1 - 2" | .001"      | <b>126-138</b> | ±.0002"  | 290      |
| 2 - 3" | .001"      | <b>126-139</b> | ±.0002"  | 390      |
| 3 - 4" | .001"      | <b>126-140</b> | ±.00025" | 450      |
| 4 - 5" | .001"      | <b>126-141</b> | ±.00025" | 530      |
| 5 - 6" | .001"      | <b>126-142</b> | ±.00025" | 620      |
| 6 - 7" | .001"      | <b>126-143</b> | ±.0003"  | 730      |

| Inch With anvil set (126 - 800) |            |                |          |          |
|---------------------------------|------------|----------------|----------|----------|
| Range                           | Graduation | Order No.      | Accuracy | Mass (g) |
| 0 - 1"                          | .001"      | <b>126-901</b> | ±.0002"  | 240      |
| 1 - 2"                          | .001"      | <b>126-902</b> | ±.0002"  | 290      |
| 2 - 3"                          | .001"      | <b>126-903</b> | ±.0002"  | 390      |
| 3 - 4"                          | .001"      | <b>126-904</b> | ±.00025" | 450      |
| 4 - 5"                          | .001"      | <b>126-905</b> | ±.00025" | 530      |
| 5 - 6"                          | .001"      | <b>126-906</b> | ±.00025" | 620      |

## DIMENSIONS



## Technical Data

Resolution\*: 0.001mm or .00005"/0.001mm  
 Graduation\*\*: 0.01mm or .001"  
 Spindle feed error: 3µm / .00012"  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

## Function of Digital Model

Zero / ABS, Data hold, Data output, 2 Presets, Function Lock.  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

**05CZA662**: SPC cable with data switch (1m / 40")\*  
**05CZA663**: SPC cable with data switch (2m / 80")\*  
 \*Only for digital models  
 (See page B-51.): Standard for screw thread micrometer



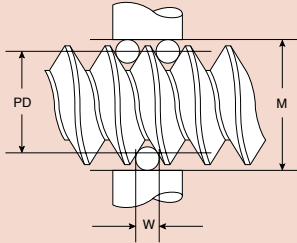
Anvil-spindle tip set:

| Applications                              | Set Order No.  | Tip Information  |            |                      |
|---|----------------|------------------|------------|----------------------|
|   |                | Threads Per Inch | Pitch (mm) | Individual Order No. |
| Metric Screw, Unified screw (60° threads) | <b>126-800</b> | 64-48 (M1)       | 0.4-0.5    | <b>126-801</b>       |
|   |                | 44-28 (M2)       | 0.6-0.9    | <b>126-802</b>       |
|   |                | 24-14 (M3)       | 1-1.75     | <b>126-803</b>       |
|   |                | 13-9 (M4)        | 2-3        | <b>126-804</b>       |
|   |                | 8-5 (M5)         | 3.5-5      | <b>126-805</b>       |
|   |                | 4.5-3.5 (M6)     | 5.5-7      | <b>126-806</b>       |
| Whitworth Screw (55° threads)             | <b>126-810</b> | 60-48            | -          | <b>126-811</b>       |
|   |                | 48-40            | -          | <b>126-812</b>       |
|   |                | 40-32            | -          | <b>126-813</b>       |
|   |                | 32-24            | -          | <b>126-814</b>       |
|   |                | 24-18            | -          | <b>126-815</b>       |
|   |                | 18-14            | -          | <b>126-816</b>       |
|   |                | 14-10            | -          | <b>126-817</b>       |
|   |                | 10-7             | -          | <b>126-818</b>       |
|   |                | 7-4.5            | -          | <b>126-819</b>       |
|   |                | 4.5-3.5          | -          | <b>126-820</b>       |

Features: 60 degree or 55 degree V-anvil and conical spindle (interchangeable) are optional, which are made of high-grade special steel, hardened and precision ground.  
 Storage box included.

# 3-Wire Thread Measuring System

Individual Holder and Wire Set



- PD = Pitch Diameter
- M = Measurement over wires
- W = Wire diameter
- C = Constant
- C = .86603 x Pitch (inches) -3W
- P.D. = M-C
- W = .57735 x P

## Applications

- Measure set of thread plug gages and working thread plug gages.
- Monitor the wear on working thread plug gages.
- Monitor and control pitch diameter variation during thread fabrication.
- Reduce measurement time to a fraction of the time normally taken using the traditional three wire method.
- Use in conjunction with go/no-go thread ring gages to control thread size to the most demanding specifications.
- Determine out of roundness and taper that may exist in threaded parts.
- Applications for preplating and post plating thread measurement.

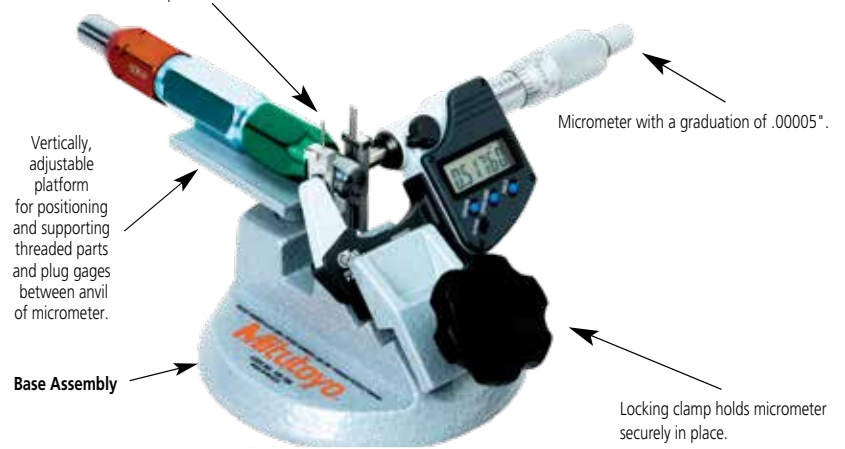
## Tolerance of Wires:

- Diameter +/- .000010"
- Roundness +/- .000010"
- Surface finish 2 micro inches AA, lapped.
- Hardness HRC 59-64
- Certification of accuracy included.
- Traceable to NIST.
- Meets or exceeds all ANSI and ISO specs.

## FEATURES

- Fast and accurate method of thread measuring available for use with micrometer

Wire holders and 3 thread measuring wires assembled for each thread pitch.



## INCH STANDARD HOLDERS AND WIRES SETS

| Order No. <sup>1,2</sup> | Threads Per Inch | Thread Measuring Wire Diameter |
|--------------------------|------------------|--------------------------------|
| 64AAA201                 | 120              | .00481                         |
| 64AAA202                 | 100              | .00577                         |
| 64AAA203                 | 95               | .00601                         |
| 64AAA204                 | 90               | .00642                         |
| 64AAA205                 | 80               | .00722                         |
| 64AAA206                 | 72               | .00802                         |
| 64AAA207                 | 64               | .00902                         |
| 64AAA208                 | 56               | .01031                         |
| 64AAA209                 | 50               | .01155                         |
| 64AAA210                 | 48               | .01203                         |
| 64AAA211                 | 44               | .01312                         |
| 64AAA212                 | 40               | .01443                         |
| 64AAA213                 | 36               | .01604                         |
| 64AAA214                 | 32               | .01804                         |
| 64AAA215                 | 30               | .01925                         |
| 64AAA216                 | 28               | .02062                         |
| 64AAA217                 | 27               | .02138                         |
| 64AAA218                 | 26               | .02221                         |
| 64AAA219                 | 24               | .02406                         |
| 64AAA220                 | 22               | .02624                         |
| 64AAA221                 | 20               | .02887                         |
| 64AAA222                 | 18               | .03208                         |
| 64AAA223                 | 16               | .03608                         |
| 64AAA224                 | 14               | .04124                         |
| 64AAA225                 | 13               | .04441                         |
| 64AAA226                 | 12               | .04811                         |
| 64AAA227                 | 11.5             | .05020                         |
| 64AAA228                 | 11               | .05249                         |
| 64AAA229                 | 10               | .05774                         |
| 64AAA230                 | 9                | .06415                         |
| 64AAA231                 | 8                | .07217                         |
| 64AAA232                 | 7.5              | .07698                         |
| 64AAA233                 | 7                | .08248                         |
| 64AAA234                 | 6                | .09623                         |
| 64AAA235                 | 5.5              | .10497                         |
| 64AAA236                 | 5                | .11547                         |

<sup>1</sup> For 6.35mm Spindle Diameter holder only, add "H" suffix to Order No. (i.e. 64AAA201H)

<sup>2</sup> For 8mm Spindle Diameter holder only, add "H8" suffix to Order No. (i.e. 64AAA201H8)

Compatible with micrometers with 0.25" anvils & spindles.

Stand Assembly  
Order No. 156-106

## METRIC HOLDERS AND WIRES SETS

| Order No. <sup>1</sup> | Pitch  | mm Diameter | Inch Diameter |
|------------------------|--------|-------------|---------------|
| 64AAA251               | .2mm   | .1155       | .00455        |
| 64AAA252               | .225mm | .1299       | .00511        |
| 64AAA253               | .25mm  | .1443       | .00568        |
| 64AAA254               | .30mm  | .1732       | .00682        |
| 64AAA255               | .35mm  | .2021       | .00796        |
| 64AAA256               | .40mm  | .2309       | .00909        |
| 64AAA257               | .45mm  | .2598       | .01023        |
| 64AAA258               | .50mm  | .2887       | .01137        |
| 64AAA259               | .55mm  | .3175       | .01250        |
| 64AAA260               | .60mm  | .3464       | .01364        |
| 64AAA261               | .70mm  | .4041       | .01591        |
| 64AAA262               | .75mm  | .4330       | .01705        |
| 64AAA263               | .80mm  | .4619       | .01818        |
| 64AAA264               | .85mm  | .4907       | .01932        |
| 64AAA265               | .90mm  | .5196       | .02046        |
| 64AAA266               | 1.00mm | .5774       | .02273        |
| 64AAA267               | 1.25mm | .7217       | .02841        |
| 64AAA268               | 1.50mm | .8660       | .03410        |
| 64AAA269               | 1.75mm | 1.0104      | .03978        |
| 64AAA270               | 2.00mm | 1.1547      | .04546        |
| 64AAA271               | 2.50mm | 1.4434      | .05683        |
| 64AAA272               | 3.00mm | 1.7321      | .06819        |
| 64AAA273               | 3.50mm | 2.0207      | .07956        |
| 64AAA274               | 4.00mm | 2.3094      | .09092        |

<sup>1</sup> For 6.35mm Spindle Diameter holder only, add "H" suffix to Order No. (i.e. 64AAA201H)

# Can Seam Micrometers

## SERIES 147

### FEATURES

- Measures the width, height, and depth of can seams.
- Three types of micrometers are available for: steel cans, aluminum cans and sprayer cans.
- Supplied in fitted carton.



147-103

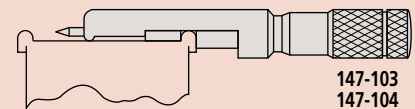
### SPECIFICATIONS

| Metric   |            |           |                   |
|----------|------------|-----------|-------------------|
| Range    | Graduation | Order No. | Remarks           |
| 0 - 13mm | 0.01mm     | 147-103   | for steel cans    |
|          |            | 147-105   | for aluminum cans |
|          |            | 147-202   | for sprayer cans  |

| Inch    |            |           |                   |
|---------|------------|-----------|-------------------|
| Range   | Graduation | Order No. | Remarks           |
| 0 - .5" | .001"      | 147-104   | for steel cans    |
|         |            | 147-106   | for aluminum cans |
|         |            | 147-201   | for sprayer cans  |

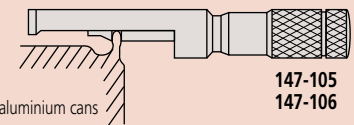
### Technical Data

Accuracy:  $\pm 0.0012"$  /  $\pm 3\mu\text{m}$   
 Graduation: .001" / 0.01mm



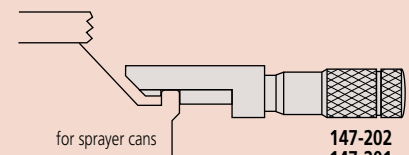
for cans  
(for depth measurements up to 5mm)

147-103  
147-104



for aluminium cans

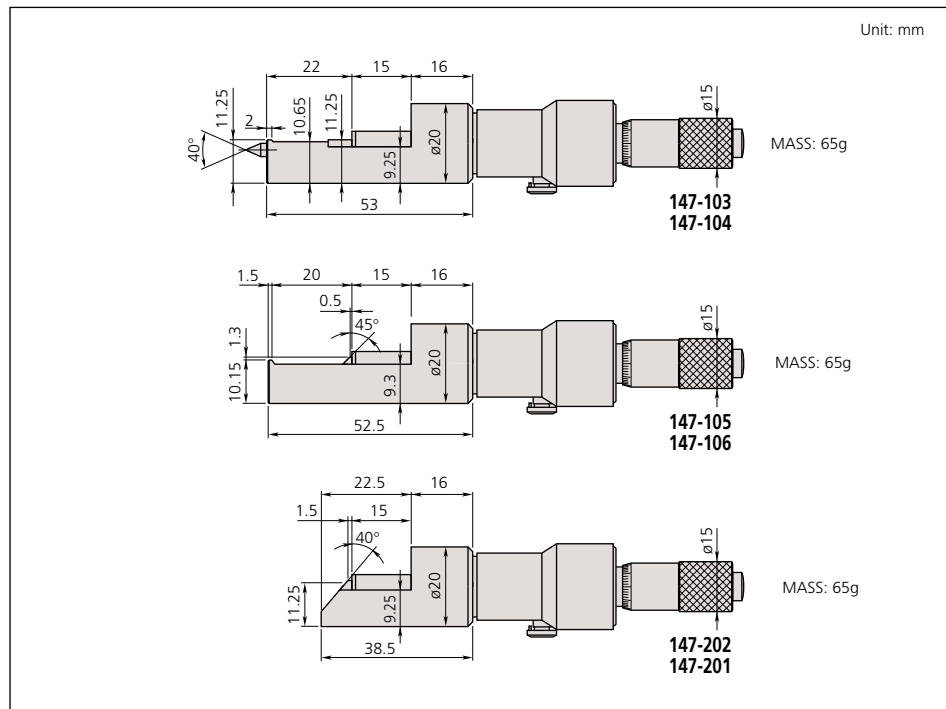
147-105  
147-106



for sprayer cans

147-202  
147-201

### DIMENSIONS AND MASS

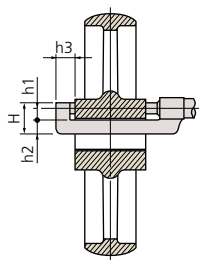


# Hub Micrometers

## SERIES 147

### Technical Data

Accuracy: Refer to the list of specifications  
 Graduation: 0.01mm / .001"  
 Flatness: 0.6µm / .000024"  
 Parallelism: (2+R/100)µm, R=max. range (mm)  
 [.00008" + .00004" (L/4)]", L = Max. range (inch)  
 Measuring faces: Carbide tipped



Unit: mm

| Range               | h1  | h2  | h3   | H    | Mass (g) |
|---------------------|-----|-----|------|------|----------|
| 0 - 1" / 0 - 25mm   | 6   | 8.5 | 13.5 | 17.5 | 135      |
| 1 - 2" / 25 - 50mm  | 6.5 | 11  | 14   | 20.5 | 150      |
| 3 - 4" / 50 - 75mm  | 6.5 | 11  | 13   | 20.5 | 170      |
| 4 - 5" / 75 - 100mm | 6.5 | 11  | 13   | 20.5 | 185      |

### FEATURES

- Measures hub thickness and shoulders inside a bore.
- With ratchet stop for constant force.
- With a standard bar except for 0 - 1" / 0 - 25mm model.
- Supplied in fitted plastic case.



147-301



147-351

### SPECIFICATIONS

#### Metric

| Range      | Graduation | Order No. | Accuracy |
|------------|------------|-----------|----------|
| 0 - 25mm   | 0.01mm     | 147-301   | ±2µm     |
| 25 - 50mm  | 0.01mm     | 147-302   | ±2µm     |
| 50 - 75mm  | 0.01mm     | 147-303   | ±2µm     |
| 75 - 100mm | 0.01mm     | 147-304   | ±3µm     |

#### Inch

| Range  | Graduation | Order No. | Accuracy |
|--------|------------|-----------|----------|
| 0 - 1" | .001"      | 147-351   | ±.0001"  |
| 1 - 2" | .001"      | 147-352   | ±.0001"  |
| 2 - 3" | .001"      | 147-353   | ±.0001"  |
| 3 - 4" | .001"      | 147-354   | ±.00015" |

# Wire Micrometers

## SERIES 147

### FEATURES

- Designed for measuring wire thickness.
- Also used to measure the diameter of a small ball.
- Supplied in fitted plastic case.



147-402



147-401

### SPECIFICATIONS

#### Metric

| Range    | Graduation | Order No. | Accuracy | Mass (g) |
|----------|------------|-----------|----------|----------|
| 0 - 10mm | 0.01mm     | 147-401   | ±3µm     | 65       |

#### Inch

| Range   | Graduation | Order No. | Accuracy | Mass (g) |
|---------|------------|-----------|----------|----------|
| 0 - .4" | .0001"     | 147-402*  | ±.00015" | 65       |

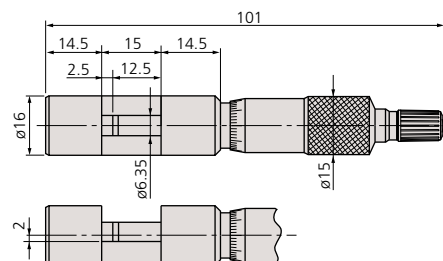
\*.0001" reading is obtained with vernier.

### Technical Data

Graduation: .0001" or 0.01mm  
 Flatness: .000024" / 0.6µm  
 Parallelism: .00005" / 1.3µm  
 Measuring faces: Carbide tipped



### DIMENSIONS AND MASS



Unit: mm  
 MASS = 65g

# Digital Outside Micrometers

## SERIES 193

### FEATURES

- Mechanical digit counter with 0.01mm or .001" reading for quick and error-free reading.
- With a standard bar except for 0-25mm / 0 - 1" model.
- Supplied in fitted plastic case.



193-211

### SPECIFICATIONS

**Metric** \_\_\_\_\_ With ratchet stop

| Range      | Graduation | Order No.       | Accuracy |
|------------|------------|-----------------|----------|
| 0 - 25mm   | 0.01mm     | <b>193-101</b>  | ±2μm     |
|            | 0.001mm    | <b>193-111*</b> | ±2μm     |
| 25 - 50mm  | 0.01mm     | <b>193-102</b>  | ±2μm     |
|            | 0.001mm    | <b>193-112*</b> | ±2μm     |
| 50 - 75mm  | 0.01mm     | <b>193-103</b>  | ±2μm     |
|            | 0.001mm    | <b>193-113*</b> | ±2μm     |
| 75 - 100mm | 0.01mm     | <b>193-104</b>  | ±3μm     |
|            | 0.001mm    | <b>193-114*</b> | ±3μm     |

\*0.001mm reading is obtained with vernier.

**Metric** \_\_\_\_\_ Micrometer sets

| Range                     | Order No.      | Included in set   |
|---------------------------|----------------|---|
| 0 - 75mm<br>(3 pcs./set)  | <b>193-901</b> | • <b>193-101, 193-102, 193-103</b><br>• 2 micrometer standards                    |
| 0 - 75mm<br>(3 pcs./set)  | <b>193-915</b> | • <b>193-111, 193-112, 193-113,</b><br>• 2 micrometer standards                   |
| 0 - 100mm<br>(4 pcs./set) | <b>193-902</b> | • <b>193-101, 193-102, 193-103,</b><br><b>193-104</b><br>• 3 micrometer standards |
| 0 - 100mm<br>(4 pcs./set) | <b>193-916</b> | • <b>193-111, 193-112, 193-113,</b><br><b>193-114</b><br>• 3 micrometer standards |

**Inch** \_\_\_\_\_ With friction thimble

| Range  | Graduation | Order No.       | Accuracy |
|--------|------------|-----------------|----------|
| 0 - 1" | .0001"     | <b>193-211*</b> | ±.0001"  |
| 1 - 2" | .0001"     | <b>193-212*</b> | ±.0001"  |

\*.0001" reading is obtained with vernier.

**Inch** \_\_\_\_\_ With ratchet stop

| Range  | Graduation | Order No.       | Accuracy |
|--------|------------|-----------------|----------|
| 2 - 3" | .0001"     | <b>193-213*</b> | ±.0001"  |
| 3 - 4" | .0001"     | <b>193-214*</b> | ±.00015" |

\*.0001" reading is obtained with vernier.

**Inch** \_\_\_\_\_ Micrometer sets

| Range                  | Order No.      | Included in set  |
|------------------------|----------------|--|
| 0 - 3"<br>(3 pcs./set) | <b>193-923</b> | • <b>193-211, 193-212, 193-213</b><br>• 2 micrometer standards |

### Technical Data

Counter reading: 0.01mm or .001"  
 Graduation: 0.01mm, 0.001mm, .001" or .0001"  
 Flatness: 0.6μm / .000024"  
 Parallelism: (2+R/100)μm, R=max. range (mm)  
 [.00008" + .00004" (L/4)]", L= max. range (inch)  
 Measuring faces: Carbide tipped



193-916

### DIMENSIONS AND MASS

**Models up to 100mm / 4"**

Unit: mm

| Range               | L   | a   | b | c  | Mass (g) |
|---------------------|-----|-----|---|----|----------|
| 0 - 25mm / 0 - 1"   | 30  | 2.5 | 5 | 26 | 224      |
| 25 - 50mm / 1 - 2"  | 55  | 2.5 | 8 | 32 | 275      |
| 50 - 75mm / 2 - 3"  | 80  | 2.5 | 9 | 45 | 379      |
| 75 - 100mm / 3 - 4" | 105 | 2.5 | 9 | 57 | 489      |

Note: The shape of the thimble changes on the model with friction thimble.



# Indicating Micrometers

## SERIES 510

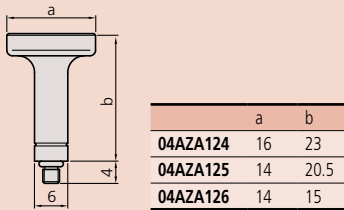
### Technical Data

Spindle feed error:  $3\mu\text{m} / .00012''$   
 Dial indication accuracy:  $1\mu\text{m} / .00004''$   
 Dispersion of indication:  $0.4\mu\text{m} / .00002''$   
 Graduation:  $0.001\text{mm}$  or  $.0001''$   
 Dial reading:  $0.001\text{mm}$  or  $.00005''$   
 Flatness:  $0.3\mu\text{m} / .000012''$   
 Parallelism:  $0.6\mu\text{m} / .000024''$  for models up to  $50\text{mm} / 2''$   
 $1\mu\text{m} / .00004''$  for models over  $50\text{mm} / 2''$   
 Measuring force: 5 - 10N (500 - 1000gf)  
 Measuring faces: Carbide tipped

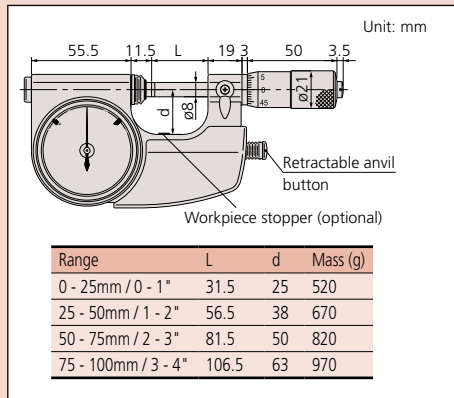
### Optional Accessories

- 04AZA124:**  $\phi 16\text{mm} / \phi .63''$  workpiece stopper (not available for  $25\text{mm} / 1''$  model)
- 04AZA125:**  $\phi 14\text{mm} / \phi .55''$  workpiece stopper
- 04AZA126:**  $\phi 14\text{mm} / \phi .55''$  workpiece stopper

Unit: mm



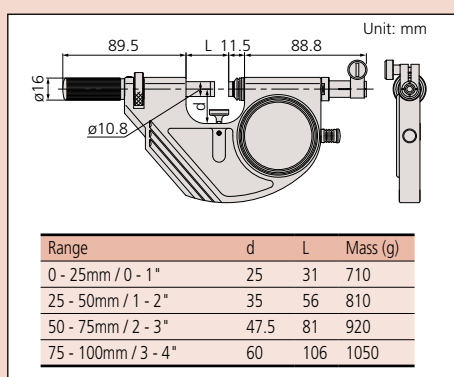
### DIMENSIONS AND MASS



### Technical Data

Flatness:  $0.3\mu\text{m} / .000012''$   
 Parallelism:  $0.6\mu\text{m} / .000024''$  for models up to  $50\text{mm} / 2''$   
 $1\mu\text{m} / .00004''$  for models over  $50\text{mm} / 2''$   
 Measuring force: 5 - 10N (500 - 1000gf)  
 Measuring faces: Carbide tipped

### DIMENSIONS AND MASS



### FEATURES

- Retractable anvil with indicator for three-wire measurements of pitch diameter of precision screws and parallelism measurements.
- With a standard bar except for 0 - 25mm / 0 - 1" model.
- IP protection level: 54
- Supplied in fitted plastic case.



### SPECIFICATIONS

| Metric     |            |                                   |                      |
|------------|------------|-----------------------------------|----------------------|
| Range      | Graduation | Order No.                         | Indicating range     |
| 0 - 25mm   | 0.001mm    | <b>510-121*</b><br><b>510-141</b> | $\pm 0.060\text{mm}$ |
| 25 - 50mm  | 0.001mm    | <b>510-122</b>                    | $\pm 0.060\text{mm}$ |
| 50 - 75mm  | 0.001mm    | <b>510-123</b>                    | $\pm 0.060\text{mm}$ |
| 75 - 100mm | 0.001mm    | <b>510-124</b>                    | $\pm 0.060\text{mm}$ |

\*Retractable anvil button on the right side.

| Inch   |            |                                   |                  |
|--------|------------|-----------------------------------|------------------|
| Range  | Graduation | Order No.                         | Indicating range |
| 0 - 1" | .00005"    | <b>510-131*</b><br><b>510-151</b> | $\pm .0023''$    |
| 1 - 2" | .00005"    | <b>510-132</b>                    | $\pm .0023''$    |
| 2 - 3" | .00005"    | <b>510-133</b>                    | $\pm .0023''$    |
| 3 - 4" | .00005"    | <b>510-134</b>                    | $\pm .0023''$    |

\*Retractable anvil button on the right side.

# Snap Meters

## SERIES 523

### FEATURES

- Various types of indicators, LVDTs and linear gages can be selected according to the measurement applications.
- Supplied in fitted plastic case.

Indicator is optional.



### SPECIFICATIONS

| Metric     |                |                | Gage stem dia 8mm |
|------------|----------------|----------------|-------------------|
| Range      | Order No.      | Anvil movement |                   |
| 0 - 25mm   | <b>523-141</b> | 2mm            |                   |
| 25 - 50mm  | <b>523-142</b> | 2mm            |                   |
| 50 - 75mm  | <b>523-143</b> | 2mm            |                   |
| 75 - 100mm | <b>523-144</b> | 2mm            |                   |

| Inch   |                |                | Gage stem dia 3/8" |
|--------|----------------|----------------|--------------------|
| Range  | Order No.      | Anvil movement |                    |
| 0 - 1" | <b>523-151</b> | .078"          |                    |
| 1 - 2" | <b>523-152</b> | .078"          |                    |
| 2 - 3" | <b>523-153</b> | .078"          |                    |
| 3 - 4" | <b>523-154</b> | .078"          |                    |

# Dial Snap Meters

## SERIES 523

### FEATURES

- Direct go/no-go judgment for mass-produced parts.
- Spindle diameter: .425" / 10.8mm
- IP protection level: 54
- Supplied in fitted plastic case.



523-131

### SPECIFICATIONS

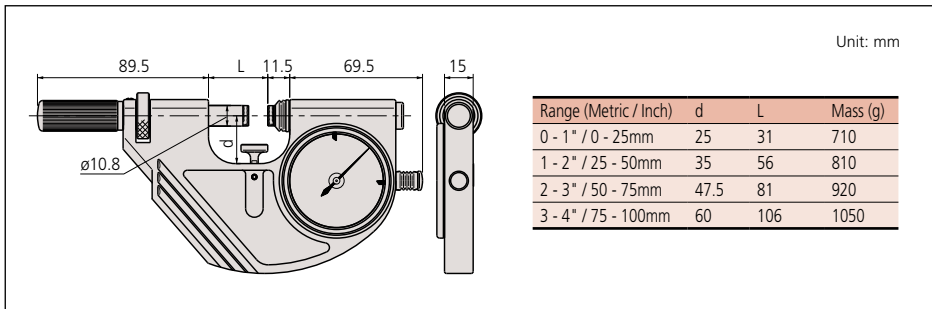
#### Metric

| Range      | Graduation | Order No.      | Indicating range |
|------------|------------|----------------|------------------|
| 0 - 25mm   | 0.001mm    | <b>523-121</b> | ±0.060mm         |
| 25 - 50mm  | 0.001mm    | <b>523-122</b> | ±0.060mm         |
| 50 - 75mm  | 0.001mm    | <b>523-123</b> | ±0.060mm         |
| 75 - 100mm | 0.001mm    | <b>523-124</b> | ±0.060mm         |

#### Inch

| Range  | Graduation | Order No.      | Indicating range |
|--------|------------|----------------|------------------|
| 0 - 1" | .00005"    | <b>523-131</b> | ±.0023"          |
| 1 - 2" | .00005"    | <b>523-132</b> | ±.0023"          |
| 2 - 3" | .00005"    | <b>523-133</b> | ±.0023"          |
| 3 - 4" | .00005"    | <b>523-134</b> | ±.0023"          |

### DIMENSIONS AND MASS



### Technical Data

Dial indication accuracy: .00005" / 1µm  
 Indication repeatability: .00002" / 0.4µm  
 Dial reading: .00005" or 0.001mm  
 Flatness: .000012" / 0.3µm  
 Parallelism: .000024" / 0.6µm for models up to 2" / 50mm  
 .00004" / 1µm for models over 2" / 50mm  
 Measuring force: 5 - 10N (500 - 1000gf)  
 Measuring faces: Carbide tipped

# Caliper-type Micrometers

## SERIES 343, 143

### Technical Data

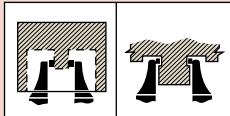
Accuracy: Refer to the list of specifications.  
 Resolution\*: 0.001mm or .00005"/0.001mm  
 Graduation\*\*: 0.01mm / .001"  
 Flatness: 0.3μm / .000012"  
 Parallelism: (3+R/75)μm, R=max. range (mm)  
 [.00012" + .00004" (L/8)]"  
 L = Max. range (inch)  
 Measuring faces: Carbide tipped  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero-setting, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (1m / 40")  
**05CZA663**: SPC cable with data switch (2m / 80")



### FEATURES

- With ratchet stop for constant force.
- With SPC output (Series 343).
- With a standard bar except 0 - 25mm and 0 - 1" model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



143-121



343-250-30

### SPECIFICATIONS

| Metric     |            | Digital model     |          |          |
|------------|------------|-------------------|----------|----------|
| Range      | Resolution | Order No.         | Accuracy | Mass (g) |
| 0 - 25mm   | 0.001mm    | <b>343-250-30</b> | ±5μm     | 630      |
| 25 - 50mm  | 0.001mm    | <b>343-251-30</b> | ±6μm     | 650      |
| 50 - 75mm  | 0.001mm    | <b>343-252-30</b> | ±7μm     | 1040     |
| 75 - 100mm | 0.001mm    | <b>343-253-30</b> | ±8μm     | 1090     |

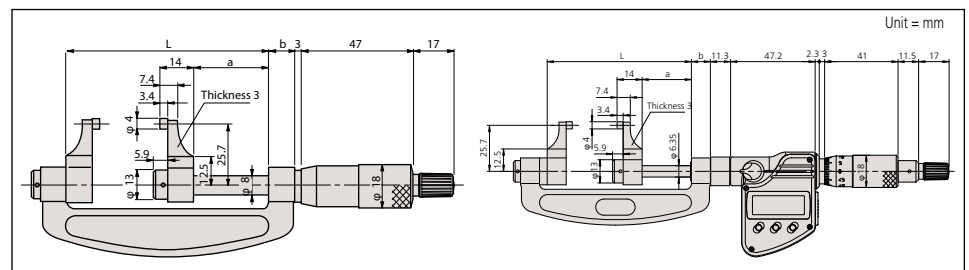
| Inch / Metric           |                   | Digital model     |          |          |
|-------------------------|-------------------|-------------------|----------|----------|
| Range                   | Resolution        | Order No.         | Accuracy | Mass (g) |
| 0 - 1" / 0 - 25.4mm     | .00005" / 0.001mm | <b>343-350-30</b> | ±.00025" | 630      |
| 1 - 2" / 25.4 - 50.8mm  | .00005" / 0.001mm | <b>343-351-30</b> | ±.0003"  | 650      |
| 2 - 3" / 50.8 - 76.2mm  | .00005" / 0.001mm | <b>343-352-30</b> | ±.00035" | 1040     |
| 3 - 4" / 76.2 - 101.6mm | .00005" / 0.001mm | <b>343-353-30</b> | ±.0004"  | 1090     |

| Metric     |            |                |          |          |
|------------|------------|----------------|----------|----------|
| Range      | Graduation | Order No.      | Accuracy | Mass (g) |
| 0 - 25mm   | 0.01mm     | <b>143-101</b> | ±5μm     | 210      |
| 25 - 50mm  | 0.01mm     | <b>143-102</b> | ±6μm     | 230      |
| 50 - 75mm  | 0.01mm     | <b>143-103</b> | ±7μm     | 280      |
| 75 - 100mm | 0.01mm     | <b>143-104</b> | ±8μm     | 330      |

Models with a range up to 300mm are available.

| Inch   |            |                |          |          |
|--------|------------|----------------|----------|----------|
| Range  | Graduation | Order No.      | Accuracy | Mass (g) |
| 0 - 1" | .001"      | <b>143-121</b> | ±.00025" | 210      |
| 1 - 2" | .001"      | <b>143-122</b> | ±.0003"  | 230      |
| 2 - 3" | .001"      | <b>143-123</b> | ±.00035" | 280      |

### DIMENSIONS



# Groove Micrometers

## SERIES 146

### FEATURES

- Flanged spindle for measuring width, depth and location of grooves inside/outside bores, and tubes.
- Provided with two types of graduations for inside and outside measurements.
- Non-rotating spindle type has two-directional ratchet stop. (Measuring force: 0.7 - 1.2N)



### SPECIFICATIONS

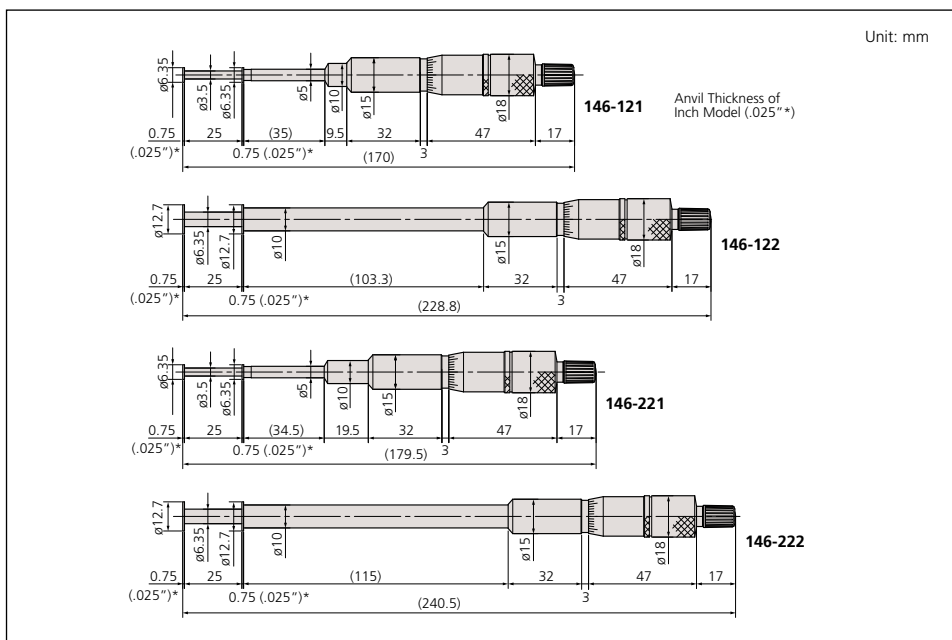
| Metric  Rotating spindle type |                |            |           |         |          |
|-------------------------------|----------------|------------|-----------|---------|----------|
| Range Outside                 | Range Inside   | Graduation | Order No. | Flange  | Mass (g) |
| 0 - 25mm                      | 1.6 - 26.5mm   | 0.01mm     | 146-121   | ø6.35mm | 135      |
|                               |                |            | 146-122   | ø12.7mm | 185      |
| 25 - 50mm                     | 26.5 - 51.5mm  | 0.01mm     | 146-123   | ø12.7mm | 175      |
| 50 - 75mm                     | 51.5 - 76.5mm  | 0.01mm     | 146-124   | ø12.7mm | 165      |
| 75 - 100mm                    | 76.5 - 101.5mm | 0.01mm     | 146-125   | ø12.7mm | 160      |

| Inch  Rotating spindle type |               |            |           |        |          |
|-----------------------------|---------------|------------|-----------|--------|----------|
| Range Outside               | Range Inside  | Graduation | Order No. | Flange | Mass (g) |
| 0 - 1"                      | .055" - 1.05" | .001"      | 146-131   | ø.25"  | 135      |
|                             |               |            | 146-132   | ø.5"   | 185      |
| 1" - 2"                     | 1.05" - 2.05" | .001"      | 146-133   | ø.5"   | 175      |
| 2" - 3"                     | 2.05" - 3.05" | .001"      | 146-134   | ø.5"   | 165      |
| 3" - 4"                     | 3.05" - 4.05" | .001"      | 146-135   | ø.5"   | 160      |

| Metric  Non-rotating spindle type |                |            |           |         |          |
|-----------------------------------|----------------|------------|-----------|---------|----------|
| Range Outside                     | Range Inside   | Graduation | Order No. | Flange  | Mass (g) |
| 0 - 25mm                          | 1.6 - 26.5mm   | 0.01mm     | 146-221   | ø6.35mm | 135      |
|                                   |                |            | 146-222   | ø12.7mm | 185      |
| 25 - 50mm                         | 26.5 - 51.5mm  | 0.01mm     | 146-223   | ø12.7mm | 175      |
| 50 - 75mm                         | 51.5 - 76.5mm  | 0.01mm     | 146-224   | ø12.7mm | 165      |
| 75 - 100mm                        | 76.5 - 101.5mm | 0.01mm     | 146-225   | ø12.7mm | 160      |

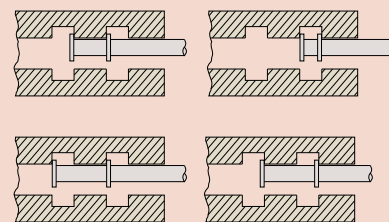
| Inch  Non-rotating spindle type |               |            |           |        |          |
|---------------------------------|---------------|------------|-----------|--------|----------|
| Range Outside                   | Range Inside  | Graduation | Order No. | Flange | Mass (g) |
| 0 - 1"                          | .055" - 1.05" | .001"      | 146-231   | ø.25"  | 135      |
|                                 |               |            | 146-232   | ø.5"   | 185      |
| 1" - 2"                         | 1.05" - 2.05" | .001"      | 146-233   | ø.5"   | 175      |
| 2" - 3"                         | 2.05" - 3.05" | .001"      | 146-234   | ø.5"   | 165      |
| 3" - 4"                         | 3.05" - 4.05" | .001"      | 146-235   | ø.5"   | 160      |

### DIMENSIONS



### Technical Data

Accuracy:  $\pm .0004"$  /  $\pm 10\mu\text{m}$   
 Parallelism:  $.0004"$  /  $10\mu\text{m}$



# Small Hole Gage Set

## SERIES 154

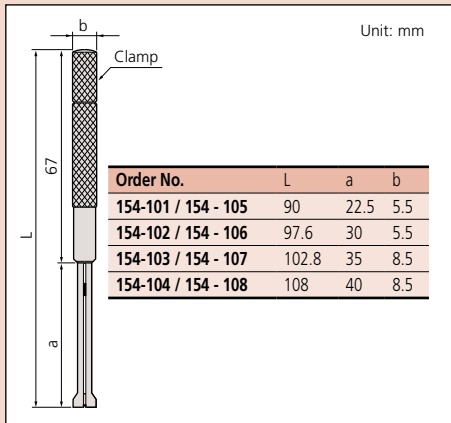
### FEATURES

- Used with an outside micrometer for measuring inside diameter of bores.
- 4 sizes of gages are supplied in a fitted pouch.
- Extra long for gaging deep and shallow holes, slots and similar workpieces.
- Gaging surface is fully hardened to ensure long tool life.



154-901

### DIMENSIONS



### SPECIFICATIONS

| Metric                    |               |                            |
|---------------------------|---------------|----------------------------|
| Total range               | Set Order No. | Assortment of gages        |
| ø3 - 13mm<br>(4-gage set) | 154-902       | ø3 - 5mm gage (154-101)    |
|                           |               | ø5 - 7.5mm gage (154-102)  |
|                           |               | ø7.5 - 10mm gage (154-103) |
|                           |               | ø10 - 13mm gage (154-104)  |

| Inch                                |               |                                 |
|-------------------------------------|---------------|---------------------------------|
| Total range                         | Set Order No. | Assortment of gages             |
| .125" - .5"<br>DIA.<br>(4-gage set) | 154-901       | .125" - .2" DIA. gage (154-105) |
|                                     |               | .2" - .3" DIA. gage (154-106)   |
|                                     |               | .3" - .4" DIA. gage (154-107)   |
|                                     |               | .4" - .5" DIA. gage (154-108)   |

# Telescoping Gage Set

## SERIES 155

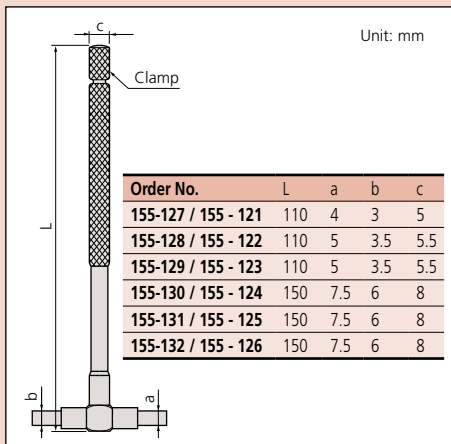
### FEATURES

- Spring-loaded plunger expands within the bore (or groove), allowing determination of the internal diameter (or groove width).
- With a knurled clamp.
- Supplied in a fitted pouch.



155-903

### DIMENSIONS



### SPECIFICATIONS

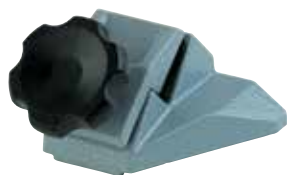
| Metric                    |               |                            |
|---------------------------|---------------|----------------------------|
| Total range               | Set Order No. | Included in set            |
| 8 - 150mm<br>(6-gage set) | 155-905       | 8 - 12.7mm gage (155-127)  |
|                           |               | 12.7 - 19mm gage (155-128) |
|                           |               | 19 - 32mm gage (155-129)   |
|                           |               | 32 - 54mm gage (155-130)   |
|                           |               | 54 - 90mm gage (155-131)   |
|                           |               | 90 - 150mm gage (155-132)  |

| Inch                          |               |   |
|-------------------------------|---------------|---|
| Total range                   | Set Order No. | Included in set                             |
| .313 - 6"<br>(6-gage set)     | 155-903       | .313" - .5" gage (155-121)                  |
|                               |               | .5" - .75" gage (155-122)                   |
|                               |               | .75" - 1.25" gage (155-123)                 |
|                               |               | 1.25" - 2.125" gage (155-124)               |
|                               |               | 2.125" - 3.5" gage (155-125)                |
|                               |               | 3.5" - 6" gage (155-126)                    |
| .50 - 6"<br>(5-gage set)      | 155-904       | 155-122, 155-123, 155-124, 155-125, 155-126 |
| .315 - 2.125"<br>(4-gage set) | 155-907       | 155-121, 155-122, 155-123, 155-124          |

# Micrometer Stands

## SERIES 156

These stands are designed to allow bench-top use with hand micrometers or other gages.



156-105-10



156-106



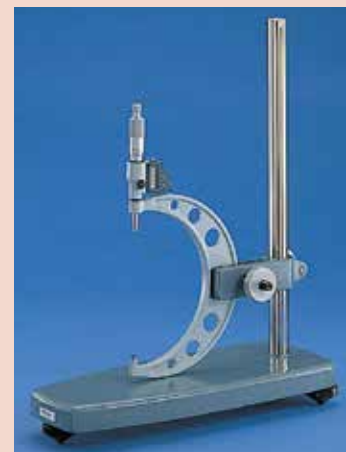
156-101-10



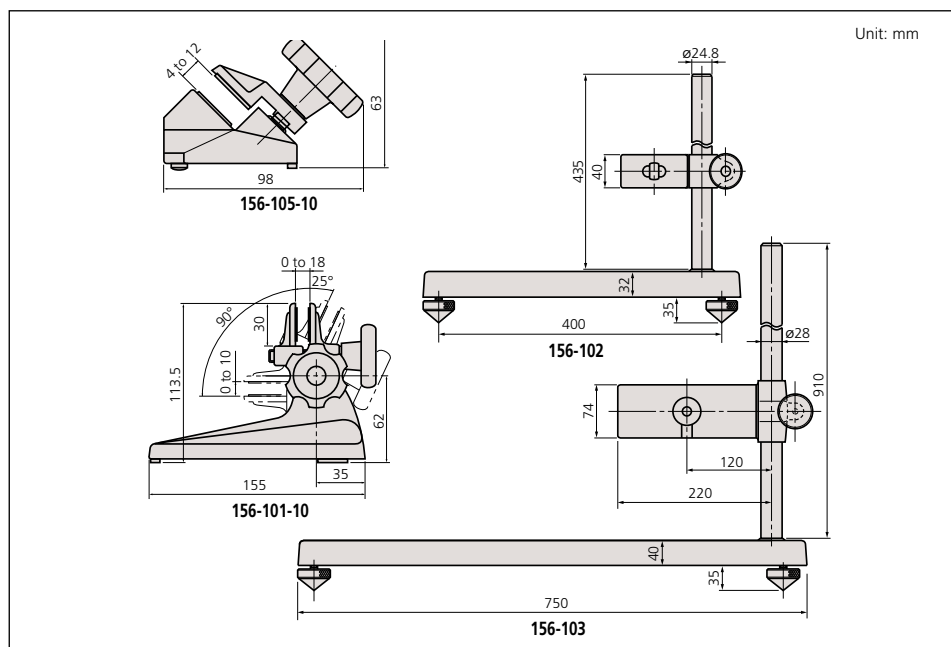
156-102

### SPECIFICATIONS

| Micrometer ranges                | Order No.  | Remarks                   |
|----------------------------------|------------|---------------------------|
| 0-1" / 0-25mm,<br>1-2" / 25-50mm | 156-105-10 | Fixed angle type          |
| Up to 4" / 100mm                 | 156-101-10 | Adjustable angle type     |
| 5-12" / 125-300mm                | 156-102    | Vertical type             |
| 12-40" / 300-1000mm              | 156-103    | Vertical type             |
| 0-1" / 0-25mm<br>1-2" / 25-50mm  | 156-106    | Fixed angle with platform |



### DIMENSIONS



# Color Ratchet & Color Speeder

## Color ratchet



### SPECIFICATIONS

| Order No.   | Color  |
|-------------|--------|
| 985056      | Black  |
| 985061      | Red    |
| 985081      | Blue   |
| 985071      | Yellow |
| 985076      | Green  |
| 985066      | Brown  |
| 04GZA241*   | Gray   |
| 04GZA239**  | Gray   |
| 04GZA243*** | Gray   |

\*for Series 293 digital model  
 \*\* up to 300mm / 12"  
 \*\*\* over 300mm / 12"

## Color Speeder for Ratchet Thimble Micrometer



### SPECIFICATIONS

| Order No. | Color  |
|-----------|--------|
| 04GAA899  | Black  |
| 04GAA900  | Red    |
| 04GAA901  | Yellow |
| 04GAA902  | Green  |
| 04GAA903  | Blue   |
| 04AAB208  | Gray   |

### Technical Data

Tip length: metric type: 10mm  $\pm 5\mu\text{m}$   
 inch type: .5"  $\pm .0002$ "

Spindle Dia: \*1 .250" / 6.35mm  
 \*1 Spindle diameter for 101469  
 (.250" ball) is .315" / 8mm



To measure odd workpieces, several convenient anvil attachments are prepared by Mitutoyo. Among them the most often used one is the ball attachment.

The ball attachments are hardened steel balls with .200" and .250" diameters which are placed on the .250" and .315" diameter anvils, respectively, by rubber caps. With these attachments, regular micrometers can measure cylindrical wall thickness, but, .200" or .250" must be subtracted from the readings.

Other attachments shown here are either .500" or 10mm in length. The added amount must be subtracted from the reading.

# Spindle Attachment Tip

| Ball   | Spline            | Comparator        | Blade             | Knife-edge        | Disk              |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |                   |                   |                   |                   |                   |
| 101468 (.200" ball dia.)<br>101469 (.250" ball dia.) | 208062*<br>208098 | 208063*<br>208099 | 208064*<br>208100 | 208065*<br>208101 | 208066*<br>208102 |

### DIMENSIONS

| Order No.         | Dimension |
|-------------------|-----------|
| 208098<br>208062* |           |
| 208099<br>208063* |           |
| 208100<br>208064* |           |

| Order No.         | Dimension |
|-------------------|-----------|
| 208101<br>208065* |           |
| 208102<br>208066* |           |

\* metric type

# Micrometer Oil

207000 (30ml)



Mitutoyo

# Optical Parallels

## SERIES 157

### FEATURES

- Designed to inspect parallelism and flatness of measuring faces of micrometers.
- Each set consists of 4 thicknesses.
- Supplied in fitted wooden case.



### SPECIFICATIONS

| Metric                            |                |   |
|-----------------------------------|----------------|---|
| Range of micrometer to be checked | Order No.      | Assortment of parallels (Thickness of parallel) |
| 0-25mm                            | <b>157-903</b> | 12.00mm (157-101)                               |
|                                   |                | 12.12mm (157-102)                               |
|                                   |                | 12.25mm (157-103)                               |
|                                   |                | 12.37mm (157-104)                               |
| 25-50mm                           | <b>157-904</b> | 25.00mm (157-105)                               |
|                                   |                | 25.12mm (157-106)                               |
|                                   |                | 25.25mm (157-107)                               |
|                                   |                | 25.37mm (157-108)                               |

| Inch                              |                |   |
|-----------------------------------|----------------|---|
| Range of micrometer to be checked | Order No.      | Assortment of parallels (Thickness of parallel) |
| 0-1"                              | <b>157-901</b> | .5000" (157-109)                                |
|                                   |                | .5062" (157-110)                                |
|                                   |                | .5125" (157-111)                                |
|                                   |                | .5187" (157-112)                                |
| 1-2"                              | <b>157-902</b> | 1.0000" (157-113)                               |
|                                   |                | 1.0062" (157-114)                               |
|                                   |                | 1.0125" (157-115)                               |
|                                   |                | 1.0187" (157-116)                               |

# Optical Flats

## SERIES 158

### FEATURES

- Used for inspecting the flatness of micrometer's or gage block's measuring faces with high accuracy.
- Supplied in fitted wooden case.



### SPECIFICATIONS

| Metric   |                |                    |
|----------|----------------|--------------------|
| Flatness | Order No.      | Diameter/Thickness |
| 0.2µm    | <b>158-117</b> | 45mm/12mm          |
|          | <b>158-119</b> | 60mm/15mm          |
| 0.1µm    | <b>158-118</b> | 45mm/12mm          |
|          | <b>158-120</b> | 60mm/15mm          |

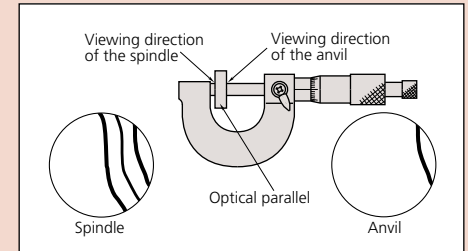
| Inch     |                |                    |
|----------|----------------|--------------------|
| Flatness | Order No.      | Diameter/Thickness |
| .000004" | <b>158-122</b> | 1.8"/.5"           |
|          | <b>158-124</b> | 2.4"/.6"           |

### Technical Data

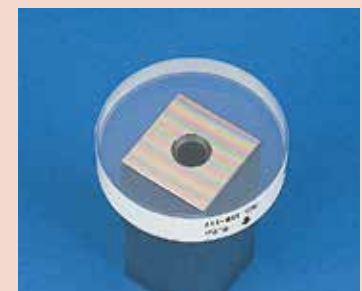
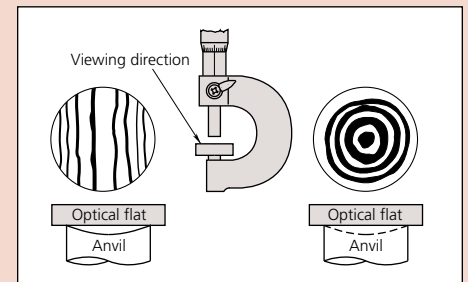
Flatness: .000004" / 0.1µm  
 Parallelism: .000008" / 0.2µm  
 Diameter: 1.18" / 30mm

### Parallelism check between measuring faces by means of interference fringe produced by an optical parallel.

The parallelism between the measuring faces can be determined as follows—place the optical parallel to the anvil and observe the number of interference fringes produced on the spindle side under the measuring force of the micrometers.  
 The parallelism is about 1µm (0.32µm x 3 = 0.96µm). Fringe on the anvil side must not be more than one.



### Flatness check of measuring faces using interference fringe pattern produced by an optical flat.





## Technical Data

Flatness: 0.3µm / .000012"  
 Parallelism: 2µm / .00008"



# Micrometer Standards

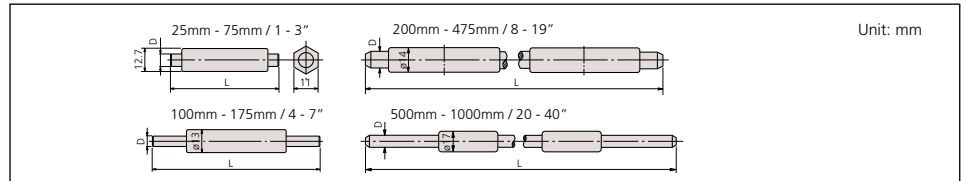
## SERIES 167

### FEATURES

- Used for the zero point setting of outside micrometers.
- Flat and lapped measuring faces.
- Heat insulating handle to prevent expansion due to body temperature.
- Supplied in fitted carton up to 500mm / 20" and wooden case for over 525mm / 21" length.



### DIMENSION



### SPECIFICATIONS

| Metric     |           |              |          |
|------------|-----------|--------------|----------|
| Length (L) | Order No. | Diameter (D) | Accuracy |
| 25mm       | 167-101   | 6.35mm       | ±1.5µm   |
| 50mm       | 167-102   | 6.35mm       | ±2.0µm   |
| 75mm       | 167-103   | 6.35mm       | ±2.5µm   |
| 100mm      | 167-104   | 7.9mm        | ±3µm     |
| 125mm      | 167-105   | 7.9mm        | ±3.5µm   |
| 150mm      | 167-106   | 7.9mm        | ±4µm     |
| 175mm      | 167-107   | 7.9mm        | ±4.5µm   |
| 200mm      | 167-108   | 9.4mm        | ±5.0µm   |
| 225mm      | 167-109   | 9.4mm        | ±5.5µm   |
| 250mm      | 167-110   | 9.4mm        | ±6.0µm   |
| 275mm      | 167-111   | 9.4mm        | ±6.5µm   |
| 300mm      | 167-112   | 9.4mm        | ±7µm     |
| 325mm      | 167-113   | 9.4mm        | ±7.5µm   |
| 350mm      | 167-114   | 9.4mm        | ±8µm     |
| 375mm      | 167-115   | 9.4mm        | ±8.5µm   |
| 400mm      | 167-116   | 9.4mm        | ±9µm     |
| 425mm      | 167-117   | 9.4mm        | ±9.5µm   |
| 450mm      | 167-118   | 9.4mm        | ±1.0µm   |
| 475mm      | 167-119   | 9.4mm        | ±10.5µm  |
| 500mm      | 167-120   | 11.9mm       | ±11µm    |
| 525mm      | 167-121   | 11.9mm       | ±11.5µm  |
| 550mm      | 167-122   | 11.9mm       | ±12µm    |
| 575mm      | 167-123   | 11.9mm       | ±12.5µm  |
| 600mm      | 167-124   | 11.9mm       | ±13µm    |
| 625mm      | 167-125   | 11.9mm       | ±13.5µm  |
| 650mm      | 167-126   | 11.9mm       | ±14µm    |
| 675mm      | 167-127   | 11.9mm       | ±14.5µm  |
| 700mm      | 167-128   | 11.9mm       | ±15µm    |
| 725mm      | 167-129   | 11.9mm       | ±15.5µm  |
| 750mm      | 167-130   | 11.9mm       | ±16µm    |
| 775mm      | 167-131   | 11.9mm       | ±16.5µm  |
| 800mm      | 167-132   | 11.9mm       | ±17µm    |
| 825mm      | 167-133   | 11.9mm       | ±17.5µm  |
| 850mm      | 167-134   | 11.9mm       | ±18µm    |
| 875mm      | 167-135   | 11.9mm       | ±18.5µm  |
| 900mm      | 167-136   | 11.9mm       | ±19µm    |
| 925mm      | 167-137   | 11.9mm       | ±19.5µm  |
| 950mm      | 167-138   | 11.9mm       | ±20µm    |
| 975mm      | 167-139   | 11.9mm       | ±20.5µm  |
| 1000mm     | 167-140   | 11.9mm       | ±21µm    |

| Inch       |           |              |          |
|------------|-----------|--------------|----------|
| Length (L) | Order No. | Diameter (D) | Accuracy |
| 1"         | 167-141   | .25"         | ±.00005" |
| 2"         | 167-142   | .25"         | ±.0001"  |
| 3"         | 167-143   | .25"         | ±.0001"  |
| 4"         | 167-144   | .31"         | ±.0001"  |
| 5"         | 167-145   | .31"         | ±.00015" |
| 6"         | 167-146   | .31"         | ±.00015" |
| 7"         | 167-147   | .31"         | ±.00015" |
| 8"         | 167-148   | .37"         | ±.00015" |
| 9"         | 167-149   | .37"         | ±.0002"  |
| 10"        | 167-150   | .37"         | ±.0002"  |
| 11"        | 167-151   | .37"         | ±.0002"  |
| 12"        | 167-152   | .37"         | ±.00025" |
| 13"        | 167-153   | .37"         | ±.00025" |
| 14"        | 167-154   | .37"         | ±.00025" |
| 15"        | 167-155   | .37"         | ±.00025" |
| 16"        | 167-156   | .37"         | ±.00025" |
| 17"        | 167-157   | .37"         | ±.00025" |
| 18"        | 167-158   | .37"         | ±.00025" |
| 19"        | 167-159   | .37"         | ±.0003"  |
| 20"        | 167-160   | .47"         | ±.0003"  |
| 21"        | 167-161   | .47"         | ±.0003"  |
| 22"        | 167-162   | .47"         | ±.0003"  |
| 23"        | 167-163   | .47"         | ±.0003"  |
| 24"        | 167-164   | .47"         | ±.0003"  |
| 25"        | 167-165   | .47"         | ±.00035" |
| 26"        | 167-166   | .47"         | ±.00035" |
| 27"        | 167-167   | .47"         | ±.00035" |
| 28"        | 167-168   | .47"         | ±.00035" |
| 29"        | 167-169   | .47"         | ±.00035" |
| 30"        | 167-170   | .47"         | ±.00035" |
| 31"        | 167-171   | .47"         | ±.00035" |
| 32"        | 167-172   | .47"         | ±.00035" |
| 33"        | 167-173   | .47"         | ±.00035" |
| 34"        | 167-174   | .47"         | ±.00035" |
| 35"        | 167-175   | .47"         | ±.00035" |
| 36"        | 167-176   | .47"         | ±.00035" |
| 37"        | 167-177   | .47"         | ±.0004"  |
| 38"        | 167-178   | .47"         | ±.0004"  |
| 39"        | 167-179   | .47"         | ±.0004"  |
| 40"        | 167-180   | .47"         | ±.0004"  |

| Inch       |           |              |          |
|------------|-----------|--------------|----------|
| Length (L) | Order No. | Diameter (D) | Accuracy |
| 41"        | 167-405   | .47"         | .0004"   |
| 42"        | 167-406   | .47"         | .0004"   |
| 43"        | 167-407   | .47"         | .0004"   |
| 44"        | 167-408   | .47"         | .0004"   |
| 45"        | 167-409   | .47"         | .0004"   |
| 46"        | 167-410   | .47"         | .0004"   |
| 47"        | 167-411   | .47"         | .0004"   |
| 48"        | 167-412   | .47"         | .0004"   |
| 49"        | 167-413   | .47"         | .0004"   |
| 50"        | 167-414   | .47"         | .0004"   |
| 51"        | 167-415   | .47"         | .0004"   |
| 52"        | 167-416   | .47"         | .0004"   |
| 53"        | 167-417   | .47"         | .0004"   |
| 54"        | 167-418   | .47"         | .0004"   |
| 55"        | 167-419   | .47"         | .0004"   |
| 56"        | 167-420   | .47"         | .0004"   |
| 57"        | 167-421   | .47"         | .0004"   |
| 58"        | 167-422   | .47"         | .0004"   |
| 59"        | 167-423   | .47"         | .0004"   |
| 60"        | 167-424   | .47"         | .0004"   |
| 61"        | 167-425   | .47"         | .0004"   |
| 62"        | 167-426   | .47"         | .0004"   |
| 63"        | 167-427   | .47"         | .0004"   |
| 64"        | 167-428   | .47"         | .0004"   |
| 65"        | 167-429   | .47"         | .0004"   |
| 66"        | 167-430   | .47"         | .0004"   |
| 67"        | 167-431   | .47"         | .0004"   |
| 68"        | 167-432   | .47"         | .0004"   |
| 69"        | 167-433   | .47"         | .0004"   |
| 70"        | 167-434   | .47"         | .0004"   |
| 71"        | 167-435   | .47"         | .0004"   |
| 72"        | 167-436   | .47"         | .0004"   |
| 73"        | 167-437   | .47"         | .0004"   |
| 74"        | 167-438   | .47"         | .0004"   |
| 75"        | 167-439   | .47"         | .0004"   |
| 76"        | 167-440   | .47"         | .0004"   |
| 77"        | 167-441   | .47"         | .0004"   |
| 78"        | 167-442   | .47"         | .0004"   |
| 79"        | 167-443   | .47"         | .0004"   |

## Micrometer Standards Set

| Inch      |        |   |
|-----------|--------|---|
| Order No. | Size   | Remarks   |
| 167-912*  | 1"-5"  | 5 pcs. Set (167-141, 142, 143, 144, 145)                                |
| 167-913*  | 1"-11" | 11 pcs. Set (167-141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151) |

| Metric    |          |   |
|-----------|----------|---|
| Order No. | Size     | Remarks   |
| 167-902*  | 25-125mm | 5 pcs. Set (167-101, 102, 103, 104, 105)                                |
| 167-903*  | 25-275mm | 11 pcs. Set (167-101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111) |

\*Supplied with fitted carrying case

# Standards for Screw Thread Micrometers

## SERIES 167 — 60 degree and 55 degree

### FEATURES

- Specially designed for the zero point setting of screw thread micrometers.
- Supplied in fitted carton.



167-264 (60°)



167-262 (60°)

### SPECIFICATIONS

| Metric |           |              |          |
|--------|-----------|--------------|----------|
| Length | Order No. | Thread angle | Accuracy |
| 25mm   | 167-261   | 60°          | ±4μm     |
|        | 167-272   | 55°          | ±4μm     |
| 50mm   | 167-262   | 60°          | ±5μm     |
|        | 167-273   | 55°          | ±5μm     |
| 75mm   | 167-263   | 60°          | ±6μm     |
|        | 167-274   | 55°          | ±6μm     |
| 100mm  | 167-264   | 60°          | ±7μm     |
|        | 167-275   | 55°          | ±7μm     |
| 125mm  | 167-265   | 60°          | ±8μm     |
|        | 167-276   |              | ±8μm     |
| 150mm  | 167-266   | 60°          | ±9μm     |
|        | 167-277   |              | ±9μm     |
| 175mm  | 167-267   | 60°          | ±10μm    |
|        | 167-278   |              | ±10μm    |
| 200mm  | 167-268   | 60°          | ±11μm    |
|        | 167-279   |              | ±11μm    |
| 225mm  | 167-269   | 60°          | ±12μm    |
|        | 167-280   |              | ±12μm    |
| 250mm  | 167-270   | 60°          | ±13μm    |
|        | 167-281   |              | ±13μm    |
| 275mm  | 167-271   | 60°          | ±14μm    |
|        | 167-282   |              | ±14μm    |

| Inch   |           |              |          |
|--------|-----------|--------------|----------|
| Length | Order No. | Thread angle | Accuracy |
| 1"     | 167-294   | 60°          | ±.00015" |
|        | 167-283   | 55°          | ±.00015" |
| 2"     | 167-295   | 60°          | ±.0002"  |
|        | 167-284   | 55°          | ±.0002"  |
| 3"     | 167-296   | 60°          | ±.00025" |
|        | 167-285   | 55°          | ±.00025" |
| 4"     | 167-297   | 60°          | ±.0003"  |
|        | 167-286   | 55°          | ±.0003"  |
| 5"     | 167-298   | 60°          | ±.00035" |
|        | 167-287   | 55°          | ±.00035" |
| 6"     | 167-299   | 60°          | ±.0004"  |
|        | 167-288   | 55°          | ±.0004"  |

### Technical Data

Thread angle: 55° or 60°  
Angle Accuracy: ±2°

# Standards for V-Anvil Micrometers

## SERIES 167

### FEATURES

- Specially designed for the zero point setting of V-anvil micrometers.
- Supplied in fitted carton.



167-329

### SPECIFICATIONS

| Metric   |           |      |          |
|----------|-----------|------|----------|
| Diameter | Order No. | Type | Accuracy |
| 5mm      | 167-327   | Plug | ±2μm     |
| 10mm     | 167-328   | Plug | ±2μm     |
| 25mm     | 167-329   | Plug | ±2μm     |
| 40mm     | 167-330   | Ring | ±3μm     |
| 55mm     | 167-331   | Ring | ±3μm     |
| 70mm     | 167-332   | Ring | ±3μm     |
| 85mm     | 167-333   | Ring | ±3μm     |

| Inch     |           |      |          |
|----------|-----------|------|----------|
| Diameter | Order No. | Type | Accuracy |
| .2"      | 167-337   | Plug | ±.0001"  |
| .4"      | 167-338   | Plug | ±.0001"  |
| 1"       | 167-339   | Plug | ±.0001"  |
| 1.6"     | 167-340   | Ring | ±.00015" |
| 2.2"     | 167-341   | Ring | ±.00015" |
| 2.8"     | 167-342   | Ring | ±.00015" |
| 3.4"     | 167-343   | Ring | ±.00015" |

# Tool Kits

The Digimatic Tool Kits include Mitutoyo's highly popular 0-1" / 0-25mm Digimatic Micrometer (choose ratchet or friction type) and 0-6" / 0-150mm Digimatic Caliper with Absolute Encoder. The case is made of handsome, solid mahogany and has space for gage batteries. The micrometer spanner is a supplied accessory.

| Order No. 64PKA068A (Inch Tool Kit) |   |
|-------------------------------------|---|
| Item No.                            | Description   |
| 103-135                             | Outside Micrometer (Friction Thimble Type)<br>(Range: 0-1", Graduation: .0001") |
| 505-742                             | Dial Caliper (Range: 0-6", Dial Graduation: .001")                              |
| 182-204                             | 6" Full-Flexible Rule (3R)  |
| 64PPP932                            | Mahogany Case   |



64PKA068A

| Order No. 64PKA069A (Inch Tool Kit) |   |
|-------------------------------------|---|
| Item No.                            | Description   |
| 103-135                             | Outside Micrometer (Friction Thimble Type)<br>(Range: 0-1", Graduation: .0001") |
| 182-202                             | 6" Full-Flexible Rule (16R)   |
| 513-518T                            | Test Indicator Set (Range: .04", Graduation: .001")                             |
| 505-742                             | 675 Dial Caliper<br>(Range: 0-6", Dial Graduation: .001")                       |
| 050501                              | Mahogany Case   |



64PKA069A

The basic measuring instruments recommended for vocational students and machinist apprentices are supplied in this kit.

| Order No. 64PKA070A (Inch Tool Kit) |   |
|-------------------------------------|---|
| Item No.                            | Description   |
| 101-117                             | Outside Micrometer (Friction Thimble Type)<br>(Range: 0-1", Graduation: .0001") |
| 129-132                             | Depth Micrometer (with 6 pcs rods)<br>(Range: 0-6", Graduation: .001")          |
| 182-202                             | Full-Flexible Rule (16R)  |
| 505-742                             | Dial Caliper (Range: 0-6", Graduation: .001")                                   |
| 050503                              | Mahogany Case   |



64PKA070A

For operations where depth measurements are a primary concern, this kit is ideal for measuring depths to 6", in addition to providing the tools for regular precision measurements.

| Order No. 64PKA071B (Inch Tool Kit) |   |
|-------------------------------------|---|
| Item No.                            | Description   |
| 103-922                             | Outside Micrometer Set (3 pcs)<br>(Range: 0-3", Graduation: .0001") |
| 141-208                             | Inside Micrometer (with 6 pcs rods)                                 |
| 182-202                             | Full-Flexible Rule (16R)  |
| 513-518T                            | Test Indicator Set (Range: .04", Graduation: .001")                 |
| 505-742                             | Dial Caliper (Range: 0-6", Dial Graduation: .001")                  |
| 2416S                               | Dial Indicator (Range: 1.0", Graduation: .001")                     |
| 7010S                               | Magnetic Stand  |
| 050504                              | Mahogany Case   |



64PKA071B

Most every routine inspection assignment can be completed with the eight high-quality Mitutoyo precision measuring instruments provided in this deluxe kit.

# Tool Kits



64PKA080B

| Order No. 64PKA080B (Inch Tool Kit) |   |
|-------------------------------------|---|
| Item No.                            | Description   |
| 182-102                             | 6" Steel Rule (16R)   |
| 103-177                             | Micrometer (Ratchet Thimble) (Range 0-1", Graduation .001") |
| 505-740                             | Dial Caliper (Range: 0-6", Dial Graduation: .001")          |
| 64PPP932                            | Mahogany Case   |



64PKA073B

| Order No. 64PKA073B (Tool Kit Lite) |   |
|-------------------------------------|---|
| Item No.                            | Description   |
| 182-102                             | 6" Steel Rule (16R)   |
| 700-113-10                          | 0 - 6" / 0 - 150mm MyCal Lite (Resolution: .001" / 0.1mm)                   |
| 293-831-30                          | 0 - 1" / 0 - 25.4mm MDC Lite (Ratchet Stop) (Resolution: .00005" / 0.001mm) |
| 64PPP932                            | Mahogany Case   |



64PKA076B

| Order No. 64PKA076B (Digimatic Tool Kit) |  |
|--|--|
| Item No.                                 | Description  |
| 293-340-30                               | Digimatic Micrometer (Ratchet Stop Type) (Range: 0 - 1" / 0 - 25.4mm, LCD Resolution: .00005" / 0.001mm) |
| 500-196-30                               | Digimatic Caliper with Absolute Encoder (Range: 0 - 6" / 0 - 150mm, LCD Resolution: .0005" / 0.001mm)    |
| 64PPP932                                 | Mahogany Case  |



64PKA077B

| Order No. 64PKA077B (Digimatic Tool Kit) |  |
|--|--|
| Item No.                                 | Description  |
| 293-348-30                               | Digimatic Micrometer (Friction Thimble Type) (Range: 0 - 1" / 0 - 25.4mm, LCD Resolution: .00005" / 0.001mm) |
| 500-196-30                               | Digimatic Caliper with Absolute Encoder (Range: 0 - 6" / 0 - 150mm, LCD Resolution: .0005" / 0.001mm)        |
| 64PPP932                                 | Mahogany Case  |

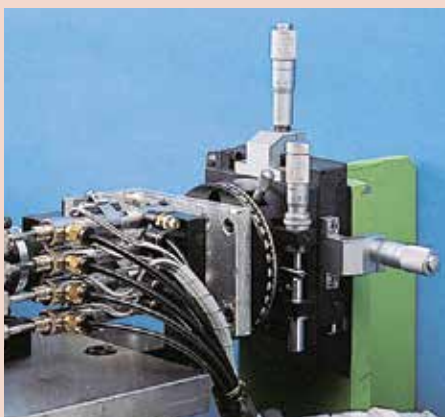
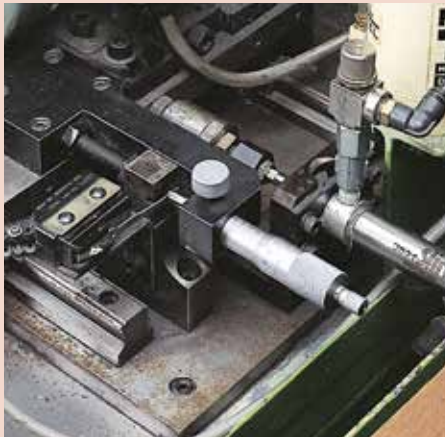
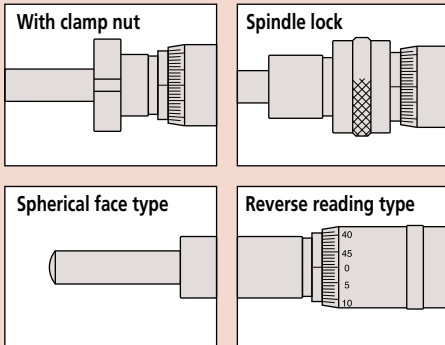


64PKA152

| Order No. 64PKA152 (Digimatic Tool Kit) |  |
|---|--|
| Item No.                                | Description  |
| 293-185-30                              | Digimatic Micrometer (Friction Thimble Type) (Range: 0 - 1" / 0 - 25.4mm, LCD Resolution: .00005" / 0.001mm) |
| 500-196-30                              | Digimatic Caliper with Absolute Encoder (Range: 0 - 6" / 0 - 150mm, LCD Resolution: .0005" / 0.001mm)        |
| 64PPP932                                | Mahogany Case  |

# Micrometer Head Selection Guide

## Variety of Specifications



The table below provides an outline of Mitutoyo micrometer heads for each series so you can locate the pages to refer to select the micrometer head most appropriate to your specific application. When selecting consider the following points:

- Dimensions
- Graduation/resolution and accuracy
- With or without spindle lock
- With or without clamping nut
- Normal or reverse reading
- With or without ratchet stop

## SELECTION TABLE

| Range     | Series | Remarks   | Page |
|-----------|--------|---|------|
| 0 - 1mm   | 110    | Differential screw translator (extra-fine feeding) type | B-69 |
| 0 - 2.5mm | 110    | Differential screw translator (extra-fine feeding) type | B-69 |
| 0 - 5mm   | 148    | Ultra-small type  | B-60 |
| 0 - 6.5mm | 148    | Fine spindle feeding of 0.1mm/rev.                      | B-58 |
|           | 148    | Fine spindle feeding of 0.25mm/rev.                     | B-59 |
|           | 148    | Small type  | B-60 |
|           | 148    | Large thimble diameter for easy reading                 | B-61 |
| 0 - 10mm  | 152    | Fine-feeding type                                       | B-68 |
| 0 - 13mm  | 148    | Common type in small size                               | B-62 |
|           | 148    | Spindle feeding of 0.25mm/rev.                          | B-59 |
|           | 148    | Zero-adjustable thimble type                            | B-63 |
|           | 148    | Large thimble diameter for easy reading                 | B-61 |
|           | 110    | Differential screw translator (extra-fine feeding) type | B-69 |
| 0 - 15mm  | 149    | with carbide-tipped spindle type                        | B-64 |
|           | 153    | Non-rotating spindle type                               | B-67 |
|           | 152    | Quick spindle feeding of 1mm/rev.                       | B-68 |
| 0 - 25mm  | 350    | Compact digital type                                    | B-57 |
|           | 150    | Common type in middle size                              | B-65 |
|           | 153    | Non-rotating spindle type                               | B-67 |
|           | 153    | Fine graduation type                                    | B-71 |
|           | 151    | Heavy-duty type (ø8mm spindle)                          | B-66 |
|           | 152    | Quick spindle feeding of 1mm/rev.                       | B-68 |
|           | 152    | Fine feeding type                                       | B-68 |
|           | 152    | for XY-stage  | B-70 |
|           | 250    | with digit counter type                                 | B-73 |
| 0 - 50mm  | 164    | Digital type  | B-56 |
|           | 151    | Heavy-duty type (ø8mm spindle)                          | B-66 |
|           | 152    | Quick spindle feeding of 1mm/rev.                       | B-68 |
|           | 152    | Fine-feeding type                                       | B-68 |
|           | 197    | Non-rotating spindle and large thimble                  | B-71 |

# Digimatic Micrometer Heads

## SERIES 164

### FEATURES

- The display can be rotated up to 330° for easy reading in any position.
- Non-rotating spindle imparts no torque on the workpiece.



164-164

### SPECIFICATIONS

| Metric   |           |          |          | Inch/Metric         |           |          |          |
|----------|-----------|----------|----------|---------------------|-----------|----------|----------|
| Range    | Order No. | Accuracy | Mass (g) | Range               | Order No. | Accuracy | Mass (g) |
| 0 - 50mm | 164-163   | ±3µm     | 490      | 0 - 2" / 0 - 50.8mm | 164-164   | ±.00015" | 490      |

### Technical Data

Accuracy: Refer to the list of specifications.

Resolution: 0.001mm or .00005"/0.001mm

Display: LCD

Battery: SR44 (2 pcs.), **938882**

Battery life: 1.8 years

### Function

Zero-setting, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)

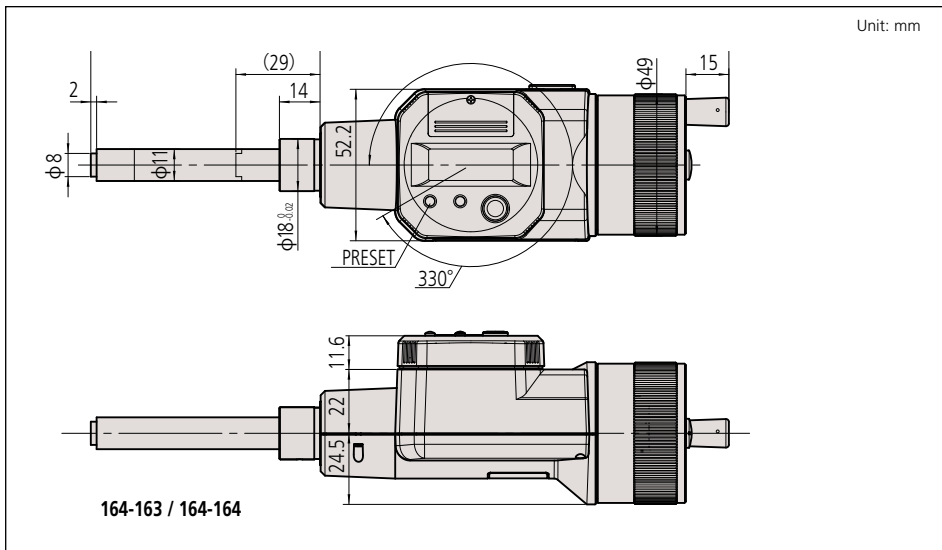
Alarm: Low voltage, Counting value composition error

### Optional Accessories

**959149:** SPC cable (1m / 40")

**959150:** SPC cable (2m / 80")

### DIMENSIONS





# Digimatic Micrometer Heads

## SERIES 350

### FEATURES

- Equipped with digital display and output.
- 350 series IP65 models: the Digimatic output port enables inclusion in a statistical process control or networked measurement system.

Measuring force: 5 - 10N

### Non-rotating device

350-261-30, 350-361-30

The non-rotating device provides no radial torsion on the workpiece surface so that workpiece wear and deformation are minimized.



### Technical Data

Accuracy\* ±2µm Metric model  
±.0001" Inch / Metric model

Resolution: 0.001mm or .00005"/0.001mm

Display: LCD

Battery: SR44 (1 pc) 938882

Battery life: Approx. 2.4 years under normal use

Dust/Water protection level: IP65

350-281-30, 350-282-30, 350-283-30, 350-284-30, 350-261-30  
350-381-30, 350-382-30, 350-383-30, 350-384-30, 350-361-30

### Function

Preset, inch/mm conversion (on inch/metric models only)

Function Lock, 2 Presets

Alarm: Low voltage, Counting value composition error

### Optional Accessories

05CZA662: SPC cable with data switch (1m / 40")

05CZA663: SPC cable with data switch (2m / 80")



350-251-30



350-381-30



### SPECIFICATIONS

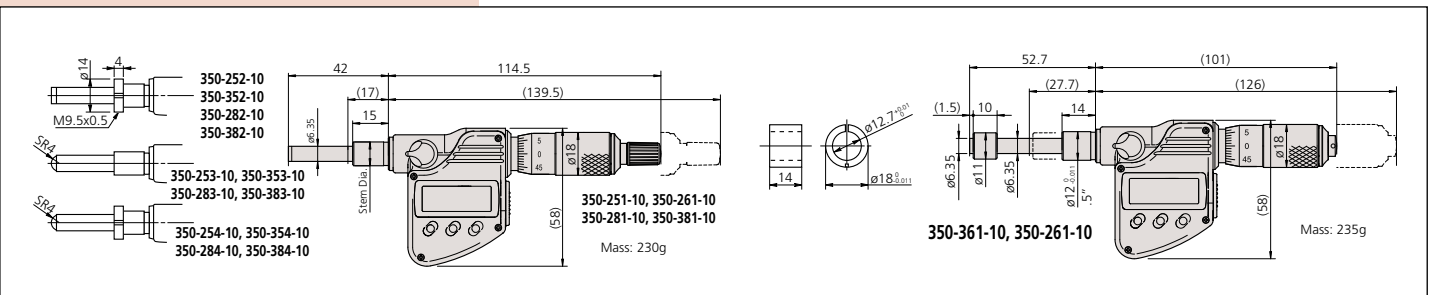
| Metric   |             |              |                    |           |         |
|----------|-------------|--------------|--------------------|-----------|---------|
| Range    | Order No.   | Stem         | Spindle face       | Stem dia. | Remarks |
| 0 - 25mm | 350-251-30  | Plain        | Flat (carbide tip) | 10mm      |         |
| 0 - 25mm | 350-252-30  | w/ clamp nut | Flat (carbide tip) | 10mm      |         |
| 0 - 25mm | 350-253-30  | Plain        | Spherical (SR4)    | 10mm      |         |
| 0 - 25mm | 350-254-30  | w/ clamp nut | Spherical (SR4)    | 10mm      |         |
| 0 - 25mm | 350-281-30  | Plain        | Flat (carbide tip) | 12mm      | IP65    |
| 0 - 25mm | 350-282-30  | w/ clamp nut | Flat (carbide tip) | 12mm      | IP65    |
| 0 - 25mm | 350-283-30  | Plain        | Spherical (SR4)    | 12mm      | IP65    |
| 0 - 25mm | 350-284-30  | w/ clamp nut | Spherical (SR4)    | 12mm      | IP65    |
| 0 - 25mm | 350-261-30* | Plain        | Flat               | 12mm      | IP65    |

\*with non-rotating device and 18mm stem bushing.

| Inch/Metric       |             |              |                    |           |         |
|-------------------|-------------|--------------|--------------------|-----------|---------|
| Range             | Order No.   | Stem         | Spindle face       | Stem dia. | Remarks |
| 0 - 1" / 0-25.4mm | 350-351-30  | Plain        | Flat (carbide tip) | .375"     |         |
| 0 - 1" / 0-25.4mm | 350-352-30  | w/ clamp nut | Flat (carbide tip) | .375"     |         |
| 0 - 1" / 0-25.4mm | 350-353-30  | Plain        | Spherical (SR4)    | .375"     |         |
| 0 - 1" / 0-25.4mm | 350-354-30  | w/ clamp nut | Spherical (SR4)    | .375"     |         |
| 0 - 1" / 0-25.4mm | 350-381-30  | Plain        | Flat (carbide tip) | .5"       | IP65    |
| 0 - 1" / 0-25.4mm | 350-382-30  | w/ clamp nut | Flat (carbide tip) | .5"       | IP65    |
| 0 - 1" / 0-25.4mm | 350-383-30  | Plain        | Spherical (SR4)    | .5"       | IP65    |
| 0 - 1" / 0-25.4mm | 350-384-30  | w/ clamp nut | Spherical (SR4)    | .5"       | IP65    |
| 0 - 1" / 0-25.4mm | 350-361-30* | Plain        | Flat               | .5"       | IP65    |

\*with non-rotating device and 18mm stem bushing.

### DIMENSIONS AND MASS

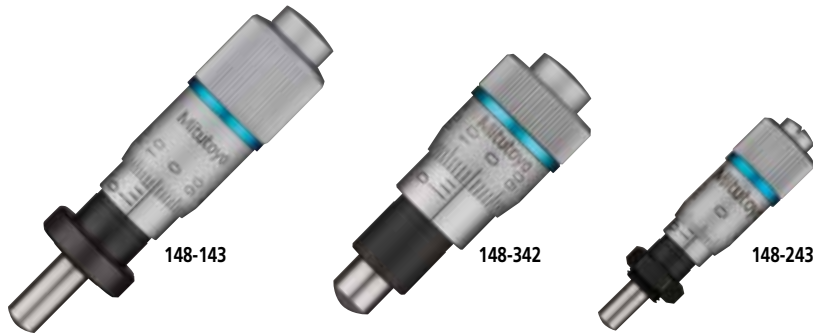


# Micrometer Heads

## SERIES 148 — Fine Spindle Feeding of 0.1mm/rev

### FEATURES

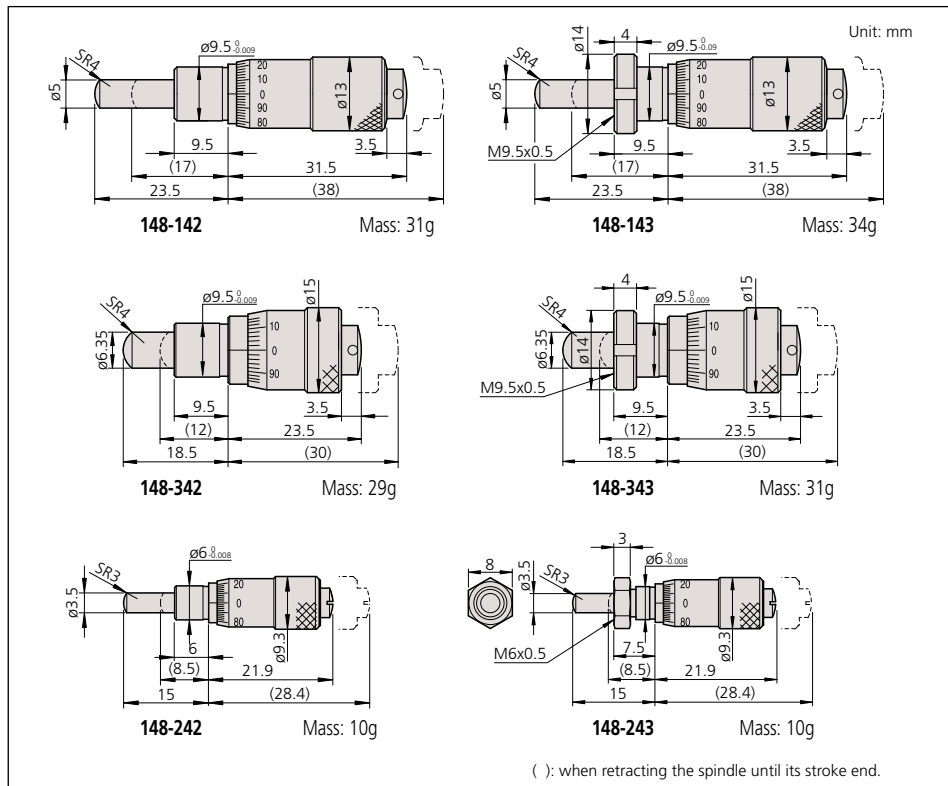
- Fine spindle feeding of just 0.1mm/rev for extra-fine adjustment and positioning.
- External dimensions are compatible with conventional 0.5mm pitch heads.



### SPECIFICATIONS

| Metric    |           |          |           |             |                 |                           |
|-----------|-----------|----------|-----------|-------------|-----------------|---------------------------|
| Range     | Order No. | Accuracy | Stem dia. | Stem        | Spindle face    | Remarks                   |
| 0 - 6.5mm | 148-142   | ±2μm     | 9.5mm     | Plain       | Spherical (SR4) | —                         |
| 0 - 6.5mm | 148-143   | ±2μm     | 9.5mm     | w/clamp nut | Spherical (SR4) | —                         |
| 0 - 6.5mm | 148-342   | ±2μm     | 9.5mm     | Plain       | Spherical (SR4) | Thicker & shorter thimble |
| 0 - 6.5mm | 148-343   | ±2μm     | 9.5mm     | w/clamp nut | Spherical (SR4) | Thicker & shorter thimble |
| 0 - 6.5mm | 148-242   | ±5μm     | 6mm       | Plain       | Spherical (SR3) | Small thimble diameter    |
| 0 - 6.5mm | 148-243   | ±5μm     | 6mm       | w/clamp nut | Spherical (SR3) | Small thimble diameter    |

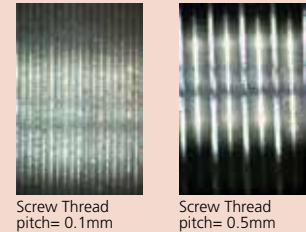
### DIMENSIONS AND MASS



### Technical Data

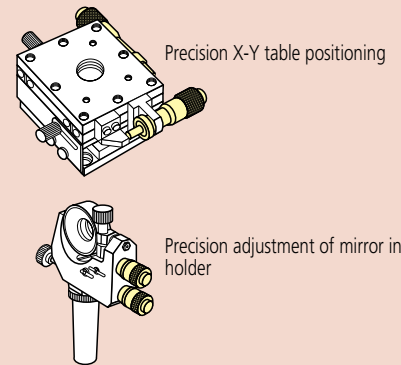
Graduations: 0.002mm  
 Spindle pitch: 0.1mm  
 Spindle face: Spherical of SKS3 (more than HRC60), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 6mm (148-243: 4mm)

### Spindle pitch

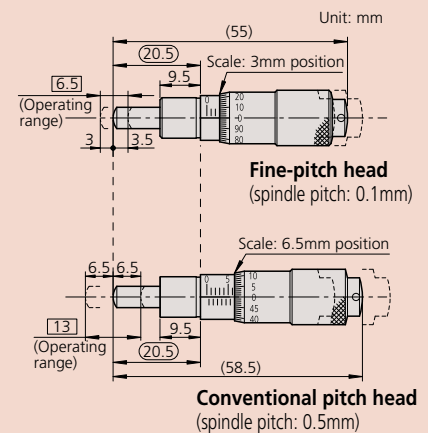


### Applications

Semiconductor wafer positioning machinery and optical component alignment units, etc.



Comparison of mounting dimensions between a standard fine-pitch head and a standard conventional pitch head at the mid-range travel position.



While the fine-pitch micrometer head has a measuring range of 6.5mm, the conventional head has a larger range of 13mm. When replacing a conventional head, the fine-pitch type can use the common range in the middle of the spindle travel. The standard and compact types of fine-pitch head are completely interchangeable.



# Micrometer Heads

**SERIES 148 — Fine Spindle Feeding of 0.25 mm / rev**

## Technical Data

Graduations: 0.01mm  
 Spindle pitch: 0.25mm  
 Spindle face: Spherical of SKS3 (more than HRC60), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 6mm

## FEATURES

- Fine spindle feeding of just 0.25mm/rev for fine adjustment and positioning.



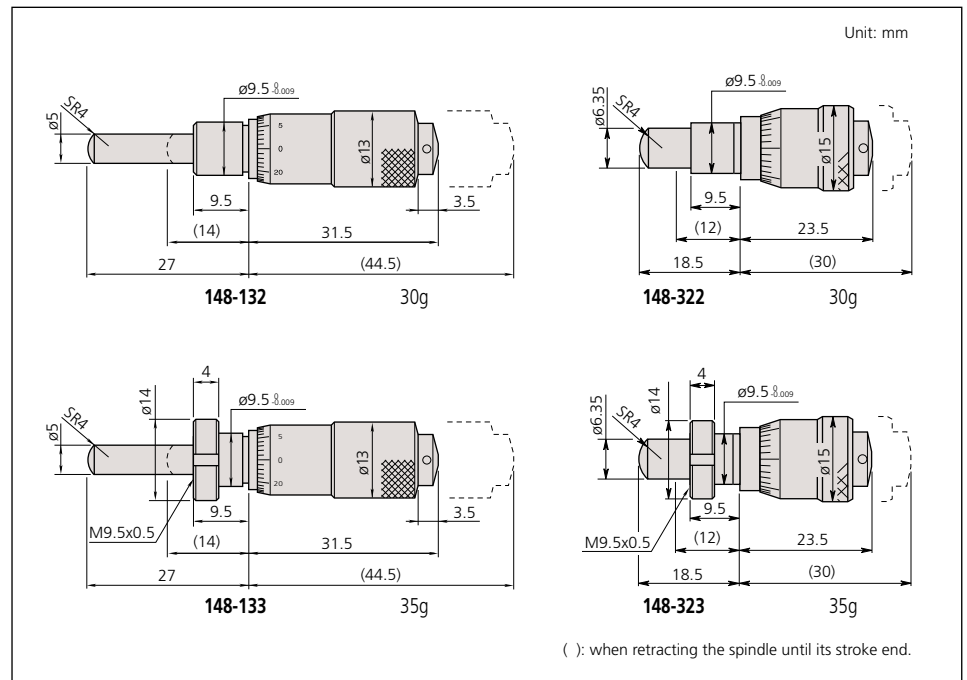
148-132

## SPECIFICATIONS

### Metric

| Range     | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face    |
|-----------|----------------|----------|-----------|--------------|-----------------|
| 0 - 13mm  | <b>148-132</b> | 2μm      | 9.5mm     | Plain        | Spherical (SR4) |
| 0 - 13mm  | <b>148-133</b> | 2μm      | 9.5mm     | w/clamp nut  | Spherical (SR4) |
| 0 - 6.5mm | <b>148-322</b> | 2μm      | 9.5mm     | Plain        | Spherical (SR4) |
| 0 - 6.5mm | <b>148-323</b> | 2μm      | 9.5mm     | w/ clamp nut | Spherical (SR4) |

## DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 148 — Ultra-Small/Small Type

### FEATURES

- Miniature micrometer heads for ease of incorporating into machines.



### Technical Data

Graduations: 0.02mm (148-215, 148-216), 0.01mm or .001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat or spherical of SKS3 (more than HRC60), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 3mm (148-216, 148-218), 4mm

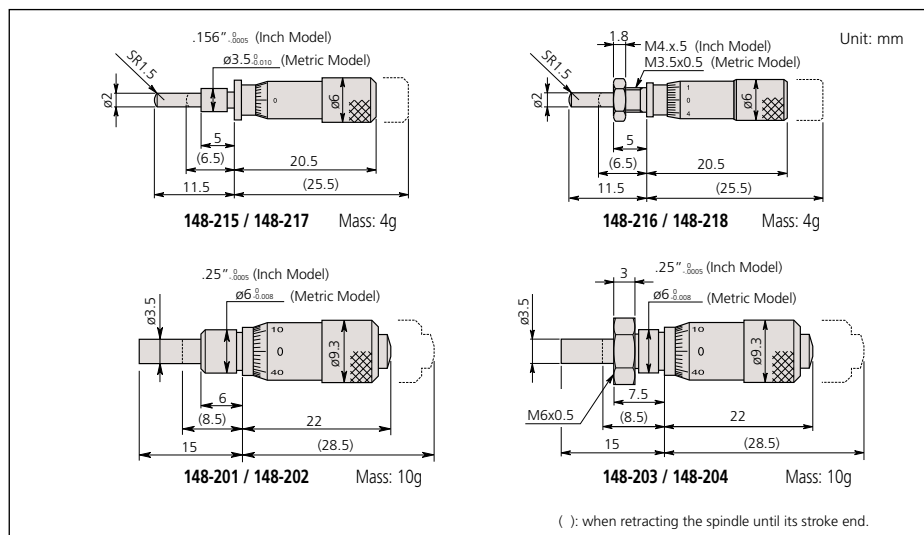
### SPECIFICATIONS

| Metric     |           |          |           |              |                   |                 |
|------------|-----------|----------|-----------|--------------|-------------------|-----------------|
| Range      | Order No. | Accuracy | Stem dia. | Stem         | Spindle face      | Remarks         |
| 0 - 5mm    | 148-215   | ±5µm     | 3.5mm     | Plain        | Spherical (SR1.5) | —               |
| 0 - 5mm    | 148-216   | ±5µm     | 3.5mm     | w/clamp nut  | Spherical (SR1.5) | —               |
| 0 - 6.5mm  | 148-201   | ±5µm     | 6mm       | Plain        | Flat              | —               |
| 0 - 6.5mm  | 148-203   | ±5µm     | 6mm       | w/clamp nut  | Flat              | —               |
| 0 - 6.5mm  | 148-205   | ±5µm     | 6mm       | Plain        | Spherical (SR3)   | —               |
| 0 - 6.5mm  | 148-207   | ±5µm     | 6mm       | w/clamp nut  | Spherical (SR3)   | —               |
| 6.5 - 0 mm | 148-209   | ±5µm     | 6mm       | Plain        | Flat              | Reverse reading |
| 6.5 - 0 mm | 148-211   | ±5µm     | 6mm       | w/ clamp nut | Flat              | Reverse reading |

| Inch     |           |          |           |              |                   |                 |
|----------|-----------|----------|-----------|--------------|-------------------|-----------------|
| Range    | Order No. | Accuracy | Stem dia. | Stem         | Spindle face      | Remarks         |
| 0 - .2"  | 148-217   | ±5µm     | .156"     | Plain        | Spherical (SR1.5) | —               |
| 0 - .2"  | 148-218   | ±5µm     | .156"     | w/clamp nut  | Spherical (SR1.5) | —               |
| 0 - .25" | 148-202   | ±5µm     | .25"      | Plain        | Flat              | —               |
| 0 - .25" | 148-204   | ±5µm     | .25"      | w/clamp nut  | Flat              | —               |
| 0 - .25" | 148-206   | ±5µm     | .25"      | Plain        | Spherical (SR3)   | —               |
| 0 - .25" | 148-208   | ±5µm     | .25"      | w/clamp nut  | Spherical (SR3)   | —               |
| .25 - 0" | 148-210   | ±5µm     | .25"      | Plain        | Flat              | Reverse reading |
| .25 - 0" | 148-212   | ±5µm     | .25"      | w/ clamp nut | Flat              | Reverse reading |



### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 148 — Large Thimble Diameter for Easy Reading

### FEATURES

- Easy reading due to the large thimble diameter. (Three types of thimble diameters can be selected.)

### SPECIFICATIONS

#### Metric

| Range     | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face | Thimble Dia. |
|-----------|----------------|----------|-----------|--------------|--------------|--------------|
| 0 - 6.5mm | <b>148-301</b> | ±2μm     | 9.5mm     | Plain        | Flat         | 15mm         |
| 0 - 6.5mm | <b>148-302</b> | ±2μm     | 9.5mm     | w/clamp nut  | Flat         | 15mm         |
| 0 - 6.5mm | <b>148-303</b> | ±2μm     | 9.5mm     | Plain        | Flat         | 20mm         |
| 0 - 6.5mm | <b>148-304</b> | ±2μm     | 9.5mm     | w/clamp nut  | Flat         | 20mm         |
| 0 - 6.5mm | <b>148-305</b> | ±2μm     | 9.5mm     | Plain        | Flat         | 29mm         |
| 0 - 6.5mm | <b>148-306</b> | ±2μm     | 9.5mm     | w/clamp nut  | Flat         | 29mm         |
| 0 - 13mm  | <b>148-307</b> | ±2μm     | 9.5mm     | Plain        | Flat         | 15mm         |
| 0 - 13mm  | <b>148-308</b> | ±2μm     | 9.5mm     | w/clamp nut  | Flat         | 15mm         |
| 0 - 13mm  | <b>148-309</b> | ±2μm     | 9.5mm     | Plain        | Flat         | 20mm         |
| 0 - 13mm  | <b>148-310</b> | ±2μm     | 9.5mm     | w/clamp nut  | Flat         | 20mm         |
| 0 - 13mm  | <b>148-311</b> | ±2μm     | 9.5mm     | Plain        | Flat         | 29mm         |
| 0 - 13mm  | <b>148-312</b> | ±2μm     | 9.5mm     | w/ clamp nut | Flat         | 29mm         |

#### Inch

| Range    | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face | Thimble Dia. |
|----------|----------------|----------|-----------|--------------|--------------|--------------|
| 0 - .25" | <b>148-351</b> | ±.0001"  | .375"     | Plain        | Flat         | .59"         |
| 0 - .25" | <b>148-352</b> | ±.0001"  | .375"     | w/clamp nut  | Flat         | .59"         |
| 0 - .25" | <b>148-353</b> | ±.0001"  | .375"     | Plain        | Flat         | .79"         |
| 0 - .25" | <b>148-354</b> | ±.0001"  | .375"     | w/clamp nut  | Flat         | .79"         |
| 0 - .25" | <b>148-355</b> | ±.0001"  | .375"     | Plain        | Flat         | 1.14"        |
| 0 - .25" | <b>148-356</b> | ±.0001"  | .375"     | w/clamp nut  | Flat         | 1.14"        |
| 0 - .5"  | <b>148-357</b> | ±.0001"  | .375"     | Plain        | Flat         | .59"         |
| 0 - .5"  | <b>148-358</b> | ±.0001"  | .375"     | w/clamp nut  | Flat         | .59"         |
| 0 - .5"  | <b>148-359</b> | ±.0001"  | .375"     | Plain        | Flat         | .79"         |
| 0 - .5"  | <b>148-360</b> | ±.0001"  | .375"     | w/clamp nut  | Flat         | .79"         |
| 0 - .5"  | <b>148-361</b> | ±.0001"  | .375"     | Plain        | Flat         | 1.14"        |
| 0 - .5"  | <b>148-362</b> | ±.0001"  | .375"     | w/ clamp nut | Flat         | 1.14"        |



148-301



148-303

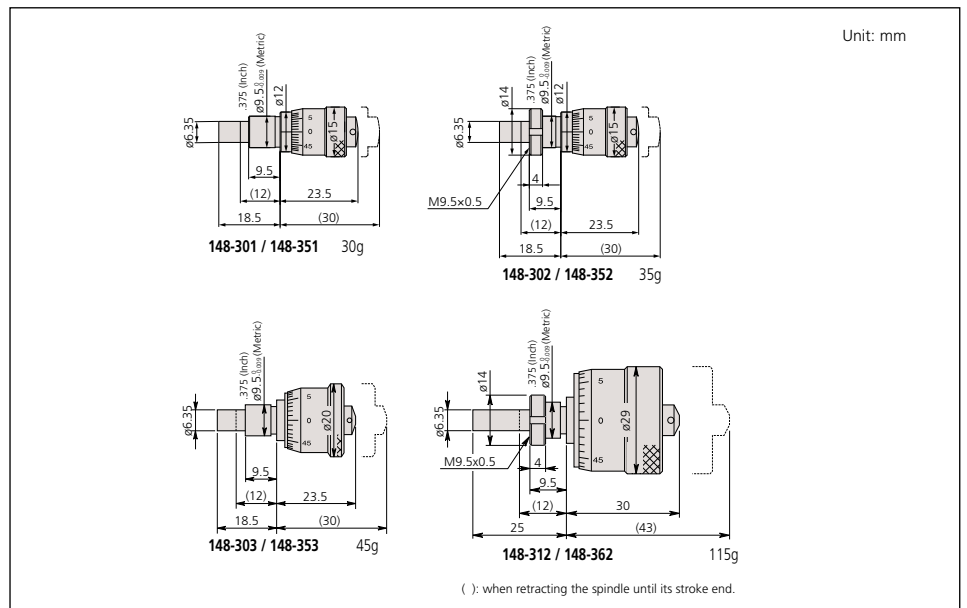


148-305

### Technical Data

Graduations: 0.01mm or .001"  
 Spindle pitch: 0.5mm or .025"  
 Spindle face: Flat of SKS3 (more than HRC60),  
 lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 6mm

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 148 — Common Type in Small Size

### SPECIFICATIONS

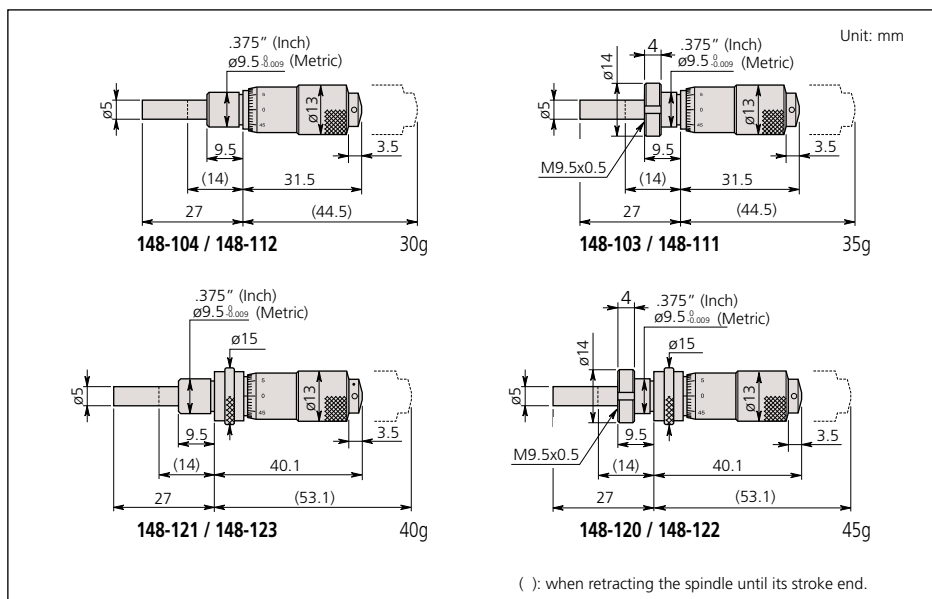
| Metric   |           |          |           |               |                 |                 |
|----------|-----------|----------|-----------|---------------|-----------------|-----------------|
| Range    | Order No. | Accuracy | Stem dia. | Stem          | Spindle face    | Remarks         |
| 0 - 13mm | 148-104   | ±2μm     | 9.5mm     | Plain         | Flat            | —               |
| 0 - 13mm | 148-103   | ±2μm     | 9.5mm     | w/clamp nut   | Flat            | —               |
| 0 - 13mm | 148-121   | ±2μm     | 9.5mm     | Plain*        | Flat            | —               |
| 0 - 13mm | 148-120   | ±2μm     | 9.5mm     | w/clamp nut*  | Flat            | —               |
| 0 - 13mm | 148-801   | ±2μm     | 9.5mm     | Plain         | Spherical (SR4) | —               |
| 0 - 13mm | 148-802   | ±2μm     | 9.5mm     | w/clamp nut   | Spherical (SR4) | —               |
| 0 - 13mm | 148-803   | ±2μm     | 9.5mm     | Plain*        | Spherical (SR4) | —               |
| 0 - 13mm | 148-804   | ±2μm     | 9.5mm     | w/clamp nut*  | Spherical (SR4) | —               |
| 13mm - 0 | 148-821   | ±2μm     | 9.5mm     | Plain         | Flat            | Reverse reading |
| 13mm - 0 | 148-822   | ±2μm     | 9.5mm     | w/clamp nut   | Flat            | Reverse reading |
| 13mm - 0 | 148-823   | ±2μm     | 9.5mm     | Plain*        | Flat            | Reverse reading |
| 13mm - 0 | 148-824   | ±2μm     | 9.5mm     | w/ clamp nut* | Flat            | Reverse reading |

\*with spindle lock

| Inch    |           |          |           |               |                 |                 |
|---------|-----------|----------|-----------|---------------|-----------------|-----------------|
| Range   | Order No. | Accuracy | Stem dia. | Stem          | Spindle face    | Remarks         |
| 0 - .5" | 148-112   | ±.0001"  | .375"     | Plain         | Flat            | —               |
| 0 - .5" | 148-111   | ±.0001"  | .375"     | w/clamp nut   | Flat            | —               |
| 0 - .5" | 148-123   | ±.0001"  | .375"     | Plain*        | Flat            | —               |
| 0 - .5" | 148-122   | ±.0001"  | .375"     | w/clamp nut*  | Flat            | —               |
| 0 - .5" | 148-811   | ±.0001"  | .375"     | Plain         | Spherical (SR4) | —               |
| 0 - .5" | 148-812   | ±.0001"  | .375"     | w/clamp nut   | Spherical (SR4) | —               |
| 0 - .5" | 148-813   | ±.0001"  | .375"     | Plain*        | Spherical (SR4) | —               |
| 0 - .5" | 148-814   | ±.0001"  | .375"     | w/clamp nut*  | Spherical (SR4) | —               |
| .5" - 0 | 148-831   | ±.0001"  | .375"     | Plain         | Flat            | Reverse reading |
| .5" - 0 | 148-832   | ±.0001"  | .375"     | w/clamp nut   | Flat            | Reverse reading |
| .5" - 0 | 148-833   | ±.0001"  | .375"     | Plain*        | Flat            | Reverse reading |
| .5" - 0 | 148-834   | ±.0001"  | .375"     | w/ clamp nut* | Flat            | Reverse reading |

\*with spindle lock

### DIMENSIONS AND MASS



148-103



148-104



148-121



148-120

### Technical Data

Graduations: 0.01mm or .001"

Spindle pitch: 0.5mm

Spindle face: Flat or spherical of SKS3 (more than HR60), lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 6mm

# Micrometer Heads

## SERIES 148 — Common Type in Small Size with Zero-Adjustable Thimble

### FEATURES

- The thimble can be set to zero at any position by loosening the set screw.

### SPECIFICATIONS

#### Metric

| Range    | Order No.      | Accuracy | Stem dia. | Stem          | Spindle face    | Remarks                    |
|----------|----------------|----------|-----------|---------------|-----------------|----------------------------|
| 0 - 13mm | <b>148-503</b> | ±2μm     | 9.5mm     | Plain         | Flat            | —                          |
| 0 - 13mm | <b>148-513</b> | ±2μm     | 9.5mm     | Plain         | Flat            | Stainless steel throughout |
| 0 - 13mm | <b>148-508</b> | ±2μm     | 9.5mm     | w/clamp nut   | Flat            | —                          |
| 0 - 13mm | <b>148-506</b> | ±2μm     | 9.5mm     | Plain*        | Flat            | —                          |
| 0 - 13mm | <b>148-504</b> | ±2μm     | 9.5mm     | w/clamp nut*  | Flat            | —                          |
| 0 - 13mm | <b>148-853</b> | ±2μm     | 9.5mm     | Plain         | Spherical (SR4) | —                          |
| 0 - 13mm | <b>148-854</b> | ±2μm     | 9.5mm     | w/clamp nut*  | Spherical (SR4) | —                          |
| 13mm - 0 | <b>148-863</b> | ±2μm     | 9.5mm     | Plain         | Flat            | Reverse reading            |
| 13mm - 0 | <b>148-864</b> | ±2μm     | 9.5mm     | w/ clamp nut* | Flat            | Reverse reading            |

\*with spindle lock

#### Inch

| Range   | Order No.      | Accuracy | Stem dia. | Stem          | Spindle face    | Remarks                    |
|---------|----------------|----------|-----------|---------------|-----------------|----------------------------|
| 0 - .5" | <b>148-501</b> | ±.0001"  | .375"     | Plain         | Flat            | —                          |
| 0 - .5" | <b>148-511</b> | ±.0001"  | .375"     | Plain         | Flat            | Stainless steel throughout |
| 0 - .5" | <b>148-507</b> | ±.0001"  | .375"     | w/clamp nut   | Flat            | —                          |
| 0 - .5" | <b>148-505</b> | ±.0001"  | .375"     | Plain*        | Flat            | —                          |
| 0 - .5" | <b>148-502</b> | ±.0001"  | .375"     | w/clamp nut*  | Flat            | —                          |
| 0 - .5" | <b>148-851</b> | ±.0001"  | .375"     | Plain         | Spherical (SR4) | —                          |
| 0 - .5" | <b>148-852</b> | ±.0001"  | .375"     | w/clamp nut*  | Spherical (SR4) | —                          |
| .5" - 0 | <b>148-861</b> | ±.0001"  | .375"     | Plain         | Flat            | Reverse reading            |
| .5" - 0 | <b>148-862</b> | ±.0001"  | .375"     | w/ clamp nut* | Flat            | Reverse reading            |

\*with spindle lock



148-503



148-504

### Technical Data

Graduations: 0.01mm or .001"

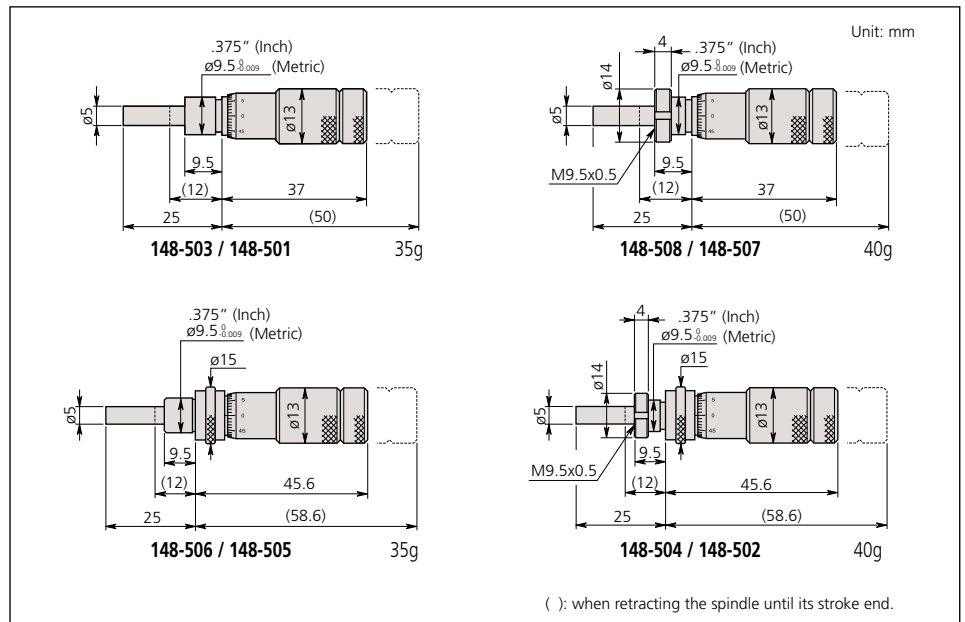
Spindle pitch: 0.5mm

Spindle face: Flat or spherical of SKS3 (more than HRC60), lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 6mm

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 149 — Common Type in Small Size with Carbide-tipped Spindle

### FEATURES

- Carbide-tipped measuring face.

### SPECIFICATIONS

#### Metric

| Range    | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face       | Remarks           |
|----------|----------------|----------|-----------|--------------|--------------------|-------------------|
| 0 - 15mm | <b>149-132</b> | ±2μm     | 9.5mm     | Plain        | Flat (carbide tip) | —                 |
| 0 - 15mm | <b>149-131</b> | ±2μm     | 9.5mm     | w/clamp nut  | Flat (carbide tip) | —                 |
| 0 - 15mm | <b>149-183</b> | ±2μm     | 9.5mm     | Plain*       | Flat (carbide tip) | With spindle lock |
| 0 - 15mm | <b>149-184</b> | ±2μm     | 9.5mm     | w/clamp nut* | Flat (carbide tip) | With spindle lock |
| 0 - 15mm | <b>149-801</b> | ±2μm     | 9.5mm     | Plain        | Spherical (SR4)    | —                 |
| 0 - 15mm | <b>149-802</b> | ±2μm     | 9.5mm     | w/clamp nut  | Spherical (SR4)    | —                 |
| 15mm - 0 | <b>149-821</b> | ±2μm     | 9.5mm     | Plain        | Flat (carbide tip) | Reverse reading   |
| 15mm - 0 | <b>149-822</b> | ±2μm     | 9.5mm     | w/ clamp nut | Flat (carbide tip) | Reverse reading   |

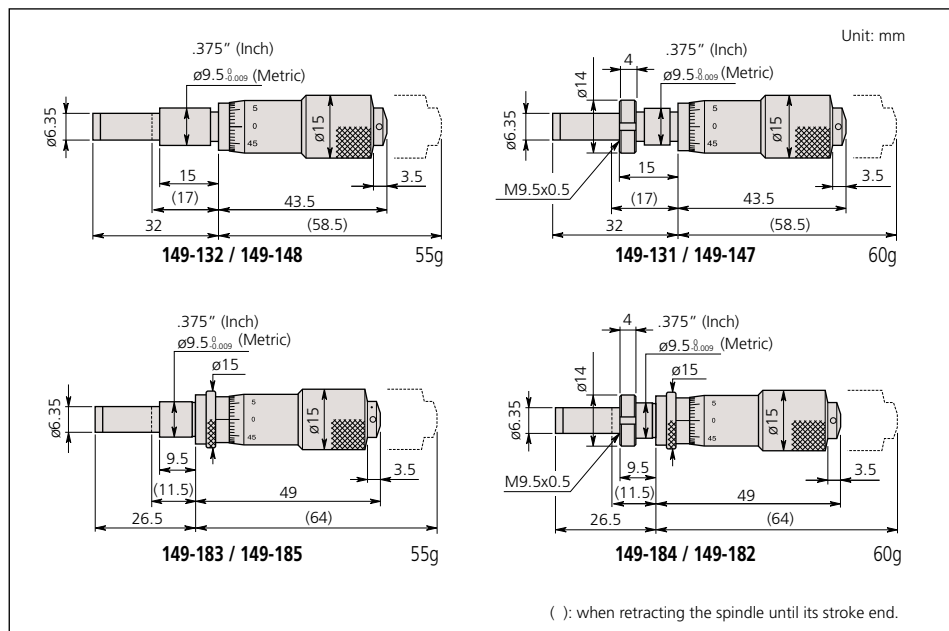
\*with spindle lock.

#### Inch

| Range   | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face       | Remarks           |
|---------|----------------|----------|-----------|--------------|--------------------|-------------------|
| 0 - .5" | <b>149-148</b> | ±.0001"  | .375"     | Plain        | Flat (carbide tip) | —                 |
| 0 - .5" | <b>149-147</b> | ±.0001"  | .375"     | w/clamp nut  | Flat (carbide tip) | —                 |
| 0 - .5" | <b>149-185</b> | ±.0001"  | .375"     | Plain*       | Flat (carbide tip) | With spindle lock |
| 0 - .5" | <b>149-182</b> | ±.0001"  | .375"     | w/clamp nut* | Flat (carbide tip) | With spindle lock |
| 0 - .5" | <b>149-811</b> | ±.0001"  | .375"     | Plain        | Spherical (SR4)    | —                 |
| 0 - .5" | <b>149-812</b> | ±.0001"  | .375"     | w/clamp nut  | Spherical (SR4)    | —                 |
| .5" - 0 | <b>149-831</b> | ±.0001"  | .375"     | Plain        | Flat (carbide tip) | Reverse reading   |
| .5" - 0 | <b>149-832</b> | ±.0001"  | .375"     | w/ clamp nut | Flat (carbide tip) | Reverse reading   |

\*with spindle lock.

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm or .001"

Spindle pitch: 0.5mm

Spindle face: Flat with carbide tip (more than HRA90) or spherical, lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 6mm

(149-131, 149-147: 11.5mm)

# Micrometer Heads

## SERIES 150 — Common Type in Middle Size

### FEATURES

- Ratchet stop for constant force.
- Long spindle type is available for a variety of applications.
- Carbide-tipped measuring face.

### SPECIFICATIONS

#### Metric

| Range    | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face       | Remarks              |
|----------|----------------|----------|-----------|--------------|--------------------|----------------------|
| 0 - 25mm | <b>150-192</b> | ±2μm     | 10mm      | Plain        | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>150-191</b> | ±2μm     | 10mm      | w/clamp nut  | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>150-209</b> | ±2μm     | 10mm      | Plain*       | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>150-210</b> | ±2μm     | 10mm      | w/clamp nut* | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>150-801</b> | ±2μm     | 10mm      | Plain        | Spherical (SR4)    | —                    |
| 0 - 25mm | <b>150-802</b> | ±2μm     | 10mm      | w/clamp nut  | Spherical (SR4)    | —                    |
| 0 - 25mm | <b>150-821</b> | ±2μm     | 10mm      | Plain        | Flat (carbide tip) | Reverse reading      |
| 0 - 25mm | <b>150-822</b> | ±2μm     | 10mm      | w/clamp nut  | Flat (carbide tip) | Reverse reading      |
| 0 - 25mm | <b>150-190</b> | ±2μm     | 10mm      | Plain        | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | <b>150-189</b> | ±2μm     | 10mm      | w/clamp nut  | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | <b>150-196</b> | ±2μm     | 10mm      | Plain*       | Flat (carbide tip) | w/ vernier (.0001mm) |
| 0 - 25mm | <b>150-195</b> | ±2μm     | 10mm      | w/clamp nut* | Flat (carbide tip) | w/ vernier (.0001mm) |
| 0 - 25mm | <b>150-211</b> | ±2μm     | 10mm      | Plain*       | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 25mm | <b>150-212</b> | ±2μm     | 10mm      | w/clamp nut* | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 25mm | <b>150-219</b> | ±2μm     | 10mm      | Plain        | Flat               | Long spindle         |
| 0 - 25mm | <b>150-220</b> | ±2μm     | 10mm      | w/ clamp nut | Flat               | Long spindle         |

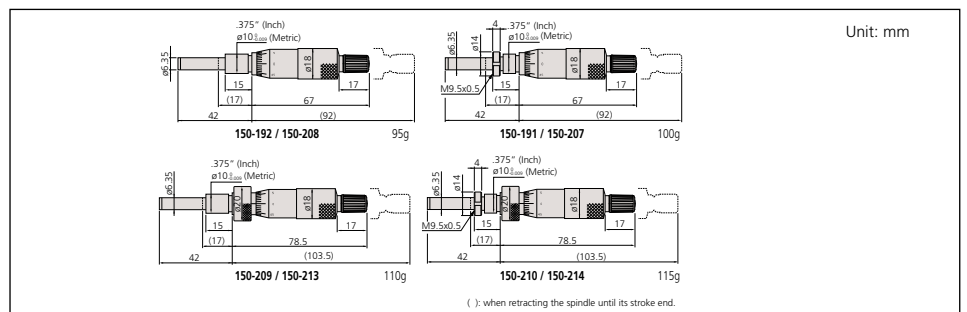
\*with spindle lock

#### Inch

| Range  | Order No.      | Accuracy | Stem dia. | Stem         | Spindle face       | Remarks             |
|--------|----------------|----------|-----------|--------------|--------------------|---------------------|
| 0 - 1" | <b>150-208</b> | ±.0001"  | .375"     | Plain        | Flat (carbide tip) | —                   |
| 0 - 1" | <b>150-198</b> | ±.0001"  | .375"     | Plain        | Flat (carbide tip) | w/o ratchet stop    |
| 0 - 1" | <b>150-207</b> | ±.0001"  | .375"     | w/clamp nut  | Flat (carbide tip) | —                   |
| 0 - 1" | <b>150-197</b> | ±.0001"  | .375"     | w/clamp nut  | Flat (carbide tip) | w/o ratchet stop    |
| 0 - 1" | <b>150-213</b> | ±.0001"  | .375"     | Plain*       | Flat (carbide tip) | —                   |
| 0 - 1" | <b>150-214</b> | ±.0001"  | .375"     | w/clamp nut* | Flat (carbide tip) | —                   |
| 0 - 1" | <b>150-811</b> | ±.0001"  | .375"     | Plain        | Spherical (SR4)    | —                   |
| 0 - 1" | <b>150-812</b> | ±.0001"  | .375"     | w/clamp nut  | Spherical (SR4)    | —                   |
| 0 - 1" | <b>150-831</b> | ±.0001"  | .375"     | Plain        | Flat (carbide tip) | Reverse reading     |
| 0 - 1" | <b>150-832</b> | ±.0001"  | .375"     | w/clamp nut  | Flat (carbide tip) | Reverse reading     |
| 0 - 1" | <b>150-206</b> | ±.0001"  | .375"     | Plain        | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | <b>150-205</b> | ±.0001"  | .375"     | w/clamp nut  | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | <b>150-215</b> | ±.0001"  | .375"     | Plain*       | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | <b>150-216</b> | ±.0001"  | .375"     | w/clamp nut* | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | <b>150-217</b> | ±.0001"  | .375"     | Plain*       | Flat (carbide tip) | w/o ratchet stop    |
| 0 - 1" | <b>150-218</b> | ±.0001"  | .375"     | w/clamp nut* | Flat (carbide tip) | w/o ratchet stop    |
| 0 - 1" | <b>150-221</b> | ±.0001"  | .375"     | Plain        | Flat               | Long spindle        |
| 0 - 1" | <b>150-222</b> | ±.0001"  | .375"     | w/ clamp nut | Flat               | Long spindle        |

\*with spindle lock

### DIMENSIONS AND MASS



150-801



150-191

### Technical Data

Graduations: 0.01mm, 0.001mm, .001" or .0001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip\* (more than HRA90) or spherical, lapped surface  
 \*Long spindle type: SKS3 (more than HRC60)  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 11.5mm

# Micrometer Heads

## SERIES 151 — Common Type in Middle Size with 8mm Diameter Spindle

### FEATURES

- 8mm diameter spindle for heavy-duty use.
- Ratchet stop for constant force.
- Carbide-tipped measuring face.

### SPECIFICATIONS

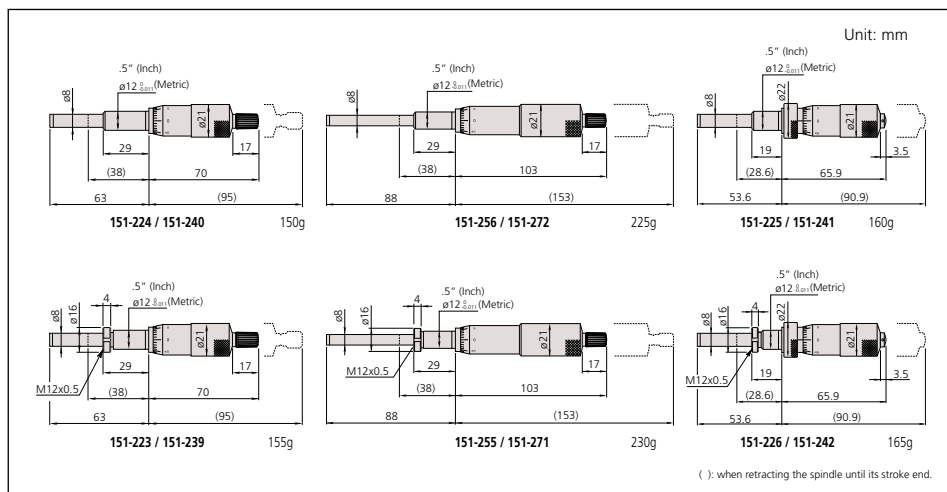
| Metric   |           |          |           |              |                    |                      |
|----------|-----------|----------|-----------|--------------|--------------------|----------------------|
| Range    | Order No. | Accuracy | Stem dia. | Stem         | Spindle face       | Remarks              |
| 0 - 25mm | 151-224   | ±2µm     | 12mm      | Plain        | Flat (carbide tip) | —                    |
| 0 - 25mm | 151-223   | ±2µm     | 12mm      | w/clamp nut  | Flat (carbide tip) | —                    |
| 0 - 25mm | 151-214   | ±2µm     | 12mm      | Plain*       | Flat (carbide tip) | —                    |
| 0 - 25mm | 151-213   | ±2µm     | 12mm      | w/clamp nut* | Flat (carbide tip) | —                    |
| 0 - 25mm | 151-222   | ±2µm     | 12mm      | Plain        | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | 151-221   | ±2µm     | 12mm      | w/clamp nut  | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | 151-212   | ±2µm     | 12mm      | Plain*       | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | 151-211   | ±2µm     | 12mm      | w/clamp nut* | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | 151-227   | ±2µm     | 12mm      | Plain        | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 25mm | 151-228   | ±2µm     | 12mm      | w/clamp nut  | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 25mm | 151-225   | ±2µm     | 12mm      | Plain*       | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 25mm | 151-226   | ±2µm     | 12mm      | w/clamp nut* | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 50mm | 151-256   | ±4µm     | 12mm      | Plain        | Flat (carbide tip) | —                    |
| 0 - 50mm | 151-255   | ±4µm     | 12mm      | w/clamp nut  | Flat (carbide tip) | —                    |
| 0 - 50mm | 151-260   | ±4µm     | 12mm      | Plain        | Flat (carbide tip) | w/o ratchet stop     |
| 0 - 50mm | 151-259   | ±4µm     | 12mm      | w/ clamp nut | Flat (carbide tip) | w/o ratchet stop     |

\*with spindle lock

| Inch   |           |          |           |              |                    |                     |
|--------|-----------|----------|-----------|--------------|--------------------|---------------------|
| Range  | Order No. | Accuracy | Stem dia. | Stem         | Spindle face       | Remarks             |
| 0 - 1" | 151-240   | ±.0001"  | .5"       | Plain        | Flat (carbide tip) | —                   |
| 0 - 1" | 151-239   | ±.0001"  | .5"       | w/clamp nut  | Flat (carbide tip) | —                   |
| 0 - 1" | 151-238   | ±.0001"  | .5"       | Plain        | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | 151-237   | ±.0001"  | .5"       | w/clamp nut  | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | 151-243** | ±.0001"  | .5"       | Plain*       | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | 151-244** | ±.0001"  | .5"       | w/clamp nut* | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1" | 151-241   | ±.0001"  | .5"       | Plain*       | Flat (carbide tip) | w/o ratchet stop    |
| 0 - 1" | 151-242   | ±.0001"  | .5"       | w/clamp nut* | Flat (carbide tip) | w/o ratchet stop    |
| 0 - 2" | 151-272   | ±.0002"  | .5"       | Plain        | Flat (carbide tip) | —                   |
| 0 - 2" | 151-271   | ±.0002"  | .5"       | w/clamp nut  | Flat (carbide tip) | —                   |

\*with spindle lock \*\*with ratchet stop

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm, 0.001mm, .001" or .0001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 25.5mm



# Micrometer Heads

## SERIES 153 — Non-rotating Spindle Type

### FEATURES

- Carbide-tipped measuring face.
- Non-rotating spindle.

### SPECIFICATIONS

#### Metric

| Range    | Order No.       | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks              |
|----------|-----------------|----------|-----------|-------|--------------------|----------------------|
| 0 - 15mm | <b>153-101</b>  | ±3μm     | 9.5mm     | Plain | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>153-201*</b> | ±3μm     | 12mm      | Plain | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>153-202*</b> | ±3μm     | 12mm      | Plain | Flat (carbide tip) | w/ vernier (0.001mm) |
| 0 - 25mm | <b>153-203</b>  | ±3μm     | 12mm      | Plain | Flat (carbide tip) | —                    |
| 0 - 25mm | <b>153-204</b>  | ±3μm     | 12mm      | Plain | Flat (carbide tip) | w/ vernier (0.001mm) |

\*with ratchet stop

#### Inch

| Range   | Order No.       | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks             |
|---------|-----------------|----------|-----------|-------|--------------------|---------------------|
| 0 - .5" | <b>153-108</b>  | ±.00015" | .375"     | Plain | Flat (carbide tip) | —                   |
| 0 - 1"  | <b>153-205*</b> | ±.00015" | .5"       | Plain | Flat (carbide tip) | —                   |
| 0 - 1"  | <b>153-206*</b> | ±.00015" | .5"       | Plain | Flat (carbide tip) | w/ vernier (.0001") |
| 0 - 1"  | <b>153-207</b>  | ±.00015" | .5"       | Plain | Flat (carbide tip) | —                   |
| 0 - 1"  | <b>153-208</b>  | ±.00015" | .5"       | Plain | Flat (carbide tip) | w/ vernier (.0001") |

\*with ratchet stop



### Technical Data

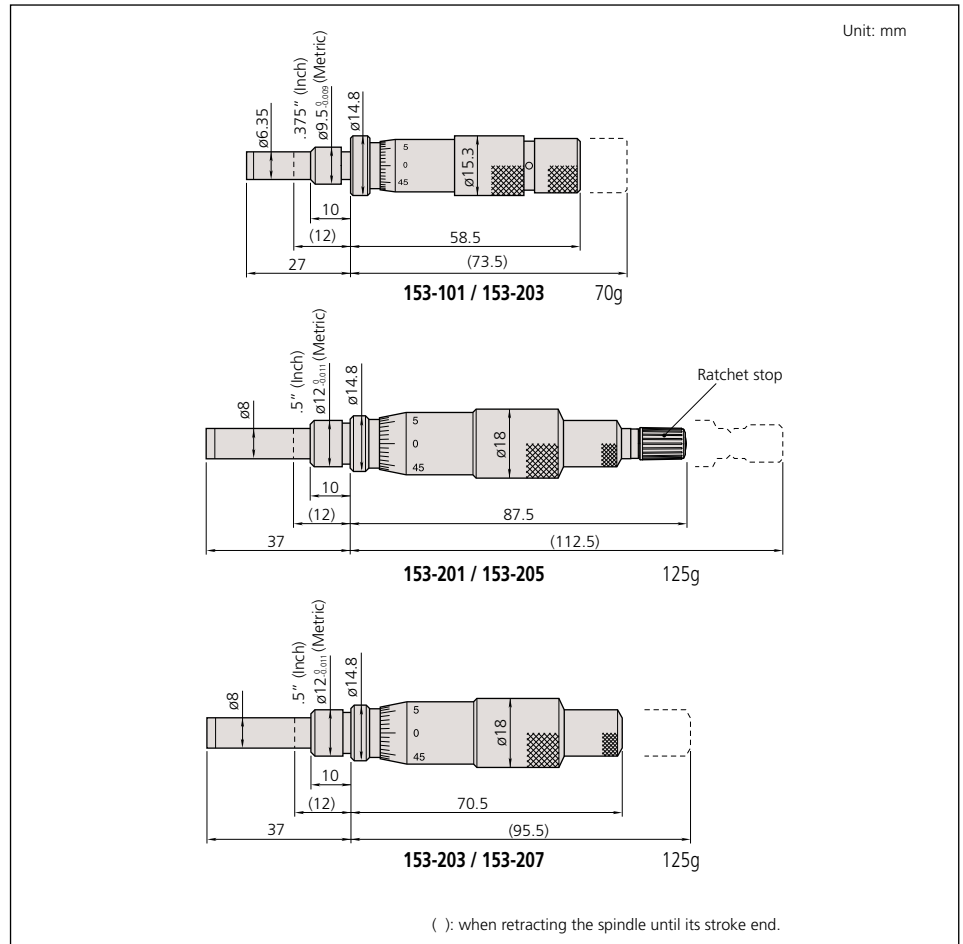
Graduations: 0.01mm, 0.001mm, .001" or .0001"

Spindle pitch: 0.5mm

Spindle face: Flat with carbide tip (more than HRA90), lapped surface

Scale surface: Hard-chrome plating

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 152 — Quick Spindle Feeding of 1mm/rev.

### FEATURES

- Quick spindle feeding of 1mm/rev.
- Carbide-tipped measuring face.



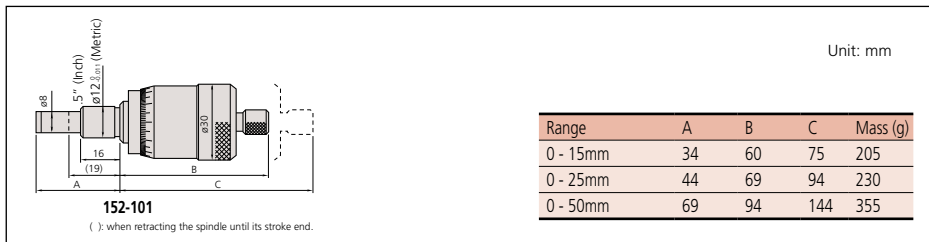
152-102

### SPECIFICATIONS

#### Metric

| Range    | Order No. | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks |
|----------|-----------|----------|-----------|-------|--------------------|---------|
| 0 - 15mm | 152-101   | ±2µm     | 12mm      | Plain | Flat (carbide tip) | —       |
| 0 - 25mm | 152-102   | ±2µm     | 12mm      | Plain | Flat (carbide tip) | —       |
| 0 - 50mm | 152-103   | ±4µm     | 12mm      | Plain | Flat (carbide tip) | —       |

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 152 — Large Thimble Type for Fine Feeding

### FEATURES

- The large diameter thimble for fine adjustment and positioning.
- Carbide-tipped measuring face.

### SPECIFICATIONS

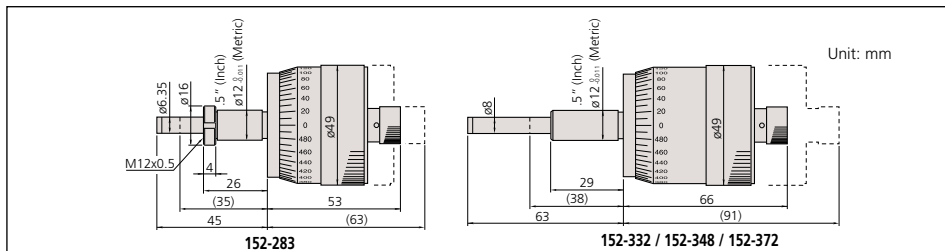
#### Metric

| Range    | Order No. | Accuracy | Stem dia. | Stem        | Spindle face       | Remarks                  |
|----------|-----------|----------|-----------|-------------|--------------------|--------------------------|
| 0 - 10mm | 152-283   | ±2µm     | 12mm      | w/clamp nut | Flat (carbide tip) | —                        |
| 0 - 25mm | 152-332   | ±2µm     | 12mm      | Plain       | Flat (carbide tip) | —                        |
| 0 - 25mm | 152-348   | ±2µm     | 12mm      | Plain       | Flat (carbide tip) | Bidirectional graduation |
| 0 - 50mm | 152-380   | ±4µm     | 12mm      | Plain       | Flat (carbide tip) | Bidirectional graduation |

#### Inch

| Range  | Order No. | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks                  |
|--------|-----------|----------|-----------|-------|--------------------|--------------------------|
| 0 - 1" | 152-372   | ±.0001"  | .5"       | Plain | Flat (carbide tip) | Bidirectional graduation |
| 0 - 2" | 152-388   | ±.0002"  | .5"       | Plain | Flat (carbide tip) | Bidirectional graduation |

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm

Spindle pitch: 1mm

Spindle face: Flat with carbide tip (more than HRA90), lapped surface

Scale surface: Hard-chrome plating



152-283

### Technical Data

Graduations: 0.002mm or .0001"

Spindle pitch: 1mm

Spindle face: Flat with carbide tip (more than HRA90), lapped surface

Scale surface: White anodized aluminum

Fixture thickness for clamp nut: 22.5mm

# Micrometer Heads

## SERIES 110 — Differential Screw Translator (Extra-Fine Feeding) Type

### FEATURES

- Differential movements of spindle threads and units allow fine spindle feeding (0.05mm/rev\*), resulting in high-resolution measurements.

\*110-502, 110-504: 0.025mm/rev / .001"/rev (fine feeding)

- Carbide-tipped measuring face.
- Non-rotating spindle.

### SPECIFICATIONS

#### Metric

| Range     | Order No.       | Graduation         | Accuracy*   | Stem dia. | Stem        | Spindle face       |
|-----------|-----------------|--------------------|-------------|-----------|-------------|--------------------|
| 0 - 1mm   | <b>110-105</b>  | 0.001mm            | ±3 / ±1.5µm | 12mm      | w/clamp nut | Flat (carbide tip) |
| 0 - 1mm   | <b>110-106</b>  | 0.0001mm           | ±3 / ±1.5µm | 12mm      | w/clamp nut | Flat (carbide tip) |
| 0 - 1mm   | <b>110-107</b>  | 0.001mm            | ±3 / ±1.5µm | 12mm      | w/clamp nut | Flat (carbide tip) |
| 0 - 1mm   | <b>110-108</b>  | 0.0001mm           | ±3 / ±1.5µm | 12mm      | w/clamp nut | Flat (carbide tip) |
| 0 - 2.5mm | <b>110-101</b>  | 0.001mm            | ±3 / ±1.5µm | 12mm      | w/clamp nut | Spherical (SR8)    |
| 0 - 2.5mm | <b>110-102</b>  | 0.0001mm           | ±3 / ±1.5µm | 12mm      | w/clamp nut | Spherical (SR8)    |
| 0 - 13mm  | <b>110-502*</b> | 0.0005mm<br>0.01mm | ±3 / ±1.5µm | 9.5mm     | w/clamp nut | Spherical (SR3)    |

\* Narrow range (within 1 rev.): 0.2mm

#### Inch

| Range    | Order No.       | Graduation       | Accuracy*           | Stem dia. | Stem        | Spindle face       |
|----------|-----------------|------------------|---------------------|-----------|-------------|--------------------|
| 0 - .02" | <b>110-115</b>  | .00005"          | ±.00015" / ±.00006" | .5"       | w/clamp nut | Flat (carbide tip) |
| 0 - .02" | <b>110-116</b>  | .000005"         | ±.00015" / ±.00006" | .5"       | w/clamp nut | Flat (carbide tip) |
| 0 - .02" | <b>110-117</b>  | .00005"          | ±.00015" / ±.00006" | .5"       | w/clamp nut | Flat (carbide tip) |
| 0 - .02" | <b>110-118</b>  | .000005"         | ±.00015" / ±.00006" | .5"       | w/clamp nut | Flat (carbide tip) |
| 0 - .05" | <b>110-111</b>  | .00005"          | ±.0002" / ±.00006"  | .5"       | w/clamp nut | Spherical (SR8)    |
| 0 - .05" | <b>110-112</b>  | .000005"         | ±.0002" / ±.00006"  | .5"       | w/clamp nut | Spherical (SR8)    |
| 0 - .5"  | <b>110-504*</b> | .00002"<br>.001" | ±.00015" / ±.00006" | .375"     | w/clamp nut | Spherical (SR3)    |

\* Narrow range (within 1 rev.): .006"

### Technical Data

Graduations: 0.001mm, 0.0005mm, 0.0001mm, .00005" or .00002", .000005"

Spindle pitch: 0.05mm or 0.025mm

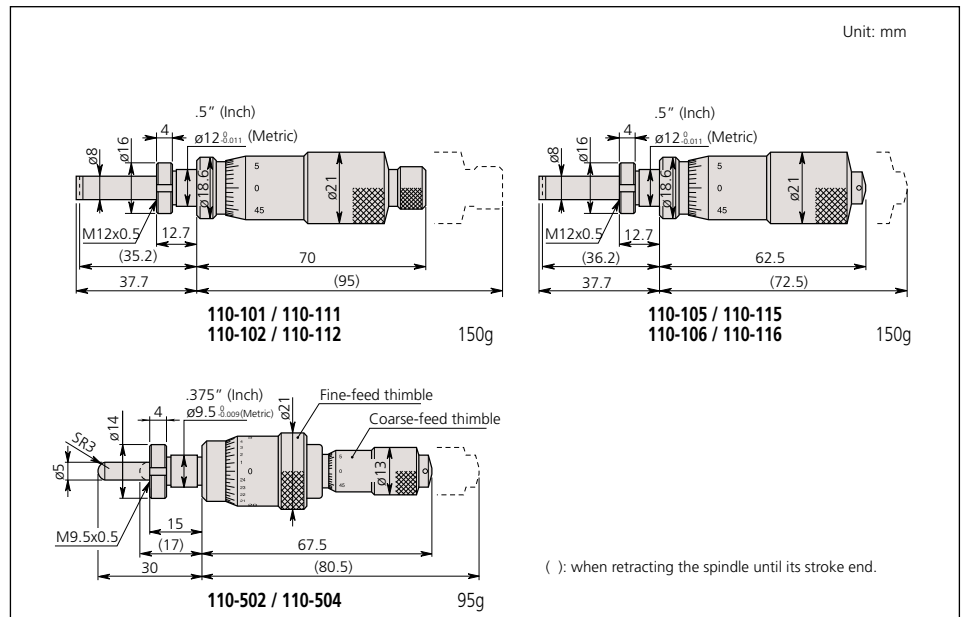
Spindle face: Flat with carbide tip (more than HRA90) or spherical, lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 9.5mm (11.5mm\*)

\*110-502, 110-504

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 152 — for XY-Stage

### FEATURES

#### 152-390, 152-389, 152-391, 152-392

- Non-rotating device is attached to the spindle tip.
- Floating thimble allows easy zero setting at any spindle position.
- Bidirectional graduation for easy reading in both directions.

#### 152-401, 152-402

- Adjustable spindle can be moved with the thimble and held at any position, allowing easy zero-setting.

### SPECIFICATIONS

| Metric   |                 |                    |           |       |  |                                 |
|----------|-----------------|--------------------|-----------|-------|--|---------------------------------|
| Range    | Order No.       | Accuracy           | Stem dia. | Stem  | Spindle face                             | Remarks                         |
| 0 - 25mm | <b>152-390</b>  | $\pm 2\mu\text{m}$ | 18mm      | Plain | Flat (hardened) with non-rotating device | for X-axis, bidirectional grad. |
| 0 - 25mm | <b>152-389</b>  | $\pm 2\mu\text{m}$ | 18mm      | Plain | Flat (hardened) with non-rotating device | for Y-axis, bidirectional grad. |
| 0 - 25mm | <b>152-402*</b> | $\pm 2\mu\text{m}$ | 18mm      | Plain | Spherical with carbide tip (SR10)        | for X-axis, with vernier        |
| 0 - 25mm | <b>152-401*</b> | $\pm 2\mu\text{m}$ | 18mm      | Plain | Spherical with carbide tip (SR10)        | for Y-axis, with vernier        |

\*0.001mm reading is obtained with vernier

| Inch   |                |              |           |       |  |                                 |
|--------|----------------|--------------|-----------|-------|--|---------------------------------|
| Range  | Order No.      | Accuracy     | Stem dia. | Stem  | Spindle face                             | Remarks                         |
| 0 - 1" | <b>152-392</b> | $\pm .0001"$ | .709"     | Plain | Flat (hardened) with non-rotating device | for X-axis, Bidirectional grad. |
| 0 - 1" | <b>152-391</b> | $\pm .0001"$ | .709"     | Plain | Flat (hardened) with non-rotating device | for Y-axis, Bidirectional grad. |



152-390

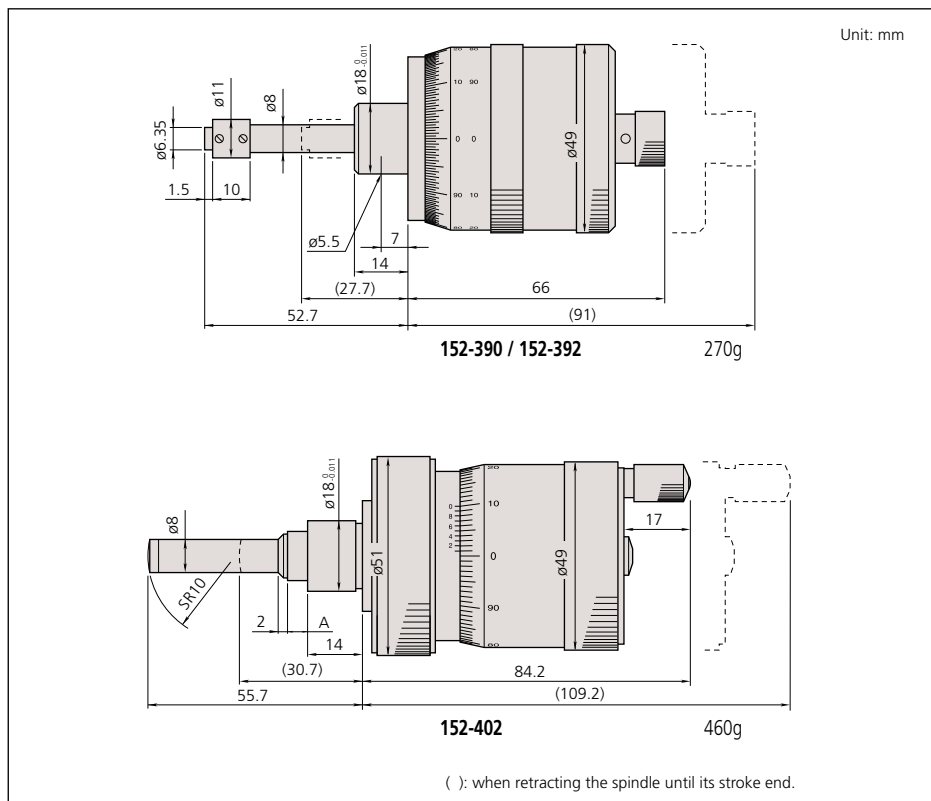
### Technical Data

Graduations: 0.005mm, 0.001mm\*  
\*vernier reading

Spindle pitch: 1mm

Spindle face: Flat (hardened) or spherical with carbide tip (more than HRA90), lapped surface  
Scale surface: White anodized aluminum

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 197 — Non-rotating Spindle and Large Thimble



197-101

### Technical Data

Graduations: 0.005mm or .0002"  
 Spindle pitch: 1mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: White anodized aluminum

### FEATURES

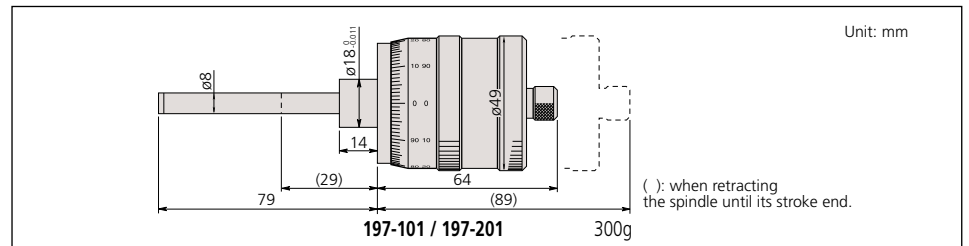
- Large thimble micrometer head with non-rotating spindle.
- Floating thimble allows easy zero setting at any spindle position.
- Bidirectional graduation for easy reading in both directions.
- Dual-spindle mechanism for quick feeding of 1mm/rev.
- Carbide-tipped measuring face.

### SPECIFICATIONS

| Metric   |           |          |           |       |                    |                          |
|----------|-----------|----------|-----------|-------|--------------------|--------------------------|
| Range    | Order No. | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks                  |
| 0 - 50mm | 197-101   | ±5µm     | 18mm      | Plain | Flat (carbide tip) | Bidirectional graduation |

| Inch   |           |          |           |       |                    |                          |
|--------|-----------|----------|-----------|-------|--------------------|--------------------------|
| Range  | Order No. | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks                  |
| 0 - 2" | 197-201   | ±.0002"  | .709"     | Plain | Flat (carbide tip) | Bidirectional graduation |

### DIMENSION AND MASS



153-301

### Technical Data

Graduations: 0.0005mm or .00001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: White anodized aluminum

# Micrometer Heads

## SERIES 153 — Fine Graduation and High Accuracy

### FEATURES

- Fine graduation and high-resolution model.
- Large thimble micrometer head with non-rotating spindle.
- Bidirectional graduation for easy reading in both directions.
- Carbide-tipped measuring face.

### SPECIFICATIONS

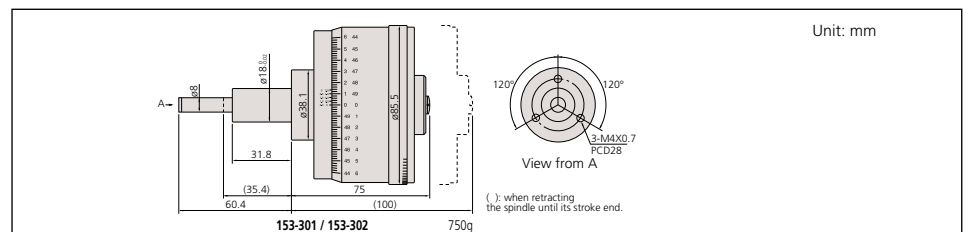
| Metric   |           |             |           |       |                    |                          |
|----------|-----------|-------------|-----------|-------|--------------------|--------------------------|
| Range    | Order No. | Accuracy*   | Stem dia. | Stem  | Spindle face       | Remarks                  |
| 0 - 25mm | 153-301   | ±1 / ±0.5µm | 18mm      | Plain | Flat (carbide tip) | Bidirectional graduation |

\*Wide range / narrow range

| Inch   |           |                     |           |       |                    |                          |
|--------|-----------|---------------------|-----------|-------|--------------------|--------------------------|
| Range  | Order No. | Accuracy*           | Stem dia. | Stem  | Spindle face       | Remarks                  |
| 0 - 1" | 153-302   | ±.00004" / ±.00002" | .709"     | Plain | Flat (carbide tip) | Bidirectional graduation |

\*Wide range / narrow range

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 250 — with Digit Counter

### FEATURES

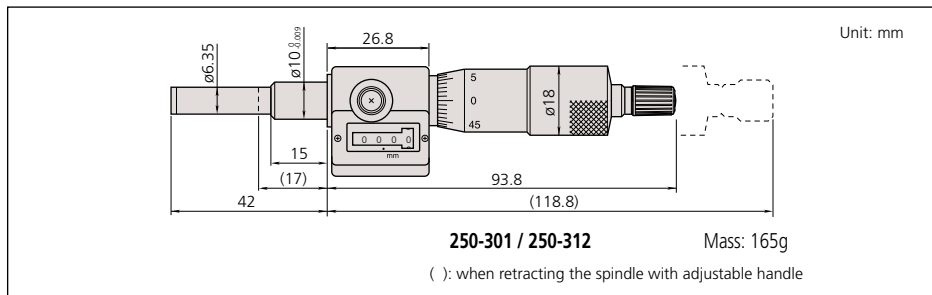
- Digit counter for easy reading of spindle movement.
- Carbide-tipped measuring face.
- Ratchet stop for constant force.

### SPECIFICATIONS

| Metric   |                |          |           |       |                    |         |
|----------|----------------|----------|-----------|-------|--------------------|---------|
| Range    | Order No.      | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks |
| 0 - 25mm | <b>250-301</b> | ±2µm     | 10mm      | Plain | Flat (carbide tip) | —       |

| Inch   |                |          |           |       |                    |                      |
|--------|----------------|----------|-----------|-------|--------------------|----------------------|
| Range  | Order No.      | Accuracy | Stem dia. | Stem  | Spindle face       | Remarks              |
| 0 - 1" | <b>250-312</b> | ±.0001"  | .375"     | Plain | Flat (carbide tip) | w / vernier (.0001") |

### DIMENSIONS AND MASS



250-301

### Technical Data

Graduations: 0.01mm or .0001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: Hard-chrome plating

# Micro Jack

## SERIES 7

### FEATURES

- Used for accurate leveling of machines, surface plates and other precision instruments.
- Easy adjustment under heavy load.

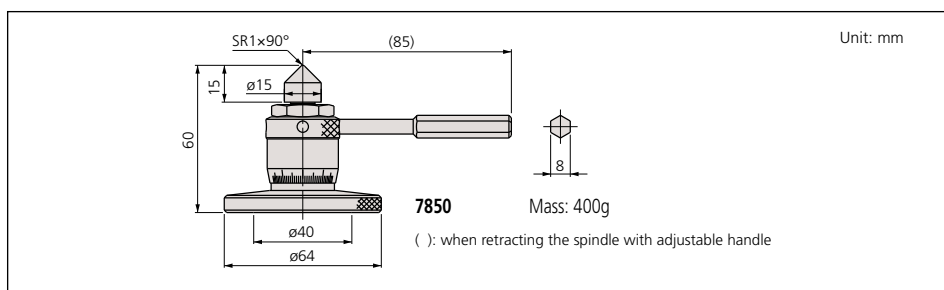


7850

### SPECIFICATIONS

| Metric    |             |            |           |                   |
|-----------|-------------|------------|-----------|-------------------|
| Range     | Order No.   | Graduation | Max. Load | Remarks           |
| 60 - 75mm | <b>7850</b> | 0.01mm     | 400kg     | adjustable handle |

### DIMENSIONS AND MASS



### Technical Data

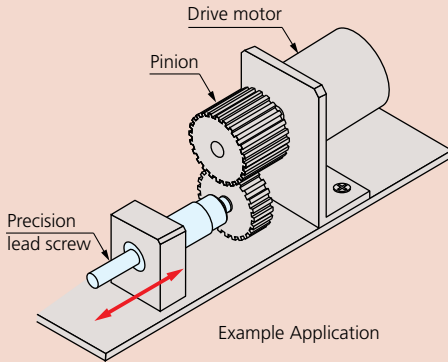
Graduations: 0.01mm



# Precision Lead Screw

## Technical Data

- Durability: 100,000 cycles are guaranteed (use condition: 4 kg load; 2 kg for AS-6.5 and BS-6.5)
- Main applications
  - Precision feed stages
  - Fine adjustment of optical elements (mirrors, prisms)
  - Fiber optic centering devices
  - Various assembly and adjustment jigs



## FEATURES

- Mitutoyo manufactures simple and economical precision lead screws for precise positioning mechanisms and fine-feed mechanisms, in addition to the conventional micrometer heads.
- Mitutoyo also manufactures screws with special specifications, such as 0.25 mm pitch, as well as those with the standard 0.5 mm feed pitch and with dimensions and forms that meet customer's requirements.



## SPECIFICATIONS

| Order No. | Model  | Stroke (mm) | Feed pitch (mm) | Feed accuracy (μm)                 | Stem diameter (mm)                  | Tip diameter (mm)                 | Tail diameter (mm)                | Screw nominal diameter | Sleeve diameter (mm) | Measuring face | Mass | Others   |
|-----------|--------|-------------|-----------------|------------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|------------------------|----------------------|----------------|------|--|
| 04AZA160  | AS-6.5 | 6.5         | 0.5             | ±5                                 | ø6 <sup>0</sup> <sub>-0.008</sub>   | ø3.5                              | ø3 <sup>0</sup> <sub>-0.01</sub>  | M4.5 x 0.5             | ø7                   | Hardened       | 10g  | <ul style="list-style-type: none"> <li>• AS type: Flat spindle tip without nut</li> <li>• BS type: Spherical spindle tip with nut</li> </ul> |
| 04AZA161  | BS-6.5 |             |                 |                                    |                                     |                                   |                                   |                        |                      |                | 11g  |  |
| 04AZA162  | AS-13  | 13          |                 | ±2                                 | ø9.5 <sup>0</sup> <sub>-0.009</sub> | ø5                                | ø5 <sup>0</sup> <sub>-0.012</sub> | M7.35 x 0.5            | ø10.5                | Carbide        | 27g  |  |
| 04AZA163  | BS-13  |             |                 |                                    |                                     |                                   |                                   |                        |                      |                | 30g  |  |
| 04AZA164  | AS-25  | 25          |                 | ø10 <sup>0</sup> <sub>-0.009</sub> | ø6.35                               | ø6 <sup>0</sup> <sub>-0.015</sub> | ø12                               | M7.35 x 0.5            | ø12                  | Carbide        | 61g  |  |
| 04AZA165  | BS-25  |             |                 |                                    |                                     |                                   |                                   |                        |                      |                | 64g  |  |

## DIMENSIONS

Unit: mm

### Type A: Straight type

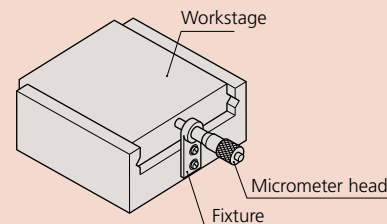
### Type B: Stem with nut

| Order No. | L    | L1 | L2   | L3   | L4 | L5 |
|-----------|------|----|------|------|----|----|
| 04AZA160  | 39   | 15 | 14.5 | 9    | 6  | —  |
| 04AZA161  | 39   | 15 | 14.5 | 7.5  | 6  | 3  |
| 04AZA162  | 57.5 | 25 | 21.5 | 15.5 | 8  | —  |
| 04AZA163  | 57.5 | 25 | 21.5 | 15.5 | 8  | 4  |
| 04AZA164  | 98.5 | 42 | 39.5 | 27   | 10 | —  |
| 04AZA165  | 98.5 | 42 | 39.5 | 27   | 10 | 4  |

# Fixtures for Micrometer Heads and Linear Gages

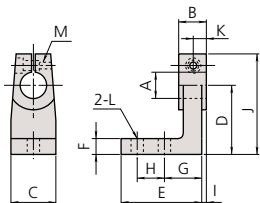
## FEATURES

- The act of fabricating brackets to mount micrometer heads for each particular application can be laborious and costly. Mitutoyo offers various types of fixtures for micrometer heads to meet a range of applications. These fixtures are made of nickel-plated cast iron.
- There are two types of fixtures for micrometer heads--with or without clamping nut on the stem.

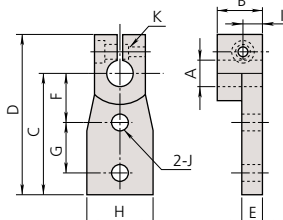


## DIMENSIONS: Fixtures for plain-stem type micrometer heads

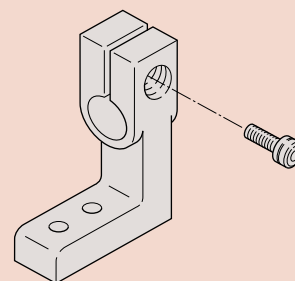
Unit: mm



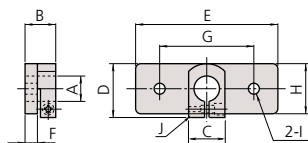
| Order No. | 303560 | 303569 | 303579 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 9      | 14.5   | 14.5   |
| C         | 14.5   | 19.5   | 19.5   |
| D         | 20     | 30     | 30     |
| E         | 23     | 35     | 35     |
| F         | 5      | 7      | 7      |
| G         | 11     | 16     | 16     |
| H         | 8      | 12     | 12     |
| I         | 1.5    | 3.25   | 3.25   |
| J         | 32.5   | 42.5   | 42.5   |
| K         | 4.5    | 7.25   | 7.25   |
| L         | ø3.4   | ø4.5   | ø4.5   |
| M         | M3x0.5 | M3x0.5 | M3x0.5 |



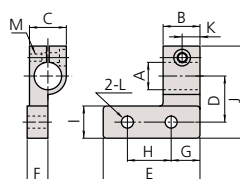
| Order No. | 303564 | 303573 | 303583 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 9      | 14.5   | 14.5   |
| C         | 30     | 40     | 40     |
| D         | 42.5   | 52.5   | 52.5   |
| E         | 4      | 6      | 6      |
| F         | 15     | 18     | 18     |
| G         | 10     | 15     | 15     |
| H         | 15     | 20     | 20     |
| I         | 4.5    | 7.25   | 7.25   |
| J         | ø3.4   | ø4.5   | ø4.5   |
| K         | M3x0.5 | M3x0.5 | M3x0.5 |



**Note:** Supplied with a socket head screw (M3x0.5x12mm) for the fixtures to be used with a micrometer head without clamp nut (plain stem type micrometer head).



| Order No. | 303562 | 303571 | 303581 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 9      | 14.5   | 14.5   |
| C         | 15     | 15     | 15     |
| D         | 20     | 22.5   | 22.5   |
| E         | 40     | 60     | 60     |
| F         | 3      | 5      | 5      |
| G         | 30     | 40     | 40     |
| H         | 15     | 20     | 20     |
| I         | ø3.4   | ø4.5   | ø4.5   |
| J         | M3x0.5 | M3x0.5 | M3x0.5 |



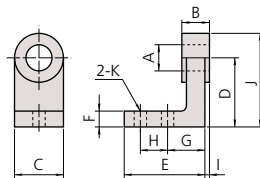
| Order No. | 303566 | 303575 | 303585 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 9      | 14.5   | 14.5   |
| C         | 15     | 15     | 15     |
| D         | 15     | 20     | 20     |
| E         | 25     | 40     | 40     |
| F         | 8.5    | 8.5    | 8.5    |
| G         | 7.5    | 10     | 10     |
| H         | 10     | 20     | 20     |
| I         | 10     | 15     | 15     |
| J         | 32.5   | 40     | 40     |
| K         | 4.5    | 7.25   | 7.25   |
| L         | ø3.4   | ø4.5   | ø4.5   |
| M         | M3x0.5 | M3x0.5 | M3x0.5 |



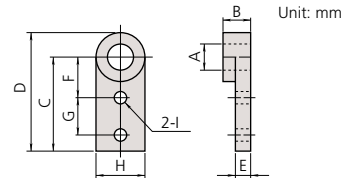
# Fixtures for Micrometer Heads and Linear Gages



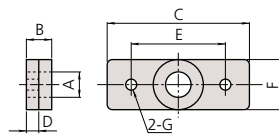
## DIMENSIONS: Fixtures for micrometer heads with clamp nut



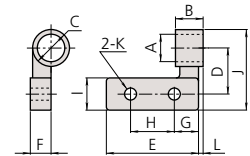
| Order No. | 303559 | 303568 | 303578 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 6      | 11.5   | 11.5   |
| C         | 14.5   | 19.5   | 19.5   |
| D         | 20     | 30     | 30     |
| E         | 24     | 35     | 35     |
| F         | 5      | 7      | 7      |
| G         | 11     | 16     | 16     |
| H         | 8      | 12     | 12     |
| I         | 0.5    | 1.75   | 1.75   |
| J         | 27.5   | 40     | 40     |
| K         | ø3.4   | ø4.5   | ø4.5   |



| Order No. | 303563 | 303572 | 303582 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 6      | 11.5   | 11.5   |
| C         | 30     | 40     | 40     |
| D         | 37.5   | 50     | 50     |
| E         | 4.5    | 6.5    | 6.5    |
| F         | 15     | 18     | 18     |
| G         | 10     | 15     | 15     |
| H         | 15     | 20     | 20     |
| I         | ø3.4   | ø4.5   | ø4.5   |

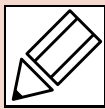


| Order No. | 303561 | 303570 | 303580 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 6      | 11.5   | 11.5   |
| C         | 40     | 60     | 60     |
| D         | 3.5    | 5.5    | 5.5    |
| E         | 30     | 40     | 40     |
| F         | 15     | 20     | 20     |
| G         | ø3.4   | ø4.5   | ø4.5   |



| Order No. | 303565 | 303574 | 303584 |
|-----------|--------|--------|--------|
| A         | ø9.5   | ø9.5   | ø10    |
| B         | 6      | 11.5   | 11.5   |
| C         | ø15    | ø15    | ø15    |
| D         | 15     | 20     | 20     |
| E         | 25     | 40     | 40     |
| F         | 8.5    | 8.5    | 8.5    |
| G         | 7.5    | 10     | 10     |
| H         | 10     | 20     | 20     |
| I         | 10     | 15     | 15     |
| J         | 27.5   | 35     | 35     |
| K         | ø3.4   | ø4.5   | ø4.5   |
| L         | 0.75   | 1.25   | 1.25   |

# Quick Guide to Precision Measuring Instruments



## Micrometer Heads

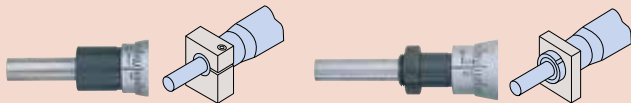
### Key Factors in Selection

Key factors in selecting a micrometer head are the measuring range, spindle face, stem, graduations, thimble diameter, etc.

#### Stem

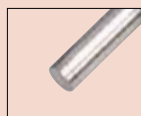
Plain stem

Stem locknut type

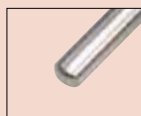


- The stem used to mount a micrometer head is classified as a "plain type" or "clamp nut type" as illustrated above. The stem diameter is manufactured to a nominal Metric or Imperial size with an h6 tolerance.
- The clamp nut stem allows fast and secure clamping of the micrometer head. The plain stem has the advantage of wider application and slight positional adjustment in the axial direction on final installation, although it does require a split-fixture clamping arrangement or adhesive fixing.
- General-purpose mounting fixtures are available as optional accessories.

#### Measuring Face



Flat face

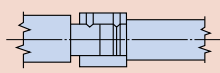
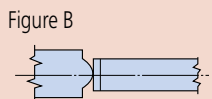
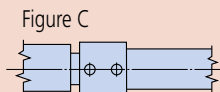
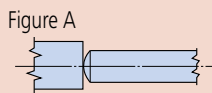


Spherical face



Anti-rotation device

- A flat measuring face is often specified where a micrometer head is used in measurement applications.
- When a micrometer head is used as a feed device, a spherical face can minimize errors due to misalignment (Figure A). Alternatively, a flat face on the spindle can bear against a sphere, such as a carbide ball (Figure B).
- A non-rotating spindle type micrometer head or one fitted with an anti-rotation device on the spindle (Figure C) can be used if a twisting action on the workpiece must be avoided.
- If a micrometer head is used as a stop then a flat face both on the spindle and the face it contacts provides durability.



#### Non-Rotating Spindle

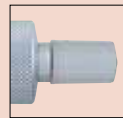
- A non-rotating spindle type head does not exert a twisting action on a workpiece, which may be an important factor in some applications.

#### Spindle Thread Pitch

- The standard type head has 0.5mm pitch.
- 1mm-pitch type: quicker to set than standard type and avoids the possibility of a 0.5mm reading error. Excellent load-bearing characteristics due to larger screw thread.
- 0.25mm or 0.1mm-pitch type  
This type is the best for fine-feed or fine-positioning applications.

#### Constant-force Device

- A micrometer head fitted with a constant-force device (ratchet or friction thimble) is recommended for measurement applications.
- If using a micrometer head as a stop, or where saving space is a priority, a head without a ratchet is probably the best choice.



Micrometer head with constant-force device



Micrometer head without constant-force device (no ratchet)

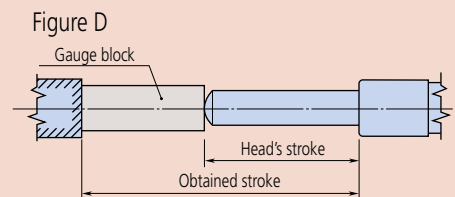
#### Spindle Lock

- If a micrometer head is used as a stop it is desirable to use a head fitted with a spindle lock so that the setting will not change even under repeated shock loading.



#### Measuring Range (Stroke)

- When choosing a measuring range for a micrometer head, allow an adequate margin in consideration of the expected measurement stroke. Six stroke ranges, 5 to 50mm, are available for standard micrometer heads.
- Even if an expected stroke is small, such as 2mm to 3mm, it will be cost effective to choose a 25mm-stroke model as long as there is enough space for installation.
- If a long stroke of over 50mm is required, the concurrent use of a gauge block can extend the effective measuring range. (Figure D)



- In this guide, the range (or stroke end) of the thimble is indicated by a dashed line. For stroke ends, consider the thimble as moving to the position indicated by the line when designing the jig.

#### Ultra-fine Feed Applications

- Dedicated micrometer heads are available for manipulator applications, etc., which require ultra-fine feed or adjustment of spindle.



**Holtest ABSOLUTE Borematic**



**Inside Micrometers**



**Bore Gages**



Digimatic Holtest

Holtest

Absolute Borematic

Digimatic Inside Micrometer

Digimatic Bore Gage



**Small Tool Instruments  
Inside Measurement**

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| Digimatic Holtest                    | C-2,3         |
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| Holtest (Type II)                    | C-6,7         |
| Borematic                            | C-8,9         |
| Holtest/Digimatic Holtest/Borematic  | C-10          |
| <b>Inside Micrometers</b>            |               |
| Tubular Inside Micrometers           | C-11-12,15-17 |
| Inside Micrometers                   | C-13,18       |
| Digimatic Tubular Inside Micrometers | C-14          |
| Inside Micro Checker                 | C-19          |
| <b>Bore Gages</b>                    |               |
| Bore Gages                           | C-20-26,28    |
| <b>ABSOLUTE Digimatic Bore Gage</b>  | <b>C-27</b>   |
| Bore Gage Zero Checker               | C-29          |
| Setting Rings                        | C-29,30       |
| Bore Gages                           | C-28          |
| Bore Gage Zero Checker               | C-29          |
| Setting Rings                        | C-29,30       |

# Digimatic Holtest

## SERIES 468 — Three-Point Internal Micrometers

### FEATURES

- TiN-coated measuring contact points provide excellent durability and impact resistance and allow the instrument to measure to the bottom of a blind hole (up to 100mm / 4" models).
- Large LCD readout.
- Functions available: Presetting, Zero/ABS, Auto power On/Off, Data hold, Data output, Error alarm, Battery replacement alarm.
- With Ratchet Stop for constant force.
- Measure deep holes by attaching an extension rod (optional).
- Setting rings for origin point setting are optional.
- Supplied in fitted plastic case up to 100mm / 4" . Over 100mm / 4" supplied in wooden case.



468-261



468-263



468-274



TiN-coated contact points (" -10" suffix models only)

### DIMENSIONS AND MASS

| Range                   | L     | Mass (g) |
|-------------------------|-------|----------|
| 6 - 8mm / .275 - .35"   | 59    | 400      |
| 8 - 10mm / .35 - .425"  | 59    | 400      |
| 10 - 12mm / .425 - .5"  | 59    | 400      |
| 12 - 16mm / .5 - .65"   | 84    | 430      |
| 16 - 20mm / .65 - .8"   | 84    | 430      |
| 20 - 25mm / .8 - 1"     | 93    | 500      |
| 25 - 30mm / 1 - 1.2"    | 93    | 510      |
| 30 - 40mm / 1.2 - 1.6"  | 103.8 | 510      |
| 40 - 50mm / 1.6 - 2"    | 103.8 | 530      |
| 50 - 63mm / 2 - 2.5"    | 105.4 | 650      |
| 62 - 75mm / 2.5 - 3.0"  | 105.4 | 660      |
| 75 - 88mm / 3.0 - 3.5"  | 105.4 | 990      |
| 87 - 100mm / 3.5 - 4.0" | 105.4 | 1000     |
| 100 - 125mm / 4 - 5"    | 151.4 | 970      |
| 125 - 150mm / 5 - 6"    | 151.4 | 1060     |
| 150 - 175mm / 6 - 7"    | 151.4 | 1150     |
| 175 - 200mm / 7 - 8"    | 151.4 | 1240     |
| 200 - 225mm / 8 - 9"    | 151.4 | 1330     |
| 225 - 250mm / 9 - 10"   | 151.4 | 1420     |
| 250 - 275mm / 10 - 11"  | 151.4 | 1510     |
| 275 - 300mm / 11 - 12"  | 151.4 | 1600     |

Unit: mm

#### Measuring a Blind Hole

The measuring contact points held in the jaws permit measuring the diameter of a blind hole to the bottom. (up to 100mm / 4" models)

| Range                 | a    | b   | c    |
|-----------------------|------|-----|------|
| 6 - 12mm / .275 - .5" | 2    | —   | 2.5  |
| 12 - 20mm / .5 - .8"  | 0.3  | 5.6 | 3.5  |
| 20 - 30mm / .8 - 1.2" | 0.3  | 8.3 | 5.2  |
| 30 - 50mm / 1.2 - 2"  | 0.3  | 13  | 10   |
| 50 - 100mm / 2 - 4"   | 0.3  | 17  | 14   |
| 100 - 300mm / 4 - 12" | 12.4 | 21  | 13.8 |



### Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution: 0.001mm or .00005"/0.001mm (over 4 - 5" models: .0001"/0.001mm)  
 Contact point: TiN coating  
 Measuring method: Three-point method  
 Display: LCD  
 Battery: SR44 (2 pcs.), **938882**  
 Battery life: Approx. 1.2 years under normal use

### Function

Zero/ABS, Auto Power On/Off, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

- 05CZA662:** SPC cable (1m / 40")
- 05CZA663:** SPC cable (2m / 80")
- 04AZB157:** Mounting plate for stand
- 156-101-10:** Stand
- 952322:** Extension rod 100mm / 3.94" For range 6-12mm / .275 - .5" models
- 952621:** Extension rod 150mm / 5.9" For range 12-20mm / .5" - .8" models
- 952622:** Extension rod 150mm / 5.9" For range 20-50mm / .8" - 2" models
- 952623:** Extension rod 150mm / 5.9" For range 50-300mm / 2" - 12" models



04AZB157

## SPECIFICATIONS

**Metric**  with TiN-coated contact points

| Range   | Accuracy       | Order Code     |                    |
|---------|----------------|----------------|--------------------|
|         |                | Individual     | Main Body Assembly |
| 6-8     | ±2μm           | <b>468-161</b> | 04AZB106           |
| 8-10    |                | <b>468-162</b> |                    |
| 10-12   |                | <b>468-163</b> |                    |
| 12-16   |                | <b>468-164</b> |                    |
| 16-20   |                | <b>468-165</b> |                    |
| 20-25   | ±3μm           | <b>468-166</b> | 04AZB107           |
| 25-30   |                | <b>468-167</b> |                    |
| 30-40   |                | <b>468-168</b> |                    |
| 40-50   |                | <b>468-169</b> |                    |
| 50-63   |                | <b>468-170</b> |                    |
| 62-75   | ±5μm           | <b>468-171</b> | 04AZB108           |
| 75-88   |                | <b>468-172</b> |                    |
| 87-100  |                | <b>468-173</b> |                    |
| 100-125 |                | <b>468-174</b> |                    |
| 125-150 |                | <b>468-175</b> |                    |
| 150-175 | ±3μm           | <b>468-176</b> | 04AZB109           |
| 175-200 |                | <b>468-177</b> |                    |
| 200-225 |                | <b>468-178</b> |                    |
| 225-250 |                | <b>468-179</b> |                    |
| 250-275 |                | <b>468-180</b> |                    |
| 275-300 | <b>468-181</b> | <b>468-181</b> | 04AZB110           |

**Inch/Metric**  with TiN-coated contact points

| Range                     | Accuracy       | Order Code     |                    |
|---------------------------|----------------|----------------|--------------------|
|                           |                | Individual     | Main Body Assembly |
| .275-.35" / 6.925-8.89mm  | ±.0001"        | <b>468-261</b> | 04AZB111           |
| .35-.425" / 8.89-10.795mm |                | <b>468-262</b> |                    |
| .425-.5" / 10.795-12.7mm  |                | <b>468-263</b> |                    |
| .5-.65" / 12.7-16.51mm    |                | <b>468-264</b> |                    |
| .65-.8" / 16.51-20.32mm   |                | <b>468-265</b> |                    |
| .8-1" / 20.32-25.4mm      | ±.00015"       | <b>468-266</b> | 04AZB112           |
| 1-1.2" / 25.4-30.48mm     |                | <b>468-267</b> |                    |
| 1.2-1.6" / 30.48-40.64mm  |                | <b>468-268</b> |                    |
| 1.6-2" / 40.64-50.8mm     |                | <b>468-269</b> |                    |
| 2-2.5" / 50.8-63.5mm      |                | <b>468-270</b> |                    |
| 2.5-3" / 63.5-76.2mm      | ±.00025"       | <b>468-271</b> | 04AZB113           |
| 3-3.5" / 76.2-88.9mm      |                | <b>468-272</b> |                    |
| 3.5-4" / 88.9-101.6mm     |                | <b>468-273</b> |                    |
| 4-5" / 101.6-127mm        |                | <b>468-274</b> |                    |
| 5-6" / 127-152.4mm        |                | <b>468-275</b> |                    |
| 6-7" / 152.4-177.8mm      | ±.00025"       | <b>468-276</b> | 04AZB114           |
| 7-8" / 177.8-203.2mm      |                | <b>468-277</b> |                    |
| 8-9" / 203.2-228.6mm      |                | <b>468-278</b> |                    |
| 9-10" / 228.6-254mm       |                | <b>468-279</b> |                    |
| 10-11" / 254-279.4mm      |                | <b>468-280</b> |                    |
| 11-12" / 279.4-304.8mm    | <b>468-281</b> | <b>468-281</b> | 04AZB115           |

### Complete Unit Set

Each set includes complete gages (display units and measuring heads for each size).

**Metric**  with TiN-coated contact points

| Range      | Order No.      | Individual range      | Setting rings included | Remarks |
|------------|----------------|-----------------------|------------------------|---------|
| 6 - 12mm   | <b>468-981</b> | 6-8, 8-10, 10-12mm    | ø8mm, ø10mm            | —       |
| 12 - 25mm  | <b>468-982</b> | 12-16, 16-20, 20-25mm | ø16mm, ø20mm           | —       |
| 25 - 50mm  | <b>468-983</b> | 25-30, 30-40, 40-50mm | ø30mm, ø40mm           | —       |
| 50 - 75mm  | <b>468-984</b> | 50-63, 62-75mm        | ø62mm                  | —       |
| 75 - 100mm | <b>468-985</b> | 75-88, 87-100mm       | ø87mm                  | —       |

**Inch/Metric**  with TiN-coated contact points

| Range                       | Order No.      | Individual range               | Setting rings included | Remarks |
|-----------------------------|----------------|--------------------------------|------------------------|---------|
| .275 - .5" / 6.925 - 12.7mm | <b>468-986</b> | .275-.35", .35-.425", .425-.5" | .35" DIA., .425" DIA.  | —       |
| .5 - 1" / 12.7 - 25.4mm     | <b>468-987</b> | .5-.65", .65-.8", .8-1"        | .65" DIA., .8" DIA.    | —       |
| 1 - 2" / 25.4 - 50.8mm      | <b>468-988</b> | 1-1.2", 1.2-1.6", 1.6-2"       | 1.2" DIA., 1.6" DIA.   | —       |
| 2 - 3" / 50.8 - 76.2mm      | <b>468-989</b> | 2-2.5", 2.5-3"                 | 2.5" DIA.              | —       |
| 3 - 4" / 76.2 - 101.6mm     | <b>468-990</b> | 3-3.5", 3.5-4"                 | 3.5" DIA.              | —       |

### Interchangeable Head Set

Each set includes one display unit with interchangeable measuring heads of the sizes specified.

**Metric**  with TiN-coated contact points

| Range       | Order No.      | Individual range                     | Setting rings included | Remarks            |
|-------------|----------------|--------------------------------------|------------------------|--------------------|
| 6 - 12mm    | <b>468-971</b> | 6-8, 8-10, 10-12mm                   | ø8mm, ø10mm            | with extension rod |
| 12 - 20mm   | <b>468-972</b> | 12-16, 16-20mm                       | ø16mm.                 | with extension rod |
| 20 - 50mm   | <b>468-973</b> | 20-25, 25-30, 30-40, 40-50mm         | ø25mm, ø40mm           | with extension rod |
| 50 - 100mm  | <b>468-974</b> | 50-63, 62-75, 75-88, 87-100mm        | ø62mm, ø87mm           | with extension rod |
| 100 - 200mm | <b>468-975</b> | 100-125, 125-150, 150-175, 175-200mm | ø125mm, ø175mm         | with extension rod |

**Inch/Metric**  with TiN-coated contact points

| Range                       | Order No.      | Individual range                | Setting rings included | Remarks            |
|-----------------------------|----------------|---------------------------------|------------------------|--------------------|
| .275 - .5" / 6.925 - 12.7mm | <b>468-976</b> | .275-.35", .35-.425", .425-.5"  | .35" DIA., .425" DIA.  | with extension rod |
| .5 - .8" / 12.7 - 20.32mm   | <b>468-977</b> | .5-.65", .65-.8"                | .65" DIA.              | with extension rod |
| .8 - 2" / 20.32 - 50.8mm    | <b>468-978</b> | .8-1", 1-1.2", 1.2-1.6", 1.6-2" | 1" DIA., 1.6" DIA.     | with extension rod |
| 2 - 4" / 50.8 - 101.6mm     | <b>468-979</b> | 2-2.5", 2.5-3", 3-3.5", 3.5-4"  | 2.5" DIA., 3.5" DIA.   | with extension rod |
| 4 - 8" / 101.6 - 203.2mm    | <b>468-980</b> | 4-5", 5-6", 6-7", 7-8"          | 5" DIA., 7" DIA.       | with extension rod |



468-986



468-978

# Holtest

## SERIES 368 — Three-Point/Two-Point Internal Micrometers

These Holtests are versatile, self-centering three-point internal micrometers for the accurate and efficient direct-measurement of internal diameters. Three anvils, evenly spaced at 120° apart, contact the internal wall surfaces and find true alignment with the axis of the bore for accurate ID measurement.



### FEATURES

- TiN-coated measuring contact points (over 6mm / .275" range models) provide excellent durability and impact resistance and allow the instrument to measure to the bottom of a blind hole (up to 100mm / 4" models).
- Highly durable because of carbide-tipped contact points (anvils up to 12mm / .5" models).
- Measure deep holes using an extension rod (optional) which is available on models over 6mm (.275") measuring range.
- With Ratchet Stop for constant force.
- Setting rings for zero point adjustment are optional.
- Supplied in fitted plastic case up to 100mm / 4". Over 100mm / 4" supplied in wooden case.



368-001  
Two-point contact type



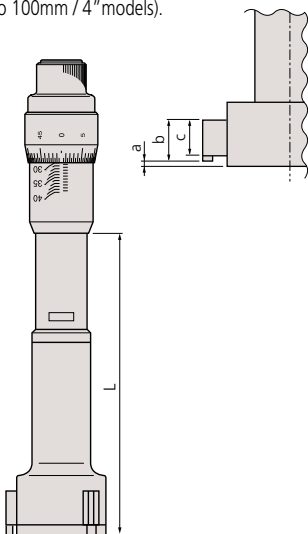
TiN-coated contact points (excluding models up to 12mm/.5")

### DIMENSIONS

#### Measuring a Blind Hole

The measuring contact points held in the jaws permit measuring the diameter of a blind hole right down to the bottom (up to 100mm / 4" models).

Unit: mm



| Range                  | L   | Mass (g) | Range                  | L   | Mass (g) |
|------------------------|-----|----------|------------------------|-----|----------|
| 2 - 2.5mm / .08 - .1"  | 12  | 88       | 40 - 50mm / 1.6 - 2"   | 102 | 330      |
| 2.5 - 3mm / .1 - .12"  | 12  | 88       | 50 - 63mm / 2 - 2.5"   | 105 | 440      |
| 3 - 4mm / .12 - .16"   | 22  | 91       | 62 - 75mm / 2.5 - 3"   | 105 | 450      |
| 4 - 5mm / .16 - .2"    | 22  | 91       | 75 - 88mm / 3 - 3.5"   | 105 | 490      |
| 5 - 6mm / .2 - .24"    | 22  | 91       | 87 - 100mm / 3.5 - 4"  | 105 | 500      |
| 6 - 8mm / .275 - .35"  | 59  | 57       | 100 - 125mm / 4 - 5"   | 161 | 1050     |
| 8 - 10mm / .35 - .425" | 59  | 58       | 125 - 150mm / 5 - 6"   | 161 | 1120     |
| 10 - 12mm / .425 - .5" | 59  | 59       | 150 - 175mm / 6 - 7"   | 161 | 1190     |
| 12 - 16mm / .5 - .65"  | 82  | 140      | 175 - 200mm / 7 - 8"   | 161 | 1260     |
| 16 - 20mm / .65 - .8"  | 82  | 145      | 200 - 225mm / 8 - 9"   | 161 | 1420     |
| 20 - 25mm / .8 - 1"    | 94  | 250      | 225 - 250mm / 9 - 10"  | 161 | 1580     |
| 25 - 30mm / 1 - 1.2"   | 94  | 270      | 250 - 275mm / 10 - 11" | 161 | 1600     |
| 30 - 40mm / 1.2 - 1.6" | 102 | 290      | 275 - 300mm / 11 - 12" | 161 | 1690     |

| Range                 | a    | b   | c    |
|-----------------------|------|-----|------|
| 2 - 6mm / .08 - .275" | —    | —   | 2    |
| 6 - 12mm / .275 - .5" | 2    | —   | 2.5  |
| 12 - 20mm / .5 - .8"  | 0.3  | 5.6 | 3.5  |
| 20 - 30mm / .8 - 1.2" | 0.3  | 8.3 | 5.2  |
| 30 - 50mm / 1.2 - 2"  | 0.3  | 13  | 10   |
| 50 - 100mm / 2 - 4"   | 0.3  | 17  | 14   |
| 100 - 300mm / 4 - 12" | 12.4 | 21  | 13.8 |



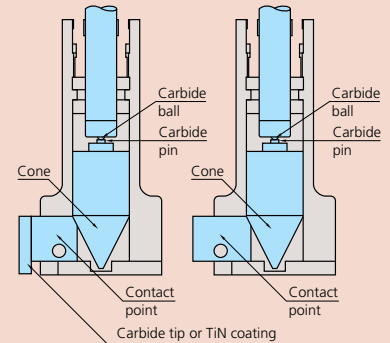
### Technical Data

Graduation: 0.001mm, 0.005mm\*, .0001" or .0002"\*  
(\*over 12mm or .5" models)

| Range            | Measuring method   | Contact-point material    |
|------------------|--------------------|---------------------------|
| 2-6mm/.08-.28"   | Two-point method   | Carbide                   |
| 6-300mm/.275-12" | Three-point method | TiN coating (1700-2000HV) |

### Optional Accessories

- 952322:** Extension rod 100mm / 3.94"  
For range 6-12mm / .275-.5" models
- 952621:** Extension rod 150mm / 5.9"  
For range 12-20mm / .5" - .8" models
- 952622:** Extension rod 150mm / 5.9"  
For range 20-50mm / .8" - 2" models
- 952623:** Extension rod 150mm / 5.9"  
For range 50-300mm / 2"-12" models



Using the optional extension rod



## SPECIFICATIONS

**Metric**  Individual  with TiN-coated contact points

| Range       | Order No.      | Accuracy |
|-------------|----------------|----------|
| 2 - 2.5mm   | <b>368-001</b> | ±2μm     |
| 2.5 - 3mm   | <b>368-002</b> | ±2μm     |
| 3 - 4mm     | <b>368-003</b> | ±2μm     |
| 4 - 5mm     | <b>368-004</b> | ±2μm     |
| 5 - 6mm     | <b>368-005</b> | ±2μm     |
| 6 - 8mm     | <b>368-161</b> | ±2μm     |
| 8 - 10mm    | <b>368-162</b> | ±2μm     |
| 10 - 12mm   | <b>368-163</b> | ±2μm     |
| 12 - 16mm   | <b>368-164</b> | ±2μm     |
| 16 - 20mm   | <b>368-165</b> | ±2μm     |
| 20 - 25mm   | <b>368-166</b> | ±3μm     |
| 25 - 30mm   | <b>368-167</b> | ±3μm     |
| 30 - 40mm   | <b>368-168</b> | ±3μm     |
| 40 - 50mm   | <b>368-169</b> | ±3μm     |
| 50 - 63mm   | <b>368-170</b> | ±3μm     |
| 62 - 75mm   | <b>368-171</b> | ±3μm     |
| 75 - 88mm   | <b>368-172</b> | ±3μm     |
| 87 - 100mm  | <b>368-173</b> | ±3μm     |
| 100 - 125mm | <b>368-174</b> | ±5μm     |
| 125 - 150mm | <b>368-175</b> | ±5μm     |
| 150 - 175mm | <b>368-176</b> | ±5μm     |
| 175 - 200mm | <b>368-177</b> | ±5μm     |
| 200 - 225mm | <b>368-178</b> | ±5μm     |
| 225 - 250mm | <b>368-179</b> | ±5μm     |
| 250 - 275mm | <b>368-180</b> | ±5μm     |
| 275 - 300mm | <b>368-181</b> | ±5μm     |

**Inch**  Individual  with TiN-coated contact points

| Range       | Order No.      | Accuracy |
|-------------|----------------|----------|
| .08 - .1"   | <b>368-021</b> | ±.0001"  |
| .1 - .12"   | <b>368-022</b> | ±.0001"  |
| .12 - .16"  | <b>368-023</b> | ±.0001"  |
| .16 - .2"   | <b>368-024</b> | ±.0001"  |
| .2 - .24"   | <b>368-025</b> | ±.0001"  |
| .24 - .28"  | <b>368-026</b> | ±.0001"  |
| .275 - .35" | <b>368-261</b> | ±.0001"  |
| .35 - .425" | <b>368-262</b> | ±.0001"  |
| .425 - .5"  | <b>368-263</b> | ±.0001"  |
| .5 - .65"   | <b>368-264</b> | ±.0001"  |
| .65 - .8"   | <b>368-265</b> | ±.0001"  |
| .8 - 1"     | <b>368-266</b> | ±.00015" |
| 1 - 1.2"    | <b>368-267</b> | ±.00015" |
| 1.2 - 1.6"  | <b>368-268</b> | ±.00015" |
| 1.6 - 2"    | <b>368-269</b> | ±.00015" |
| 2 - 2.5"    | <b>368-270</b> | ±.00015" |
| 2.5 - 3"    | <b>368-271</b> | ±.00015" |
| 3 - 3.5"    | <b>368-272</b> | ±.00015" |
| 3.5 - 4"    | <b>368-273</b> | ±.00015" |
| 4 - 5"      | <b>368-274</b> | ±.00025" |
| 5 - 6"      | <b>368-275</b> | ±.00025" |
| 6 - 7"      | <b>368-276</b> | ±.00025" |
| 7 - 8"      | <b>368-277</b> | ±.00025" |
| 8 - 9"      | <b>368-278</b> | ±.00025" |
| 9 - 10"     | <b>368-279</b> | ±.00025" |
| 10 - 11"    | <b>368-280</b> | ±.00025" |
| 11 - 12"    | <b>368-281</b> | ±.00025" |

### Complete Unit Set

Each set includes complete gages (micrometer head units and measuring heads for each size).

**Metric**  with TiN-coated contact points

| Range       | Order No.      | Individual range                     | Setting rings included | Remarks            |
|-------------|----------------|--------------------------------------|------------------------|--------------------|
| 2 - 3mm     | <b>368-906</b> | 2-2.5, 2.5-3mm                       | ø2.5mm                 | —                  |
| 3 - 6mm     | <b>368-907</b> | 3-4, 4-5, 5-6mm                      | ø4mm, ø5mm             | —                  |
| 6 - 12mm    | <b>368-911</b> | 6-8, 8-10, 10-12mm                   | ø8mm, ø10mm            | with extension rod |
| 12 - 20mm   | <b>368-912</b> | 12-16, 16-20mm                       | ø16mm                  | with extension rod |
| 20 - 50mm   | <b>368-913</b> | 20-25, 25-30, 30-40, 40-50mm         | ø25mm, ø40mm           | with extension rod |
| 50 - 100mm  | <b>368-914</b> | 50-63, 62-75, 75-88, 87-100mm        | ø62mm, ø87mm           | with extension rod |
| 100 - 200mm | <b>368-915</b> | 100-125, 125-150, 150-175, 175-200mm | ø125mm, ø175mm         | with extension rod |

**Inch**  with TiN-coated contact points

| Range       | Order No.      | Individual range                     | Setting rings included | Remarks            |
|-------------|----------------|--------------------------------------|------------------------|--------------------|
| .08" - .12" | <b>368-926</b> | .08-.1", .1-.12"                     | .1" DIA.               | —                  |
| .12" - .28" | <b>368-927</b> | .12-.16", .16-.2", .2-.24", .24-.28" | .16" DIA., .24" DIA.   | —                  |
| .275" - .5" | <b>368-916</b> | .275-.35", .35-.425", .425-.5"       | .35" DIA., .5" DIA.    | with extension rod |
| .5" - .8"   | <b>368-917</b> | .5-.65", .65-.8"                     | .65" DIA.              | with extension rod |
| .8" - 2"    | <b>368-918</b> | .8-1", 1-1.2", 1.2-1.6", 1.6-2"      | 1" DIA., 1.6" DIA.     | with extension rod |
| 2" - 4"     | <b>368-919</b> | 2-2.5", 2.5-3", 3-3.5", 3.5-4"       | 2.5" DIA., 3.5" DIA.   | with extension rod |
| 4" - 8"     | <b>368-920</b> | 4-5", 5-6", 6-7", 7-8"               | 5" DIA., 7" DIA.       | with extension rod |

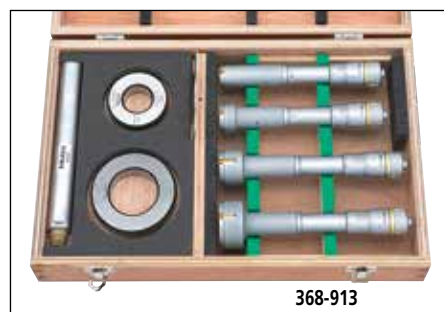
\*.0001" graduation



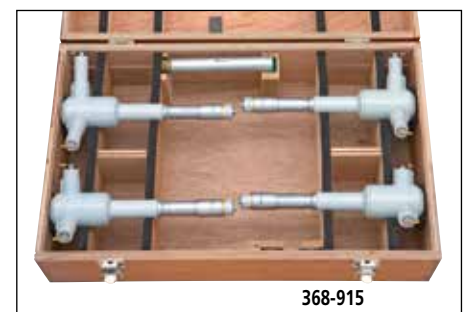
368-906



368-911



368-913



368-915

# Holtest (Type II)

## SERIES 368 — Three-Point Internal Micrometers

### FEATURES

- The Holtests (type II) have three contact points made of alloy steel.
- Measurement can be taken closer to the bottom of the blind bore (up to 100mm / 4" models).
- Measure deep holes using an extension rod (optional).
- With Ratchet Stop for constant force.
- Setting rings for origin point settings are optional.
- Supplied in fitted plastic case up to 100mm / 4". Over 100mm / 4" supplied in wooden case.



368-869



368-770



368-774

### DIMENSIONS AND MASS

| Range                  | L   | Mass (g) |
|------------------------|-----|----------|
| 12 - 16mm / .5 - .65"  | 82  | 150      |
| 16 - 20mm / .65 - .8"  | 82  | 150      |
| 20 - 25mm / .8 - 1"    | 94  | 260      |
| 25 - 30mm / 1 - 1.2"   | 94  | 280      |
| 30 - 40mm / 1.2 - 1.6" | 102 | 290      |
| 40 - 50mm / 1.6 - 2"   | 102 | 330      |
| 50 - 63mm / 2 - 2.5"   | 105 | 440      |
| 62 - 75mm / 2.5 - 3"   | 105 | 450      |
| 75 - 88mm / 3 - 3.5"   | 105 | 560      |
| 87 - 100mm / 3.5 - 4"  | 105 | 570      |
| 100 - 125mm / 4 - 5"   | 161 | 1020     |
| 125 - 150mm / 5 - 6"   | 161 | 1110     |
| 150 - 175mm / 6 - 7"   | 161 | 1200     |
| 175 - 200mm / 7 - 8"   | 161 | 1300     |
| 200 - 225mm / 8 - 9"   | 161 | 1420     |
| 225 - 250mm / 9 - 10"  | 161 | 1540     |
| 250 - 275mm / 10 - 11" | 161 | 1690     |
| 275 - 300mm / 11 - 12" | 161 | 1860     |

Unit: mm

#### Measuring a Blind Hole

The measuring contact points held in the jaws permit measuring the diameter of a blind hole right down to the bottom (up to 100mm / 4" models).

| Range                 | a    | b    |
|-----------------------|------|------|
| 12 - 20mm / .5 - .8"  | 2.6  | 3.5  |
| 20 - 30mm / .8 - .12" | 3.4  | 5.2  |
| 30 - 50mm / 1.2 - 2"  | 3.4  | 10   |
| 50 - 100mm / 2 - 4"   | 3.4  | 14   |
| 100 - 300mm / 4 - 12" | 19.6 | 13.8 |



### Technical Data

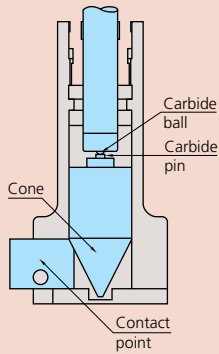
Graduation: 0.005mm or .0002"  
 Measuring method: Three-point method  
 Contact point: Hardened steel (over HRC 60)

### Optional Accessories

- 952621:** Extension rod 150mm / 5.9"  
For range 12-20mm / .5 - .8" models
- 952622:** Extension rod 150mm / 5.9"  
For range 20-50mm / .8 - 2" models
- 952623:** Extension rod 150mm / 5.9"  
For range 50-300mm / 2 - 12" models



## SPECIFICATIONS



### HT (Type II)

| Head Assy Order No. | Measuring Range | HT (type II) Order No. |
|---------------------|-----------------|------------------------|
| 04AZA839            | 12 - 16mm       | 368-764                |
| 04AZA840            | 16 - 20mm       | 368-765                |
| 04AZA848            | 20 - 25mm       | 368-766                |
| 04AZA849            | 25 - 30mm       | 368-767                |
| 04AZA857            | 30 - 40mm       | 368-768                |
| 04AZA858            | 40 - 50mm       | 368-769                |
| 04AZA870            | 50 - 63mm       | 368-770                |
| 04AZA871            | 62 - 75mm       | 368-771                |
| 04AZA872            | 75 - 88mm       | 368-772                |
| 04AZA873            | 87 - 100mm      | 368-773                |
| 04AZA895            | 100 - 125mm     | 368-774                |
| 04AZA896            | 125 - 150mm     | 368-775                |
| 04AZA897            | 150 - 175mm     | 368-776                |
| 04AZA898            | 175 - 200mm     | 368-777                |
| 04AZA899            | 200 - 225mm     | 368-778                |
| 04AZA900            | 225 - 250mm     | 368-779                |
| 04AZA901            | 250 - 275mm     | 368-780                |
| 04AZA902            | 275 - 300mm     | 368-781                |
| 04AZA841            | .5 - .65"       | 368-864                |
| 04AZA842            | .65 - .8"       | 368-865                |
| 04AZA850            | .8 - 1"         | 368-866                |
| 04AZA851            | 1 - 1.2"        | 368-867                |
| 04AZA859            | 1.2 - 1.6"      | 368-868                |
| 04AZA860            | 1.6 - 2"        | 368-869                |
| 04AZA874            | 2 - 2.5"        | 368-870                |
| 04AZA875            | 2.5 - 3"        | 368-871                |
| 04AZA876            | 3 - 3.5"        | 368-872                |
| 04AZA877            | 3.5 - 4"        | 368-873                |
| 04AZA903            | 4 - 5"          | 368-874                |
| 04AZA904            | 5 - 6"          | 368-875                |
| 04AZA905            | 6 - 7"          | 368-876                |
| 04AZA906            | 7 - 8"          | 368-877                |
| 04AZA907            | 8 - 9"          | 368-878                |
| 04AZA908            | 9 - 10"         | 368-879                |
| 04AZA909            | 10 - 11"        | 368-880                |
| 04AZA910            | 11 - 12"        | 368-881                |

| Metric Individual |           |          |
|-------------------|-----------|----------|
| Range             | Order No. | Accuracy |
| 12 - 16mm         | 368-764   | ±2µm     |
| 16 - 20mm         | 368-765   | ±2µm     |
| 20 - 25mm         | 368-766   | ±3µm     |
| 25 - 30mm         | 368-767   | ±3µm     |
| 30 - 40mm         | 368-768   | ±3µm     |
| 40 - 50mm         | 368-769   | ±3µm     |
| 50 - 63mm         | 368-770   | ±3µm     |
| 62 - 75mm         | 368-771   | ±3µm     |
| 75 - 88mm         | 368-772   | ±3µm     |
| 87 - 100mm        | 368-773   | ±3µm     |
| 100 - 125mm       | 368-774   | ±5µm     |
| 125 - 150mm       | 368-775   | ±5µm     |
| 150 - 175mm       | 368-776   | ±5µm     |
| 175 - 200mm       | 368-777   | ±5µm     |
| 200 - 225mm       | 368-778   | ±5µm     |
| 225 - 250mm       | 368-779   | ±5µm     |
| 250 - 275mm       | 368-780   | ±5µm     |
| 275 - 300mm       | 368-781   | ±5µm     |

| Inch Individual |           |          |
|-----------------|-----------|----------|
| Range           | Order No. | Accuracy |
| .5 - .65"       | 368-864   | ±.0001"  |
| .65 - .8"       | 368-865   | ±.0001"  |
| .8 - 1"         | 368-866   | ±.00015" |
| 1 - 1.2"        | 368-867   | ±.00015" |
| 1.2 - 1.6"      | 368-868   | ±.00015" |
| 1.6 - 2"        | 368-869   | ±.00015" |
| 2 - 2.5"        | 368-870   | ±.00015" |
| 2.5 - 3"        | 368-871   | ±.00015" |
| 3 - 3.5"        | 368-872   | ±.00015" |
| 3.5 - 4"        | 368-873   | ±.00015" |
| 4 - 5"          | 368-874   | ±.00025" |
| 5 - 6"          | 368-875   | ±.00025" |
| 6 - 7"          | 368-876   | ±.00025" |
| 7 - 8"          | 368-877   | ±.00025" |
| 8 - 9"          | 368-878   | ±.00025" |
| 9 - 10"         | 368-879   | ±.00025" |
| 10 - 11"        | 368-880   | ±.00025" |
| 11 - 12"        | 368-881   | ±.00025" |

### Complete Unit Set

Each set includes complete gages (micrometer head units and measuring heads for each size).

| Metric      |           |                                      |                        |                    |
|-------------|-----------|--------------------------------------|------------------------|--------------------|
| Range       | Order No. | Individual range                     | Setting rings included | Remarks            |
| 12 - 20mm   | 368-991   | 12-16, 16-20mm                       | ø16mm                  | with extension rod |
| 20 - 50mm   | 368-992   | 20-25, 25-30, 30-40, 40-50mm         | ø25mm, ø40mm           | with extension rod |
| 50 - 100mm  | 368-993   | 50-63, 62-75, 75-88, 87-100mm        | ø62mm, ø87mm           | with extension rod |
| 100 - 200mm | 368-994   | 100-125, 125-150, 150-175, 175-200mm | ø125mm, ø175mm         | with extension rod |

| Inch      |           |                                 |                        |                    |
|-----------|-----------|---------------------------------|------------------------|--------------------|
| Range     | Order No. | Individual range                | Setting rings included | Remarks            |
| .5" - .8" | 368-995   | .5-.65", .65-.8"                | .65" DIA.              | with extension rod |
| .8" - 2"  | 368-996   | .8-1", 1-1.2", 1.2-1.6", 1.6-2" | 1" DIA., 1.6" DIA.     | with extension rod |
| 2" - 4"   | 368-997   | 2-2.5", 2.5-3", 3-3.5", 3.5-4"  | 2.5" DIA., 3.5" DIA.   | with extension rod |
| 4" - 8"   | 368-998   | 4-5", 5-6", 6-7", 7-8"          | 5" DIA., 7" DIA.       | with extension rod |



# Borematic

## SERIES 568 — ABSOLUTE Digimatic Snap Bore Gages

The Borematic enables the operator to take measurements more accurately and quicker than ever before. Once the origin point is set with the ORIGIN button, the Borematic retains the setting for the entire battery life, therefore, no longer repeated origin setting (presetting) is necessary.

### FEATURES

- TiN-coated measuring contact points provide excellent durability and impact resistance and allow the instrument to measure to the bottom of a blind hole.
- Large LCD digits of 8.5mm height for easy reading.
- 330-degree rotatable display unit for easy reading at any angle.
- Go/no-go judgment function.
- The ABSOLUTE linear encoder eliminates over-speed errors.
- With SPC data output.
- Setting rings for origin point setting are optional.
- Measure deep holes by attaching an optional extension rod.
- Measurement can be taken closer to the bottom of a blind bore.
- Supplied in fitted wooden case.



TiN-coated contact points (" -10" suffix models only)

### SPECIFICATIONS

| Metric      | Individual |          |          |
|-------------|------------|----------|----------|
| Range       | Order No.  | Accuracy | Mass (g) |
| 6 - 8mm     | 568-361    | ±5µm     | 480      |
| 8 - 10mm    | 568-362    | ±5µm     | 485      |
| 10 - 12mm   | 568-363    | ±5µm     | 485      |
| 12 - 16mm   | 568-364    | ±5µm     | 475      |
| 16 - 20mm   | 568-365    | ±5µm     | 480      |
| 20 - 25mm   | 568-366    | ±6µm     | 540      |
| 25 - 30mm   | 568-367    | ±6µm     | 555      |
| 30 - 40mm   | 568-368    | ±6µm     | 565      |
| 40 - 50mm   | 568-369    | ±6µm     | 610      |
| 50 - 63mm   | 568-370    | ±6µm     | 730      |
| 62 - 75mm   | 568-371    | ±6µm     | 740      |
| 75 - 88mm   | 568-372    | ±6µm     | 790      |
| 87 - 100mm  | 568-373    | ±6µm     | 800      |
| 100 - 113mm | 568-374    | ±6µm     | 900      |
| 112 - 125mm | 568-375    | ±6µm     | 910      |

| Inch/Metric                    |           |          |          |
|--------------------------------|-----------|----------|----------|
| Range                          | Order No. | Accuracy | Mass (g) |
| .275 - .350" / 6.985 - 8.89mm  | 568-461   | ±.00025" | 480      |
| .350 - .425" / 8.89 - 10.795mm | 568-462   | ±.00025" | 485      |
| .425 - .5" / 10.795 - 12.7mm   | 568-463   | ±.00025" | 485      |
| .50 - .65" / 12.7 - 16.51mm    | 568-464   | ±.00025" | 475      |
| .65 - .80" / 16.51 - 20.32mm   | 568-465   | ±.00025" | 480      |
| .8 - 1.0" / 20.32 - 25.4mm     | 568-466   | ±.0003"  | 540      |
| 1.0 - 1.2" / 25.4 - 30.48mm    | 568-467   | ±.0003"  | 555      |
| 1.2 - 1.6" / 30.48 - 40.64mm   | 568-468   | ±.0003"  | 565      |
| 1.6 - 2.0" / 40.64 - 50.8mm    | 568-469   | ±.0003"  | 610      |
| 2.0 - 2.5" / 50.8 - 63.5mm     | 568-470   | ±.0003"  | 730      |
| 2.5 - 3.0" / 63.5 - 76.2mm     | 568-471   | ±.0003"  | 740      |
| 3.0 - 3.5" / 76.2 - 88.9mm     | 568-472   | ±.0003"  | 790      |
| 3.5 - 4.0" / 88.9 - 101.6mm    | 568-473   | ±.0003"  | 800      |
| 4.0 - 4.5" / 101.6 - 114.3mm   | 568-474   | ±.0003"  | 900      |
| 4.5 - 5.0" / 114.3 - 127mm     | 568-475   | ±.0003"  | 910      |



### Technical Data

Accuracy: Refer to the list of specifications.

Resolution: 0.001mm or .00005"/0.001mm

Contact point: Carbide or TiN coating\*  
(\*over 12mm/.5" models)

Measuring method: Three-point method

Display: LCD

Battery: SR44 (1 pc.) (938882)

Battery life: Approx. 7,000 hours

### Functions

Zero/ABS, presetting, go/no-go judgment, power on/off, inch/mm conversion (on inch/metric models only), SPC data output, data hold

### Optional Accessories

905338: SPC cable (1m / 40")

905409: SPC cable (2m / 80")

952322: Extension rod 100mm / 3.94"  
For range 6-12mm / .275-.5" models

952621: Extension rod 150mm / 5.9"  
For range 12-20mm / .5" - .8" models

952622: Extension rod 150mm / 5.9"  
For range 20-50mm / .8" - 2" models

952623: Extension rod 150mm / 5.9"  
For range 50-300mm / 2" - 12" models

----: Setting ring (See page C-29.)



## Complete Unit Set

Each set includes complete gage display units and measuring heads for each size and extension rod.

### Metric

| Range      | Set Order No. | Individual Order No.        | Setting rings included             |
|------------|---------------|-----------------------------|------------------------------------|
| 6 - 12mm   | 568-955       | 568-361, 568-362<br>568-363 | 177-125 (ø8mm)<br>177-126 (ø10mm)  |
| 12 - 25mm  | 568-956       | 568-364, 568-365<br>568-366 | 177-177 (ø16mm)<br>177-286 (ø20mm) |
| 25 - 50mm  | 568-957       | 568-367, 568-368<br>568-369 | 177-139 (ø25mm)<br>177-290 (ø40mm) |
| 50 - 75mm  | 568-958       | 568-370<br>568-371          | 177-314 (ø62mm)                    |
| 75 - 100mm | 568-959       | 568-372<br>568-373          | 177-318 (ø87mm)                    |

### Inch/Metric

| Range                           | Set Order No. | Individual Order No.        | Setting rings included                      |
|---------------------------------|---------------|-----------------------------|---|
| .275" - .5" /<br>6.985 - 12.7mm | 568-965       | 568-461, 568-462<br>568-463 | 177-179 (.35" DIA.)<br>177-283 (.425" DIA.) |
| .5" - 1" /<br>12.7 - 25.4mm     | 568-966       | 568-464, 568-465<br>568-466 | 177-182 (.65" DIA.)<br>177-287 (.8" DIA.)   |
| 1" - 2" /<br>25.4 - 50.8mm      | 568-967       | 568-467, 568-468<br>568-469 | 177-289 (1.2" DIA.)<br>177-291 (1.6" DIA.)  |
| 2" - 3" /<br>50.8 - 76.2mm      | 568-968       | 568-470<br>568-471          | 177-315 (2.5" DIA.)                         |
| 3" - 4" /<br>76.2 - 101.6mm     | 568-969       | 568-472<br>568-473          | 177-319 (3.5" DIA.)                         |

## Interchangeable Head Set

Each set includes one display unit with interchangeable measuring heads of the sizes specified and extension rod.

### Metric

| Range      | Set Order No. | Display Unit | Adaptor Supplied | Individual Head No.                      | Setting rings included             |
|------------|---------------|--------------|------------------|--|------------------------------------|
| 6 - 12mm   | 568-924       | 568-014      | 954595           | 04AZB136<br>04AZB137<br>04AZB138         | 177-125 (ø8mm)<br>177-126 (ø10mm)  |
| 12 - 25mm  | 568-925       | 568-014      | 216556<br>216557 | 04AZA719<br>04AZA720<br>04AZA728         | 177-177 (ø16mm)<br>177-286 (ø20mm) |
| 25 - 50mm  | 568-926       | 568-014      | 216557           | 04AZA729<br>04AZA737<br>04AZA738         | 177-288 (ø30mm)<br>177-290 (ø40mm) |
| 50 - 100mm | 568-927       | 568-014      | 216558           | 04AZA750, 04AZA751, 04AZA752<br>04AZA753 | 177-314 (ø62mm)<br>177-318 (ø87mm) |

### Inch/Metric

| Range                           | Set Order No. | Display Unit | Adaptor Supplied | Individual Head No.                          | Setting rings included                      |
|---------------------------------|---------------|--------------|------------------|--|---|
| .275" - .5" /<br>6.985 - 12.7mm | 568-928       | 568-015      | 954595           | 04AZB139<br>04AZB140<br>04AZB141             | 177-179 (.35" DIA.)<br>177-283 (.425" DIA.) |
| .5" - 1" /<br>12.7 - 25.4mm     | 568-929       | 568-015      | 216556<br>216557 | 04AZA721<br>04AZA722<br>04AZA730             | 177-182 (.65" DIA.)<br>177-287 (.8" DIA.)   |
| 1" - 2" /<br>25.4 - 50.8mm      | 568-930       | 568-015      | 216557           | 04AZA731<br>04AZA739<br>04AZA740             | 177-289 (1.2" DIA.)<br>177-291 (1.6" DIA.)  |
| 2" - 4" /<br>50.8 - 101.6mm     | 568-936       | 568-015      | 216558           | 04AZA754<br>04AZA755<br>04AZA756<br>04AZA757 | 177-315 (2.5" DIA.)<br>177-319 (3.5" DIA.)  |

## Interchangeable Contact Head Set



568-924

## Complete Unit Set



568-959

## DIMENSIONS

### Measuring a Blind Hole

The measuring pins held in the jaws permit measuring the diameter of a blind hole right down to the bottom.

Unit: mm

| Range                 | L  | a   | b   | c   |
|-----------------------|----|-----|-----|-----|
| 6 - 12mm / .275 - .5" | 83 | 2   | —   | 2.5 |
| 12 - 20mm / .5 - .8"  | 53 | 0.3 | 5.6 | 3.5 |
| 20 - 30mm / .8 - 1.2" | 59 | 0.3 | 8.3 | 5.2 |
| 30 - 50mm / 1.2 - 2"  | 67 | 0.3 | 13  | 10  |
| 50 - 125mm / 2 - 5"   | 75 | 0.3 | 17  | 14  |

( ) : 50-125mm model

# Holtest/Digimatic Holtest/Borematic

## SERIES 368, 468, 568 Replacement Head Assembly List

TiN-coated measuring contact head assembly

| Head Assy Order No. | Measuring Range | HT(Type I) |           | HTD       |            | SBM       |            | Adaptor* |
|---------------------|-----------------|------------|-----------|-----------|------------|-----------|------------|----------|
|                     |                 | Order No.  | Model     | Order No. | Model      | Order No. | Model      |          |
| 04AZB136            | 6 - 8mm         | 368-161    | HT-8R     | 468-161   | HTD-8R     | 568-361   | SBM-8C     | 954595   |
| 04AZB137            | 8 - 10mm        | 368-162    | HT-10R    | 468-162   | HTD-10R    | 568-362   | SBM-10C    |          |
| 04AZB138            | 10 - 12mm       | 368-163    | HT-12R    | 468-163   | HTD-12R    | 568-363   | SBM-12C    |          |
| 04AZA719            | 12 - 16mm       | 368-164    | HT-16R    | 468-164   | HTD-16R    | 568-364   | SBM-16C    | 216556   |
| 04AZA720            | 16 - 20mm       | 368-165    | HT-20R    | 468-165   | HTD-20R    | 568-365   | SBM-20C    |          |
| 04AZA728            | 20 - 25mm       | 368-166    | HT-25R    | 468-166   | HTD-25R    | 568-366   | SBM-25C    | 216557   |
| 04AZA729            | 25 - 30mm       | 368-167    | HT-30R    | 468-167   | HTD-30R    | 568-367   | SBM-30C    |          |
| 04AZA737            | 30 - 40mm       | 368-168    | HT-40R    | 468-168   | HTD-40R    | 568-368   | SBM-40C    |          |
| 04AZA738            | 40 - 50mm       | 368-169    | HT-50R    | 468-169   | HTD-50R    | 568-369   | SBM-50C    |          |
| 04AZA750            | 50 - 63mm       | 368-170    | HT-63R    | 468-170   | HTD-63R    | 568-370   | SBM-63C    |          |
| 04AZA751            | 62 - 75mm       | 368-171    | HT-75R    | 468-171   | HTD-75R    | 568-371   | SBM-75C    | 216558   |
| 04AZA752            | 75 - 88mm       | 368-172    | HT-88R    | 468-172   | HTD-88R    | 568-372   | SBM-88C    |          |
| 04AZA753            | 87 - 100mm      | 368-173    | HT-100R   | 468-173   | HTD-100R   | 568-373   | SBM-100C   |          |
| 04AZA775            | 100 - 125mm     | 368-174    | HT-125R   | 468-174   | HTD-125R   | —         | —          | —        |
| 04AZA776            | 125 - 150mm     | 368-175    | HT-150R   | 468-175   | HTD-150R   | —         | —          | —        |
| 04AZA777            | 150 - 175mm     | 368-176    | HT-175R   | 468-176   | HTD-175R   | —         | —          | —        |
| 04AZA778            | 175 - 200mm     | 368-177    | HT-200R   | 468-177   | HTD-200R   | —         | —          | —        |
| 04AZA779            | 200 - 225mm     | 368-178    | HT-225R   | 468-178   | HTD-225R   | —         | —          | —        |
| 04AZA780            | 225 - 250mm     | 368-179    | HT-250R   | 468-179   | HTD-250R   | —         | —          | —        |
| 04AZA781            | 250 - 275mm     | 368-180    | HT-275R   | 468-180   | HTD-275R   | —         | —          | —        |
| 04AZA782            | 275 - 300mm     | 368-181    | HT-300R   | 468-181   | HTD-300R   | —         | —          | —        |
| 04AZB139            | .275 - .35"     | 368-261    | HT-.35"R  | 468-261   | HTD-.35"R  | 568-461   | SBM-.35"C  | 954595   |
| 04AZB140            | .35 - .425"     | 368-262    | HT-.425"R | 468-262   | HTD-.425"R | 568-462   | SBM-.425"C |          |
| 04AZB141            | .425 - .5"      | 368-263    | HT-.5"R   | 468-263   | HTD-.5"R   | 568-463   | SBM-.5"C   |          |
| 04AZA721            | .5 - .65"       | 368-264    | HT-.65"R  | 468-264   | HTD-.65"R  | 568-464   | SBM-.65"C  | 216556   |
| 04AZA722            | .65 - .8"       | 368-265    | HT-.8"R   | 468-265   | HTD-.8"R   | 568-465   | SBM-.8"C   |          |
| 04AZA730            | .8 - 1"         | 368-266    | HT-1"R    | 468-266   | HTD-1"R    | 568-466   | SBM-1"C    | 216557   |
| 04AZA731            | 1 - 1.2"        | 368-267    | HT-1.2"R  | 468-267   | HTD-1.2"R  | 568-467   | SBM-1.2"C  |          |
| 04AZA739            | 1.2 - 1.6"      | 368-268    | HT-1.6"R  | 468-268   | HTD-1.6"R  | 568-468   | SBM-1.6"C  |          |
| 04AZA740            | 1.6 - 2"        | 368-269    | HT-2"R    | 468-269   | HTD-2"R    | 568-469   | SBM-2"C    |          |
| 04AZA754            | 2 - 2.5"        | 368-270    | HT-2.5"R  | 468-270   | HTD-2.5"R  | 568-470   | SBM-2.5"C  |          |
| 04AZA755            | 2.5 - 3"        | 368-271    | HT-3"R    | 468-271   | HTD-3"R    | 568-471   | SBM-3"C    | 216558   |
| 04AZA756            | 3 - 3.5"        | 368-272    | HT-3.5"R  | 468-272   | HTD-3.5"R  | 568-472   | SBM-3.5"C  |          |
| 04AZA757            | 3.5 - 4"        | 368-273    | HT-4"R    | 468-273   | HTD-4"R    | 568-473   | SBM-4"C    |          |
| 04AZA783            | 4 - 5"          | 368-274    | HT-5"R    | 468-274   | HTD-5"R    | —         | —          | —        |
| 04AZA784            | 5 - 6"          | 368-275    | HT-6"R    | 468-275   | HTD-6"R    | —         | —          | —        |
| 04AZA785            | 6 - 7"          | 368-276    | HT-7"R    | 468-276   | HTD-7"R    | —         | —          | —        |
| 04AZA786            | 7 - 8"          | 368-277    | HT-8"R    | 468-277   | HTD-8"R    | —         | —          | —        |
| 04AZA787            | 8 - 9"          | 368-278    | HT-9"R    | 468-278   | HTD-9"R    | —         | —          | —        |
| 04AZA788            | 9 - 10"         | 368-279    | HT-10"R   | 468-279   | HTD-10"R   | —         | —          | —        |
| 04AZA789            | 10 - 11"        | 368-280    | HT-11"R   | 468-280   | HTD-11"R   | —         | —          | —        |
| 04AZA790            | 11 - 12"        | 368-281    | HT-12"R   | 468-281   | HTD-12"R   | —         | —          | —        |
| 04AZA941            | 100 - 113mm     | —          | —         | —         | —          | 568-374   | SBM-113C   | 216558   |
| 04AZA942            | 112 - 125mm     | —          | —         | —         | —          | 568-375   | SBM-125C   |          |
| 04AZA943            | 4 - 4.5"        | —          | —         | —         | —          | 568-474   | SBM-4.5"C  |          |
| 04AZA944            | 4.5 - 5"        | —          | —         | —         | —          | 568-475   | SBM-5"C    |          |

\* Adaptors are required to connect borematic head assemblies and borematic main body units. Sets and complete units include the correct adaptors for the included heads, while individual heads (purchased separately) do not.

Adaptors are not required for Vernier/Digimatic Holtests.

Separately purchased head assemblies are not covered by the guaranteed accuracy for holtests (368/468 series).

# Tubular Inside Micrometers

## SERIES 133 — Single-Rod Type

### FEATURES

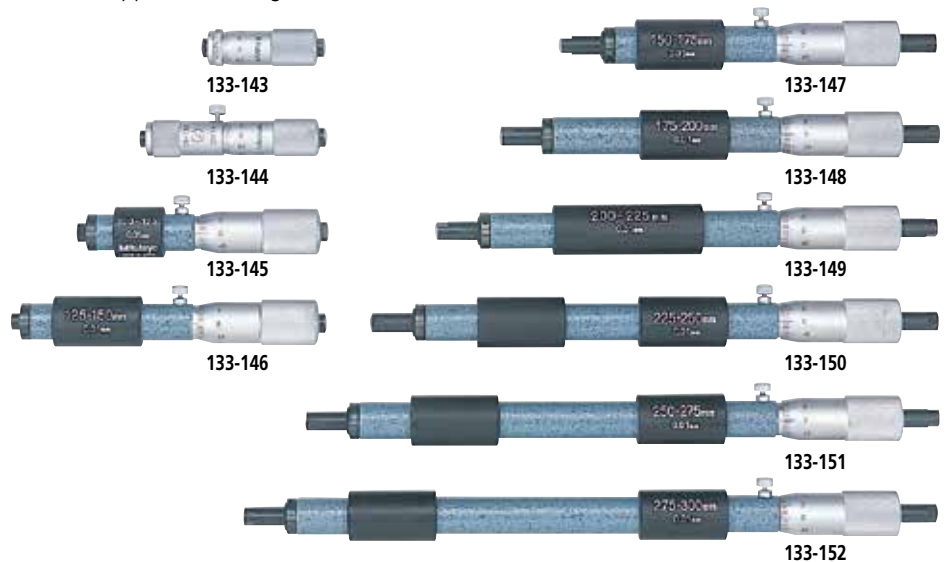
- With locking clamp.
- Zero point can be readjusted by rotating the micrometer head sleeve. A key wrench is supplied.
- Clear, crisp graduations on the satin-chrome finished micrometer head.
- Carbide-tipped measuring faces.
- Supplied in fitted plastic case. Over 200mm / 8" supplied in wooden case.

### Technical Data

Accuracy: Refer to the list of specifications.  
Graduation: 0.01mm or .001"

### Optional Accessories

---- : Setting ring (See page C-29.)



### SPECIFICATIONS

| Metric Individual |           |          |
|-------------------|-----------|----------|
| Range             | Order No. | Accuracy |
| 50 - 75mm         | 133-143   | ±3µm     |
| 75 - 100mm        | 133-144   | ±4µm     |
| 100 - 125mm       | 133-145   | ±5µm     |
| 125 - 150mm       | 133-146   | ±5µm     |
| 150 - 175mm       | 133-147   | ±5µm     |
| 175 - 200mm       | 133-148   | ±5µm     |
| 200 - 225mm       | 133-149   | ±5µm     |
| 225 - 250mm       | 133-150   | ±6µm     |
| 250 - 275mm       | 133-151   | ±6µm     |
| 275 - 300mm       | 133-152   | ±6µm     |
| 300 - 325mm       | 133-153   | ±7µm     |
| 325 - 350mm       | 133-154   | ±7µm     |
| 350 - 375mm       | 133-155   | ±7µm     |
| 375 - 400mm       | 133-156   | ±8µm     |
| 400 - 425mm       | 133-157   | ±8µm     |
| 425 - 450mm       | 133-158   | ±8µm     |
| 450 - 475mm       | 133-159   | ±9µm     |
| 475 - 500mm       | 133-160   | ±9µm     |
| 500 - 525mm       | 133-161   | ±9µm     |
| 525 - 550mm       | 133-162   | ±10µm    |
| 550 - 575mm       | 133-163   | ±10µm    |
| 575 - 600mm       | 133-164   | ±10µm    |
| 600 - 625mm       | 133-165   | ±11µm    |
| 625 - 650mm       | 133-166   | ±11µm    |
| 650 - 675mm       | 133-167   | ±11µm    |
| 675 - 700mm       | 133-168   | ±12µm    |

| Metric Individual |           |          |
|-------------------|-----------|----------|
| Range             | Order No. | Accuracy |
| 700 - 725mm       | 133-169   | ±12µm    |
| 725 - 750mm       | 133-170   | ±12µm    |
| 750 - 775mm       | 133-171   | ±13µm    |
| 775 - 800mm       | 133-172   | ±13µm    |
| 800 - 825mm       | 133-173   | ±13µm    |
| 825 - 850mm       | 133-174   | ±14µm    |
| 850 - 875mm       | 133-175   | ±14µm    |
| 875 - 900mm       | 133-176   | ±14µm    |
| 900 - 925mm       | 133-177   | ±15µm    |
| 925 - 950mm       | 133-178   | ±15µm    |
| 950 - 975mm       | 133-179   | ±15µm    |
| 975 - 1000mm      | 133-180   | ±16µm    |

| Inch Individual |           |          |
|-----------------|-----------|----------|
| Range           | Order No. | Accuracy |
| 2" - 3"         | 133-223   | ±.00015" |
| 3" - 4"         | 133-224   | ±.0002"  |
| 4" - 5"         | 133-225   | ±.00025" |
| 5" - 6"         | 133-226   | ±.00025" |
| 6" - 7"         | 133-227   | ±.00025" |
| 7" - 8"         | 133-228   | ±.00025" |
| 8" - 9"         | 133-229   | ±.00025" |
| 9" - 10"        | 133-230   | ±.0003"  |
| 10" - 11"       | 133-231   | ±.0003"  |
| 11" - 12"       | 133-232   | ±.0003"  |

# Tubular Inside Micrometers

**SERIES 133**



133-902

| Metric Micrometer set       |           |  |
|-----------------------------|-----------|--|
| Range                       | Order No. | Included in set  |
| 50 - 150mm<br>(4 pcs. set)  | 133-901   | <ul style="list-style-type: none"> <li>• 133-143, 133-144, 133-145, 133-146</li> <li>• with fitted case</li> </ul>   |
| 50 - 300mm<br>(10 pcs. set) | 133-902   | <ul style="list-style-type: none"> <li>• 133-143, 133-144, 133-145, 133-146, 133-147, 133-148, 133-149, 133-150, 133-151, 133-152</li> <li>• with fitted case</li> </ul> |

| Inch Micrometer set       |           |  |
|---------------------------|-----------|--|
| Range                     | Order No. | Included in set  |
| 2" - 6"<br>(4 pcs. set)   | 133-903   | <ul style="list-style-type: none"> <li>• 133-223, 133-224, 133-225, 133-226</li> <li>• with fitted case</li> </ul>   |
| 2" - 12"<br>(10 pcs. set) | 133-904   | <ul style="list-style-type: none"> <li>• 133-223, 133-224, 133-225, 133-226, 133-227, 133-228, 133-229, 133-230, 133-231, 133-232</li> <li>• with fitted case</li> </ul> |

## DIMENSIONS

Unit: mm

| Order No.         | L   | a  | b  |
|-------------------|-----|----|----|
| 133-145 / 133-225 | 100 | 5  | 3  |
| 133-146 / 133-226 | 125 | 5  | 3  |
| 133-147 / 133-227 | 150 | 18 | 15 |
| 133-148 / 133-228 | 175 | 18 | 15 |
| 133-149 / 133-229 | 200 | 18 | 15 |
|                   |     |    |    |
|                   |     |    |    |
|                   |     |    |    |
| 133-180 / 133-232 | 975 | 18 | 15 |

# Inside Micrometers

## SERIES 141 — Interchangeable-Rod Type

### FEATURES

- Wide range of ID measurements with interchangeable rods.
- Each interchangeable rod is marked with its measuring range.
- The sizes of interchangeable rods can be adjusted with spacing collars.
- Both micrometer head and furnished rods are satin-chrome finished throughout.
- Supplied in fitted plastic case. Over 1000mm / 40" supplied in wooden case.

### Technical Data

Metric Model

Accuracy:  $\pm(6+L/50)\mu\text{m}$   
L=Maximum measuring length (mm)  
Fraction rounded up

Inch Model

Accuracy:  $\pm\{.00024+ (.00004 \times R/2)\}''$   
R=Maximum measuring length (inch)  
Fraction rounded up

Graduation: 0.01mm or .001"

### Optional Accessories

---- : Setting ring (See page C-29.)



141-233

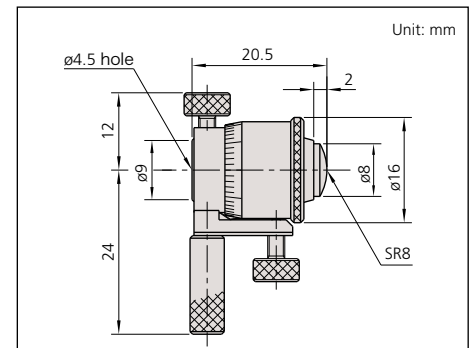


141-101



When using the extension rod

### DIMENSIONS



### SPECIFICATIONS

#### Metric

| Range        | Order No.          | Travel of micrometer head | Remarks              |
|--------------|--------------------|---------------------------|----------------------|
| 25 - 32mm    | 141-001 / 141-003* | 7mm                       | Micrometer Head only |
| 25 - 50mm    | 141-101 / 141-103* | 7mm                       | with 2 rods          |
| 50 - 63mm    | 141-025 / 141-027* | 13mm                      | Micrometer Head only |
| 50 - 200mm   | 141-205 / 141-211* | 13mm                      | with 3 rods          |
| 50 - 300mm   | 141-206 / 141-212* | 13mm                      | with 5 rods          |
| 200 - 225mm  | 141-009 / 141-011* | 25mm                      | Micrometer Head only |
| 200 - 500mm  | 141-117            | 25mm                      | with 3 rods          |
| 200 - 1000mm | 141-118            | 25mm                      | with 8 rods          |

\*with carbide-tipped face

#### Inch

| Range      | Order No.          | Travel of micrometer head | Remarks              |
|------------|--------------------|---------------------------|----------------------|
| 1" - 1.25" | 141-002 / 141-004* | .25"                      | Micrometer Head only |
| 1" - 2"    | 141-102 / 141-104* | .25"                      | with 2 rods          |
| 2" - 2.5"  | 141-026 / 141-028* | .5"                       | Micrometer Head only |
| 2" - 8"    | 141-208 / 141-214* | .5"                       | with 3 rods          |
| 2" - 12"   | 141-233 / 141-215* | .5"                       | with 5 rods          |
| 8" - 9"    | 141-010 / 141-012* | 1"                        | Micrometer Head only |
| 8" - 20"   | 141-121            | 1"                        | with 3 rods          |
| 8" - 40"   | 141-122            | 1"                        | with 8 rods          |

\*with carbide-tipped face

# Digimatic Tubular Inside Micrometers

**SERIES 337 — Extension-Rod Type / SERIES 339 — Extension-Pipe Type**



## FEATURES

- Wide range of ID measurements by combining extension rods (pipes) and anvils with the micrometer head.
- The 339 Series uses highly durable extension pipes.
- Carbide-tipped measuring faces.
- Supplied in wooden case.



337-303



339-304



### Metric — Extension-rod type

| Range        | Order No. | Travel of micrometer head | Extension rods                           |
|--------------|-----------|---------------------------|--|
| 200 - 225mm  | 337-101   | 25mm                      | Micrometer Head only                     |
| 200 - 1000mm | 337-301   | 25mm                      | 25mm, 50mm, 100mm (2 pcs.), 200mm, 300mm |
| 200 - 1500mm | 337-302   | 25mm                      | 25mm, 50mm, 100mm, 200mm, 300mm (3 pcs.) |

### Inch/Metric — Extension-rod type

| Range                    | Order No. | Travel of micrometer head | Extension rods               |
|--------------------------|-----------|---------------------------|------------------------------|
| 8 - 9" / 203.2 - 228.6mm | 337-102   | 1"                        | Micrometer Head only         |
| 8 - 40" / 203.2 - 1016mm | 337-303   | 1"                        | 1", 2", 4" (2 pcs.), 8", 12" |
| 8 - 60" / 203.2 - 1524mm | 337-304   | 1"                        | 1", 2", 4", 8", 12" (3 pcs.) |

### Metric — Extension-pipe type

| Range        | Order No. | Travel of micrometer head | Extension pipes                                   |
|--------------|-----------|---------------------------|---|
| 200 - 225mm  | 339-101   | 25mm                      | Micrometer Head only                              |
| 200 - 1000mm | 339-301   | 25mm                      | 25mm, 50mm, 100mm, 200mm, 400mm                   |
| 200 - 2000mm | 339-302   | 25mm                      | 25mm, 50mm, 100mm, 200mm (2 pcs.), 400mm (3 pcs.) |

### Inch/Metric — Extension-pipe type

| Range                    | Order No. | Travel of micrometer head | Extension pipes                       |
|--------------------------|-----------|---------------------------|---------------------------------------|
| 8 - 9" / 203.2 - 228.6mm | 339-102   | 1"                        | Micrometer Head only                  |
| 8 - 40" / 203.2 - 1016mm | 339-303   | 1"                        | 1", 2", 4", 8", 16"                   |
| 8 - 80" / 203.2 - 2000mm | 339-304   | 1"                        | 1", 2", 4", 8" (2 pcs.), 16" (3 pcs.) |

## Technical Data

Metric Model

Accuracy:  $\pm(3+n+L/50)\mu\text{m}$   
 L=Maximum measuring length (mm)  
 Fraction rounded up  
 n=Number of rods  
 Excluding quantizing error

Inch Model

Accuracy:  $\pm\{.00015+.00005n+.00005R/2\}''$   
 R=Maximum measuring length (inch)  
 n=Number of rods  
 Fraction rounded up

Resolution: 0.001mm or .0001"/0.001mm

Display: LCD

Battery: SR44 (1 pcs.), **938882**

Battery life: Approx. 8 months under normal use

## Function

Zero/ABS, Data hold, Data output, Preset, inch/mm conversion (inch/mm models)

Alarm: Low voltage, Counting value composition error

## Optional Accessories

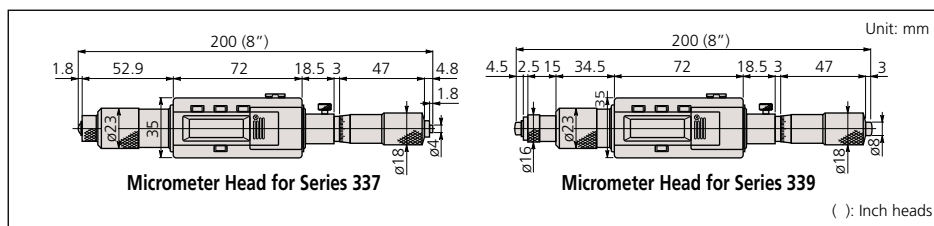
**05CZA662:** SPC cable (1m)

**05CZA663:** SPC cable (2m)

----- : Setting ring (See page C-29.)



## DIMENSIONS





# Tubular Inside Micrometers

## SERIES 137 — Extension-Rod Type

### FEATURES

- Wide range of ID measurements by combining extension rods (pipes) and anvils with the micrometer head.
- Carbide-tipped measuring faces are available.
- Supplied in fitted plastic case except 1500 mm / 60" come in wooden case.



### Technical Data

Metric Model

Accuracy:  $\pm(3+n+L/50)\mu\text{m}$   
 L=Maximum measuring length (mm)  
 n=Number of rods  
 Fraction rounded up

Inch Model

Accuracy:  $\pm[.00015+.00005n+.00005R*/2]$ "  
 R=Maximum measuring length (inch)  
 n=Number of rods  
 Fraction rounded up

Graduation: 0.01mm or .001"

### Optional Accessories

-----: Setting ring (See page C-29.)

### SPECIFICATIONS

**Metric** Extension-rod type

| Range       | Order No.          | Travel of micrometer head | Extension rods  |
|-------------|--------------------|---------------------------|---|
| 50 - 63mm   | 137-011 / 137-013* | 13mm                      | Micrometer Head only  |
| 50 - 150mm  | 137-201 / 137-206* | 13mm                      | 13mm, 25mm, 50mm  |
| 50 - 300mm  | 137-202 / 137-207* | 13mm                      | 13mm, 25mm, 50mm (2 pcs.), 100mm                                |
| 50 - 500mm  | 137-203 / 137-208* | 13mm                      | 13mm, 25mm, 50mm (2 pcs.), 100mm, 200mm                         |
| 50 - 1000mm | 137-204 / 137-209* | 13mm                      | 13mm, 25mm, 50mm (2 pcs.), 100mm, 200mm (2 pcs.), 300mm         |
| 50 - 1500mm | 137-205 / 137-210* | 13mm                      | 13mm, 25mm, 50mm (2 pcs.), 100mm, 200mm (3pcs.), 300mm (2 pcs.) |

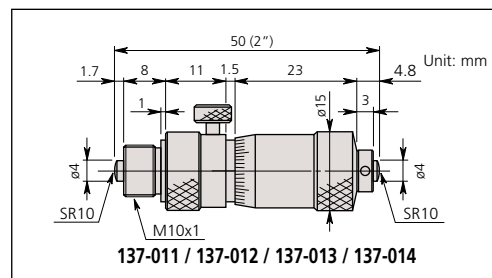
\*with carbide-tipped face

**Inch** Extension-rod type

| Range     | Order No.          | Travel of micrometer head | Extension rods                                      |
|-----------|--------------------|---------------------------|---|
| 2" - 2.5" | 137-012 / 137-014* | .5"                       | Micrometer Head only                                |
| 2" - 6"   | 137-211 / 137-216* | .5"                       | .5", 1", 2"   |
| 2" - 12"  | 137-212 / 137-217* | .5"                       | .5", 1", 2" (2 pcs.), 4"                            |
| 2" - 20"  | 137-213 / 137-218* | .5"                       | .5", 1", 2" (2 pcs.), 4", 8"                        |
| 2" - 40"  | 137-214 / 137-219* | .5"                       | .5", 1", 2" (2 pcs.), 4", 8" (2 pcs.), 12"          |
| 2" - 60"  | 137-215 / 137-220* | .5"                       | .5", 1", 2" (2 pcs.), 4", 8" (3 pcs.), 12" (2 pcs.) |

\*with carbide-tipped face

### DIMENSIONS



# Tubular Inside Micrometers

## SERIES 139 — Extension-Pipe Type

### FEATURES

- Wide range of ID measurements by combining extension pipes and anvils with the micrometer head.
- Supplied in fitted wooden case, except 500 mm / 20" which comes in plastic case.



### Metric Extension-pipe type

| Range        | Order No.      | Travel of micrometer head | Extension pipes                          |
|--------------|----------------|---------------------------|--|
| 100 - 125mm  | <b>139-001</b> | 25mm                      | Micrometer Head only                     |
| 100 - 500mm  | <b>139-173</b> | 25mm                      | 25mm, 50mm, 100mm, 200mm                 |
| 100 - 900mm  | <b>139-174</b> | 25mm                      | 25mm, 50mm, 100mm, 200mm, 400mm          |
| 100 - 1300mm | <b>139-175</b> | 25mm                      | 25mm, 50mm, 100mm, 200mm, 400mm (2 pcs.) |
| 100 - 1700mm | <b>139-176</b> | 25mm                      | 25mm, 50mm, 100mm, 200mm, 400mm (3 pcs.) |
| 100 - 2100mm | <b>139-177</b> | 25mm                      | 25mm, 50mm, 100mm, 200mm, 400mm (4 pcs.) |

### Inch Extension-pipe type

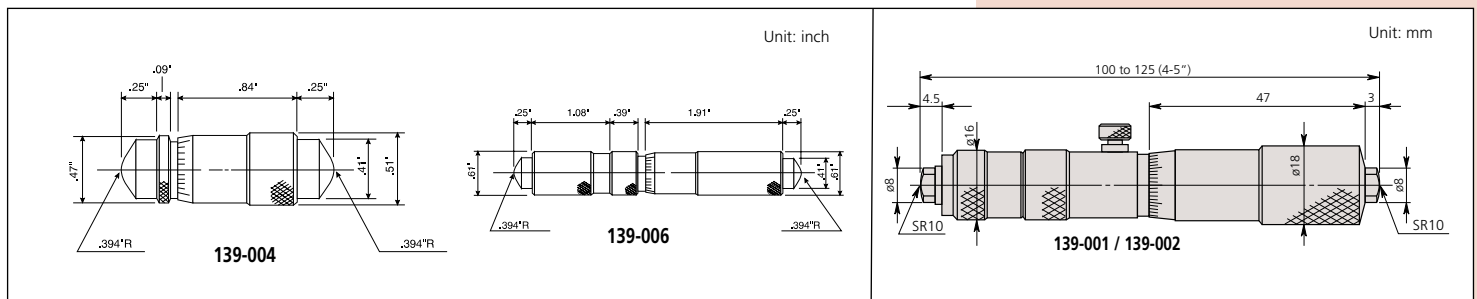
| Range    | Order No.      | Travel of micrometer head | Extension pipes              |
|----------|----------------|---------------------------|------------------------------|
| 4" - 5"  | <b>139-002</b> | 1"                        | Micrometer Head only         |
| 4" - 20" | <b>139-178</b> | 1"                        | 1", 2", 4", 8"               |
| 4" - 36" | <b>139-179</b> | 1"                        | 1", 2", 4", 8", 16"          |
| 4" - 52" | <b>139-180</b> | 1"                        | 1", 2", 4", 8", 16" (2 pcs.) |
| 4" - 68" | <b>139-181</b> | 1"                        | 1", 2", 4", 8", 16" (3 pcs.) |
| 4" - 84" | <b>139-182</b> | 1"                        | 1", 2", 4", 8", 16" (4 pcs.) |



### Inch Extension-pipe type

| Range     | Order No.      | Travel of micrometer head | Extension pipes                             | Remarks                 |
|-----------|----------------|---------------------------|---|-------------------------|
| 1.5 - 2"  | <b>139-004</b> | .5"                       | Micrometer Head only                        | —                       |
| 4 - 5"    | <b>139-006</b> | 1"                        | Micrometer Head only                        | —                       |
| 1.5 - 12" | <b>139-201</b> | .5"                       | .5", 1", 2", 2.5", 3", 3.5", 4", 6"         | Includes <b>139-004</b> |
| 4 - 40"   | <b>139-202</b> | 1"                        | 1", 2", 3", 6", 9", 12", 14", 16", 17", 19" | Includes <b>139-006</b> |

### DIMENSIONS



### Technical Data

Metric Model

Accuracy:

- Series 139:  $\pm(3+n+L/50)\mu\text{m}$   
L=Maximum measuring length (mm)  
n=number of rods  
Fraction rounded up

Inch Model

Accuracy:

- Series 139:  $\pm(.00015+.00005n+.00005R*/2)"$   
R=Maximum measuring length (inch)  
n=number of rods  
Fraction rounded up

Graduation: 0.01mm or .001"

Measurement error of micrometer head:  $\pm 3\mu\text{m}$

### Optional Accessories

-----: Setting ring (See page C-29.)

# Tubular Inside Micrometers

## SERIES 140 — Extension-Pipe Type

### Technical Data

Metric Model

Accuracy:  $\pm(3+n+L/50)\mu\text{m}$   
 n=Number of rod,  
 L=Maximum measuring length (mm),  
 Fraction rounded up

Inch Model

Accuracy:  $\pm(.00015+.00005n+.00005R*/2)''$   
 n=Number of rod  
 R=Maximum measuring length (inch)  
 Fraction rounded up

Graduation: 0.01mm or .001"

### Optional Accessories

----- : Setting ring (See page C-29.)

### FEATURES

- Wide range of ID measurements by combining extension rods (pipes) and anvils with the micrometer head.
- The Series 140 use highly durable/ large-diameter extension pipes.
- Supplied in fitted wooden case.

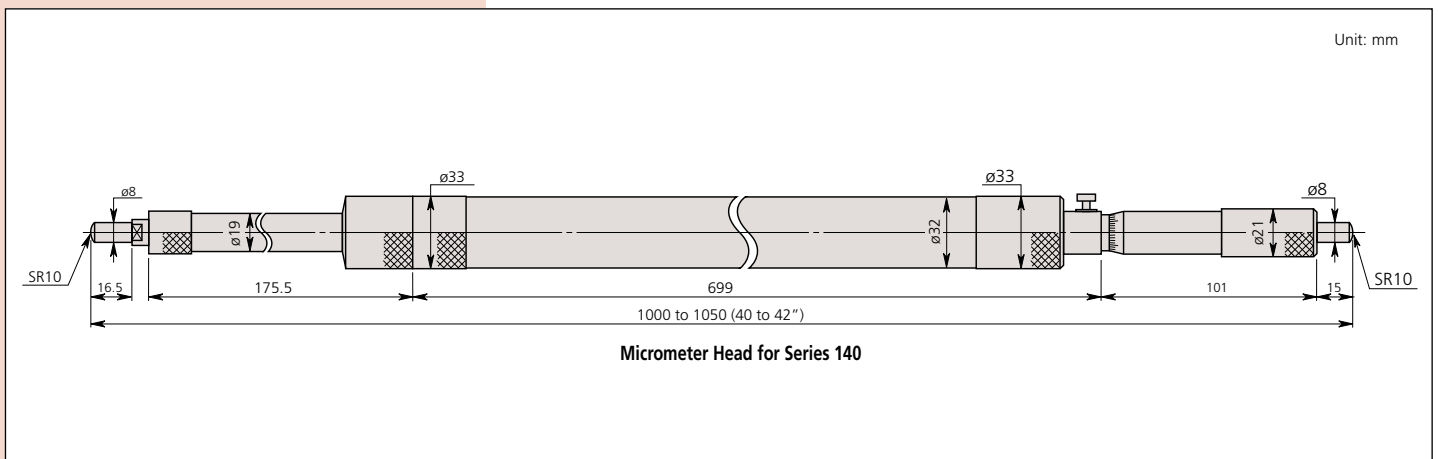
#### Metric — Extension-pipe type

| Range         | Order No.      | Travel of micrometer head | Extension pipes                                     |
|---------------|----------------|---------------------------|---|
| 1000 - 2000mm | <b>140-157</b> | 50mm                      | 50mm, 100mm (2 pcs.), 200mm, 500mm                  |
| 1000 - 3000mm | <b>140-158</b> | 50mm                      | 50mm, 100mm (2 pcs.), 200mm, 500mm, 1000mm          |
| 1000 - 4000mm | <b>140-159</b> | 50mm                      | 50mm, 100mm (2 pcs.), 200mm, 500mm, 1000mm (2 pcs.) |
| 1000 - 5000mm | <b>140-160</b> | 50mm                      | 50mm, 100mm (2 pcs.), 200mm, 500mm, 1000mm (3 pcs.) |

#### Inch — Extension-pipe type

| Range      | Order No.      | Travel of micrometer head | Extension pipes                        |
|------------|----------------|---------------------------|--|
| 40" - 80"  | <b>140-161</b> | 2"                        | 2", 4" (2 pcs.), 8", 20"               |
| 40" - 120" | <b>140-162</b> | 2"                        | 2", 4" (2 pcs.), 8", 20", 40"          |
| 40" - 160" | <b>140-163</b> | 2"                        | 2", 4" (2 pcs.), 8", 20", 40" (2 pcs.) |
| 40" - 200" | <b>140-164</b> | 2"                        | 2", 4" (2 pcs.), 8", 20", 40" (3 pcs.) |

### DIMENSIONS



# Inside Micrometers

## SERIES 345, 145 — Caliper Type

### FEATURES

- Caliper-type jaws are made of high-grade, tool steel.
- Locking clamp for positive locking of spindle.
- Non-slip grip finish (digital models)
- Satin-chrome finished.
- A special holder is available to be used with Mitutoyo micrometer stand.
- Supplied in fitted plastic case. Over 175mm / 4" supplied in wooden case.



### SPECIFICATIONS

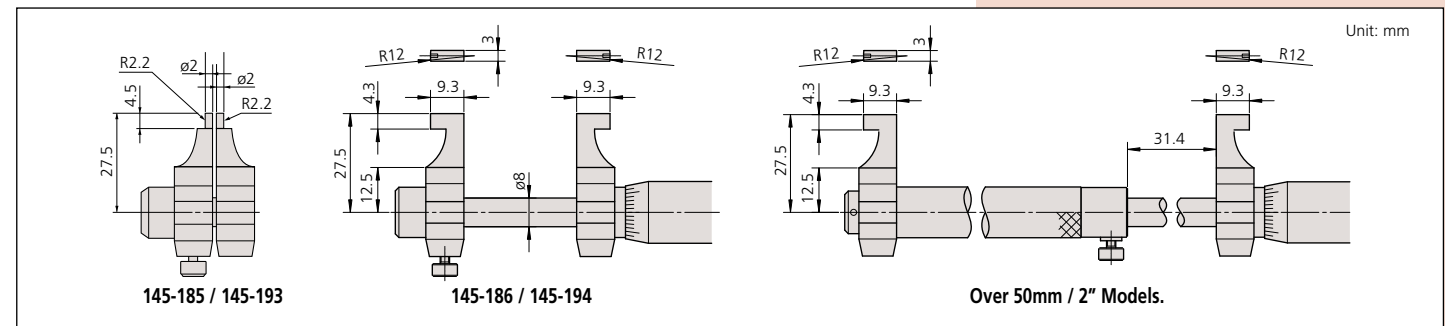
| Metric    |            |          |
|-----------|------------|----------|
| Range     | Order No.  | Accuracy |
| 5 - 30mm  | 345-250-30 | ±5µm     |
| 25 - 50mm | 345-251-30 | ±6µm     |

| Metric      |           |          |
|-------------|-----------|----------|
| Range       | Order No. | Accuracy |
| 5 - 30mm    | 145-185   | ±5µm     |
| 25 - 50mm   | 145-186   | ±6µm     |
| 50 - 75mm   | 145-187   | ±7µm     |
| 75 - 100mm  | 145-188   | ±8µm     |
| 100 - 125mm | 145-189   | ±9µm     |
| 125 - 150mm | 145-190   | ±9µm     |
| 150 - 175mm | 145-191   | ±10µm    |
| 175 - 200mm | 145-192   | ±10µm    |
| 200 - 225mm | 145-217   | ±11µm    |
| 225 - 250mm | 145-218   | ±11µm    |
| 250 - 275mm | 145-219   | ±12µm    |
| 275 - 300mm | 145-220   | ±12µm    |

| Inch/Metric Digital model |            |          |
|---------------------------|------------|----------|
| Range                     | Order No.  | Accuracy |
| .2 - 1.2" / 5-30mm        | 345-350-30 | ±.00025" |
| 1 - 2" / 25-50mm          | 345-351-30 | ±.0003"  |

| Inch      |           |          |
|-----------|-----------|----------|
| Range     | Order No. | Accuracy |
| .2 - 1.2" | 145-193   | ±.00025" |
| 1 - 2"    | 145-194   | ±.0003"  |
| 2 - 3"    | 145-195   | ±.00035" |
| 3 - 4"    | 145-196   | ±.0004"  |

### DIMENSIONS



### Technical Data

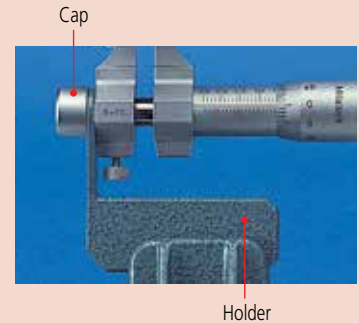
Accuracy: Refer to the list of specifications.  
(excluding quantizing error for digital models)  
Resolution\*: 0.01mm or .0005"/0.001mm  
Graduation\*\*: 0.01mm or .001"  
Measuring faces: Carbide tipped  
Display\*: LCD  
Battery\*: SR44 (1 pc.), 938882  
Battery life\*: Approx. 2.4 years under normal use  
\*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero-setting, Data hold, Data output, inch/mm conversion (inch/mm models)  
Function Lock, 2 Presets  
Alarm: Low voltage, Counting value composition error

### Optional Accessories

- 05CZA662: SPC cable with data switch 1m / 40"
- 05CZA663: SPC cable with data switch 2m / 80"
- : Setting ring (See page C-29.)
- 300401: Cap for stand holder
- 300400: Stand holder





# Inside Micro Checker

## SERIES 515

### FEATURES

- The Inside Micro Checker is designed to efficiently check the zero point of a tubular inside micrometer.
- Each measuring block is made of zirconia-based ceramic and is free from deterioration and dimensional changes over time.



515-585



Standard accessory

### Technical Data

Block pitch accuracy:  $\pm(1+L/150)\mu\text{m}$   
 L= Length to check (mm)

### Standard Accessories

- 611671-02:** Auxiliary Block (10mm)
- 940286:** Clamping element with V-rest
- 602195:** Spacer (for  $\varnothing 8\text{mm}$  measuring anvil)

### Optional Accessories

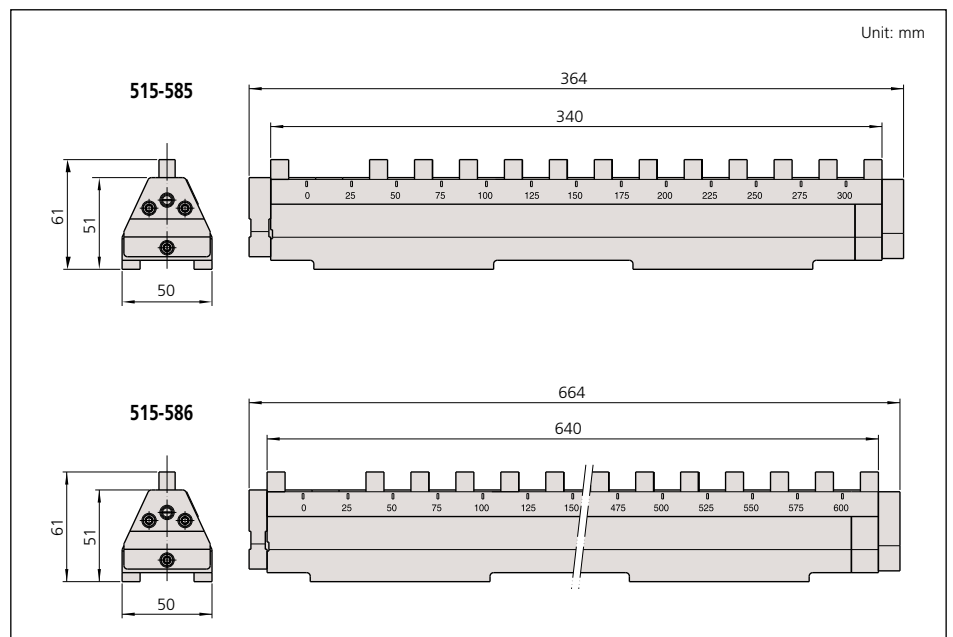
- 602160:** Wooden case for 300mm Inside Micro Checker
- 602163:** Wooden case for 600mm Inside Micro Checker



### SPECIFICATIONS

| Range | Order No.      | Length to check   |
|-------|----------------|---|
| 300mm | <b>515-585</b> | 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300mm   |
| 600mm | <b>515-586</b> | 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, 500, 525, 550, 575, 600mm |

### DIMENSIONS



# Bore Gages

## SERIES 511 — for Small Holes

### FEATURES

- Interchangeable anvils are made of alloy steel.
- The dial indicator is fully protected by a rugged cover.

### SPECIFICATIONS

#### Metric    Gage Stem $\varnothing$ 8mm

| Measuring Range | Order No. Without Dial Gage | Order No. With 2046SB Graduation 0.01mm | Order No. With 2109SB-10 Graduation 0.001mm | Number of Anvils | Number of Spacers |
|-----------------|-----------------------------|---|---|------------------|-------------------|
| 6 - 10mm        | 511-209*                    | 511-211                                 | 511-210                                     | 9                | 1                 |
| 10 - 18.5mm     | 511-201*                    | 511-204                                 | 511-203                                     | 9                | 1                 |

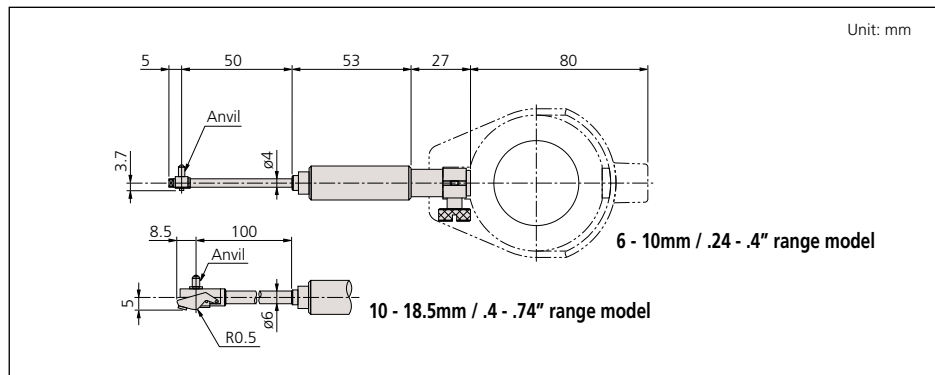
\*Does not come with Dial Gage Protector Cover (21DZA000)

#### Inch    Gage Stem Dia .375"

| Measuring Range | Order No. Without Dial Gage | Order No. With 2922SB Graduation .0005" | Order No. With 2923SB-10 Graduation .0001" | Number of Anvils | Number of Spacers |
|-----------------|-----------------------------|---|--|------------------|-------------------|
| .24 - .4"       | 511-214*                    | 511-213                                 | 511-212                                    | 9                | 1                 |
| .4 - .74"       | 511-205*                    | 511-207                                 | 511-206                                    | 9                | 1                 |

\*Does not come with Dial Gage Protector Cover (21DZA000)

### DIMENSIONS

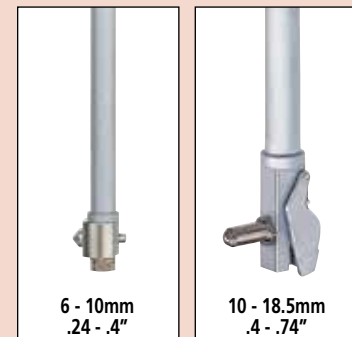


511-204

### Technical Data

Accuracy:  $5\mu\text{m} / .0002''$   
 Indication stability:  $2\mu\text{m} / .00008''$   
 Graduation: 0.01mm, 0.001mm, .0005" or .0001"

### Measuring Heads



6 - 10mm  
.24 - .4"

10 - 18.5mm  
.4 - .74"

### Optional Accessories

21DZA000: Dial Gage Protector Cover  
 -----: Setting ring (See page C-29.)

# Bore Gages

## SERIES 511—Standard Type

Mitutoyo offers a complete selection of bore gages, all of them with interchangeable anvils and necessary accessories to perform close tolerance ID measurements.

### FEATURES

- Carbide-tipped contact points for durability.
- The dial indicator is fully protected by a rugged cover.
- Optional extension rods can be attached for measuring deep holes.



511-743

### SPECIFICATIONS

**Inch** Gage Stem  $\varnothing$  3/8"

| Measuring Range | Order No. Without Indicator | Order No. With 2922SB Graduation .0005" | Order No. With 2923SB-10 Graduation .0001" | Number of Anvils  | Number of Spacers |
|-----------------|-----------------------------|---|--|-------------------|-------------------|
| .7 - 1.4"       | 511-731*                    | 511-741                                 | 511-751                                    | 9                 | 2                 |
| 1.4 - 2.5"      | 511-732*                    | 511-742                                 | 511-752                                    | 6                 | 4                 |
| 2.0 - 6.0"      | 511-733*                    | 511-743                                 | 511-753                                    | 11 (2" sub anvil) | 4                 |
| 4.0 - 6.5"      | 511-734*                    | 511-744                                 | 511-754                                    | 13                | 4                 |
| 6.5 - 10"       | 511-735*                    | 511-745                                 | 511-755                                    | 6                 | 7                 |
| 10 - 16"        | 511-736*                    | 511-746                                 | 511-756                                    | 5 (3" sub anvil)  | 7                 |
| .7 - 6"         | —                           | 511-931                                 | 511-932                                    | 26 (2" sub anvil) | 10                |

\*Does not come with Dial Gage Protector Cover (21DZA000)

**Metric** Gage Stem  $\varnothing$  8mm

| Measuring Range | Order No. Without Indicator | Order No. With 2046SB Graduation 0.01mm | Order No. With 2109SB-10 Graduation 0.001mm | Number of Anvils    | Number of Spacers |
|-----------------|-----------------------------|---|---|---------------------|-------------------|
| 18 - 35mm       | 511-701*                    | 511-711                                 | 511-721                                     | 9                   | 2                 |
| 35 - 60mm       | 511-702*                    | 511-712                                 | 511-722                                     | 6                   | 4                 |
| 50 - 150mm      | 511-703*                    | 511-713                                 | 511-723                                     | 11 (50mm Sub Anvil) | 4                 |
| 100 - 160mm     | 511-704*                    | 511-714                                 | 511-724                                     | 13                  | 4                 |
| 160 - 250mm     | 511-705*                    | 511-715                                 | 511-725                                     | 6                   | 7                 |
| 250 - 400mm     | 511-706*                    | 511-716                                 | 511-726                                     | 5 (75mm Sub Anvil)  | 7                 |
| 18 - 150mm      | —                           | 511-921 (3 pc set)                      | 511-922 (3 pc set)                          | 26 (50mm Sub Anvil) | 10                |

\*Does not come with Dial Gage Protector Cover (21DZA000)

### Technical Data

Accuracy:  $2\mu\text{m} / .00008"$

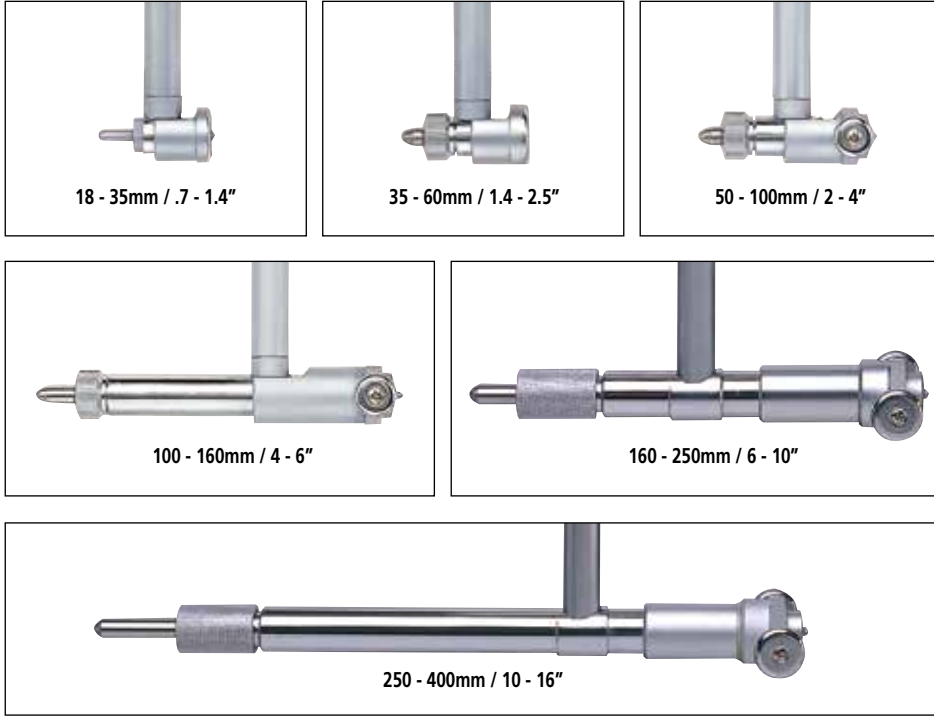
Indication stability:  $1\mu\text{m} / .00004"$

Graduation: 0.01mm, 0.001mm, .0005" or .0001"

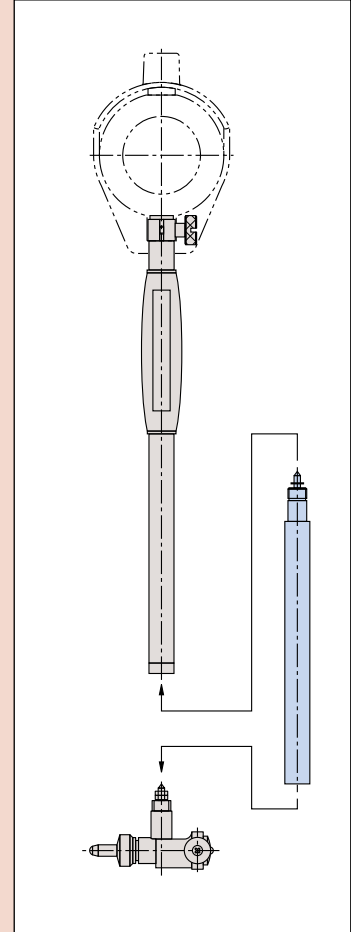
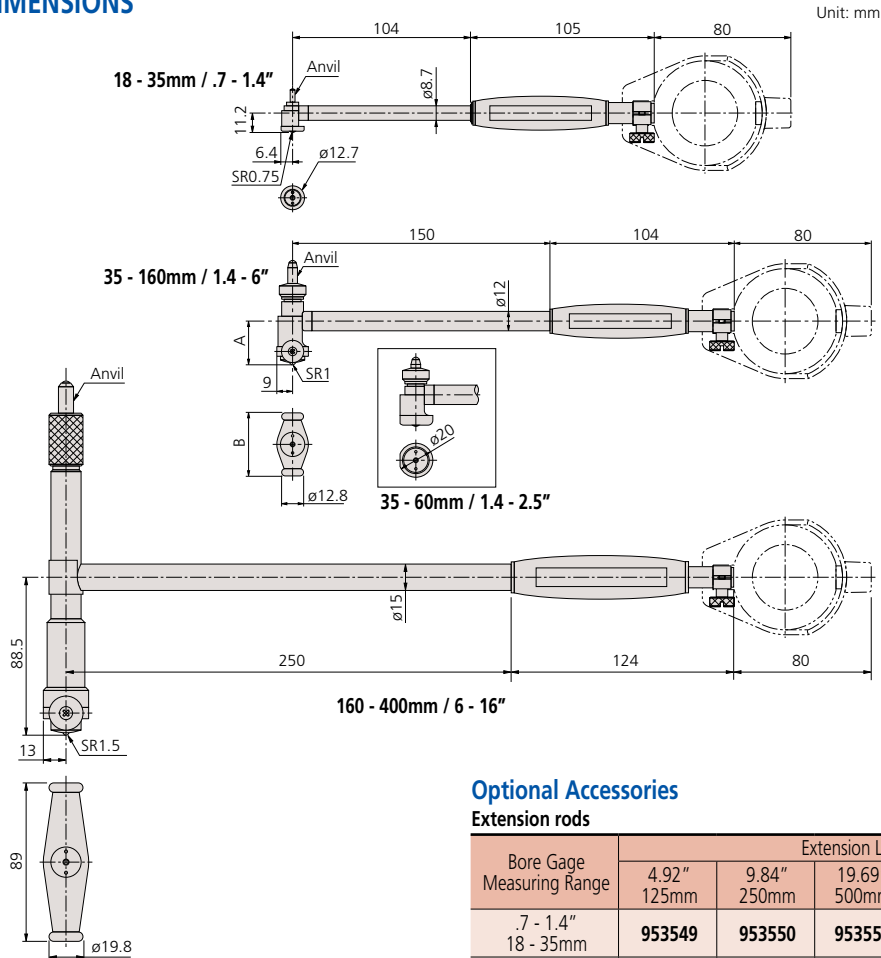


511-712

## Contact Point



## DIMENSIONS



Setting ring (See page C-29.)

## Optional Accessories

### Extension rods

| Bore Gage Measuring Range | Extension Length |                |                 |                 |                  | Rod Diameter  | Spanner |
|---------------------------|------------------|----------------|-----------------|-----------------|------------------|---------------|---------|
|                           | 4.92"<br>125mm   | 9.84"<br>250mm | 19.69"<br>500mm | 29.53"<br>750mm | 39.37"<br>1000mm |               |         |
| .7 - 1.4"<br>18 - 35mm    | 953549           | 953550         | 953551          | -               | -                | .34"<br>8.7mm | 102148  |
| 1.4 - 6.5"<br>35 - 160mm  | 953552           | 953553         | 953554          | 953555          | 953556           | .47"<br>12mm  | 212556  |
| 6.5 - 16"<br>160 - 400mm  | 953557           | 952361         | 953558          | 953559          | 953560           | .59"<br>15mm  | 212556  |

Note: Above list is used for 511-1XX series; not available for 511-2XX Series.



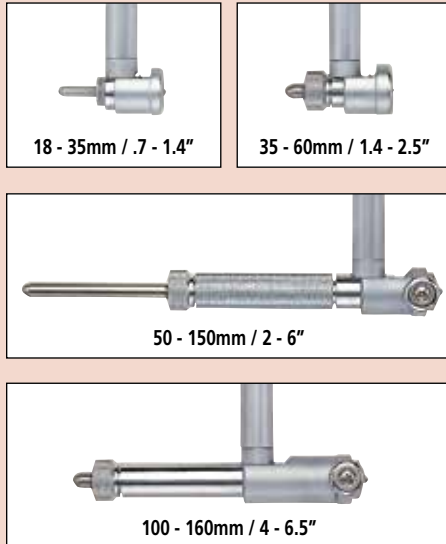


511-786

### Technical Data

Accuracy:  $2\mu\text{m} / .00008''$   
 Indication stability:  $1\mu\text{m} / .00004''$   
 Graduation: 0.01mm, 0.001mm, .0005" or .0001"

### Contact Point



# Bore Gages

## SERIES 511 — Short-Leg Type

### FEATURES

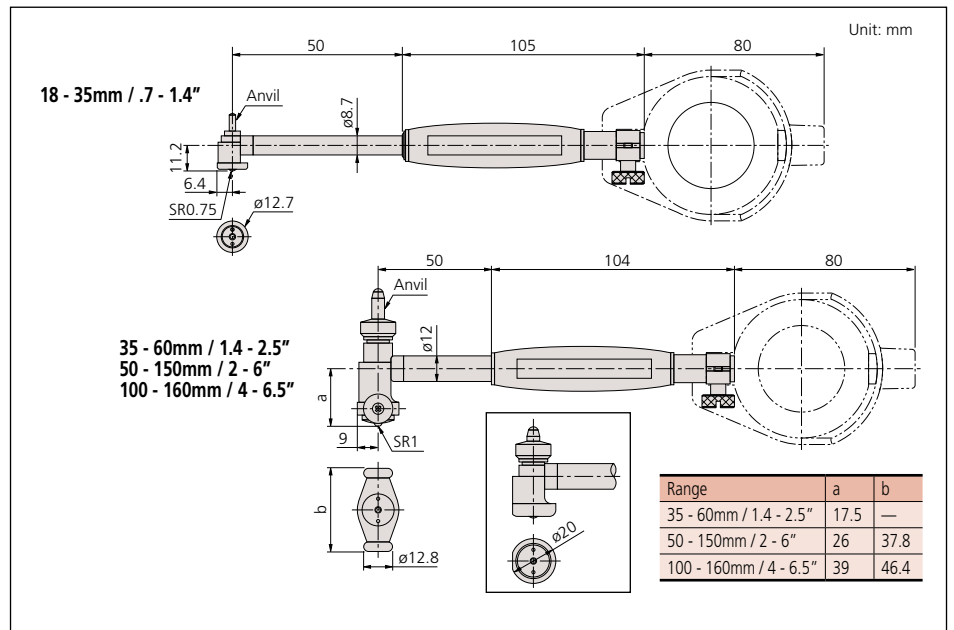
- Compact and lightweight because of the short length below the grip.
- Carbide-tipped contact point for durability.

### SPECIFICATIONS

| Inch            |   | Gage Stem $\varnothing 3/8''$              |                   |                   |
|-----------------|---|--|-------------------|-------------------|
| Measuring Range | Order No. With 2922SB Graduation .0005" | Order No. With 2923SB-10 Graduation .0001" | Number of Anvils  | Number of Spacers |
| .7 - 1.4"       | 511-786                                 | 511-791                                    | 9                 | 2                 |
| 1.4 - 2.5"      | 511-787                                 | 511-792                                    | 6                 | 4                 |
| 2.0 - 6.0"      | 511-788                                 | 511-793                                    | 11 (2" sub anvil) | 4                 |
| 4.0 - 6.5"      | 511-789                                 | 511-794                                    | 13                | 4                 |

| Metric          |   | Gage Stem $\varnothing 8\text{mm}$          |                     |                   |
|-----------------|---|---|---------------------|-------------------|
| Measuring Range | Order No. With 2046SB Graduation 0.01mm | Order No. With 2109SB-10 Graduation 0.001mm | Number of Anvils    | Number of Spacers |
| 18 - 35mm       | 511-766                                 | 511-771                                     | 9                   | 2                 |
| 35 - 60mm       | 511-767                                 | 511-772                                     | 6                   | 4                 |
| 50 - 150mm      | 511-768                                 | 511-773                                     | 11 (50mm Sub Anvil) | 4                 |
| 100 - 160mm     | 511-769                                 | 511-774                                     | 13                  | 4                 |

### DIMENSIONS



### Optional Accessories

---- : Setting ring (See page C-29.)

# Bore Gages

## SERIES 511 — for Blind Holes

### FEATURES

- Measure ID at position close to the bottom of blind holes.
- Carbide-contact point ensures high durability and wear resistance.
- Grip is large and hollow to reduce effect of body heat on high-accuracy measurements.



511-426

### SPECIFICATIONS

**Metric** Gage Stem  $\varnothing$  8mm

| Measuring Range | Order No. Without Dial Gage | Order No. With 2046SB Graduation 0.01mm | Order No. With 2109SB-10 Graduation 0.001mm | Number of Anvils     | Number of Spacers |
|-----------------|-----------------------------|---|---|----------------------|-------------------|
| 15 - 35mm       | 511-415*                    | 511-425                                 | 511-435                                     | 11<br>10mm Sub-Anvil | 1                 |
| 35 - 60mm       | 511-416*                    | 511-426                                 | 511-436                                     | 6                    | 4                 |
| 50 - 150mm      | 511-417*                    | 511-427                                 | 511-437                                     | 11<br>50mm Sub-Anvil | 4                 |

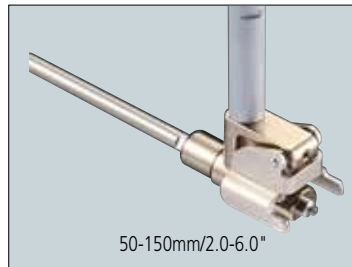
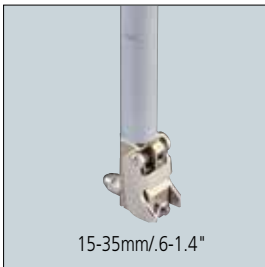
\*Does not come with Dial Gage Protector Cover (21DZA000)

**Inch** Gage Stem Dia. .375"

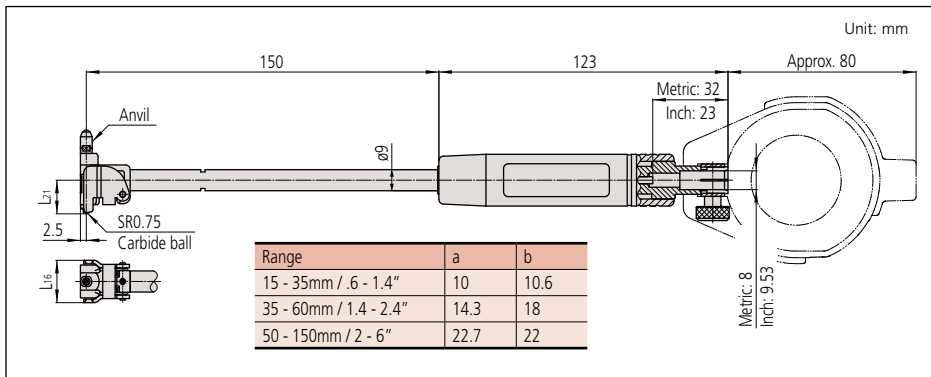
| Measuring Range | Order No. Without Dial Gage | Order No. With 2922SB Graduation .0005" | Order No. With 2923SB-10 Graduation .0001" | Number of Anvils    | Number of Spacers |
|-----------------|-----------------------------|---|--|---------------------|-------------------|
| .6 - 1.4"       | 511-418*                    | 511-428                                 | 511-438                                    | 11<br>.4" Sub-Anvil | 1                 |
| 1.4 - 2.4"      | 511-419*                    | 511-429                                 | 511-439                                    | 6                   | 4                 |
| 2 - 6"          | 511-420*                    | 511-430                                 | 511-440                                    | 11<br>2" Sub-Anvil  | 4                 |

\*Does not come with Dial Gage Protector Cover (21DZA000)

### Contact Points

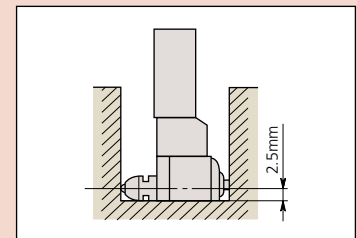


### DIMENSIONS



### Technical Data

Accuracy:  $4\mu\text{m}/.00016"$   
 Indication stability:  $1\mu\text{m}/.0004"$   
 Graduation: 0.01mm, 0.001mm, .0005" or .0001"



### Optional Accessories

----- : Setting ring (See page C-29.)



511-843

### Technical Data

Accuracy:  $2\mu\text{m} / .00008''$   
 Indication stability:  $1\mu\text{m} / .00004''$   
 Graduation: 0.01mm, 0.001mm, .0005" or .0001"

# Bore Gages

## SERIES 511 — with Micrometer Head

### FEATURES

- Interchangeable anvil is attached to a micrometer head for accurate dimensional setting.
- Wide measuring range with sub-anvils.
- Carbide ball contact point for durability.
- Extension rods (optional) can be attached for measuring deep holes.
- Optional setting rings offer the best method of zero-setting bore gages.

### SPECIFICATIONS

| Inch            |                             | Gage Stem $\varnothing$ 3/8"            |  |                 |                   |
|-----------------|-----------------------------|---|--|-----------------|-------------------|
| Measuring Range | Order No. Without Indicator | Order No. With 2922SB Graduation .0005" | Order No. With 2923SB-10 Graduation .0001" | Mic Head Travel | Sub Anvil         |
| 2.4 - 4.0"      | 511-833*                    | 511-843                                 | 511-853                                    | .4"             | .4", .8"          |
| 4.0 - 6.4"      | 511-834*                    | 511-844                                 | 511-854                                    | .5"             | .4", .8", .8"     |
| 6.0 - 10"       | 511-835*                    | 511-845                                 | 511-855                                    | .5"             | .4", .8", .8", 2" |
| 10 - 16"        | 511-836*                    | 511-846                                 | 511-856                                    | 1"              | 1", 2", 2"        |
| 16 - 24"        | 511-837*                    | 511-847                                 | 511-857                                    | 2"              | 2", 4"            |
| 24 - 32"        | 511-838*                    | 511-848                                 | 511-858                                    | 2"              | 2", 4"            |

\*Does not come with Dial Gage Protector Cover (21DZA000)

| Metric          |                             | Gage Stem $\varnothing$ 8mm             |   |                 |                        |
|-----------------|-----------------------------|---|---|-----------------|------------------------|
| Measuring Range | Order No. Without Indicator | Order No. With 2046SB Graduation 0.01mm | Order No. With 2109SB-10 Graduation 0.001mm | Mic Head Travel | Sub Anvil              |
| 60 - 100mm      | 511-803*                    | 511-813                                 | 511-823                                     | 10mm            | 10mm, 20mm             |
| 100 - 160mm     | 511-804*                    | 511-814                                 | 511-824                                     | 13mm            | 10mm, 20mm, 20mm       |
| 150 - 250mm     | 511-805*                    | 511-815                                 | 511-825                                     | 13mm            | 10mm, 20mm, 20mm, 50mm |
| 250 - 400mm     | 511-806*                    | 511-816                                 | 511-826                                     | 25mm            | 25mm, 50mm, 50mm       |
| 400 - 600mm     | 511-807*                    | 511-817                                 | 511-827                                     | 50mm            | 50mm, 100mm            |
| 600 - 800mm     | 511-808*                    | 511-818                                 | 511-828                                     | 50mm            | 50mm, 100mm            |

\*Does not come with Dial Gage Protector Cover (21DZA000)

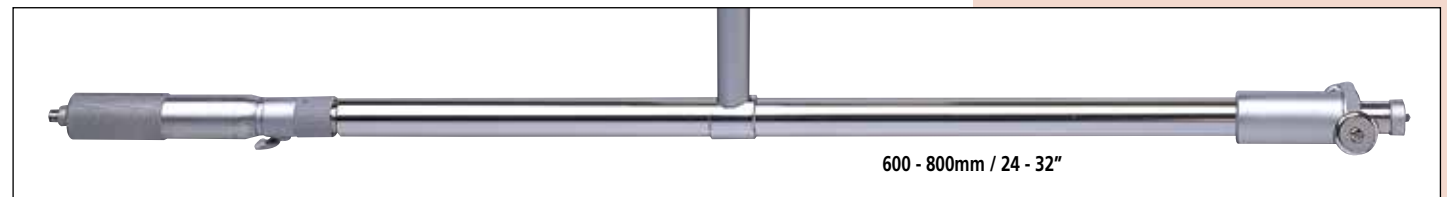
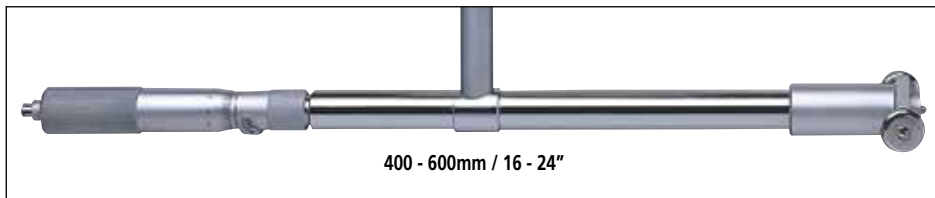
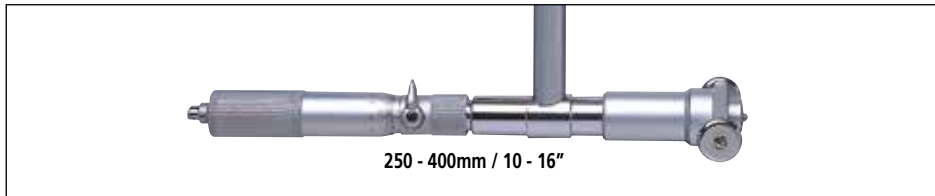
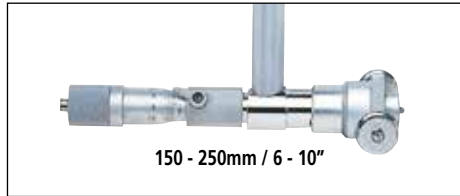
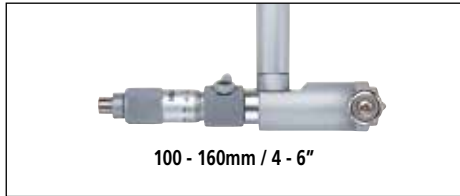
### Optional Accessories

#### Extension rods

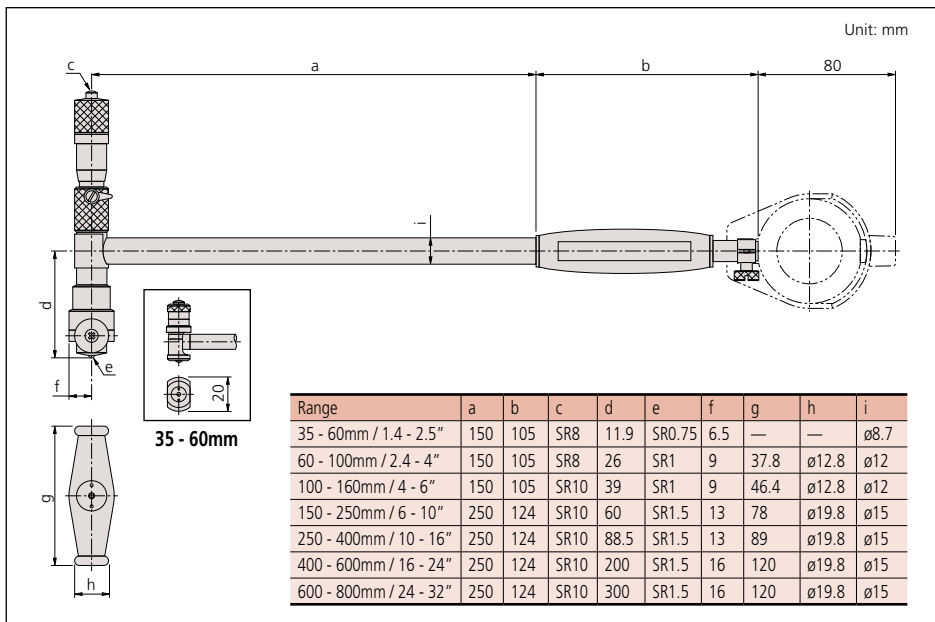
| Bore Gage Measuring Range | Extension Length |             |              |              |               | Rod Diameter | Spanner |
|---------------------------|------------------|-------------|--------------|--------------|---------------|--------------|---------|
|                           | 4.92" 125mm      | 9.84" 250mm | 19.69" 500mm | 29.53" 750mm | 39.37" 1000mm |              |         |
| 2.4-6.4" 60 - 160mm       | 953552           | 953553      | 953554       | 953555       | 953556        | .47" 12mm    | 212556  |
| 6.0 - 32.0" 150-800mm     | 953557           | 952361      | 953558       | 953559       | 953560        | .59" 15mm    | 212556  |

Note: Not available for 511-2XX Series.

## Contact Point



## DIMENSIONS





### Technical Data

Accuracy: Wide Range: 0.003mm / .00012"  
 Resolution: .00005" / 0.001mm  
 Display: LCD  
 Battery: SR44 (1 pc.) (938882)  
 Battery life: Approx. 9 months for normal use  
 Dust/Water protection level: Conforming to IP53

### Functions

Origin-set, Zero-Setting, Presetting, Power on/off, inch/mm conversion (inch/mm type only), Data output, go/no-go tolerance judgment  
 Alarm: Low battery voltage, scale contamination, over-flow error, tolerance limit setting error

### Optional Accessories

- 21DZA089:** Extension rod 250 mm (10")
- 21DZA081:** Extension rod 500 mm (20")
- 516-118-10:** Origin setup metric rectangular gage block set
- 516-119-10:** Origin setup metric square gage block set
- 516-120-26:** GB calibration kit for series 511 bore gage. (9 pcs GB and plain jaw, 160mm holder)
- 905338:** SPC cable (40" / 1m)
- 905409:** SPC cable (80" / 2m)
- : Setting ring (See page C-29.)



Origin setup gage block set

Example: using four extension rods.

# ABSOLUTE Digimatic Bore Gage

## SERIES 511

This ABSOLUTE Digimatic bore gage is exclusively designed for ID measurement.



511-521

### FEATURES

- The minimum value holding function provides the easy detection of hole diameter.

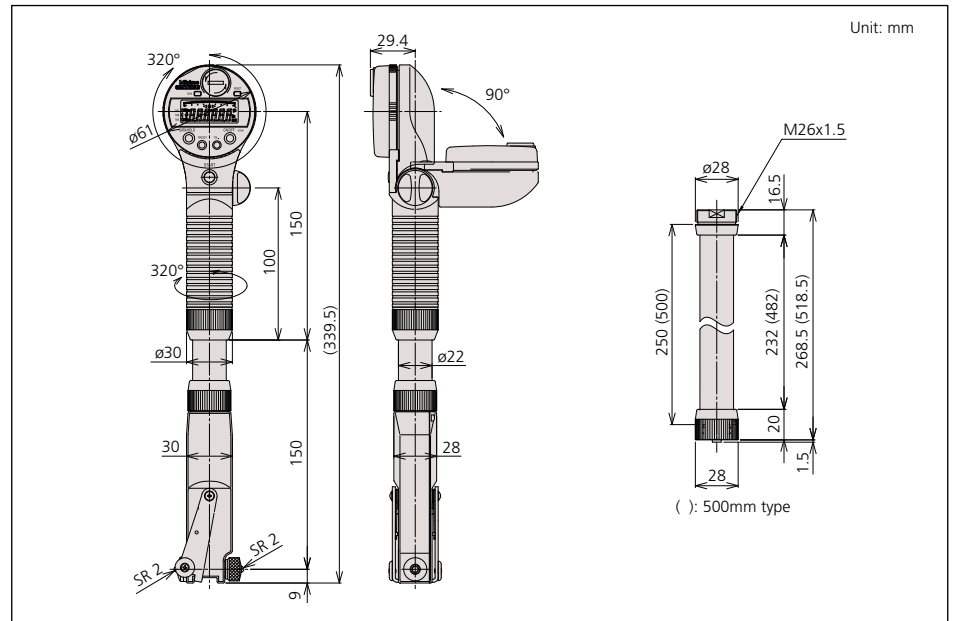


- Up to three sets of master value and upper/lower tolerance value can be memorized.
- An analog bar indicator is integrated to enhance the intuition in reading.
- Go/no-go judgment is performed by setting the upper and lower tolerances.
- Up to four rods (250mm or 500mm) can be used.

### SPECIFICATIONS

| Inch/Metric            |           |              |
|------------------------|-----------|--------------|
| Range                  | Order No. | Probe depth  |
| 1.8 - 4" / 45 - 100mm  | 511-521   | 6" (152.4mm) |
| 4 - 6.5" / 100 - 160mm | 511-522   | 6" (152.4mm) |

### DIMENSIONS AND MASS



MASS: 500g

# Bore Gages

## SERIES 526 — for Extra Small Holes

These bore gages measure diameters of small holes. The radial displacement of split-ball contact is converted to axial displacement of measuring rod, which is shown on the dial indicator.

### FEATURES

- Optional stand (215-120-10) is available for efficient measurement of multiple small holes.

### SPECIFICATIONS

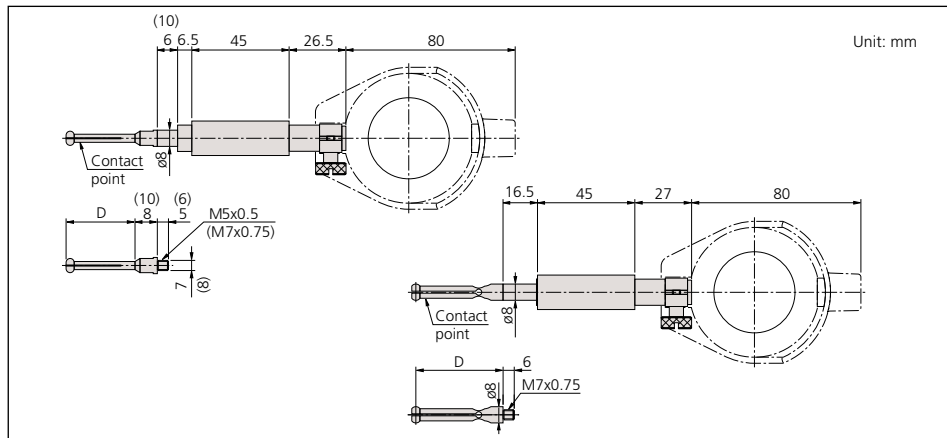
| Metric          |                             | Gage Stem $\varnothing$ 8mm             |   |                  |                   |                 |               |
|-----------------|-----------------------------|---|---|------------------|-------------------|-----------------|---------------|
| Measuring Range | Order No. Without Dial Gage | Order No. With 2046SB Graduation 0.01mm | Order No. With 2109SB-10 Graduation 0.001mm | Number of Anvils | Number of Needles | Probe depth (D) | Setting Rings |
| 0.95-1.55mm     | 526-170-10*                 | 526-173-10                              | 526-172-10                                  | 5                | 1                 | 11.5mm          | -             |
| 0.95-1.55mm     | 526-170-11*                 | 526-173-11                              | 526-172-11                                  | 5                | 1                 | 11.5mm          | 5             |
| 1.5-3.95mm      | 526-160-10*                 | 526-163-10                              | 526-162-10                                  | 9                | 2                 | 17.5,22.5mm     | -             |
| 1.5-3.95mm      | 526-160-11*                 | 526-163-11                              | 526-162-11                                  | 9                | 2                 | 17.5,22.5mm     | 9             |
| 3.7-7.3mm       | 526-150-10*                 | 526-153-10                              | 526-152-10                                  | 7                | 1                 | 32mm            | -             |
| 3.7-7.3mm       | 526-150-11*                 | 526-153-11                              | 526-152-11                                  | 7                | 1                 | 32mm            | 7             |
| 7 - 10mm        | 526-101*                    | 526-126                                 | 526-124                                     | 6                | 1                 | 56mm            |               |
| 10 - 18mm       | 526-102*                    | 526-127                                 | 526-125                                     | 8                | 1                 | 62mm            |               |

\*Does not come with Dial Gage Protector (21DZA000)

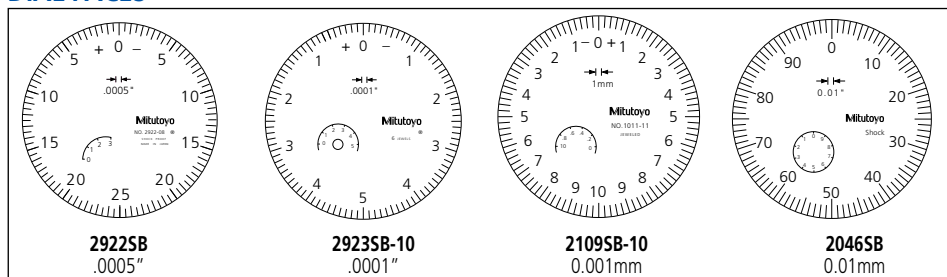
| Inch            |                             | Gage Stem Dia .375"                     |  |                  |                   |                 |               |
|-----------------|-----------------------------|---|--|------------------|-------------------|-----------------|---------------|
| Measuring Range | Order No. Without Dial Gage | Order No. With 2922SB Graduation .0005" | Order No. With 2923SB-10 Graduation .0001" | Number of Anvils | Number of Needles | Probe depth (D) | Setting Rings |
| .037-.061"      | 526-175-10*                 | -                                       | 526-176-10                                 | 5                | 1                 | .453"           | -             |
| .037-.061"      | 526-175-11*                 | -                                       | 526-176-11                                 | 5                | 1                 | .453"           | 5             |
| .059-.156"      | 526-165-10*                 | -                                       | 526-166-10                                 | 9                | 2                 | .689, .886"     | -             |
| .059-.156"      | 526-165-11*                 | -                                       | 526-166-11                                 | 9                | 2                 | .689, .886"     | 9             |
| .146-.287"      | 526-155-10*                 | -                                       | 526-156-10                                 | 7                | 1                 | 1.26"           | -             |
| .146-.287"      | 526-155-11*                 | -                                       | 526-156-11                                 | 7                | 1                 | 1.26"           | 7             |
| .3 - .4"        | 526-103*                    | 526-119                                 | 526-122                                    | 6                | 1                 | 2.2"            |               |
| .4 - .7"        | 526-104*                    | 526-120                                 | 526-123                                    | 8                | 1                 | 2.4"            |               |

\*Does not come with Dial Gage Protector (21DZA000)

### DIMENSIONS



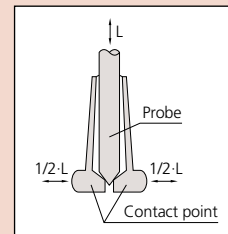
### DIAL FACES



### Technical Data

Accuracy:  $4\mu\text{m} / .00016''$   
 Indication stability:  $2\mu\text{m} / .00008''$   
 Graduation: 0.01mm, 0.001mm, .0005" or .00001"

### Contact Point



### Optional Accessory

215-120-10: Bore gage stand



----- : Setting ring (See page C-29.)



515-590

# Bore Gage Zero Checker

## SERIES 515

The Bore Gage Zero Checker allows easy zero adjustment of dial bore gages with ranges of 18mm (.7") through 400mm (16") using gage blocks.

### SPECIFICATIONS

| Order No. | Applicable range       |
|-----------|------------------------|
| 515-590   | 18 - 400mm (.7" - 16") |



# Setting Rings

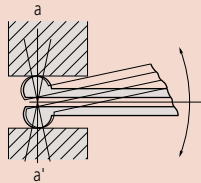
## SERIES 177 — Accessories for Inside Micrometers, Holtest and Dial Bore Gages

### FEATURES

- Used for quick and accurate setting of dial bore gages, Holtest and inside micrometers.
- If a setting ring of an optimal size is prepared, it can be used for calibration.

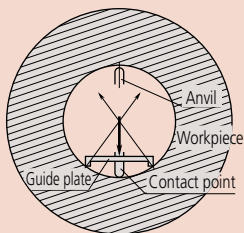
### How to read the indicated value

Series 526



The 526 series has a gage head with high curvature. Alignment with the diameter (a-a') is achieved by rotating the gage head in the direction indicated by the arrow, and the reading is the maximum value read from the dial indicator.

Series 511

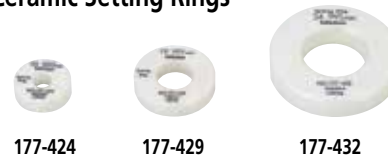


The 511 series provides a guide plate to align the setting ring diameter with the measurement axis of the bore gage.

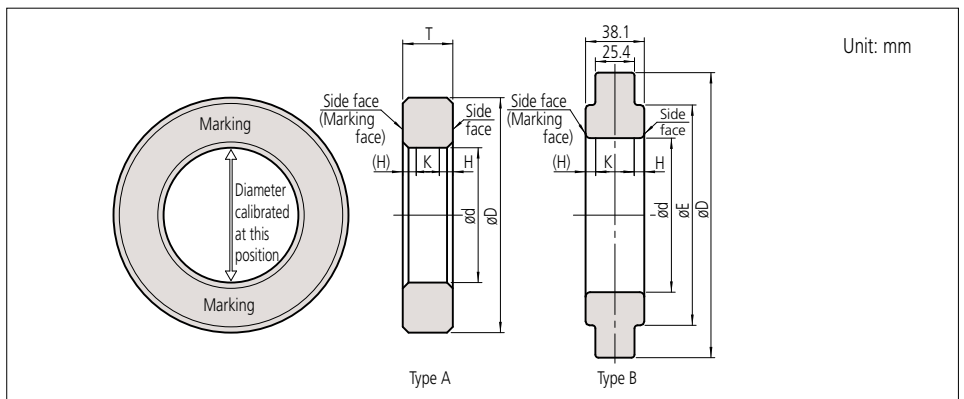
### Steel Setting Rings



### Ceramic Setting Rings



### DIMENSIONS







# D

## Small Tool Instruments Calipers Height Gages Depth Gages



**Digimatic Caliper**



**Digimatic Height Gages**



**Linear Height**



**Depth Gages**



**ABSOLUTE Digimatic Caliper**



**ABSOLUTE Coolant-Proof Caliper**



**Super Caliper**



**Digimatic Height Gage**

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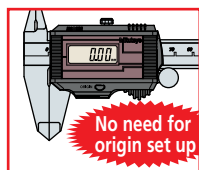
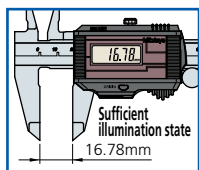
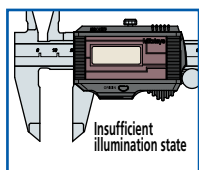
# Super Caliper—Solar Powered

**SERIES 500 — No battery or origin reset needed for IP67 Digital Caliper**



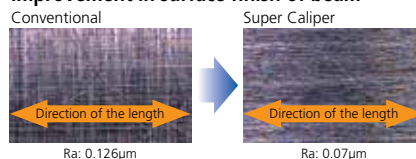
## FEATURES

- With no annoying origin restoration necessary, a measurement can be started at any time and without restrictions on operating speed.



- This unique\* eco-friendly solar-powered Super Caliper requires no battery.  
\*According to Mitutoyo investigation in January, 2005
- The impact resistance of the display unit has been increased for improved usability in workshop conditions.
- IP67 protection ensures waterproof reliability.
- This Super Caliper uses components that do not contain harmful substances and is compatible with RoHS Directives.
- Supplied in fitted plastic case.

### Improvement in surface finish of beam



500-784

## SPECIFICATIONS

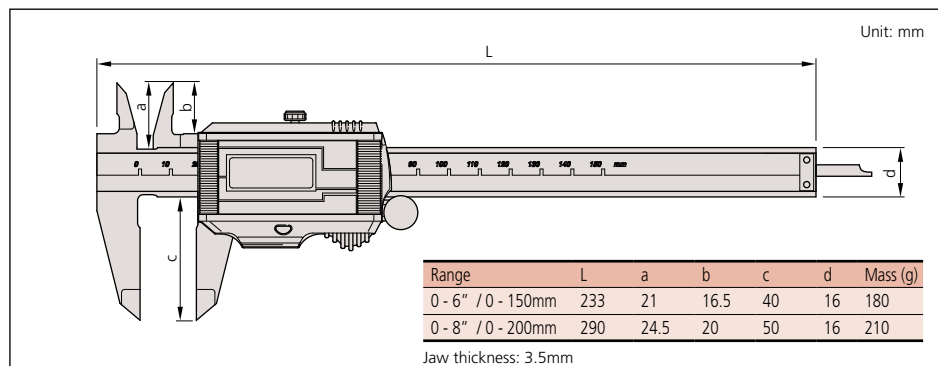
| Metric    |                 |          |            |
|-----------|-----------------|----------|------------|
| Range     | Order No.       | Accuracy | Resolution |
| 0 - 150mm | <b>500-776</b>  | ±0.02mm  | 0.01mm     |
| 0 - 150mm | <b>500-774*</b> | ±0.02mm  | 0.01mm     |
| 0 - 200mm | <b>500-777</b>  | ±0.02mm  | 0.01mm     |
| 0 - 200mm | <b>500-775*</b> | ±0.02mm  | 0.01mm     |

\*Without SPC data output

| Inch/Metric        |                 |          |                 |
|--------------------|-----------------|----------|-----------------|
| Range              | Order No.       | Accuracy | Resolution      |
| 0 - 6" / 0 - 150mm | <b>500-786</b>  | ±.001"   | .0005" / 0.01mm |
| 0 - 6" / 0 - 150mm | <b>500-784*</b> | ±.001"   | .0005" / 0.01mm |
| 0 - 8" / 0 - 200mm | <b>500-787</b>  | ±.001"   | .0005" / 0.01mm |
| 0 - 8" / 0 - 200mm | <b>500-785*</b> | ±.001"   | .0005" / 0.01mm |

\*Without SPC data output

## DIMENSIONS AND MASS



| Range              | L   | a    | b    | c  | d  | Mass (g) |
|--------------------|-----|------|------|----|----|----------|
| 0 - 6" / 0 - 150mm | 233 | 21   | 16.5 | 40 | 16 | 180      |
| 0 - 8" / 0 - 200mm | 290 | 24.5 | 20   | 50 | 16 | 210      |

Jaw thickness: 3.5mm



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005" / 0.01mm or 0.01mm  
 Repeatability: .0005" / 0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electromagnetic induction linear encoder  
 Max. response speed: Unlimited  
 Battery: Solar cell\*  
 Dust/Water protection level: IP67  
 \*Can be used continuously above 60 lux ambient illumination.

## Function

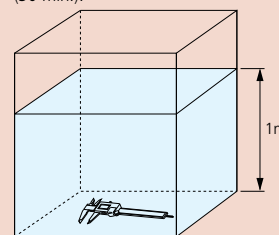
Origin-set, inch/mm conversion (on inch/metric models only)  
 Alarm: Counting value composition error

## Optional Accessories

- 05CZA624:** SPC cable with data switch (40" / 1m)
- 05CZA625:** SPC cable with data switch (80" / 2m)

## IP67 protection level

- Level 6: Dust-tight  
No ingress of dust.
- Level 7: Protected against the effects of temporary immersion in water.  
Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed 1 meter in water under standardized conditions of pressure and time (30 min.).



## About the charge function (Super Caliper)

The minimum illumination required in the uncharged state is 60 lux. As shown in the table, JIS Z 9110 Artificial Illumination Intensity Standard, this Super Caliper can be used without problems in a normal work environment.

The charge function allows the operator to use this Super Caliper without interrupting work even if the ambient illumination is temporarily insufficient.

- In the fully charged state, this Super Caliper can operate for approximately an hour in an environment of 50lux illumination (less than the minimum necessary illumination intensity).
- The time necessary for full charge differs, depending on the charging conditions. If this Super Caliper is left unused in an illumination of 500 lux (usual for manufacturing environments), it takes approximately one hour to reach full charge.

# ABSOLUTE Solar Caliper

**SERIES 500 — No battery or origin reset needed**

Mitutoyo's Absolute Solar Digimatic Caliper retains its origin point for the entire life of the caliper, even the display turns off. At 60 Lux and higher, the ABSOLUTE solar caliper is turned on ready to start measurement.

## FEATURES

- No more repeated zero setting caused by low-light intensity.
- Hard-coated solar panel for increased durability.
- No fear for overspeed errors.
- With thumb roller.
- Supplied in fitted plastic case.



500-474

## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Repeatability: .0005" / 0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Battery: Solar cell\*

## Function

Origin-set, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Counting value composition error

## Optional Accessories

- 959143:** Data hold unit (SPC output model only)
- 959149:** SPC cable with data switch (40" / 1m)
- 959150:** SPC cable with data switch (80" / 2m)

## SPECIFICATIONS

### Metric

| Range     | Order No.       | Accuracy | Resolution | Remarks                |
|-----------|-----------------|----------|------------|------------------------|
| 0 - 100mm | <b>500-443</b>  | ±0.02mm  | 0.01mm     | ø1.9mm round depth bar |
| 0 - 100mm | <b>500-453*</b> | ±0.02mm  | 0.01mm     | ø1.9mm round depth bar |
| 0 - 150mm | <b>500-444</b>  | ±0.02mm  | 0.01mm     |                        |
| 0 - 150mm | <b>500-454*</b> | ±0.02mm  | 0.01mm     |                        |
| 0 - 200mm | <b>500-445</b>  | ±0.02mm  | 0.01mm     |                        |
| 0 - 200mm | <b>500-455*</b> | ±0.02mm  | 0.01mm     |                        |

\*without SPC data output

### Inch/Metric

| Range              | Order No.       | Accuracy | Resolution      | Remarks               |
|--------------------|-----------------|----------|-----------------|-----------------------|
| 0 - 4" / 0 - 100mm | <b>500-463</b>  | ±.001"   | .0005" / 0.01mm | .075" round depth bar |
| 0 - 4" / 0 - 100mm | <b>500-473*</b> | ±.001"   | .0005" / 0.01mm | .075" round depth bar |
| 0 - 6" / 0 - 150mm | <b>500-464</b>  | ±.001"   | .0005" / 0.01mm |                       |
| 0 - 6" / 0 - 150mm | <b>500-474*</b> | ±.001"   | .0005" / 0.01mm |                       |
| 0 - 8" / 0 - 200mm | <b>500-465</b>  | ±.001"   | .0005" / 0.01mm |                       |
| 0 - 8" / 0 - 200mm | <b>500-475*</b> | ±.001"   | .0005" / 0.01mm |                       |

\*without SPC data output

## DIMENSIONS AND MASS

Unit: mm

| Range              | L   | a  | b    | c    | Mass (g) |
|--------------------|-----|----|------|------|----------|
| 0 - 4" / 0 - 100mm | 182 | 40 | 21   | 16.5 | 125      |
| 0 - 6" / 0 - 150mm | 233 | 40 | 21   | 16.5 | 150      |
| 0 - 8" / 0 - 200mm | 290 | 50 | 24.5 | 20   | 180      |

# ABSOLUTE Coolant-Proof Caliper

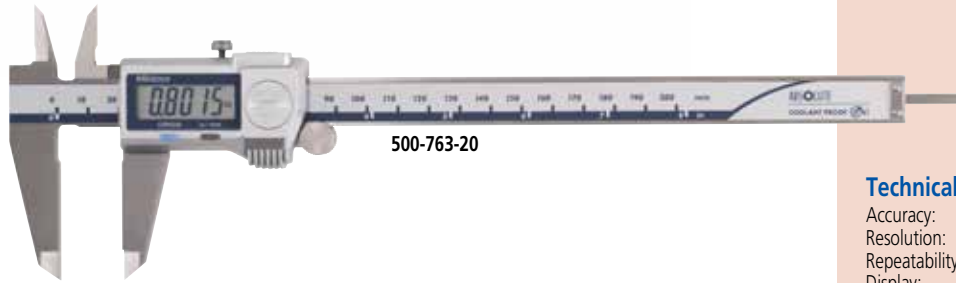
**SERIES 500 — with Dust/Water Protection Conforming to IP67 Level**

## FEATURES

- Can be used in workshop conditions exposed to coolant, water, dust or oil.
- Easy to use - no need to wipe or clean the scale.
- Advanced design.
- Character height increased from 7.4mm to 9.0mm for improved readability.
- Redesigned battery cover eliminates the need for a screwdriver.
- Incorporates absolute measurement system.
- Automatic power-on/off.
- Data output function.
- With thumb roller.
- Supplied in fitted plastic case.



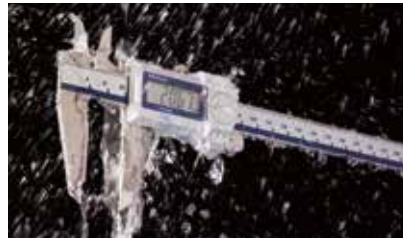
500-752-20



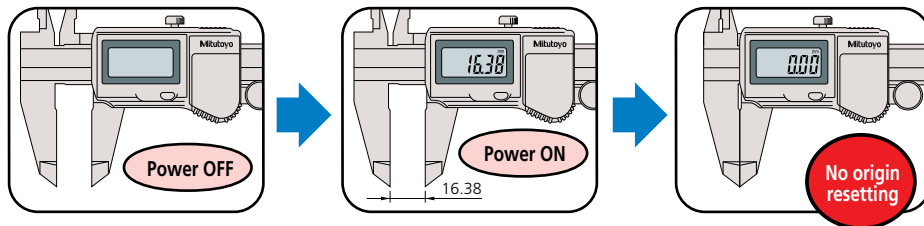
500-763-20

## COOLANT PROOF™ IP67

COOLANT PROOF is the universal term of Mitutoyo Digimatic Small Tool Instruments that are free from measurement error and physical deterioration due to routine exposure to water, cutting oil or coolant. This high performance is achieved by using encoders that are inherently immune to contamination, where exposure is inevitable, combined with comprehensive sealing techniques and extremely oil-resistant materials to guarantee a long working life under normal operating conditions.



**Built-in ABS (absolute) scale means that these calipers are ready to use immediately after power-on without origin resetting. It's as easy as vernier caliper measurements.**



Certificate of inspection



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005" / 0.01mm or 0.01mm  
 Repeatability: .0005" / 0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electromagnetic induction linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc./2 pcs\*), **938882**  
 Battery life: Approx. 5 years under normal use  
 (1 year: over 12" / 300mm models)  
 Dust/Water protection level: IP67  
 \*0 - 300mm model

## Function

Origin-set, Zero-setting, Automatic power on/off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

- 05CZA624:** SPC cable with data switch (40" / 1m)
- 05CZA625:** SPC cable with data switch (80" / 2m)



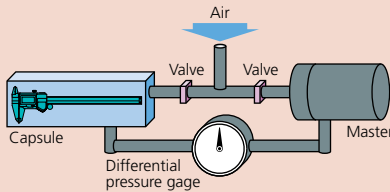
05CZA624



Measurement data output function is available with a water-resistant SPC cable.

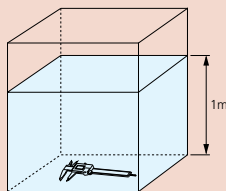
## Air leakage detection system used for water-proof testing

Generally, air leakage tests are performed to evaluate water resistance. Testing begins by placing a measuring tool into the capsule. Next, air with equivalent pressure is supplied to the capsule and the master, then the valves are closed. If none of the air in the capsule seeps into the measuring tool, the capsule's air pressure will remain equal to that of the master, and the differential pressure gage will continue to point to the center. However, if some air seeps into the measuring tool, it will create an air pressure difference in the amount indicated by the differential pressure gage. Thus, detection of air pressure differences is used as a criterion for judging leakage. Every single unit of the ABS Coolant Proof calipers and Coolant Proof micrometer is tested this way for air leakage to help ensure product quality.



## IP67 protection level

- Level 6: Dust-tight  
No ingress of dust.
- Level 7: Protected against the effects of temporary immersion in water.  
Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed 1 meter in water under standardized conditions of pressure and time (30 min.).



## SPECIFICATIONS

### Metric IP67 model

| Range   | Order No.          | Accuracy  | Resolution | Remarks                                     |
|---------|--------------------|-----------|------------|---|
| 0-150mm | <b>500-702-20*</b> | +/-0.02mm | 0.01mm     |   |
| 0-150mm | <b>500-712-20</b>  | +/-0.02mm | 0.01mm     |   |
| 0-150mm | <b>500-719-20</b>  | +/-0.02mm | 0.01mm     | dia. 1.9mm rod depth bar                    |
| 0-150mm | <b>500-721-20</b>  | +/-0.02mm | 0.01mm     | carbide-tipped jaws for ID measurement      |
| 0-150mm | <b>500-723-20</b>  | +/-0.02mm | 0.01mm     | carbide-tipped jaws for OD & ID measurement |
| 0-200mm | <b>500-703-20*</b> | +/-0.02mm | 0.01mm     |   |
| 0-200mm | <b>500-713-20</b>  | +/-0.02mm | 0.01mm     |   |
| 0-200mm | <b>500-722-20</b>  | +/-0.02mm | 0.01mm     | carbide-tipped jaws for ID measurement      |
| 0-200mm | <b>500-724-20</b>  | +/-0.02mm | 0.01mm     | carbide-tipped jaws for OD & ID measurement |
| 0-300mm | <b>500-704-10*</b> | +/-0.03mm | 0.01mm     |   |
| 0-300mm | <b>500-714-10</b>  | +/-0.03mm | 0.01mm     |   |

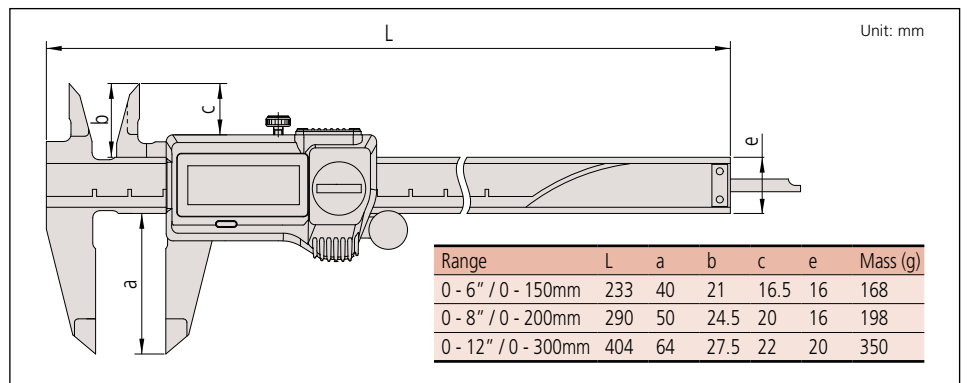
\*without SPC data output

### Inch/Metric IP67 model

| Range           | Order No.          | Accuracy   | Resolution      | Remarks                                     |
|-----------------|--------------------|------------|-----------------|---|
| 0-6" / 0-150mm  | <b>500-752-20*</b> | +/- .001"  | .0005" / 0.01mm |   |
| 0-6" / 0-150mm  | <b>500-762-20</b>  | +/- .001"  | .0005" / 0.01mm |   |
| 0-6" / 0-150mm  | <b>500-768-20*</b> | +/- .001"  | .0005" / 0.01mm | .075" rod depth bar                         |
| 0-6" / 0-150mm  | <b>500-769-20</b>  | +/- .001"  | .0005" / 0.01mm | .075" rod depth bar                         |
| 0-6" / 0-150mm  | <b>500-731-20*</b> | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD measurement      |
| 0-6" / 0-150mm  | <b>500-735-20</b>  | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD measurement      |
| 0-6" / 0-150mm  | <b>500-733-20*</b> | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD & ID measurement |
| 0-6" / 0-150mm  | <b>500-737-20</b>  | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD & ID measurement |
| 0-8" / 0-200mm  | <b>500-753-20*</b> | +/- .001"  | .0005" / 0.01mm |   |
| 0-8" / 0-200mm  | <b>500-763-20</b>  | +/- .001"  | .0005" / 0.01mm |   |
| 0-8" / 0-200mm  | <b>500-732-20*</b> | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD measurement      |
| 0-8" / 0-200mm  | <b>500-736-20</b>  | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD measurement      |
| 0-8" / 0-200mm  | <b>500-734-20*</b> | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD & ID measurement |
| 0-8" / 0-200mm  | <b>500-738-20</b>  | +/- .001"  | .0005" / 0.01mm | carbide-tipped jaws for OD & ID measurement |
| 0-12" / 0-300mm | <b>500-754-10*</b> | +/- .0015" | .0005" / 0.01mm |   |
| 0-12" / 0-300mm | <b>500-764-10</b>  | +/- .0015" | .0005" / 0.01mm |   |

\*without SPC data output

## DIMENSIONS AND MASS

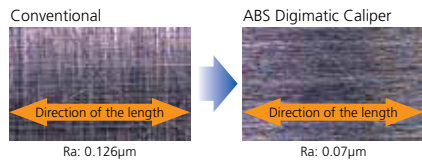


# ABSOLUTE Digimatic Caliper

**SERIES 500 — with Exclusive ABSOLUTE Encoder Technology**

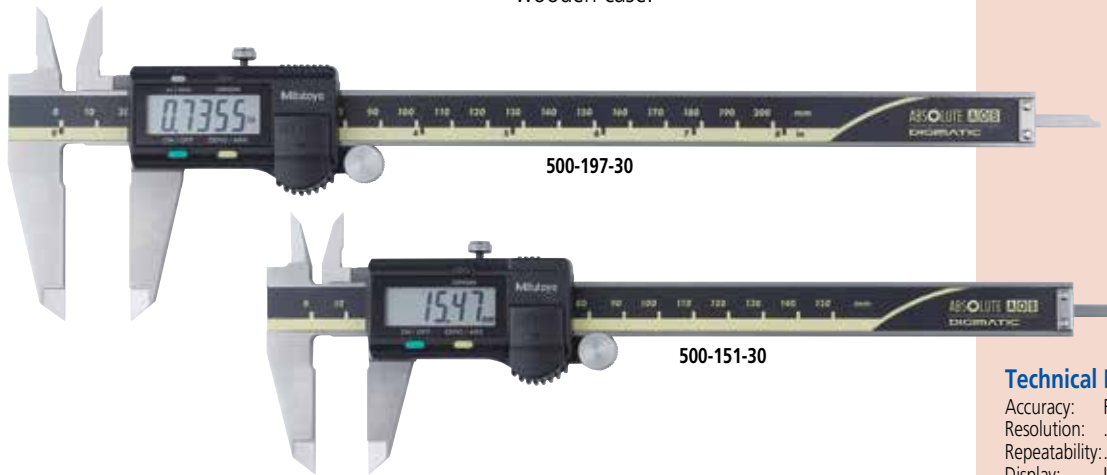
Mitutoyo's absolute Digimatic Caliper is the next generation of electronic calipers. It keeps track of its origin point once set. Whenever turned on, the large LCD displays the actual slider position ready to start measurement. No more repeated zero setting is necessary with the absolute encoder technology, as well as no more concern for overspeed errors.

**High-quality guide surface finish for smooth slider movement.**



## FEATURES

- Large and clear LCD readout.
- The ZERO/ABS key allows the display to be zero-set at any slider position along the scale for incremental comparison measurements. This switch also will allow return to the absolute (ABS) coordinate and display of the true position from the origin point (usually jaws-closed point).
- Data Hold Unit (959143) is optional.
- Carbide-tipped jaw-type calipers are also available.
- Thumb roller included only on calipers up to and including 12" or 300mm.
- Supplied in fitted plastic case. Except 40" / 1000mm supplied in wooden case.



## DIMENSIONS AND MASS

| Range               | L   | a  | b    | c    | d  | Mass (g) |
|---------------------|-----|----|------|------|----|----------|
| 0 - 4" / 0 - 100mm  | 182 | 40 | 21   | 16.5 | 16 | 143      |
| 0 - 6" / 0 - 150mm  | 233 | 40 | 21   | 16.5 | 16 | 168      |
| 0 - 8" / 0 - 200mm  | 290 | 50 | 24.5 | 20   | 16 | 198      |
| 0 - 12" / 0 - 300mm | 403 | 64 | 27.5 | 22   | 20 | 350      |

| Range                | L    | a   | b  | c  | d  | Mass (g) |
|----------------------|------|-----|----|----|----|----------|
| 0 - 18" / 0 - 450mm  | 630  | 90  | 47 | 38 | 25 | 1170     |
| 0 - 24" / 0 - 600mm  | 780  | 90  | 47 | 38 | 25 | 1350     |
| 0 - 40" / 0 - 1000mm | 1240 | 130 | 61 | 50 | 32 | 3300     |



The new Mitutoyo ABS Digimatic Caliper line with exclusive AOS sensor technology. The patented Advanced Onsite Sensor (AOS) offers improved measurement dependability by increasing resistance to harsh workshop conditions.

## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Repeatability: .0005"/0.01mm  
 Display: LCD  
 Length standard:  
 ABSOLUTE electromagnetic induction type linear encoder (200mm and smaller models)  
 ABSOLUTE electrostatic capacitance type linear encoder (300mm and larger models)  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3.5 years under normal use

## Function

Origin-set, Zero-setting, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

- 959143:** Data hold unit
- 959149:** SPC cable with data switch (40" / 1m)
- 959150:** SPC cable with data switch (80" / 2m)

**959143**



**959149**



500-506-10

500-502-10

500-501-10

500-500-10

## SPECIFICATIONS

### Metric

| Range      | Order No.         | Accuracy | Resolution | Remarks                                     |
|------------|-------------------|----------|------------|---|
| 0 - 100mm  | <b>500-150-30</b> | ±0.02mm  | 0.01mm     | ø1.9mm rod depth bar                        |
| 0 - 150mm  | <b>500-151-30</b> | ±0.02mm  | 0.01mm     | —   |
| 0 - 150mm  | <b>500-154-30</b> | ±0.02mm  | 0.01mm     | Carbide-tipped jaws for OD measurement      |
| 0 - 150mm  | <b>500-155-30</b> | ±0.02mm  | 0.01mm     | Carbide-tipped jaws for OD & ID measurement |
| 0 - 150mm  | <b>500-158-30</b> | ±0.02mm  | 0.01mm     | ø1.9mm rod depth bar                        |
| 0 - 200mm  | <b>500-152-30</b> | ±0.02mm  | 0.01mm     | —   |
| 0 - 200mm  | <b>500-156-30</b> | ±0.02mm  | 0.01mm     | Carbide-tipped jaws for OD measurement      |
| 0 - 200mm  | <b>500-157-30</b> | ±0.02mm  | 0.01mm     | Carbide-tipped jaws for OD & ID measurement |
| 0 - 300mm  | <b>500-153</b>    | ±0.03mm  | 0.01mm     | —   |
| 0 - 450mm  | <b>500-500-10</b> | ±0.05mm  | 0.01mm     | Without Thumb Roller                        |
| 0 - 600mm  | <b>500-501-10</b> | ±0.05mm  | 0.01mm     | Without Thumb Roller                        |
| 0 - 1000mm | <b>500-502-10</b> | ±0.07mm  | 0.01mm     | Without Thumb Roller                        |

### Inch/Metric

| Range                | Order No.          | Accuracy | Resolution      | Remarks                                     |
|----------------------|--------------------|----------|-----------------|---|
| 0 - 4" / 0 - 100mm   | <b>500-170-30</b>  | ±.001"   | .0005" / 0.01mm | .075" rod depth bar                         |
| 0 - 4" / 0 - 100mm   | <b>500-195-30*</b> | ±.001"   | .0005" / 0.01mm | .075" rod depth bar                         |
| 0 - 6" / 0 - 150mm   | <b>500-171-30</b>  | ±.001"   | .0005" / 0.01mm | —   |
| 0 - 6" / 0 - 150mm   | <b>500-174-30</b>  | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD measurement      |
| 0 - 6" / 0 - 150mm   | <b>500-175-30</b>  | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD & ID measurement |
| 0 - 6" / 0 - 150mm   | <b>500-178-30</b>  | ±.001"   | .0005" / 0.01mm | .075" rod depth bar                         |
| 0 - 6" / 0 - 150mm   | <b>500-196-30*</b> | ±.001"   | .0005" / 0.01mm | —   |
| 0 - 6" / 0 - 150mm   | <b>500-159-30*</b> | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD measurement      |
| 0 - 6" / 0 - 150mm   | <b>500-160-30*</b> | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD & ID measurement |
| 0 - 8" / 0 - 200mm   | <b>500-172-30</b>  | ±.001"   | .0005" / 0.01mm | —   |
| 0 - 8" / 0 - 200mm   | <b>500-176-30</b>  | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD measurement      |
| 0 - 8" / 0 - 200mm   | <b>500-177-30</b>  | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD & ID measurement |
| 0 - 8" / 0 - 200mm   | <b>500-197-30*</b> | ±.001"   | .0005" / 0.01mm | —   |
| 0 - 8" / 0 - 200mm   | <b>500-163-30*</b> | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD measurement      |
| 0 - 8" / 0 - 200mm   | <b>500-164-30*</b> | ±.001"   | .0005" / 0.01mm | Carbide-tipped jaws for OD & ID measurement |
| 0 - 12" / 0 - 300mm  | <b>500-173</b>     | ±.0015"  | .0005" / 0.01mm | —   |
| 0 - 12" / 0 - 300mm  | <b>500-167</b>     | ±.0015"  | .0005" / 0.01mm | Carbide-tipped jaws for OD measurement      |
| 0 - 12" / 0 - 300mm  | <b>500-168</b>     | ±.0015"  | .0005" / 0.01mm | Carbide-tipped jaws for OD & ID measurement |
| 0 - 12" / 0 - 300mm  | <b>500-193*</b>    | ±.0015"  | .0005" / 0.01mm | —   |
| 0 - 12" / 0 - 300mm  | <b>500-165*</b>    | ±.0015"  | .0005" / 0.01mm | Carbide-tipped jaws for OD measurement      |
| 0 - 12" / 0 - 300mm  | <b>500-166*</b>    | ±.0015"  | .0005" / 0.01mm | Carbide-tipped jaws for OD & ID measurement |
| 0 - 18" / 0 - 450mm  | <b>500-505-10</b>  | ±.002"   | .0005" / 0.01mm | Without Thumb Roller                        |
| 0 - 24" / 0 - 600mm  | <b>500-506-10</b>  | ±.002"   | .0005" / 0.01mm | Without Thumb Roller                        |
| 0 - 40" / 0 - 1000mm | <b>500-507-10</b>  | ±.003"   | .0005" / 0.01mm | Without Thumb Roller                        |

\*without SPC data output

# Dial Caliper

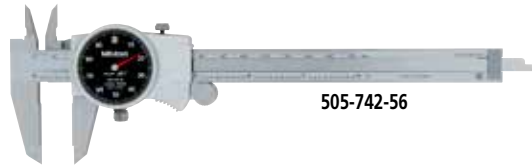
## SERIES 505

### FEATURES

- New designed dial movement for ultra-smooth sliding and high-shock protection.
- Improved finish on sliding surfaces for longevity.
- New face for improved readability.
- Lock screw for dial bezel and for holding the sliding jaw position.
- Can measure OD, ID, depth and steps.
- Models available with carbide-tipped OD and ID jaws.
- Supplied in fitted plastic case.



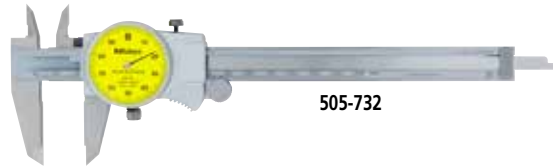
505-746



505-742-56



505-745



505-732



.100" per revolution



.200" per revolution



1mm per revolution



2mm per revolution

### SPECIFICATIONS

**Metric** 1mm Per One Revolution

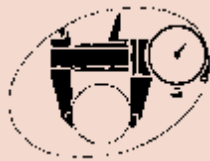
| Range   | Order No.      | Accuracy  | Graduation | Remarks |
|---------|----------------|-----------|------------|---------|
| 0-150mm | <b>505-732</b> | +/-0.03mm | 0.01mm     | —       |
| 0-200mm | <b>505-733</b> | +/-0.03mm | 0.01mm     | —       |

**Metric** 2mm Per One Revolution

| Range   | Order No.      | Accuracy  | Graduation | Remarks                                     |
|---------|----------------|-----------|------------|---|
| 0-150mm | <b>505-730</b> | +/-0.03mm | 0.02mm     | —   |
| 0-150mm | <b>505-734</b> | +/-0.03mm | 0.02mm     | Carbide-tipped jaws for OD measurement      |
| 0-150mm | <b>505-735</b> | +/-0.03mm | 0.02mm     | Carbide-tipped jaws for OD & ID measurement |
| 0-200mm | <b>505-731</b> | +/-0.03mm | 0.02mm     | —   |
| 0-300mm | <b>505-745</b> | +/-0.04mm | 0.02mm     | —   |



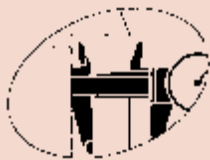
## Measurement Applications



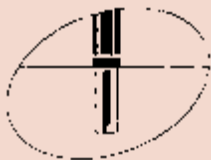
1. Outside measurement



2. Inside measurement



3. Step measurement



4. Depth measurement

## SPECIFICATIONS

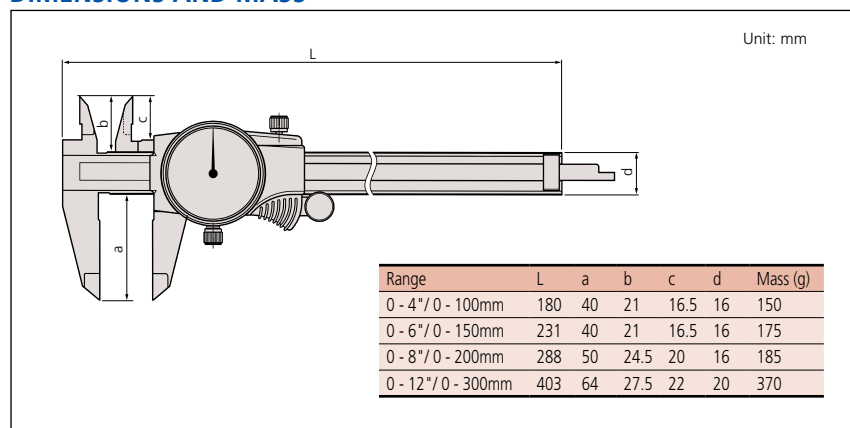
**Inch** .1" Per Revolution

| Range | Order No.         | Accuracy  | Graduation | Remarks                                     |
|-------|-------------------|-----------|------------|---|
| 0-6"  | <b>505-742</b>    | +/- .001" | .001"      | -   |
| 0-6"  | <b>505-742-51</b> | +/- .001" | .001"      | Blue Dial Face                              |
| 0-6"  | <b>505-742-52</b> | +/- .001" | .001"      | Purple Dial Face                            |
| 0-6"  | <b>505-742-53</b> | +/- .001" | .001"      | Green Dial Face                             |
| 0-6"  | <b>505-742-54</b> | +/- .001" | .001"      | Red Dial Face                               |
| 0-6"  | <b>505-742-55</b> | +/- .001" | .001"      | Orange Dial Face                            |
| 0-6"  | <b>505-742-56</b> | +/- .001" | .001"      | Black Dial Face                             |
| 0-6"  | <b>505-736</b>    | +/- .001" | .001"      | Carbide-tipped jaws for OD measurement      |
| 0-6"  | <b>505-738</b>    | +/- .001" | .001"      | Carbide-tipped jaws for OD & ID measurement |
| 0-8"  | <b>505-743</b>    | +/- .002" | .001"      | -   |
| 0-8"  | <b>505-737</b>    | +/- .002" | .001"      | Carbide-tipped jaws for OD measurement      |
| 0-8"  | <b>505-739</b>    | +/- .002" | .001"      | Carbide-tipped jaws for OD & ID measurement |
| 0-12" | <b>505-746</b>    | +/- .002" | .001"      | —   |
| 0-12" | <b>505-747</b>    | +/- .002" | .001"      | Carbide-tipped jaws for OD measurement      |
| 0-12" | <b>505-748</b>    | +/- .002" | .001"      | Carbide-tipped jaws for OD & ID             |

**Inch** .2" Per Revolution

| Range | Order No.      | Accuracy  | Graduation | Remarks                                |
|-------|----------------|-----------|------------|--|
| 0-6"  | <b>505-740</b> | +/- .001" | .001"      | —                                      |
| 0-6"  | <b>505-744</b> | +/- .001" | .001"      | Carbide-tipped jaws for OD measurement |
| 0-8"  | <b>505-741</b> | +/- .002" | .001"      | —                                      |
| 0-12" | <b>505-749</b> | +/- .002" | .001"      | —                                      |
| 0-12" | <b>505-750</b> | +/- .002" | .001"      | Carbide-tipped jaws for OD measurement |

## DIMENSIONS AND MASS

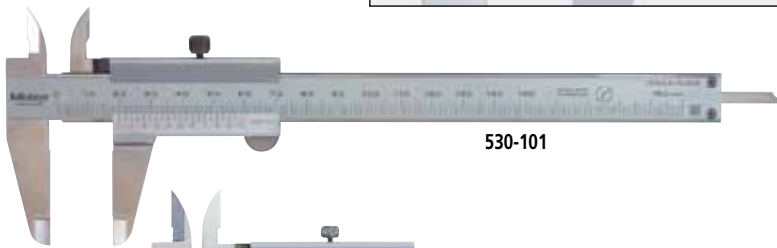
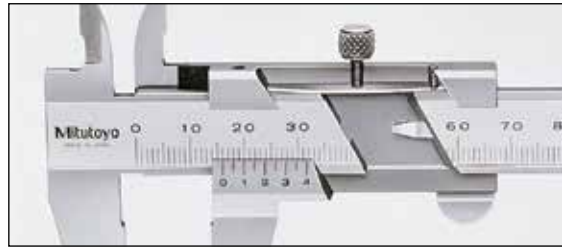
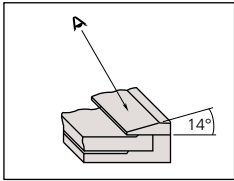


# Vernier Caliper

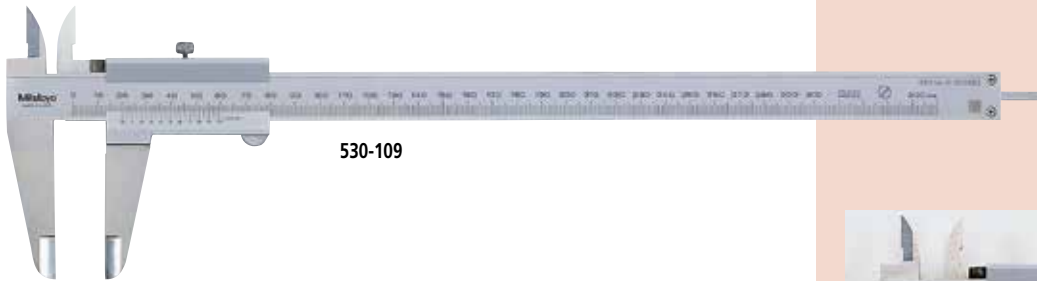
## SERIES 530 — Standard Model

### FEATURES

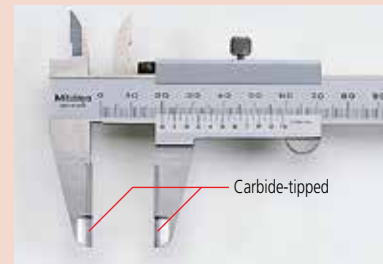
- Measures OD (outside diameter), ID (inside diameter), depth, and steps.
- The small vernier face angle ( $14^\circ$ ) provides easy reading.
- Dual reading scales on vernier. (metric/inch and inch models only).
- Lock screw for holding the sliding jaw position.
- Carbide-tipped jaw-type calipers are available.
- Supplied with vinyl holster in fitted carton. Except 24" / 600mm models are carton only. 40" / 1000mm supplied in wooden case.



530-101

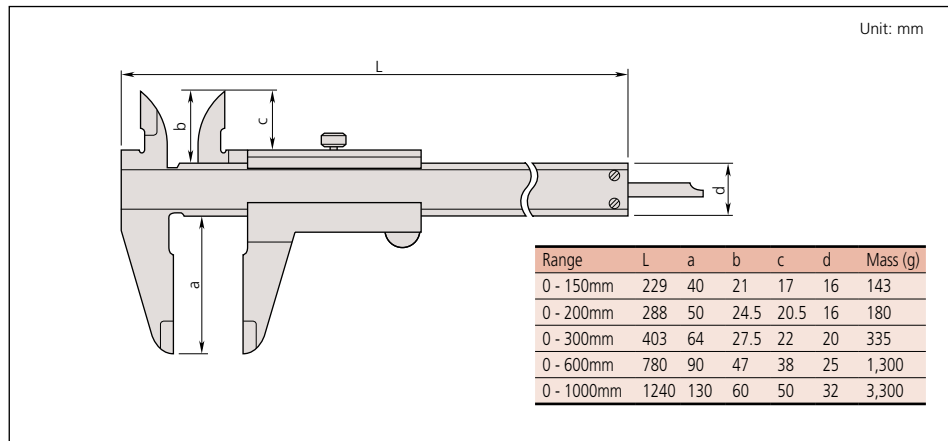


530-109



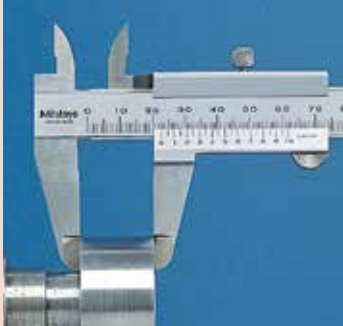
Carbide-tipped jaw type

### DIMENSIONS AND MASS

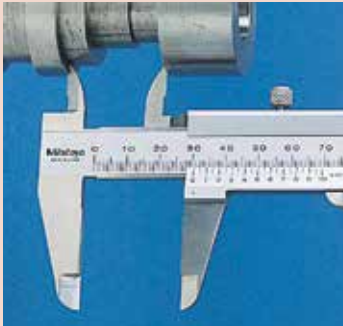


Round depth bar type

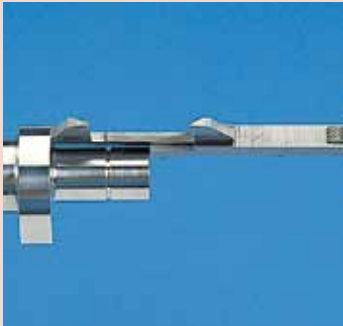
## Measurement Applications



OD measurement



ID measurement



Step measurement



Depth measurement

## SPECIFICATIONS

### Metric

| Range      | Order No.        | Accuracy | Graduation | Remarks                                     |
|------------|------------------|----------|------------|---|
| 0 - 150mm  | <b>530-102</b>   | ±0.05mm  | 0.05mm     | ∅ 1.9mm Depth bar                           |
| 0 - 150mm  | <b>530-101</b>   | ±0.05mm  | 0.05mm     | —   |
| 0 - 150mm  | <b>530-320</b>   | ±0.05mm  | 0.05mm     | Carbide-tipped jaws for OD measurement      |
| 0 - 150mm  | <b>530-335</b>   | ±0.05mm  | 0.05mm     | Carbide-tipped jaws for OD & ID measurement |
| 0 - 150mm  | <b>530-122*</b>  | ±0.03mm  | 0.02mm     | High-accuracy model                         |
| 0 - 200mm  | <b>530-108</b>   | ±0.05mm  | 0.05mm     | —   |
| 0 - 200mm  | <b>530-321</b>   | ±0.05mm  | 0.05mm     | Carbide-tipped jaws for OD measurement      |
| 0 - 200mm  | <b>530-123*</b>  | ±0.03mm  | 0.02mm     | High-accuracy model                         |
| 0 - 300mm  | <b>530-109</b>   | ±0.08mm  | 0.05mm     | —   |
| 0 - 300mm  | <b>530-322</b>   | ±0.08mm  | 0.05mm     | Carbide-tipped jaws for OD measurement      |
| 0 - 300mm  | <b>530-124*</b>  | ±0.04mm  | 0.02mm     | High-accuracy model: ±0.04mm                |
| 0 - 600mm  | <b>530-501**</b> | ±0.1mm   | 0.05mm     | —   |
| 0 - 1000mm | <b>530-502**</b> | ±0.15mm  | 0.05mm     | —   |

\*Graduation: 0.02mm

\*\*No depth measuring bar

### Metric/Inch with metric/inch dual scale

| Range               | Order No.       | Accuracy | Vernier Graduation |             | Remarks             |
|---------------------|-----------------|----------|--------------------|-------------|---------------------|
|                     |                 |          | Lower Scale        | Upper Scale |                     |
| 0 - 150mm / 0 - 6"  | <b>530-104</b>  | ±0.05mm  | 0.05mm             | 1/128"      | —                   |
| 0 - 150mm / 0 - 6"  | <b>530-316</b>  | ±0.05mm  | 0.05mm             | 1/128"      | —                   |
| 0 - 150mm / 0 - 6"  | <b>530-312*</b> | ±0.03mm  | 0.02mm             | .001"       | High-accuracy model |
| 0 - 200mm / 0 - 8"  | <b>530-114</b>  | ±0.05mm  | 0.05mm             | 1/128"      | —                   |
| 0 - 200mm / 0 - 8"  | <b>530-118*</b> | ±0.03mm  | 0.02mm             | .001"       | High-accuracy model |
| 0 - 300mm / 0 - 12" | <b>530-115</b>  | ±0.08mm  | 0.05mm             | 1/128"      | —                   |
| 0 - 300mm / 0 - 12" | <b>530-119*</b> | ±0.04mm  | 0.02mm             | .001"       | High-accuracy model |

\*Graduation: 0.02mm

### Inch with inch/inch dual scale

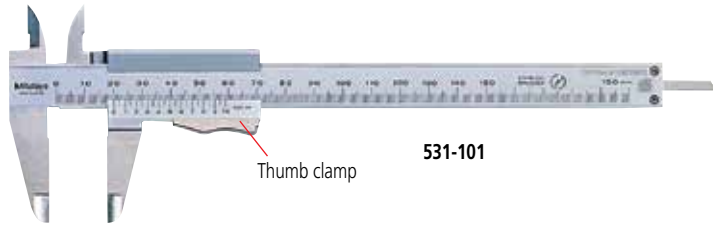
| Range  | Order No.      | Accuracy | Vernier Graduation |             | Remarks |
|--------|----------------|----------|--------------------|-------------|---------|
|        |                |          | Lower Scale        | Upper Scale |         |
| 0 - 6" | <b>530-105</b> | ±.0015"  | .001"              | 1/128"      | —       |
| 0 - 8" | <b>530-116</b> | ±.0015"  | .001"              | 1/128"      | —       |

# Vernier Caliper

## SERIES 531 — with Thumb Clamp

### FEATURES

- The slider moves only when the spring loaded thumb clamp is depressed.
- Can measure OD, ID, depth and steps
- Supplied with vinyl holster in fitted carton.



531-101

Thumb clamp

### SPECIFICATIONS

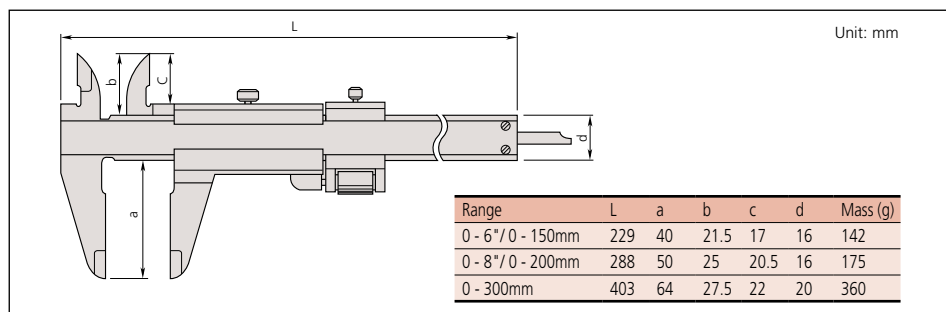
#### Metric

| Range     | Order No. | Accuracy | Graduation | Remarks |
|-----------|-----------|----------|------------|---------|
| 0 - 150mm | 531-101   | ±0.05mm  | 0.05mm     | —       |
| 0 - 200mm | 531-102   | ±0.05mm  | 0.05mm     | —       |
| 0 - 300mm | 531-103   | ±0.08mm  | 0.05mm     | —       |

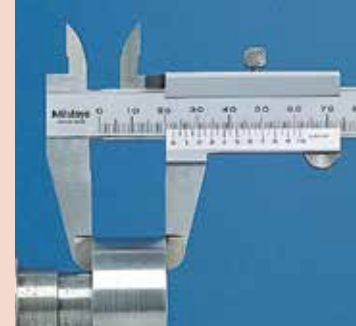
#### Metric/Inch with metric/inch dual scale

| Range               | Order No. | Accuracy | Graduation  |             | Remarks                       |
|---------------------|-----------|----------|-------------|-------------|-------------------------------|
|                     |           |          | Lower Scale | Upper Scale |                               |
| 0 - 150mm / 0 - 6"  | 531-122   | ±0.05mm  | 0.05mm      | 1/128"      | with inch/mm conversion label |
| 0 - 150mm / 0 - 6"  | 531-128   | ±0.03mm  | 0.02mm      | .001"       | High-accuracy model           |
| 0 - 200mm / 0 - 8"  | 531-108   | ±0.05mm  | 0.05mm      | 1/128"      | —                             |
| 0 - 200mm / 0 - 8"  | 531-129   | ±0.03mm  | 0.02mm      | .001"       | High-accuracy model           |
| 0 - 300mm / 0 - 12" | 531-109   | ±0.08mm  | 0.05mm      | 1/128"      | —                             |
| 0 - 300mm / 0 - 12" | 531-112   | ±0.04mm  | 0.02mm      | .001"       | High-accuracy model           |

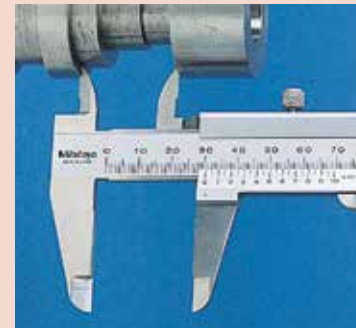
### DIMENSIONS AND MASS



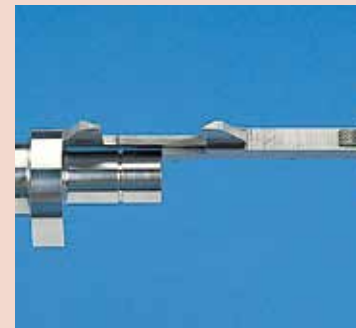
### Measurement Applications



OD measurement



ID measurement



Step measurement

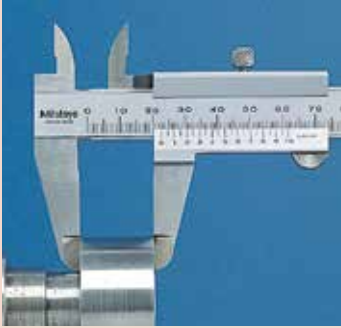


Depth measurement

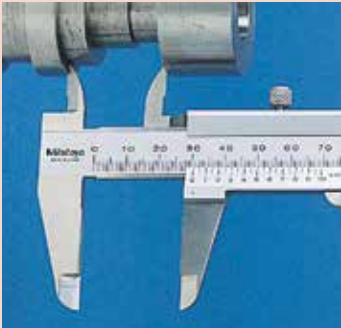
# Vernier Caliper

**SERIES 532 — with Fine Adjustment**

## Measurement Applications



OD measurement



ID measurement



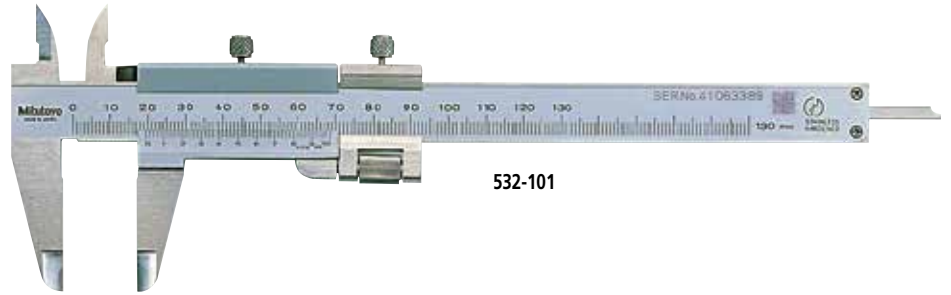
Step measurement



Depth measurement

## FEATURES

- Provided with a fine-adjustment carriage to feed the slider finely.
- Can measure OD, ID, depth and steps.
- Supplied with vinyl holster in fitted carton.



532-101

## SPECIFICATIONS

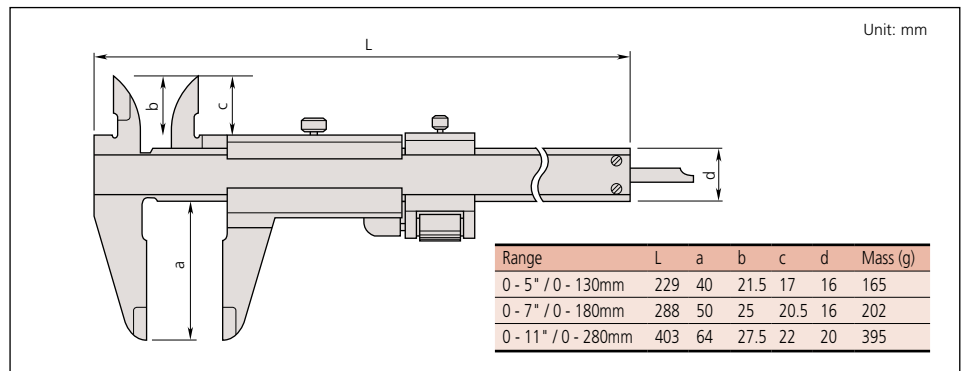
### Metric

| Range     | Order No.      | Accuracy | Graduation |
|-----------|----------------|----------|------------|
| 0 - 130mm | <b>532-101</b> | ±0.03mm  | 0.02mm     |
| 0 - 180mm | <b>532-102</b> | ±0.03mm  | 0.02mm     |
| 0 - 280mm | <b>532-103</b> | ±0.04mm  | 0.02mm     |

### Metric/Inch with metric/inch dual scale

| Range               | Order No.      | Accuracy | Graduation  |             |
|---------------------|----------------|----------|-------------|-------------|
|                     |                |          | Lower Scale | Upper Scale |
| 0 - 130mm / 0 - 5"  | <b>532-119</b> | ±0.03mm  | 0.02mm      | .001"       |
| 0 - 180mm / 0 - 7"  | <b>532-120</b> | ±0.03mm  | 0.02mm      | .001"       |
| 0 - 280mm / 0 - 11" | <b>532-121</b> | ±0.04mm  | 0.02mm      | .001"       |

## DIMENSIONS AND MASS



# Vernier Caliper

## SERIES 160 — with Nib Style Jaws and Fine Adjustment

### FEATURES

- The jaws have round measuring faces for accurate ID measurement.
- With fine adjustment carriage to feed the slider.
- Inside and outside measurements can be directly read from the upper and lower slider graduations, respectively.
- Supplied with vinyl holster in fitted carton. Except 12" / 300mm, 18" / 450mm and 24" / 600mm are fitted carton only. Over 24" / 600mm supplied in wooden case.



### Technical Data

Accuracy: Refer to the list of specifications  
 Graduation: Refer to the list of specifications



### SPECIFICATIONS

**Metric** with metric/metric dual scale

| Range*          | Order No.      | Accuracy | Graduation  |             | Mass (g) |
|-----------------|----------------|----------|-------------|-------------|----------|
|                 |                |          | Lower Scale | Upper Scale |          |
| 0 (10) - 300mm  | <b>160-127</b> | ±0.04mm  | 0.02mm      | 0.02mm      | 450      |
| 0 (20) - 450mm  | <b>160-128</b> | ±0.05mm  | 0.02mm      | 0.02mm      | 1,200    |
| 0 (20) - 600mm  | <b>160-101</b> | ±0.05mm  | 0.02mm      | 0.02mm      | 2,600    |
| 0 (20) - 1000mm | <b>160-104</b> | ±0.07mm  | 0.02mm      | 0.02mm      | 3,500    |
| 0 (20) - 1500mm | <b>160-110</b> | ±0.09mm  | 0.02mm      | 0.02mm      | 4,850    |
| 0 (20) - 2000mm | <b>160-113</b> | ±0.12mm  | 0.02mm      | 0.02mm      | 10,200   |

\*( ): Minimum dimension in ID measurement

**Metric/Inch** with metric/inch dual scale

| Range*                         | Order No.      | Accuracy | Graduation  |             | Mass (g) |
|--------------------------------|----------------|----------|-------------|-------------|----------|
|                                |                |          | Lower Scale | Upper Scale |          |
| 0 (10) - 300mm / 0 (.3") - 12" | <b>160-150</b> | ±0.04mm  | 0.02mm      | .001"       | 450      |
| 0 (20) - 450mm / 0 (.5") - 18" | <b>160-151</b> | ±0.05mm  | 0.02mm      | .001"       | 1,200    |
| 0 (20) - 600mm / 0 (.5") - 24" | <b>160-153</b> | ±0.05mm  | 0.02mm      | .001"       | 1,400    |
| 0 (20) - 1000mm / 0 (1") - 40" | <b>160-155</b> | ±0.07mm  | 0.02mm      | .001"       | 3,500    |
| 0 (20) - 1500mm / 0 (1") - 60" | <b>160-157</b> | ±0.09mm  | 0.02mm      | .001"       | 4,850    |
| 0 (20) - 2000mm / 0 (1") - 80" | <b>160-159</b> | ±0.12mm  | 0.02mm      | .001"       | 10,200   |

\*( ): Minimum dimension in ID measurement

**Inch** with inch/inch dual scale

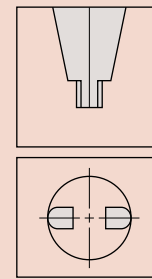
| Range*        | Order No.      | Accuracy | Graduation  |             | Mass (g) |
|---------------|----------------|----------|-------------|-------------|----------|
|               |                |          | Lower Scale | Upper Scale |          |
| 0 (.3") - 12" | <b>160-124</b> | ±.0015"  | .001"       | .001"       | 450      |
| 0 (.5") - 18" | <b>160-116</b> | ±.002"   | .001"       | .001"       | 1,200    |
| 0 (.5") - 24" | <b>160-102</b> | ±.002"   | .001"       | .001"       | 1,400    |
| 0 (1") - 40"  | <b>160-105</b> | ±.003"   | .001"       | .001"       | 3,500    |
| 0 (1") - 60"  | <b>160-111</b> | ±.004"   | .001"       | .001"       | 4,850    |
| 0 (1") - 80"  | <b>160-114</b> | ±.005"   | .001"       | .001"       | 10,200   |

\*( ): Minimum dimension in ID measurement

**Inch/Metric** with inch/metric dual scale

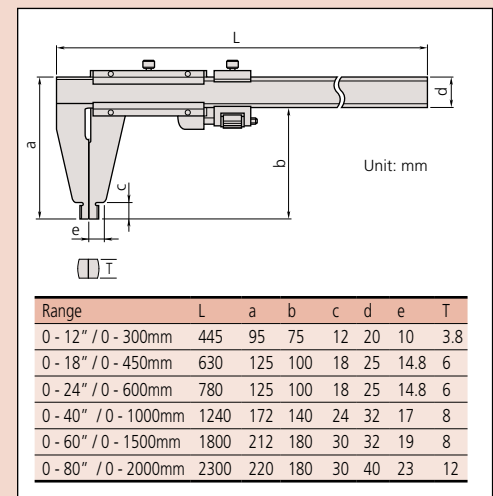
| Range*                         | Order No.      | Accuracy | Graduation  |             | Mass (g) |
|--------------------------------|----------------|----------|-------------|-------------|----------|
|                                |                |          | Lower Scale | Upper Scale |          |
| 0 (.3") - 12" / 0 (10) - 300mm | <b>160-125</b> | ±.0015"  | .001"       | 0.02mm      | 450      |
| 0 (.5") - 18" / 0 (20) - 450mm | <b>160-119</b> | ±.002"   | .001"       | 0.02mm      | 1,200    |
| 0 (.5") - 24" / 0 (20) - 600mm | <b>160-103</b> | ±.002"   | .001"       | 0.02mm      | 1,400    |
| 0 (1") - 40" / 0 (20) - 1000mm | <b>160-106</b> | ±.003"   | .001"       | 0.02mm      | 3,500    |
| 0 (1") - 60" / 0 (20) - 1500mm | <b>160-112</b> | ±.004"   | .001"       | 0.02mm      | 4,850    |
| 0 (1") - 80" / 0 (20) - 2000mm | <b>160-115</b> | ±.005"   | .001"       | 0.02mm      | 10,200   |

\*( ): Minimum dimension in ID measurement



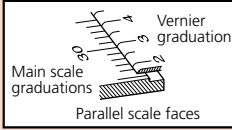
Round surface of jaws for accurate ID measurement.

### DIMENSIONS





**ABSOLUTE**  
Absolute System Patented by MITUTOYO



### Technical Data

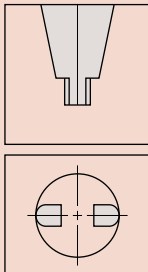
Accuracy: Refer to the list of specifications  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero-setting, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

- 959143:** Data hold unit
- 959149:** SPC cable with data switch (40" / 1m)
- 959150:** SPC cable with data switch (80" / 2m)
- 05CZA624:** SPC cable with data switch (40" / 1m) for IP67 model
- 05CZA625:** SPC cable with data switch (80" / 2m) for IP67 model



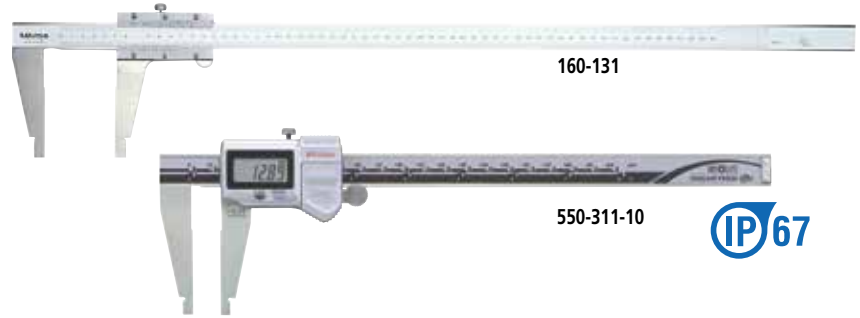
Round surface of jaws for accurate ID measurement.

# ABSOLUTE Digimatic & Vernier Caliper

**SERIES 550, 160 — with Nib-Style Jaws**

### FEATURES

- The rounded faces of the jaws are ideal for accurate ID (inside diameter) measurement.
- Inside and outside measurements can be directly read from the upper and lower slider graduations (Series 160).
- A fine-adjustment carriage type is available (Series 160).
- Parallax-free vernier scale type is available for easy and positive measurement (Series 160).
- With SPC output (Series 550).
- Supplied in fitted plastic case. Except 40" / 1000mm supplied in wooden case.



### SPECIFICATIONS

| Metric          |                     | Digital model |            |          |   |  |
|-----------------|---------------------|---------------|------------|----------|---|--|
| Range*          | Order No.           | Accuracy      | Resolution | Mass (g) | Remarks   |  |
| 0 (10) - 200mm  | <b>550-301-20</b>   | ±0.03mm       | 0.01mm     | 180      | IP67  |  |
| 0 (10) - 300mm  | <b>550-331-10</b>   | ±0.03mm       | 0.01mm     | 380      | w/ offset/preset function for easy ID measurement, IP67 |  |
| 0 (20) - 450mm  | <b>550-203-10**</b> | ±0.05mm       | 0.01mm     | 1,110    |   |  |
| 0 (20) - 600mm  | <b>550-205-10**</b> | ±0.05mm       | 0.01mm     | 1,290    |   |  |
| 0 (20) - 1000mm | <b>550-207-10**</b> | ±0.07mm       | 0.01mm     | 3,350    |   |  |

\*( ): Minimum dimension in ID measurement \*\*Models are not IP67 rated

| Inch/Metric                    |                     | Digital model |                 |          |   |  |
|--------------------------------|---------------------|---------------|-----------------|----------|---|--|
| Range*                         | Order No.           | Accuracy      | Resolution      | Mass (g) | Remarks   |  |
| 0 (.4") - 8" / 0 (10) - 200mm  | <b>550-311-20</b>   | ±.001"        | .0005" / 0.01mm | 180      | IP67  |  |
| 0 (.4") - 12" / 0 (10) - 300mm | <b>550-341-10</b>   | ±.0015"       | .0005" / 0.01mm | 380      | w/ offset/preset function for easy ID measurement, IP67 |  |
| 0 (.5") - 18" / 0 (20) - 450mm | <b>550-223-10**</b> | ±.002"        | .0005" / 0.01mm | 1,110    | —   |  |
| 0 (.5") - 24" / 0 (20) - 600mm | <b>550-225-10**</b> | ±.002"        | .0005" / 0.01mm | 1,290    | —   |  |
| 0 (1") - 40" / 0 (20) - 1000mm | <b>550-227-10**</b> | ±.003"        | .0005" / 0.01mm | 3,350    | —   |  |

\*( ): Minimum dimension in ID measurement \*\*Models are not IP67 rated

| Metric          |                | with metric/metric dual scale |            |          |         |  |
|-----------------|----------------|-------------------------------|------------|----------|---------|--|
| Range*          | Order No.      | Accuracy                      | Graduation | Mass (g) | Remarks |  |
| 0 (20) - 450mm  | <b>160-130</b> | ±0.10mm                       | 0.02mm     | 1,100    | —       |  |
| 0 (20) - 600mm  | <b>160-131</b> | ±0.10mm                       | 0.02mm     | 1,300    | —       |  |
| 0 (20) - 1000mm | <b>160-132</b> | ±0.15mm                       | 0.02mm     | 3,350    | —       |  |
| 0 (20) - 1500mm | <b>160-133</b> | ±0.22mm                       | 0.05mm     | 4,850    |         |  |
| 0 (20) - 2000mm | <b>160-134</b> | ±0.28mm                       | 0.05mm     | 10,000   |         |  |

\*( ): Minimum dimension in ID measurement

### DIMENSIONS

| Range                | L         | a   | b  | d  | T   |
|----------------------|-----------|-----|----|----|-----|
| 0 - 8" / 0 - 200mm   | 288 (290) | 60  | 8  | 16 | 3   |
| 0 - 12" / 0 - 300mm  | 445       | 75  | 12 | 20 | 3.8 |
| 0 - 18" / 0 - 450mm  | 632       | 100 | 18 | 25 | 6   |
| 0 - 24" / 0 - 600mm  | 780       | 100 | 18 | 25 | 6   |
| 0 - 40" / 0 - 1000mm | 1240      | 140 | 24 | 32 | 8   |
| 0 - 60" / 0 - 1500mm | 1800      | 180 | 30 | 32 | 8   |
| 0 - 80" / 0 - 2000mm | 2300      | 180 | 30 | 40 | 12  |

( ): Digital models

# Long-Jaw Vernier Caliper

## SERIES 534

### FEATURES

- Long jaws for measuring hard-to-reach features.
- Fine adjustment for more accurate measurement (except 534-109 and 534-110)
- Supplied in fitted wooden case.



### SPECIFICATIONS

**Metric** with metric/metric dual scale without fine adjustment

| Range*         | Order No. | Accuracy | Graduation  |             | Mass (g) |
|----------------|-----------|----------|-------------|-------------|----------|
|                |           |          | Lower Scale | Upper Scale |          |
| 0 (10) - 300mm | 534-109   | ±0.07mm  | 0.05mm      | 0.05mm      | 400      |
| 0 (20) - 500mm | 534-110   | ±0.13mm  | 0.05mm      | 0.05mm      | 1,400    |

\*( ): Minimum dimension in ID measurement

**Metric** with metric/metric dual scale

| Range*          | Order No. | Accuracy | Graduation  |             | Mass (g) |
|-----------------|-----------|----------|-------------|-------------|----------|
|                 |           |          | Lower Scale | Upper Scale |          |
| 0 (10) - 300mm  | 534-113   | ±0.04mm  | 0.02mm      | 0.02mm      | 460      |
| 0 (20) - 500mm  | 534-114   | ±0.06mm  | 0.02mm      | 0.02mm      | 1,500    |
| 0 (20) - 750mm  | 534-115   | ±0.08mm  | 0.02mm      | 0.02mm      | 2,900    |
| 0 (20) - 1000mm | 534-116   | ±0.10mm  | 0.02mm      | 0.02mm      | 3,500    |

\*( ): Minimum dimension in ID measurement

**Metric/Inch** with metric/inch dual scale

| Range*                          | Order No. | Accuracy | Graduation  |             | Mass (g) |
|---------------------------------|-----------|----------|-------------|-------------|----------|
|                                 |           |          | Lower Scale | Upper Scale |          |
| 0 (10) - 300mm / 0 (.3") - 12"  | 534-101   | ±0.07mm  | 0.05mm      | 1/128"      | 460      |
| 0 (10) - 300mm / 0 (.3") - 12"  | 534-105   | ±0.04mm  | 0.02mm      | .001"       | 460      |
| 0 (20) - 500mm / 0 (.8") - 20"  | 534-102   | ±0.13mm  | 0.05mm      | 1/128"      | 1,500    |
| 0 (20) - 500mm / 0 (.8") - 20"  | 534-106   | ±0.06mm  | 0.02mm      | .001"       | 1,500    |
| 0 (20) - 700mm / 0 (.8") - 30"  | 534-103   | ±0.16mm  | 0.05mm      | 1/128"      | 2,900    |
| 0 (20) - 700mm / 0 (.8") - 30"  | 534-107   | ±0.08mm  | 0.02mm      | .001"       | 2,900    |
| 0 (20) - 1000mm / 0 (.8") - 40" | 534-104   | ±0.20mm  | 0.05mm      | 1/128"      | 3,500    |
| 0 (20) - 1000mm / 0 (.8") - 40" | 534-108   | ±0.10mm  | 0.02mm      | .001"       | 3,500    |

\*( ): Minimum dimension in ID measurement

**Inch** with inch/inch dual scale

| Range*        | Order No. | Accuracy | Graduation  |             | Mass (g) |
|---------------|-----------|----------|-------------|-------------|----------|
|               |           |          | Lower Scale | Upper Scale |          |
| 0 (.3") - 12" | 534-117   | ±.002"   | .001"       | .001"       | 400      |
| 0 (.8") - 20" | 534-118   | ±.003"   | .001"       | .001"       | 1500     |
| 0 (.8") - 30" | 534-119   | ±.004"   | .001"       | .001"       | 2900     |
| 0 (.8") - 40" | 534-120   | ±.004"   | .001"       | .001"       | 3500     |

\*( ): Minimum dimension in ID measurement

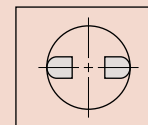
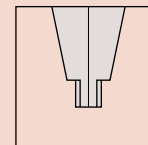
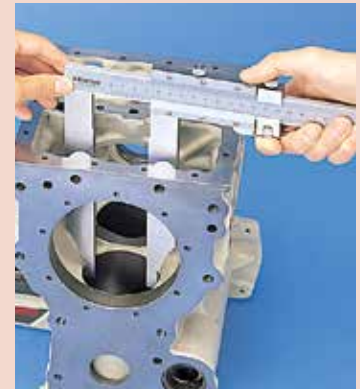
### DIMENSIONS

Unit: mm

| Range                | L    | a   | b   | c    | d  | e  | T   |
|----------------------|------|-----|-----|------|----|----|-----|
| 0 - 12" / 0 - 300mm  | 445  | 110 | 90  | 12   | 20 | 7  | 3.8 |
| 0 - 20" / 0 - 500mm  | 682  | 225 | 200 | 18.5 | 25 | 12 | 6   |
| 0 - 30" / 0 - 750mm  | 995  | 232 | 200 | 18.5 | 32 | 12 | 8   |
| 0 - 40" / 0 - 1000mm | 1230 | 232 | 200 | 18.5 | 32 | 12 | 8   |

### Technical Data

Accuracy: Refer to the list of specifications  
 Graduation: Refer to the list of specifications



Round surface of jaws for accurate CD measurement.





### Technical Data

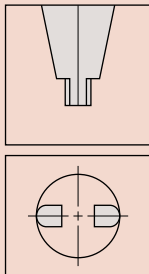
Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm or .0005"/0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3.5 years under normal use

### Function of Digital Model

Origin-set, Zero-setting, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA624:** SPC cable with data switch (1m / 40") IP67  
**05CZA625:** SPC cable with data switch (2m / 80") IP67



Round surface of jaws for accurate ID measurement.

# ABSOLUTE Digimatic Caliper

**SERIES 551 — with Nib Style and Standard Jaws**

### FEATURES

- The rounded faces of the jaws are ideal for accurate ID (inside diameter) measurement.
- With SPC output.
- Supplied in fitted plastic holster in carton. 18" / 450mm and larger supplied wooden case.



### SPECIFICATIONS

**Metric** Digital model

| Range*          | Order No.           | Accuracy | Resolution | Mass (g) | Remarks   |
|-----------------|---------------------|----------|------------|----------|---|
| 0 (10) - 200mm  | <b>551-301-20</b>   | ±0.03mm  | 0.01mm     | 180      | IP67  |
| 0 (10) - 300mm  | <b>551-331-10</b>   | ±0.04mm  | 0.01mm     | 380      | with offset/preset function for easy ID measurement, IP67 |
| 0 (20) - 500mm  | <b>551-204-10**</b> | ±0.06mm  | 0.01mm     | 1,060    | —   |
| 0 (20) - 750mm  | <b>551-206-10**</b> | ±0.06mm  | 0.01mm     | 1,410    | —   |
| 0 (20) - 1000mm | <b>551-207-10**</b> | ±0.07mm  | 0.01mm     | 3,430    | —   |

\*( ): Minimum dimension in ID measurement \*\* Models are not IP67 rated

**Inch/Metric** Digital model

| Range*                         | Order No.           | Accuracy | Resolution      | Mass (g) | Remarks   |
|--------------------------------|---------------------|----------|-----------------|----------|---|
| 0 (.4") - 8" / 0 (10) - 200mm  | <b>551-311-20</b>   | ±.001"   | .0005" / 0.01mm | 180      | IP67  |
| 0 (.4") - 12" / 0 (10) - 300mm | <b>551-341-10</b>   | ±.002"   | .0005" / 0.01mm | 380      | w/ offset/preset function for easy ID measurement, IP67 |
| 0 (.5") - 20" / 0 (20) - 500mm | <b>551-224-10**</b> | ±.0025"  | .0005" / 0.01mm | 1,060    | —   |
| 0 (.5") - 30" / 0 (20) - 750mm | <b>551-226-10**</b> | ±.0025"  | .0005" / 0.01mm | 1,410    | —   |
| 0 (1") - 40" / 0 (20) - 1000mm | <b>551-227-10**</b> | ±.003"   | .0005" / 0.01mm | 3,430    | —   |

\*( ): Minimum dimension in ID measurement \*\* Models are not IP67 rated

### DIMENSIONS

Series 551 Unit: mm

| Range                | a   | b   | c  | d    | R  | T   |
|----------------------|-----|-----|----|------|----|-----|
| 0 - 8" / 0 - 200mm   | 60  | 43  | 8  | 30   | 5  | 3   |
| 0 - 12" / 0 - 300mm  | 90  | 68  | 10 | 40.1 | 5  | 3.8 |
| 0 - 20" / 0 - 500mm  | 150 | 115 | 15 | 56   | 10 | 6   |
| 0 - 30" / 0 - 750mm  | 150 | 115 | 15 | 56   | 10 | 8   |
| 0 - 40" / 0 - 1000mm | 150 | 115 | 20 | 56   | 10 | 8   |

# Digimatic Carbon-Fiber Caliper

**SERIES 552 — with Optional Jaw Attachments**



## FEATURES

- Lightweight Digimatic Calipers employ CFRP (Carbon-Fiber Reinforced Plastics) in the beam and jaws.
- Highly durable and easy to handle.
- The range of applications can be expanded by using the optional attachments.
- Direct readout of ID measurements from the LCD. (Offset value can be set easily by pressing the Offset key.)
- Preset function for setting a desired starting point.
- With SPC data output.
- Special model available with ceramic jaws which are suitable for measuring abrasive and magnetic products.
- Supplied in fitted wooden case.



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Display: LCD  
 Length standard: Electrostatic capacitance type linear encoder  
 Max. response speed: unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3,000 hours in continuous use



## SPECIFICATIONS

| Metric       |                   |           |            |                 |
|--------------|-------------------|-----------|------------|-----------------|
| Range*       | Order No.         | Accuracy  | Resolution | Remarks         |
| 0(20)-450mm  | <b>552-302-10</b> | +/-0.04mm | 0.01mm     |                 |
| 0(20)-450mm  | <b>552-150-10</b> | +/-0.06mm | 0.01mm     | long jaws 200mm |
| 0(20)-450mm  | <b>552-155-10</b> | +/-0.04mm | 0.01mm     | ceramic jaws    |
| 0(20)-600mm  | <b>552-303-10</b> | +/-0.04mm | 0.01mm     |                 |
| 0(20)-600mm  | <b>552-151-10</b> | +/-0.06mm | 0.01mm     | long jaws 200mm |
| 0(20)-600mm  | <b>552-156-10</b> | +/-0.04mm | 0.01mm     | ceramic jaws    |
| 0(20)-1000mm | <b>552-304-10</b> | +/-0.05mm | 0.01mm     |                 |
| 0(20)-1000mm | <b>552-152-10</b> | +/-0.07mm | 0.01mm     | long jaws 200mm |
| 0(20)-1500mm | <b>552-305-10</b> | +/-0.09mm | 0.01mm     |                 |
| 0(20)-1500mm | <b>552-153-10</b> | +/-0.11mm | 0.01mm     | long jaws 200mm |
| 0(20)-2000mm | <b>552-306-10</b> | +/-0.12mm | 0.01mm     |                 |
| 0(20)-2000mm | <b>552-154-10</b> | +/-0.14mm | 0.01mm     | long jaws 200mm |

\*( ): Minimum dimension in ID measurement

| Inch/Metric |                   |            |               |                |
|-------------|-------------------|------------|---------------|----------------|
| Range*      | Order No.         | Accuracy   | Resolution    | Remarks        |
| 0(.5")-18"  | <b>552-312-10</b> | +/- .002"  | .0005"/0.01mm |                |
| 0(.5")-18"  | <b>552-160-10</b> | +/- .0025" | .0005"/0.01mm | long jaws 7.9" |
| 0(.5")-18"  | <b>552-165-10</b> | +/- .002"  | .0005"/0.01mm | ceramic jaws   |
| 0(.5")-24"  | <b>552-313-10</b> | +/- .002"  | .0005"/0.01mm |                |
| 0(.5")-24"  | <b>552-161-10</b> | +/- .0025" | .0005"/0.01mm | long jaws 7.9" |
| 0(.5")-24"  | <b>552-166-10</b> | +/- .002"  | .0005"/0.01mm | ceramic jaws   |
| 0(1")-40"   | <b>552-314-10</b> | +/- .002"  | .0005"/0.01mm |                |
| 0(1")-40"   | <b>552-162-10</b> | +/- .003"  | .0005"/0.01mm | long jaws 7.9" |
| 0(1")-60"   | <b>552-315-10</b> | +/- .004"  | .0005"/0.01mm |                |
| 0(1")-60"   | <b>552-163-10</b> | +/- .0045" | .0005"/0.01mm | long jaws 7.9" |
| 0(1")-80"   | <b>552-316-10</b> | +/- .005"  | .0005"/0.01mm |                |
| 0(1")-80"   | <b>552-164-10</b> | +/- .0055" | .0005"/0.01mm | long jaws 7.9" |

\*( ): Minimum dimension in ID measurement

## Function

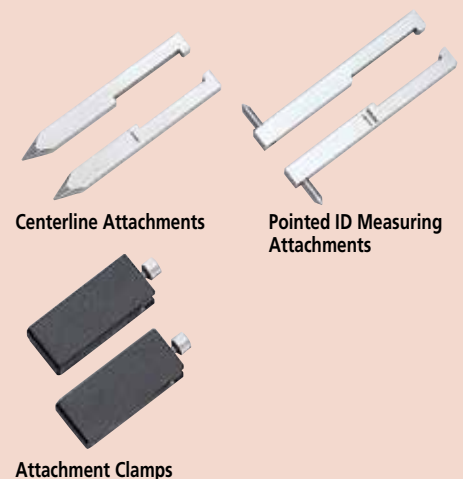
Origin-set, Zero-setting, Presetting, Offsetting, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

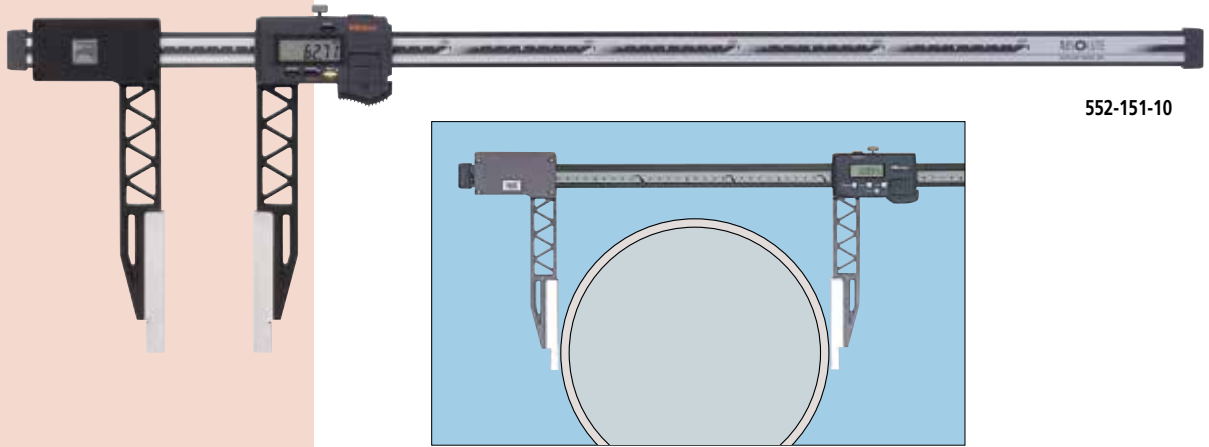
## Optional Accessories

**05CZA624:** SPC cable with data switch (40"/1m)  
**05CZA625:** SPC cable with data switch (80"/2m)

- 914055:**\* Centerline attachments (mm)
- 914056:**\* Centerline attachments (inch)
- 914057:**\* Pointed ID measuring attachments (mm)
- 914058:**\* Pointed ID measuring attachments (inch)
- 914053:\*\*** Attachment clamps (for models up to 24" / 600mm range)
- 914054:\*\*** Attachment clamps (for models over 24" / 600mm range)

\* Attachment clamps are required  
 \*\* Attachment clamps and attachments are not available for long jaw type calipers





552-151-10



Ceramic jaws



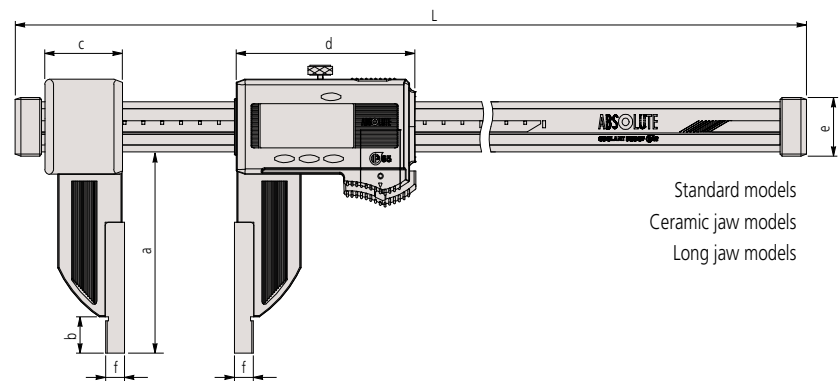
Centerline attachments



ID point attachments

## DIMENSIONS AND MASS

Unit: mm

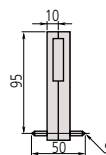


Standard models, Ceramic jaw models

| Range                | L    | a   | b  | c    | d     | e  | f         | Mass (g) |
|----------------------|------|-----|----|------|-------|----|-----------|----------|
| 0 - 18" / 0 - 450mm  | 640  | 100 | 18 | 41.2 | 91.8  | 25 | 10 (.25") | 715      |
| 0 - 24" / 0 - 600mm  | 790  | 100 | 18 | 41.2 | 91.8  | 25 | 10 (.25") | 790      |
| 0 - 40" / 0 - 1000mm | 1230 | 150 | 24 | 62.8 | 113.8 | 32 | 10 (.5")  | 1,760    |
| 0 - 60" / 0 - 1500mm | 1740 | 150 | 24 | 62.8 | 113.8 | 32 | 10 (.5")  | 2,160    |
| 0 - 80" / 0 - 2000mm | 2250 | 150 | 24 | 62.8 | 113.8 | 32 | 10 (.5")  | 2,560    |

( ) : inch/mm models

Pointed ID Measuring Attachments



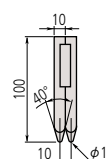
Unit: mm

Long jaw models

| Range                | L    | a   | b  | c   | d     | e  | f         | Mass (g) |
|----------------------|------|-----|----|-----|-------|----|-----------|----------|
| 0 - 18" / 0 - 450mm  | 680  | 200 | 24 | 89  | 91.8  | 25 | 10 (.25") | 1,215    |
| 0 - 24" / 0 - 600mm  | 830  | 200 | 24 | 89  | 91.8  | 25 | 10 (.25") | 1,290    |
| 0 - 40" / 0 - 1000mm | 1280 | 200 | 24 | 110 | 113.8 | 32 | 10 (.5")  | 2,090    |
| 0 - 60" / 0 - 1500mm | 1790 | 200 | 24 | 110 | 113.8 | 32 | 10 (.5")  | 2,490    |
| 0 - 80" / 0 - 2000mm | 2300 | 200 | 24 | 110 | 113.8 | 32 | 10 (.5")  | 2,890    |

( ) : inch/mm models

Centerline Attachments

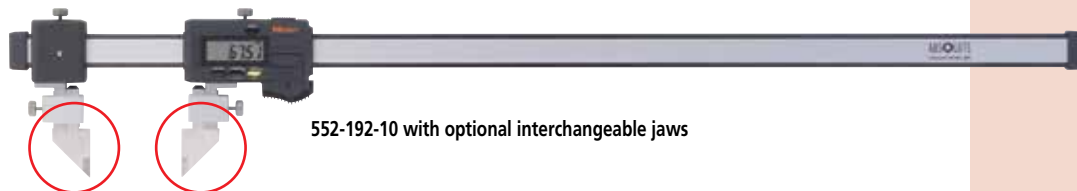


# ABSOLUTE Coolant-Proof Carbon-Fiber Caliper

## SERIES 552 — with Interchangeable Jaws

### FEATURES

- The range of applications can be expanded by using interchangeable jaws (optional).
- Quick and easy change of jaws due to the unique clamping mechanism. (A pair of clamping wheels is a standard accessory.)
- Provided with preset function for setting a desired starting point, which allows direct readout of offset measurements.
- SPC data output.



552-192-10 with optional interchangeable jaws

### SPECIFICATIONS

| Range                | Order No.  | Accuracy | Mass(g) |
|----------------------|------------|----------|---------|
| 0 - 18" / 0 - 450mm  | 552-191-10 | ±.002"   | 650     |
| 0 - 24" / 0 - 600mm  | 552-192-10 | ±.002"   | 725     |
| 0 - 40" / 0 - 1000mm | 552-193-10 | ±.002"   | 1480    |
| 0 - 60" / 0 - 1500mm | 552-194-10 | ±.004"   | 1880    |
| 0 - 80" / 0 - 2000mm | 552-195-10 | ±.005"   | 2280    |

### Interchangeable Jaws (Optional)

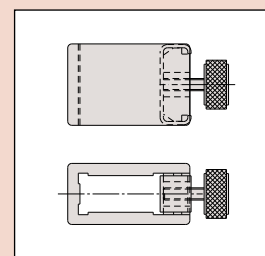
| Standard type | Inside point type                    | Standard Type  |                |            |   |   |          |                                      |                |                |          |                                      |      |      |
|---------------|--------------------------------------|--|----------------|------------|---|---|----------|--------------------------------------|----------------|----------------|----------|--------------------------------------|------|------|
|               |                                      | <table border="1"> <thead> <tr> <th>Order No.</th> <th>Components</th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>07CZA056</td> <td>Right (07CAA044),<br/>Left (07CAA045)</td> <td>28mm<br/>(1.1")</td> <td>30mm<br/>(1.2")</td> </tr> </tbody> </table>  | Order No.      | Components | a | b | 07CZA056 | Right (07CAA044),<br>Left (07CAA045) | 28mm<br>(1.1") | 30mm<br>(1.2") |          |                                      |      |      |
| Order No.     | Components                           | a  | b              |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA056      | Right (07CAA044),<br>Left (07CAA045) | 28mm<br>(1.1")   | 30mm<br>(1.2") |            |   |   |          |                                      |                |                |          |                                      |      |      |
|               |                                      | <table border="1"> <thead> <tr> <th>Order No.</th> <th>Components</th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>07CZA055</td> <td>Right (07CZA042),<br/>Left (07CZA043)</td> <td>8mm</td> <td>30mm</td> </tr> <tr> <td>07CZA061</td> <td>Right (07CZA042),<br/>Left (07CZA049)</td> <td>031"</td> <td>1.2"</td> </tr> </tbody> </table> | Order No.      | Components | a | b | 07CZA055 | Right (07CZA042),<br>Left (07CZA043) | 8mm            | 30mm           | 07CZA061 | Right (07CZA042),<br>Left (07CZA049) | 031" | 1.2" |
| Order No.     | Components                           | a  | b              |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA055      | Right (07CZA042),<br>Left (07CZA043) | 8mm  | 30mm           |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA061      | Right (07CZA042),<br>Left (07CZA049) | 031"   | 1.2"           |            |   |   |          |                                      |                |                |          |                                      |      |      |
|               |                                      | <table border="1"> <thead> <tr> <th>Order No.</th> <th>Components</th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>07CZA057</td> <td>07CZA039 x 2pcs.</td> <td>30mm</td> <td>30mm</td> </tr> <tr> <td>07CZA060</td> <td>07CZA047 x 2pcs.</td> <td>1.2"</td> <td>1.2"</td> </tr> </tbody> </table>  | Order No.      | Components | a | b | 07CZA057 | 07CZA039 x 2pcs.                     | 30mm           | 30mm           | 07CZA060 | 07CZA047 x 2pcs.                     | 1.2" | 1.2" |
| Order No.     | Components                           | a  | b              |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA057      | 07CZA039 x 2pcs.                     | 30mm   | 30mm           |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA060      | 07CZA047 x 2pcs.                     | 1.2"   | 1.2"           |            |   |   |          |                                      |                |                |          |                                      |      |      |
|               |                                      | <table border="1"> <thead> <tr> <th>Order No.</th> <th>Components</th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>07CZA058</td> <td>07CZA041 x 2pcs.</td> <td>25mm</td> <td>50mm</td> </tr> <tr> <td>07CZA059</td> <td>07CZA048 x 2pcs.</td> <td>1"</td> <td>2"</td> </tr> </tbody> </table>  | Order No.      | Components | a | b | 07CZA058 | 07CZA041 x 2pcs.                     | 25mm           | 50mm           | 07CZA059 | 07CZA048 x 2pcs.                     | 1"   | 2"   |
| Order No.     | Components                           | a  | b              |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA058      | 07CZA041 x 2pcs.                     | 25mm   | 50mm           |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA059      | 07CZA048 x 2pcs.                     | 1"   | 2"             |            |   |   |          |                                      |                |                |          |                                      |      |      |
|               |                                      | <table border="1"> <thead> <tr> <th>Order No.</th> <th>Components</th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>07CZA044</td> <td></td> <td>3.5" / 90mm</td> <td>1.1" / 28mm</td> </tr> </tbody> </table>   | Order No.      | Components | a | b | 07CZA044 |                                      | 3.5" / 90mm    | 1.1" / 28mm    |          |                                      |      |      |
| Order No.     | Components                           | a  | b              |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA044      |                                      | 3.5" / 90mm  | 1.1" / 28mm    |            |   |   |          |                                      |                |                |          |                                      |      |      |
|               |                                      | <table border="1"> <thead> <tr> <th>Order No.</th> <th>Components</th> <th>a</th> <th>b</th> </tr> </thead> <tbody> <tr> <td>07CZA056</td> <td>Right (07CAA044),<br/>Left (07CAA045)</td> <td>28mm<br/>(1.1")</td> <td>30mm<br/>(1.2")</td> </tr> </tbody> </table>  | Order No.      | Components | a | b | 07CZA056 | Right (07CAA044),<br>Left (07CAA045) | 28mm<br>(1.1") | 30mm<br>(1.2") |          |                                      |      |      |
| Order No.     | Components                           | a  | b              |            |   |   |          |                                      |                |                |          |                                      |      |      |
| 07CZA056      | Right (07CAA044),<br>Left (07CAA045) | 28mm<br>(1.1")   | 30mm<br>(1.2") |            |   |   |          |                                      |                |                |          |                                      |      |      |

Unit: mm



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm  
 Display: LCD  
 Scale type: ABSOLUTE electromagnetic linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), 938882  
 Battery life: Approx. 5,000 hours in continuous use  
 Dust/Water protection level: IP66  
 Standard accessory: Jaw clamps (2 pcs.), 05GZA033

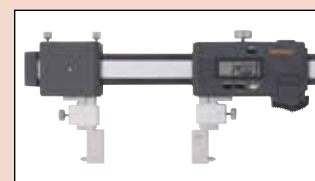


### Functions

Origin-set, Zero-setting, Presetting, Offsetting, Data hold,  
 Automatic power on/off, Data output, inch/mm conversion  
 (inch/mm models)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

- 05CZA624: SPC cable with data switch (40" / 1m)
- 05CZA625: SPC cable with data switch (80" / 2m)





**ABSOLUTE**<sup>®</sup>

Absolute System Patented by MITUTOYO

# ABSOLUTE Back-Jaw Centerline Caliper

**SERIES 573 — Center-to-Center & Edge-to-Center Types**

## FEATURES

- Specially designed to measure the distance between two centers or the distance from an edge to center.
- Provided with jaws on the back of the slider, measurements can be read easily by upside down.
- Direct reading of pitch measurements is available due to the offset value setting function.
- With SPC data output.
- Supplied fitted in wooden case.

## Technical Data

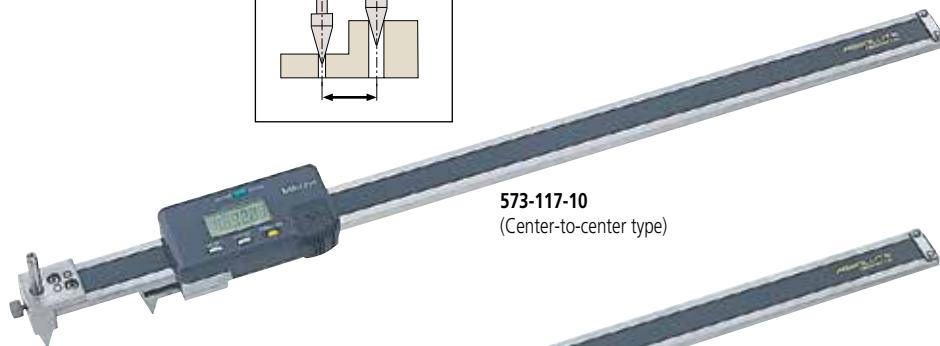
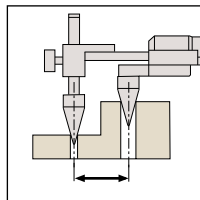
Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm  
 Display: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3.5 years under normal use

## Function

Origin-set, Zero-setting, Power On/Off, Data output  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

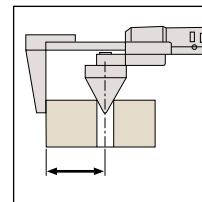
**959143:** Data hold unit  
**959149:** SPC cable with data switch (1m)  
**959150:** SPC cable with data switch (2m)



**573-117-10**  
(Center-to-center type)



**573-119-10**  
(Edge-to-center type)



## SPECIFICATIONS

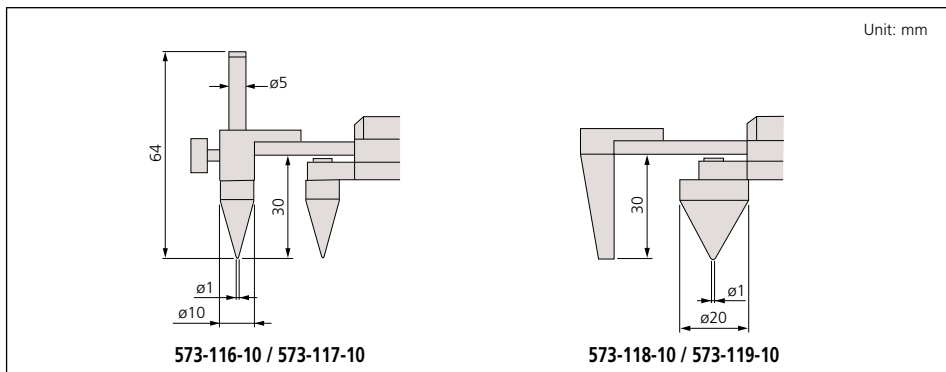
**Metric** Center-to-center distance type

| Range      | Order No.         | Accuracy | Resolution | Mass (g) |
|------------|-------------------|----------|------------|----------|
| 10 - 200mm | <b>573-116-10</b> | ±0.10mm  | 0.01mm     | 482      |
| 10 - 300mm | <b>573-117-10</b> | ±0.15mm  | 0.01mm     | 578      |

**Metric** Edge-to-center distance type

| Range      | Order No.         | Accuracy | Resolution | Mass (g) |
|------------|-------------------|----------|------------|----------|
| 10 - 200mm | <b>573-118-10</b> | ±0.10mm  | 0.01mm     | 485      |
| 10 - 300mm | <b>573-119-10</b> | ±0.15mm  | 0.01mm     | 581      |

## DIMENSIONS



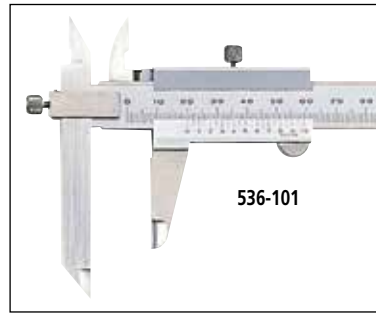
# Offset Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**



## FEATURES

- Main scale jaw can slide up and down to facilitate measurement of stepped sections. (Hard-to-reach dimensions such as A, B, C can be accurately measured.)
- With depth bar.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.



## SPECIFICATIONS

**Metric** Digital model

| Range     | Order No.         | Accuracy | Resolution | Mass (g) |
|-----------|-------------------|----------|------------|----------|
| 0 - 150mm | <b>573-601-20</b> | ±0.02mm  | 0.01mm     | 168      |
| 0 - 200mm | <b>573-602-20</b> | ±0.02mm  | 0.01mm     | 198      |
| 0 - 300mm | <b>573-604</b>    | ±0.03mm  | 0.01mm     | 350      |

**Metric**

| Range     | Order No.      | Accuracy | Graduation | Mass (g) |
|-----------|----------------|----------|------------|----------|
| 0 - 150mm | <b>536-101</b> | ±0.05mm  | 0.05mm     | 150      |
| 0 - 200mm | <b>536-102</b> | ±0.05mm  | 0.05mm     | 200      |
| 0 - 300mm | <b>536-103</b> | ±0.08mm  | 0.05mm     | 400      |

**Inch/Metric** Digital model

| Range               | Order No.         | Accuracy | Resolution      | Mass (g) |
|---------------------|-------------------|----------|-----------------|----------|
| 0 - 6" / 0 - 150mm  | <b>573-701-20</b> | ±.001"   | .0005" / 0.01mm | 168      |
| 0 - 8" / 0 - 200mm  | <b>573-702-20</b> | ±.001"   | .0005" / 0.01mm | 198      |
| 0 - 12" / 0 - 300mm | <b>573-704</b>    | ±.0015"  | .0005" / 0.01mm | 350      |

## DIMENSIONS

Vernier model

Digital model

Unit: mm

| Range               | a   | b  | c  | d           |
|---------------------|-----|----|----|-------------|
| 0 - 6" / 0 - 150mm  | 95  | 10 | 40 | 30.4 (30)   |
| 0 - 8" / 0 - 200mm  | 95  | 10 | 50 | 40.4 (38.5) |
| 0 - 12" / 0 - 300mm | 135 | 15 | 64 | 51          |

( ) Digital Model



## Technical Data

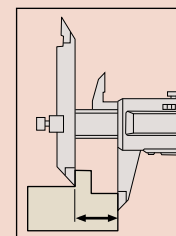
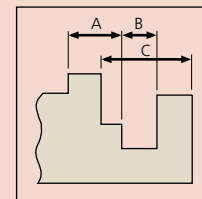
Accuracy: Refer to the list of specifications  
 Resolution\*: .0005"/0.01mm or 0.01mm  
 Graduation\*\*: 0.05mm  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA624**: SPC cable with data switch (40" / 1m)
- 05CZA625**: SPC cable with data switch (80" / 2m)





### Technical Data

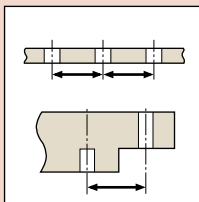
Accuracy: Refer to the list of specifications  
 Resolution\*: .0005"/0.01mm or 0.01mm  
 Graduation\*\*: 0.05mm  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA624:** SPC cable with data switch (40" / 1m)  
**05CZA625:** SPC cable with data switch (80" / 2m)



# Offset Centerline Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**

## FEATURES

- Specially designed for center to center distance measurements on the same and offset planes.
- Can also measure from edge to center.
- Hole diameter should be in the range of 1.5mm - 10mm (.06" - .4").
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.



## SPECIFICATIONS

| Metric     |                   | Digital model |            |          |
|------------|-------------------|---------------|------------|----------|
| Range      | Order No.         | Accuracy      | Resolution | Mass (g) |
| 10 - 150mm | <b>573-605-20</b> | ±0.03mm       | 0.01mm     | 157      |
| 10 - 200mm | <b>573-606-20</b> | ±0.03mm       | 0.01mm     | 177      |
| 10 - 300mm | <b>573-608</b>    | ±0.04mm       | 0.01mm     | 320      |

| Inch/Metric           |                   | Digital model |                 |          |
|-----------------------|-------------------|---------------|-----------------|----------|
| Range                 | Order No.         | Accuracy      | Resolution      | Mass (g) |
| .4 - 6" / 10 - 150mm  | <b>573-705-20</b> | ±.0015"       | .0005" / 0.01mm | 157      |
| .4 - 8" / 10 - 200mm  | <b>573-706-20</b> | ±.0015"       | .0005" / 0.01mm | 177      |
| .4 - 12" / 10 - 300mm | <b>573-708</b>    | ±.0015"       | .0005" / 0.01mm | 320      |

| Metric     |                | Vernier model |            |          |
|------------|----------------|---------------|------------|----------|
| Range      | Order No.      | Accuracy      | Graduation | Mass (g) |
| 10 - 150mm | <b>536-105</b> | ±0.05mm       | 0.05mm     | 140      |
| 10 - 200mm | <b>536-106</b> | ±0.05mm       | 0.05mm     | 160      |
| 10 - 300mm | <b>536-107</b> | ±0.08mm       | 0.05mm     | 320      |

## DIMENSIONS

Unit: mm

Analog model

| Range      | W   | t   |
|------------|-----|-----|
| 10 - 150mm | 75  | 3   |
| 10 - 200mm | 75  | 3   |
| 10 - 300mm | 100 | 3.8 |

Digital model

| Range                 | W   | t   |
|-----------------------|-----|-----|
| 10 - 160mm/.4 - 6.4"  | 75  | 3.5 |
| 10 - 210mm/.4 - 8.4"  | 75  | 3.5 |
| 10 - 310mm/.4 - 12.4" | 100 | 3.8 |

# Point Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**



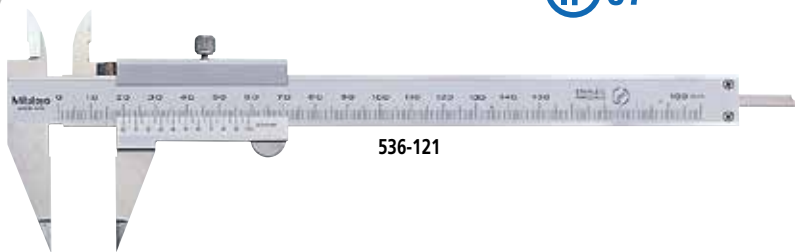
www.tuv.com  
ID: 2011207400

## FEATURES

- Narrow tip jaws fit into very small grooves and tracks, making many previously difficult outside measurements far easier to obtain.
- With depth bar.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.



573-721-20



536-121

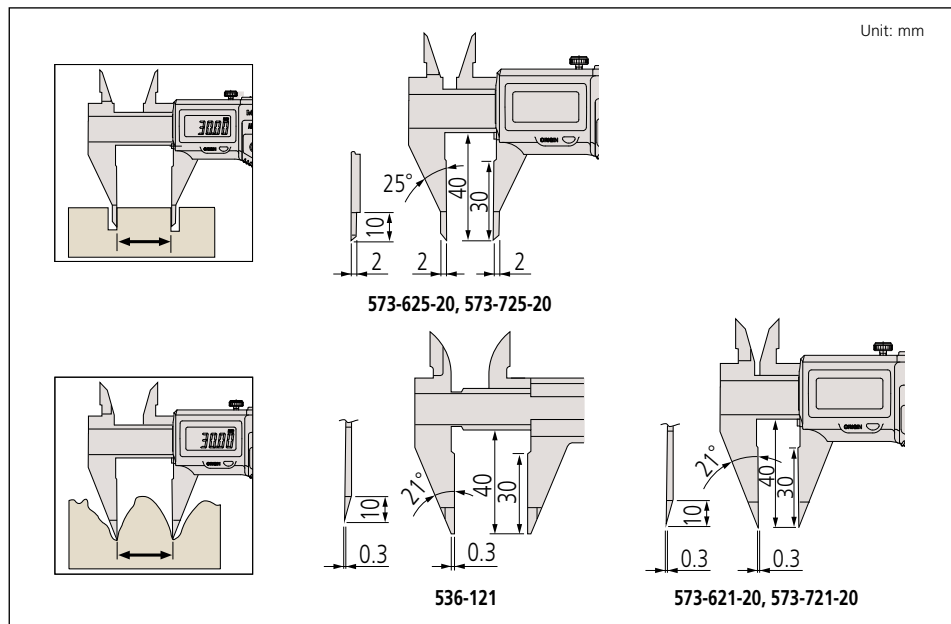
## SPECIFICATIONS

| Metric    |            | Digital model |            |          |
|-----------|------------|---------------|------------|----------|
| Range     | Order No.  | Accuracy      | Resolution | Mass (g) |
| 0 - 150mm | 573-621-20 | ±0.02mm       | 0.01mm     | 163      |
| 0 - 150mm | 573-625-20 | ±0.02mm       | 0.01mm     | 163      |

| Inch/Metric        |            | Digital model |                 |          |
|--------------------|------------|---------------|-----------------|----------|
| Range              | Order No.  | Accuracy      | Resolution      | Mass (g) |
| 0 - 6" / 0 - 150mm | 573-721-20 | ±.001"        | .0005" / 0.01mm | 163      |
| 0 - 6" / 0 - 150mm | 573-725-20 | ±.001"        | .0005" / 0.01mm | 163      |

| Metric    |           | Vernier model |            |          |
|-----------|-----------|---------------|------------|----------|
| Range     | Order No. | Accuracy      | Graduation | Mass (g) |
| 0 - 150mm | 536-121   | ±0.05mm       | 0.05mm     | 150      |

## DIMENSIONS



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .0005"/0.01mm or 0.01mm  
 Graduation\*\*: 0.05mm  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA624**: SPC cable with data switch (40" / 1m)  
**05CZA625**: SPC cable with data switch (80" / 2m)







### Technical Data

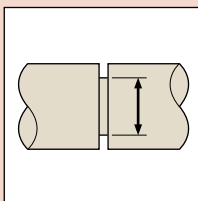
Accuracy: Refer to the list of specifications  
 Resolution\*: .0005" / 0.01mm or 0.01mm  
 Graduation\*\*\*: 0.05mm  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA624**: SPC cable with data switch (40" / 1m)  
**05CZA625**: SPC cable with data switch (80" / 2m)

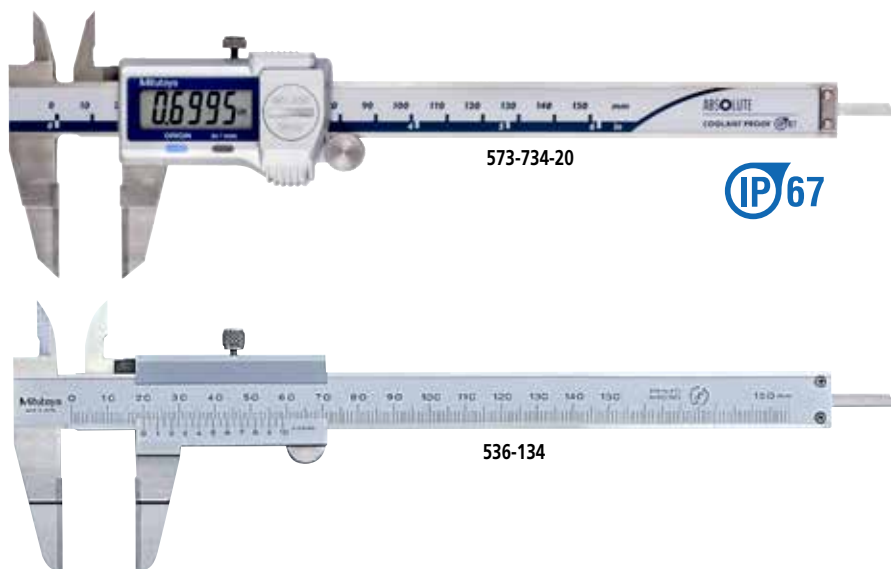


# Blade-Type Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**

## FEATURES

- The thin-blade type jaws fit into very small grooves and making previously difficult outside measurements easier to obtain.
- The OD measuring faces are carbide-tipped.
- With depth bar.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.



## SPECIFICATIONS

| Metric    |                   | Digital model |            |          |
|-----------|-------------------|---------------|------------|----------|
| Range     | Order No.         | Accuracy      | Resolution | Mass (g) |
| 0 - 150mm | <b>573-634-20</b> | ±0.02mm       | 0.01mm     | 168      |

| Inch/Metric        |                   | Digital model |                 |          |
|--------------------|-------------------|---------------|-----------------|----------|
| Range              | Order No.         | Accuracy      | Resolution      | Mass (g) |
| 0 - 6" / 0 - 150mm | <b>573-734-20</b> | ±.001"        | .0005" / 0.01mm | 168      |

| Metric    |                |          |            |          |
|-----------|----------------|----------|------------|----------|
| Range     | Order No.      | Accuracy | Graduation | Mass (g) |
| 0 - 150mm | <b>536-134</b> | ±0.05mm  | 0.05mm     | 130      |
| 0 - 200mm | <b>536-135</b> | ±0.05mm  | 0.05mm     | 160      |
| 0 - 300mm | <b>536-136</b> | ±0.08mm  | 0.05mm     | 340      |

## DIMENSIONS

**Analog model**

**Digital model**

Unit: mm

| Range              | D  | d  | e    | t   |
|--------------------|----|----|------|-----|
| 0 - 6" / 0 - 150mm | 40 | 20 | 0.75 | 3   |
| 0 - 200mm          | 50 | 25 | 0.75 | 3   |
| 0 - 300mm          | 64 | 30 | 1    | 3.8 |

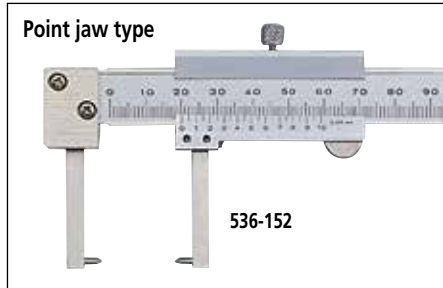
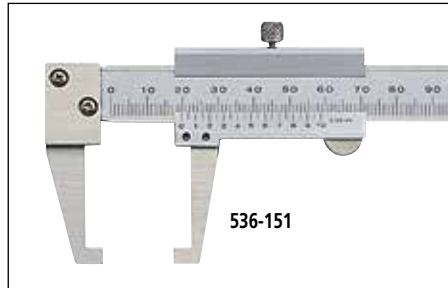
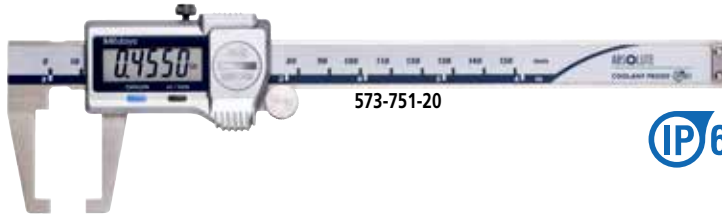
# Neck Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**



## FEATURES

- Point-jaw type can measure wall thickness inside bores and recesses.
- Flat-jaw type can measure grooves and recesses.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.



## SPECIFICATIONS

**Metric** Digital model

| Range     | Order No.          | Accuracy | Resolution | Mass (g) |
|-----------|--------------------|----------|------------|----------|
| 0 - 150mm | <b>573-651-20</b>  | ±0.03mm  | 0.01mm     | 157      |
| 0 - 150mm | <b>573-652-20*</b> | ±0.03mm  | 0.01mm     | 157      |

\*Point jaw type

**Inch/Metric** Digital model

| Range              | Order No.          | Accuracy | Resolution      | Mass (g) |
|--------------------|--------------------|----------|-----------------|----------|
| 0 - 6" / 0 - 150mm | <b>573-751-20</b>  | ±.0015"  | .0005" / 0.01mm | 157      |
| 0 - 6" / 0 - 150mm | <b>573-752-20*</b> | ±.0015"  | .0005" / 0.01mm | 157      |

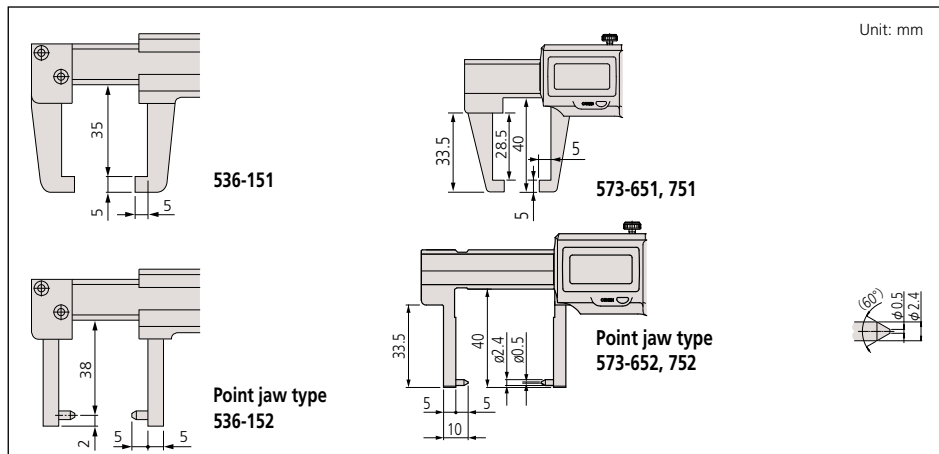
\*Point jaw type

**Metric**

| Range     | Order No.       | Accuracy | Graduation | Mass (g) |
|-----------|-----------------|----------|------------|----------|
| 0 - 150mm | <b>536-151</b>  | ±0.05mm  | 0.05mm     | 140      |
| 0 - 150mm | <b>536-152*</b> | ±0.05mm  | 0.05mm     | 140      |

\*Point jaw type

## DIMENSIONS



## Technical Data

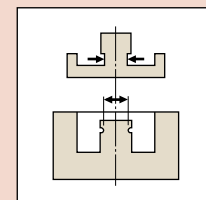
Accuracy: Refer to the list of specifications  
 Resolution\*: 0.01mm or .0005"/0.01mm  
 Graduation\*\*: 0.05mm  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA624**: SPC cable with data switch (1m / 40")
- 05CZA625**: SPC cable with data switch (2m / 80")





### Technical Data

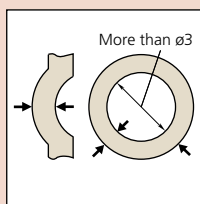
Accuracy: Refer to the list of specifications  
 Display\*: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), 938882  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

05CZA624: SPC cable with data switch (40" / 1m)  
 05CZA625: SPC cable with data switch (80" / 2m)

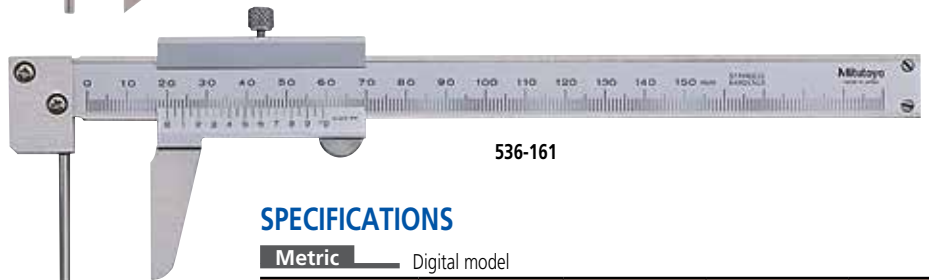


# Tube Thickness Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**

### FEATURES

- The main scale jaw is a round bar that facilitates measurements of tube wall thickness.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.



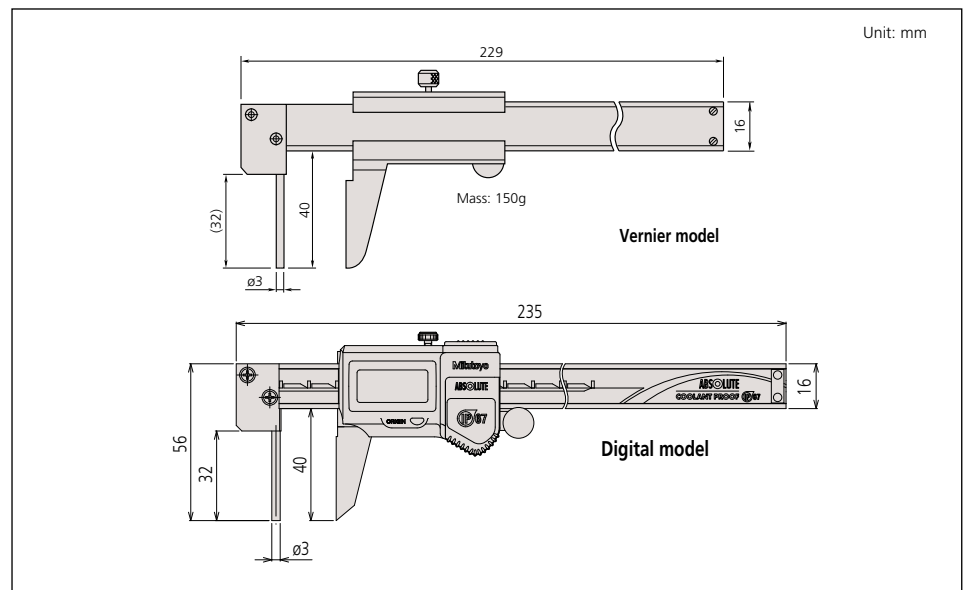
### SPECIFICATIONS

| Metric    |            | Digital model |            |         |
|-----------|------------|---------------|------------|---------|
| Range     | Order No.  | Accuracy      | Resolution | Mass(g) |
| 0 - 150mm | 573-661-20 | ±0.05mm       | 0.01mm     | 167     |

| Inch/Metric        |            | Digital model |                 |         |
|--------------------|------------|---------------|-----------------|---------|
| Range              | Order No.  | Accuracy      | Resolution      | Mass(g) |
| 0 - 6" / 0 - 150mm | 573-761-20 | ±.002"        | .0005" / 0.01mm | 167     |

| Metric    |           | Vernier model |            |         |
|-----------|-----------|---------------|------------|---------|
| Range     | Order No. | Accuracy      | Graduation | Mass(g) |
| 0 - 150mm | 536-161   | ±0.05mm       | 0.05mm     | 150     |

### DIMENSIONS AND MASS

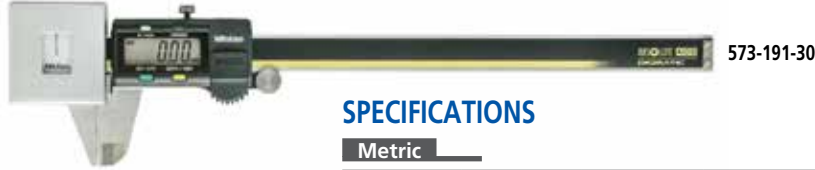


# ABSOLUTE Low-Force Caliper

**SERIES 573**

## FEATURES

- Due to their low measuring force, these calipers are ideal for elastic or resilient workpieces such as plastic parts and rubber parts that standard calipers cannot measure.
- With SPC data output.
- Supplied in fitted plastic case.

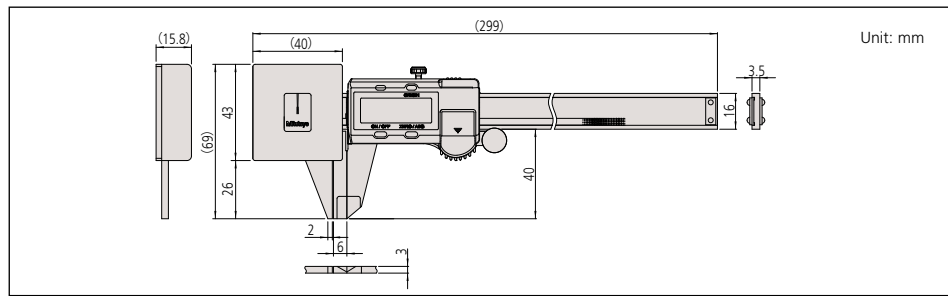


## SPECIFICATIONS

| Metric    |                   |          |            |          |
|-----------|-------------------|----------|------------|----------|
| Range     | Order No.         | Accuracy | Resolution | Mass (g) |
| 0 - 180mm | <b>573-191-30</b> | ±0.05mm  | 0.01mm     | 253      |

| Inch/Metric        |                   |          |                 |          |
|--------------------|-------------------|----------|-----------------|----------|
| Range              | Order No.         | Accuracy | Resolution      | Mass (g) |
| 0 - 7" / 0 - 180mm | <b>573-291-30</b> | ±.002"   | .0005" / 0.01mm | 253      |

## DIMENSIONS AND MASS

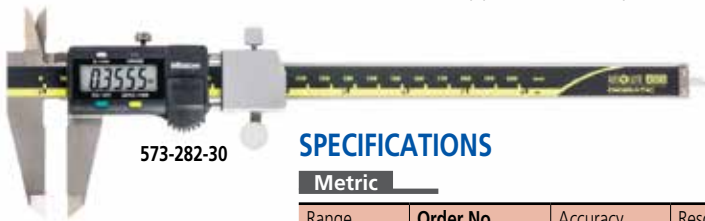


# ABSOLUTE Snap Caliper

**SERIES 573**

## FEATURES

- The ABSOLUTE Digimatic snap caliper features a spring-loaded mechanism to allow quick and efficient go/no-go inspection for mass production parts.
- With SPC data output.
- Supplied in fitted plastic case.

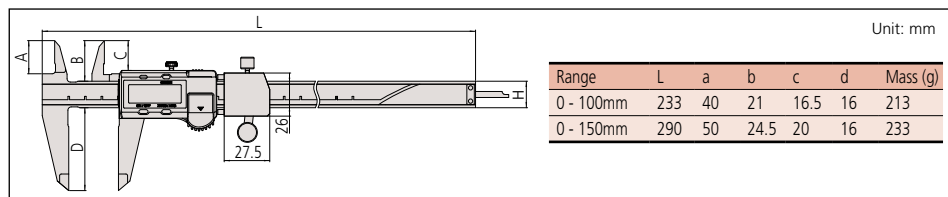


## SPECIFICATIONS

| Metric    |                   |          |            |          |
|-----------|-------------------|----------|------------|----------|
| Range     | Order No.         | Accuracy | Resolution | Mass (g) |
| 0 - 100mm | <b>573-181-30</b> | ±0.02mm  | 0.01mm     | 213      |
| 0 - 150mm | <b>573-182-30</b> | ±0.02mm  | 0.01mm     | 233      |

| Inch/Metric        |                   |          |                 |          |
|--------------------|-------------------|----------|-----------------|----------|
| Range              | Order No.         | Accuracy | Resolution      | Mass (g) |
| 0 - 4" / 0 - 100mm | <b>573-281-30</b> | ±.001"   | .0005" / 0.01mm | 213      |
| 0 - 6" / 0 - 150mm | <b>573-282-30</b> | ±.001"   | .0005" / 0.01mm | 233      |

## DIMENSIONS AND MASS



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE Electromagnetic Induction-type Linear Encoder  
 Measuring force: 0.5N-1.0N (50gf to 100gf)  
 Jaw retraction: 0.3mm  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3.5 years under normal use

## Function

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

- 959143:** Data hold unit
- 959149:** SPC cable with data switch (40" / 1m)
- 959150:** SPC cable with data switch (80" / 2m)



## Measurement procedures



A consistently low measuring force can be guaranteed by only taking measurements when the pointer is between the two fiducial lines.



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Repeatability: .0005" / 0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE Electromagnetic Induction-type Linear Encoder  
 Measuring force: 7N to 14N (700gf to 1400gf)  
 Jaw retraction: 2mm  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3.5 years under normal use

## Function

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

- 959143:** Data hold unit
- 959149:** SPC cable with data switch (40" / 1m)
- 959150:** SPC cable with data switch (80" / 2m)



### Technical Data

Accuracy: Refer to the list of specifications  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3.5 years under normal use

### Function

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

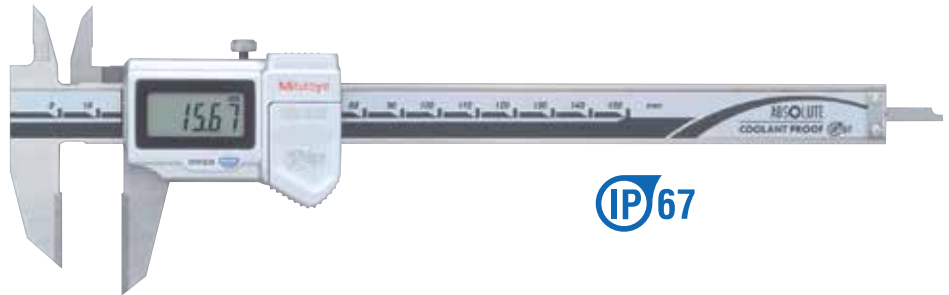
**05CZA624:** SPC cable with data switch (40" / 1m)  
**05CZA625:** SPC cable with data switch (80" / 2m)

# Scribing Caliper

**SERIES 573, 536 — ABSOLUTE Digimatic and Vernier Type**

### FEATURES

- The carbide-tipped jaws facilitate fine scribing on workpiece.
- With depth bar.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case.

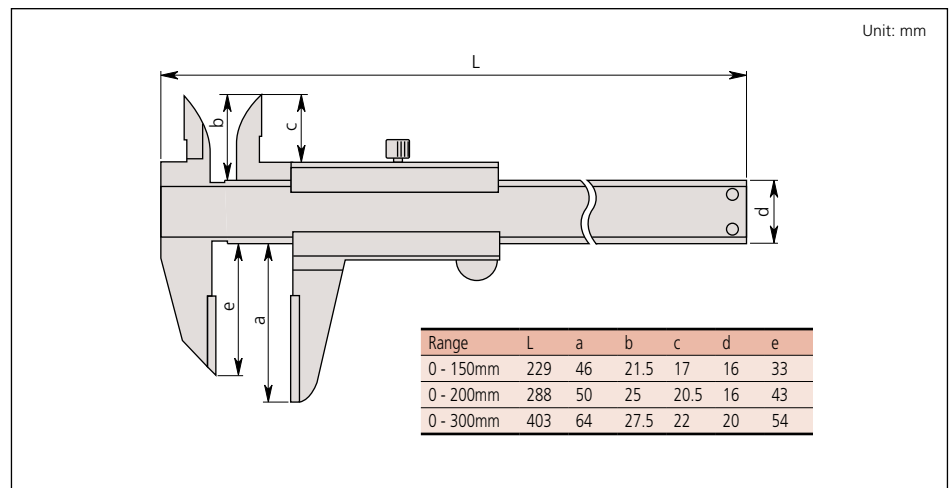


### SPECIFICATIONS

| Metric    |                   | Digital model |            |          |  |
|-----------|-------------------|---------------|------------|----------|--|
| Range     | Order No.         | Accuracy      | Resolution | Mass (g) |  |
| 0 - 150mm | <b>573-676-20</b> | ±0.02mm       | 0.01mm     | 166      |  |
| 0 - 200mm | <b>573-677-20</b> | ±0.02mm       | 0.01mm     | 196      |  |
| 0 - 300mm | <b>573-679</b>    | ±0.03mm       | 0.01mm     | 345      |  |

| Metric    |                | Vernier type |            |          |  |
|-----------|----------------|--------------|------------|----------|--|
| Range     | Order No.      | Accuracy     | Graduation | Mass (g) |  |
| 0 - 150mm | <b>536-221</b> | ±0.05mm      | 0.05mm     | 150      |  |
| 0 - 200mm | <b>536-222</b> | ±0.05mm      | 0.05mm     | 180      |  |
| 0 - 300mm | <b>536-223</b> | ±0.08mm      | 0.05mm     | 355      |  |

### DIMENSIONS



# ABSOLUTE Inside Caliper

**SERIES 573, 536 — Knife-edge/Inside Groove/Point-Jaw Type**



## FEATURES

- Specially designed for inside measurements in hard-to-reach places.
- With SPC data output. (Series 573)
- Supplied in fitted plastic case. 18" / 450mm and 24" / 600mm supplied in wooden case.

### Knife-edge type



### Inside-groove type



### Point-jaw type



## SPECIFICATIONS

| Metric     |                   | Digital model |  |          |
|------------|-------------------|---------------|--|----------|
| Range      | Order No.         | Accuracy      | Remarks  | Mass (g) |
| 10 - 200mm | <b>573-642-20</b> | ±0.05mm       | Knife-edge type, Measurable min. hole diameter: ø10mm    | 227      |
| 10 - 160mm | <b>573-645-20</b> | ±0.05mm       | Inside-groove type, Measurable min. hole diameter: ø10mm | 147      |
| 20 - 170mm | <b>573-646-20</b> | ±0.03mm       | Point-jaw type, Measurable min. hole diameter: ø20mm     | 157      |

| Inch/Metric         |                   | Digital model |   |          |
|---------------------|-------------------|---------------|---|----------|
| Range               | Order No.         | Accuracy      | Remarks   | Mass (g) |
| .4" - 8" / 10-200mm | <b>573-742-20</b> | ±.002"        | Knife-edge type, Measurable min. hole diameter: ø.4"    | 227      |
| .4" - 6" / 10-150mm | <b>573-745-20</b> | ±.002"        | Inside-groove type, Measurable min. hole diameter: ø.4" | 147      |
| .8" - 6" / 20-150mm | <b>573-746-20</b> | ±.0015"       | Point-jaw type, Measurable min. hole diameter: ø.8"     | 157      |

| Metric     |                | Analog model |  |          |
|------------|----------------|--------------|--|----------|
| Range      | Order No.      | Accuracy     | Remarks  | Mass (g) |
| 10 - 200mm | <b>536-142</b> | ±0.12mm      | Knife-edge type, Measurable min. hole diameter: ø10mm    | 210      |
| 10 - 150mm | <b>536-145</b> | ±0.05mm      | Inside groove type, Measurable min. hole diameter: ø10mm | 130      |
| 20 - 150mm | <b>536-146</b> | ±0.05mm      | Point jaw type, Measurable min. hole diameter: ø20mm     | 140      |
| 30 - 300mm | <b>536-147</b> | ±0.08mm      | Point jaw type, Measurable min. hole diameter: ø30mm     | 370      |
| 70 - 450mm | <b>536-148</b> | ±0.10mm      | Point jaw type, Measurable min. hole diameter: ø70mm     | 1,250    |
| 70 - 600mm | <b>536-149</b> | ±0.12mm      | Point jaw type, Measurable min. hole diameter: ø70mm     | 1,430    |



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .0005" / 0.01mm / 0.01mm  
 Graduation\*\*: 0.05mm  
 Display\*: LCD  
 Length standard\*: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed\*: Unlimited  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Analog models

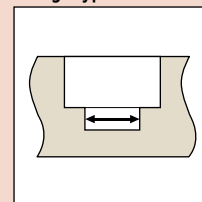
## Function of Digital Model

Origin-set, Zero-setting, Power On/Off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

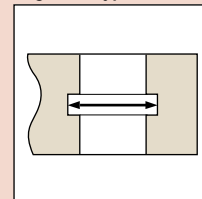
## Optional Accessories for Digital Model

- 05CZA624**: SPC cable with data switch (40" / 1m)
- 05CZA625**: SPC cable with data switch (80" / 2m)

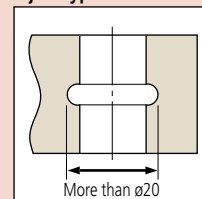
### Knife-edge type



### Inside groove type



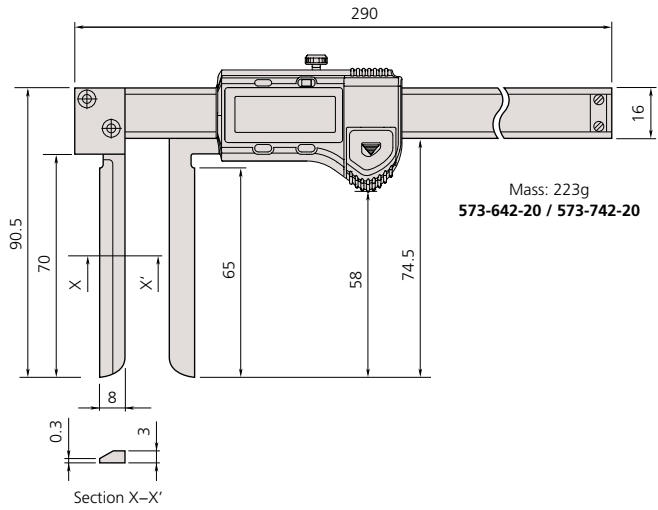
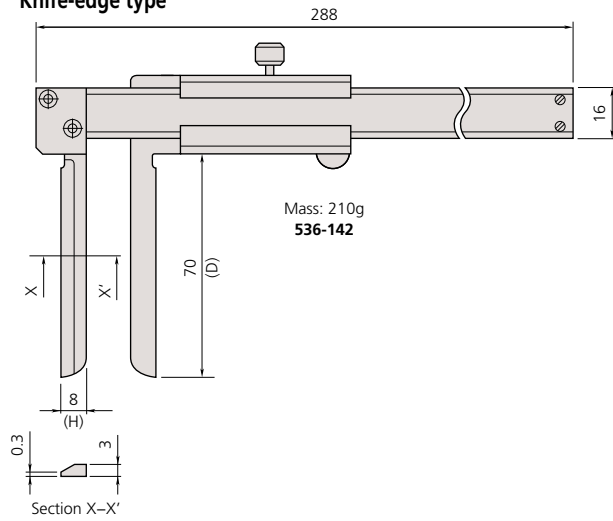
### Point jaw type



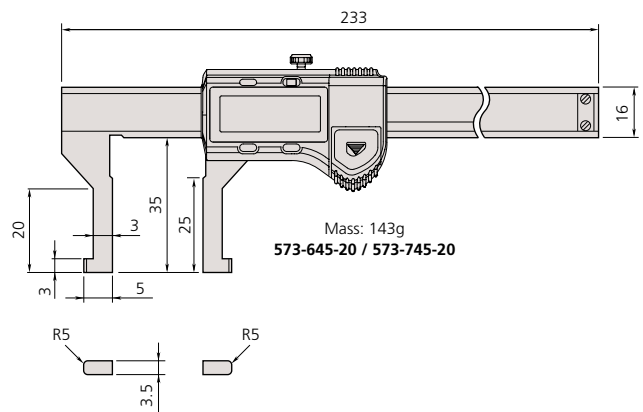
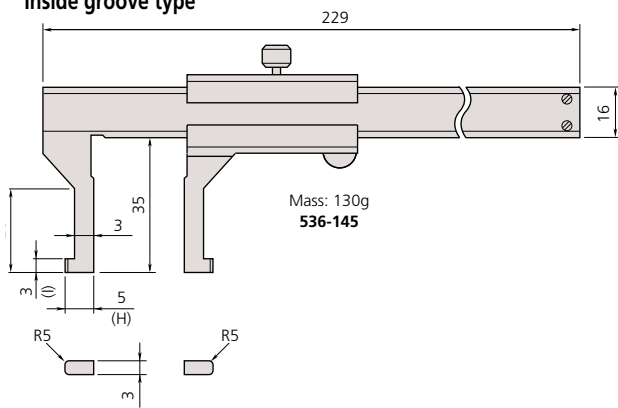
# DIMENSIONS AND MASS

Unit: mm

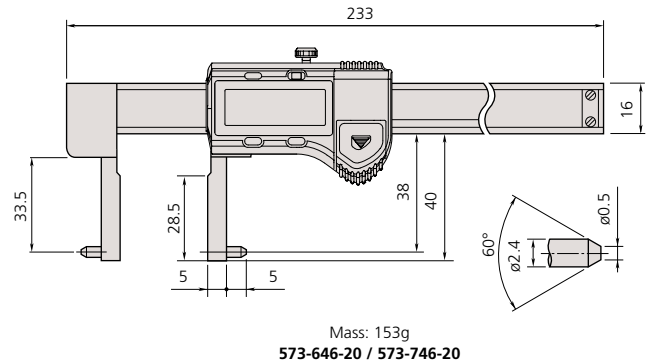
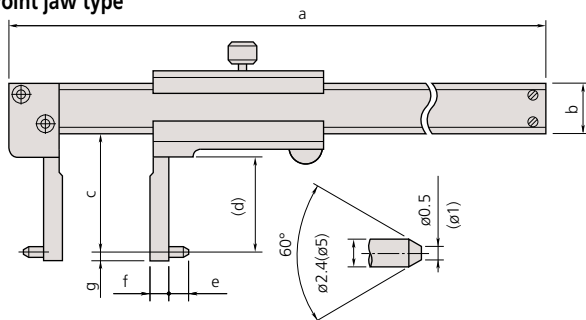
## Knife-edge type



## Inside groove type



## Point jaw type



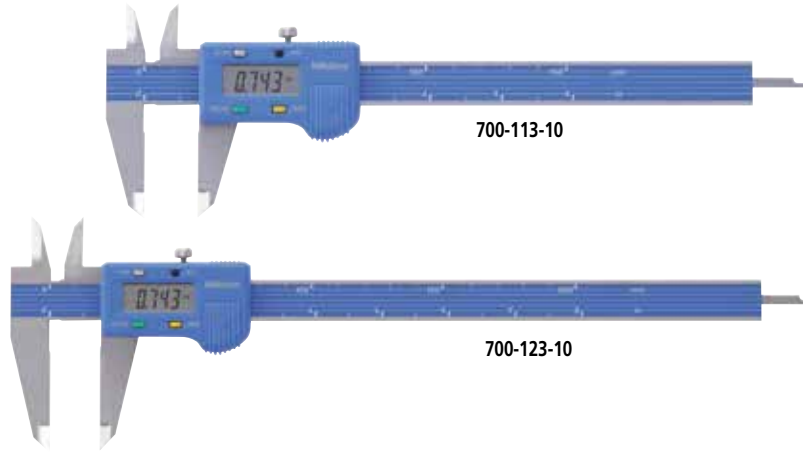
| Order No. | Range | a   | b  | c   | d   | e  | f  | g | Mass (g) |
|-----------|-------|-----|----|-----|-----|----|----|---|----------|
| 536-146   | 150mm | 229 | 16 | 38  | 31  | 5  | 5  | 2 | 140      |
| 536-147   | 300mm | 403 | 20 | 98  | 89  | 5  | 10 | 2 | 370      |
| 536-148   | 450mm | 610 | 25 | 145 | 136 | 10 | 25 | 5 | 1,250    |
| 536-149   | 600mm | 750 | 25 | 145 | 136 | 10 | 25 | 5 | 1,430    |

# MyCAL-Lite

## SERIES 700 — Digital Caliper for DIY

### FEATURES

- The MyCAL-Lite is an ideal measuring tool for the DIY market.
- The LCD screen allows error-free readout of measurements.
- With depth measuring bar.



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .001" / 0.1mm  
 Display: LCD  
 Length standard: Electrostatic capacitance type linear encoder  
 Max. response speed: 1800mm/s  
 Battery: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2 years under normal use

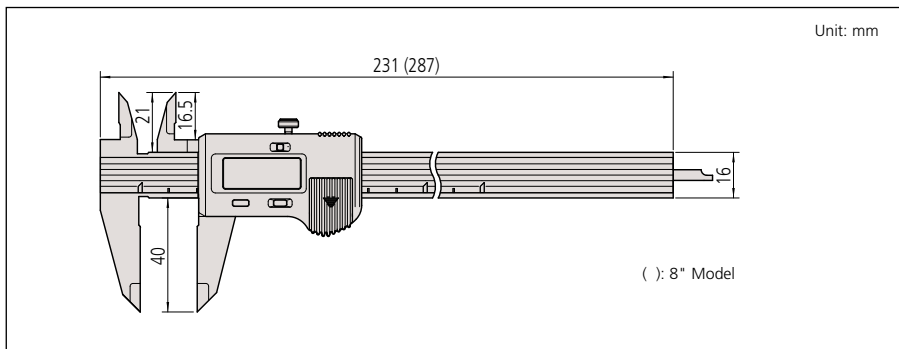
### Function

Zero-setting, Power on/off  
 inch/mm conversion  
 Alarm: Low voltage, Counting value composition error

### SPECIFICATIONS

| Inch/Metric        |                   |                 |          |
|--------------------|-------------------|-----------------|----------|
| Range              | Order No.         | Accuracy        | Mass (g) |
| 0 - 6" / 0 - 150mm | <b>700-113-10</b> | ±.005" / ±0.2mm | 150      |
| 0 - 8" / 0 - 200mm | <b>700-123-10</b> | ±.005" / ±0.2mm | 170      |

### DIMENSIONS



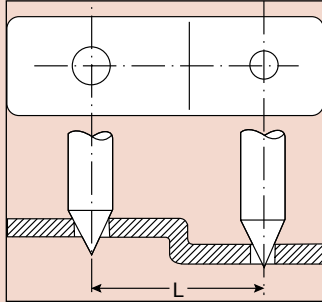


# Center Line Gage

## Optional Accessories for Caliper

### FEATURES

Pairs of conical probes are specially designed for Digimatic, Dial and Vernier calipers to quickly measure centerline distances.



**050001**

Application for 4", 6" and 8" Vernier, Dial and Digimatic Calipers, requiring dimensions over .375".



**050018**

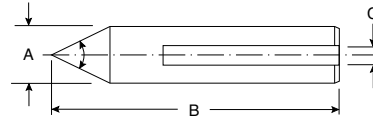
Application for 12" Vernier, Dial and Digimatic Calipers requiring dimensions over .5".

### SPECIFICATIONS

Center Line Gage

| Order No.     | Description              |
|---------------|--------------------------|
| <b>050001</b> | For 4, 6 and 8" Calipers |
| <b>050018</b> | For 12" Calipers         |

### DIMENSIONS



|               | A     | B      | C     |
|---------------|-------|--------|-------|
| <b>050001</b> | .375" | 2.187" | .141" |
| <b>050018</b> | .500" | 2.75"  | .154" |

# Depth Base Attachment

## Optional Accessories for Caliper

### FEATURES

- For 4", 6", 8", 12" / 100mm, 150mm, 200mm, 300mm, vernier, dial and digital calipers which have a depth measuring bar.

- Finely grounded base surface and secure locking clamp.



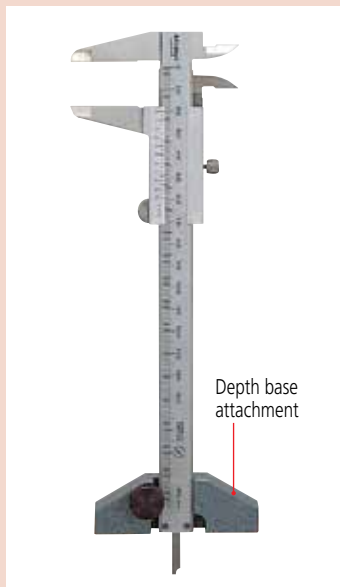
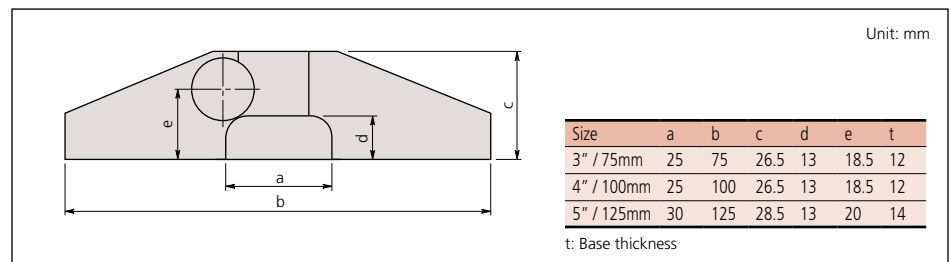
**050084-10**

### SPECIFICATIONS

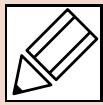
Inch/Metric

| Size       | Order No.        | Remarks (applicable measuring range of caliper) |
|------------|------------------|---|
| 3" / 75mm  | <b>050083-10</b> | 4", 6", 8" / 100mm, 150mm, 200mm                |
| 4" / 100mm | <b>050084-10</b> | 4", 6", 8" / 100mm, 150mm, 200mm                |
| 5" / 125mm | <b>050085-10</b> | 12" / 300mm                                     |

### DIMENSIONS



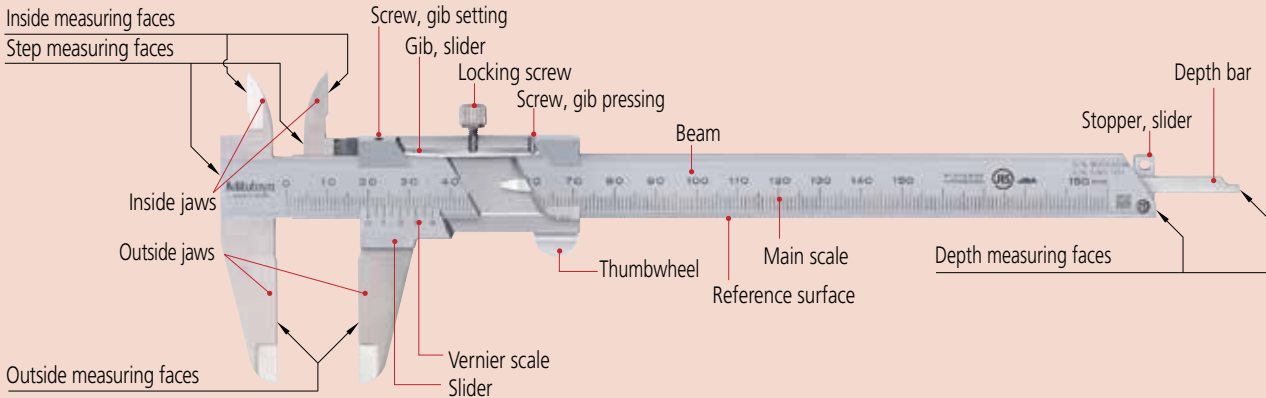
# Quick Guide to Precision Measuring Instruments



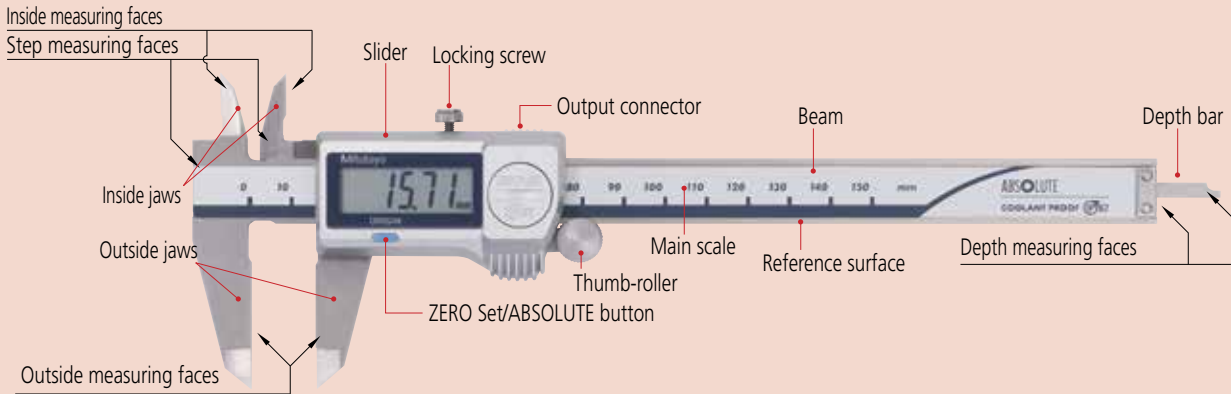
## Calipers

### Nomenclature

#### Vernier Caliper

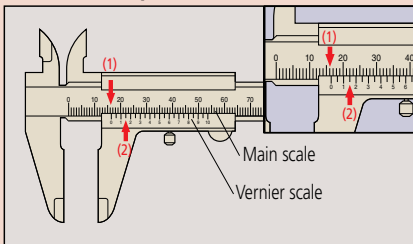


#### Absolute Digimatic Caliper



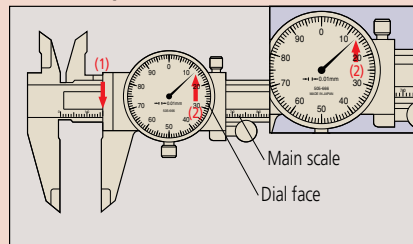
### How to Read the Scale

#### Vernier Calipers



| Graduation     | 0.05mm   |
|----------------|----------|
| (1) Main scale | 16 mm    |
| (2) Vernier    | 0.15 mm  |
| Reading        | 16.15 mm |

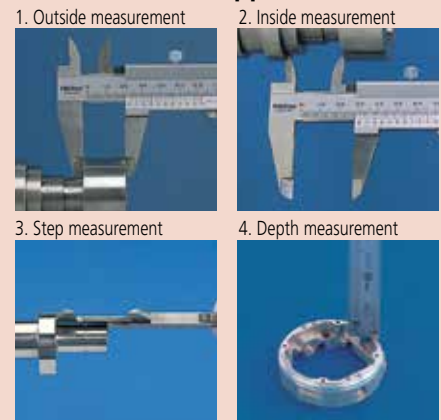
#### Dial Calipers



| Graduation     | 0.01mm   |
|----------------|----------|
| (1) Main scale | 16 mm    |
| (2) Dial face  | 0.13 mm  |
| Reading        | 16.13 mm |

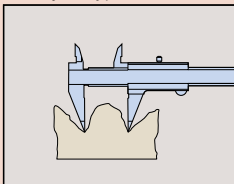
Note) Above left, 0.15 mm (2) is read at the position where a main scale graduation line corresponds with a vernier graduation line.

### Measurement applications



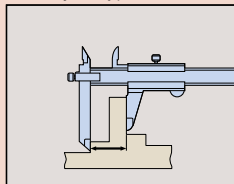
### Special Purpose Caliper Applications

#### Point jaw type



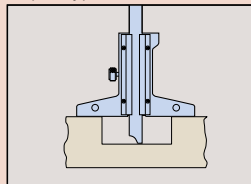
For uneven surface measurement

#### Offset jaw type



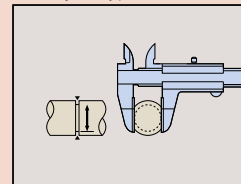
For stepped feature measurement

#### Depth type



For depth measurement

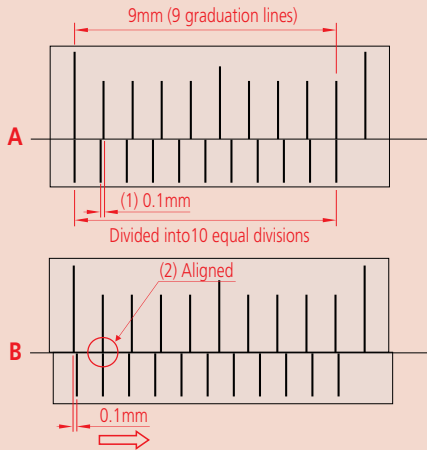
#### Blade jaw type



For diameter of narrow groove measurement

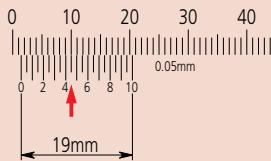
## Vernier scale

This is a short auxiliary scale that enables accurate interpolation between the divisions of a longer scale without using mechanical magnification. The principle of operation is that each vernier scale division is slightly smaller than a main scale division, so that successive vernier graduations successively coincide with main scale graduations as one is moved relative to the other. Specifically,  $n$  divisions on a vernier scale are the same length as  $n-1$  divisions on the main scale it works with, and  $n$  defines the division (or interpolation) ratio. Although  $n$  may be any number, in practice it is typically 10, 20, 25, etc., so that the division is a useful decimal fraction. The example below is for  $n = 10$ . The main scale is graduated in mm, and so the vernier scale is 9mm (10 divisions) long, the same as 9mm (9 divisions) on the main scale. This produces a difference in length of 0.1mm (1) as shown in figure A (the 1st vernier graduation is aligned with the first main scale graduation). If the vernier scale is slid 0.1mm to the right as shown in figure B, the 2nd graduation line on the vernier scale moves into alignment with the 2nd line on the main scale (2), and so enables easy reading of the 0.1mm displacement.

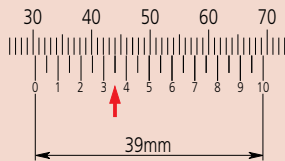


Some early calipers divided 19 divisions on the main scale by 20 vernier divisions to provide 0.05mm resolution. However, the closely spaced lines proved difficult to read and so, since the 1970s, a long vernier scale that uses 39 main scale divisions to spread the lines is generally used instead, as shown below.

### 19mm Vernier scale

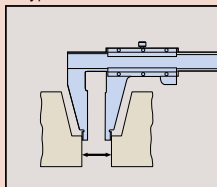


### 39mm vernier scale (long vernier scale)



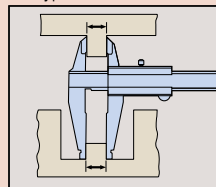
Calipers were made that gave an even finer resolution of 0.02mm. These required a 49-division vernier scale dividing 50 main scale divisions. However, they were difficult to read and are now hard to find since digital calipers with an easily read display and resolution of 0.01mm appeared.

### C-type



Standard outside measurement  
Inside measurement of a stepped hole  
Measurement of a stepped part

### CN-type

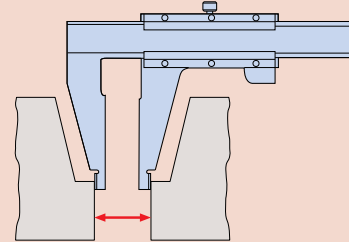


Standard outside measurement  
Measurement of a stepped hole  
Measurement of a stepped part

## About Long Calipers

Steel rules are commonly used to roughly measure large workpieces, but if more accuracy is needed, then a long caliper is suitable for the job. A long caliper is convenient for its user friendliness but does require some care during use. In the first place it is important to realize there is no relationship between resolution and accuracy. For details, refer to the values in our catalog. Resolution is constant whereas the accuracy obtainable varies dramatically according to how the caliper is used.

The measuring method with this instrument is a concern since distortion of the main beam causes a large amount of the measurement error, so accuracy will vary greatly depending on the method used for supporting the caliper at the time. Also, be careful not to use too much measuring force when using the outside measuring faces as they are furthest away from the main beam so potential errors will be at a maximum here. This precaution is also necessary when using the tips of the outside measuring faces of a long-jaw caliper.



## Small hole measurement with an M-type caliper

Structural error ( $d$ ) occurs when you measure the internal diameter of a small hole.

$\phi D$ : True internal diameter

$\phi d$ : Measured diameter

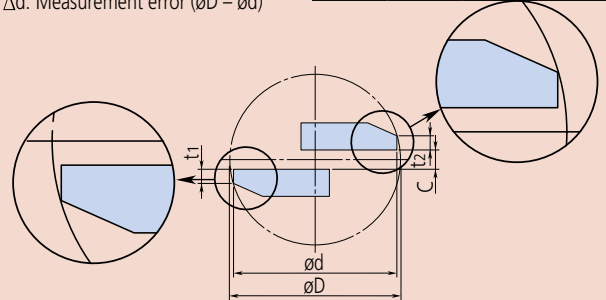
$t$ ,  $t_c$ : Thickness of the inside jaw

$C$ : Distance between the inside jaws

$\Delta d$ : Measurement error ( $\phi D - \phi d$ )

True internal diameter ( $\phi D$ : 5mm)  
Unit: mm

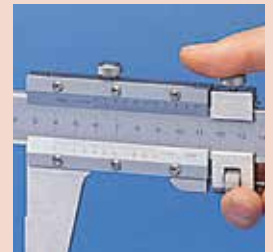
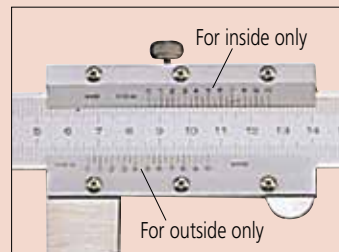
| $t, t_c + C$ | 0.3   | 0.5   | 0.7   |
|--------------|-------|-------|-------|
| $\Delta d$   | 0.009 | 0.026 | 0.047 |



## Inside Measurement with a CM-type Caliper

Because the inside measuring faces of a CM-type caliper are at the tips of the jaws, the measuring face parallelism is heavily affected by measuring force, and this becomes a large factor in the measurement accuracy attainable.

In contrast to an M-type caliper, a CM-type caliper cannot measure a very small hole diameter because it is limited to the size of the stepped jaws, although normally this is not an inconvenience as it would be unusual to have to measure a very small hole with this type of caliper. Of course, the radius of curvature on the inside measuring faces is always small enough to allow correct hole diameter measurements right down to the lowest limit (jaw closure). Mitutoyo CM-type calipers are provided with an extra scale on the slider for inside measurements so they can be read directly without the need for calculation, just as for an outside measurement. This useful feature eliminates the possibility of error that occurs when having to add the inside-jaw-thickness correction on a single-scale caliper.



# Linear Height LH-600E

## SERIES 518 — High-Performance 2D Measurement System

### FEATURES

- Excellent accuracy of (1.1+0.6L/600) $\mu$ m with 0.1 $\mu$ m/0.5 $\mu$ m resolution/repeatability.
- Perpendicularity (frontal) of 5 $\mu$ m and straightness of 4 $\mu$ m are guaranteed.
- Pneumatic full/semi-floating system allows adjustment of air-cushion height.
- Basic statistical functions are provided and, additionally, RS-232C / USB data output provides the option of evaluating measurement data externally with SPC software on a PC.
- One-key operation for running a semi-automatic measurement.
- Data entry from a Digimatic tool.



### Technical Data

Measuring range: 0 - 38" / 0 - 972mm  
 Slider stroke: 24" / 600mm  
 Resolution: .000001" / .00001" / .0001" / .001" or (switchable) 0.0001 / 0.001 / 0.01 / 0.1mm / 0.0001 / 0.001 / 0.01 / 0.1mm  
 Accuracy at 20°C: Refer to the list of specifications  
 Floating method: Full / semi-floating with built-in air compressor  
 Display: TFT LCD (color)

With power grip



518-351A-21



### SPECIFICATIONS

| Inch/Metric               |                    |   |
|---------------------------|--------------------|---|
| <b>Order No.</b>          |                    | <b>518-351A-21</b> <b>518-352A-21 w/power grip</b>  |
| Model                     |                    | LH-600E      LH-600EG   |
| Measuring Range (stroke)  |                    | 0-38" (24") / 0-977mm(600mm)  |
| Resolution (selectable)   |                    | .000001" / .00001" / .0001" / .001" / 0.0001mm / 0.001mm / 0.01mm / 0.1mm   |
| Accuracy at 20°C          | Measuring accuracy | (.000043 + .000024 x L*/24)" / (1.1 + 0.6L**/600) $\mu$ m   |
|                           | Repeatability (2s) | Plane: .000015" / 0.4 $\mu$ m Bore: .000035" / 0.9 $\mu$ m  |
|                           | Perpendicularity   | .0002" / 5 $\mu$ m  |
|                           | Straightness       | .0002" / 4 $\mu$ m  |
| Drive Method              |                    | Motor Drive (5, 10, 15, 20, 25, 30, 40mm/s=7 steps) / manual  |
| Measuring Force           |                    | 1N  |
| Balancing Method          |                    | Counter balance   |
| Main Unit Floating Method |                    | Full/semi-floating with air   |
| Air Source                |                    | Built-in air compressor   |
| LCD                       |                    | TFT LCD (color)   |
| Language for Display      |                    | English/German/French/Spanish/Italian/Japanese  |
| Number of Programs        |                    | 50 (max.)   |
| Number of Datas           |                    | 60,000 (max.) 1 program 30,000 (Max.)   |
| Power Supply              |                    | AC Adapter/Battery (Ni-MH)  |
| Power Consumption         |                    | 43VA  |
| Operation Time            |                    | Approx. 5 hours   |
| Standard Accessories      |                    | $\phi$ 5 Eccentric probe ( <b>12AAF634</b> )<br>Probe diameter calibration block ( <b>12AAA715</b> )<br>Battery ( <b>12AAF712</b> )<br>AC adapter ( <b>357651</b> ), Power Cable ( <b>02ZAA010</b> )<br>Clear Cover ( <b>223587</b> )<br>Conveying handle ( <b>510434</b> ) |
| Mass                      |                    | 24kg      24.5kg  |

L\*=Measuring length (inch) L\*\*=Measuring length (mm)



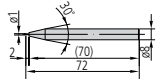
5.7" color LCD

## Optional probes and calibration blocks

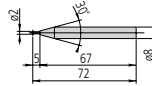
### Optional Accessories

- 12AAF712:** Battery pack
- 12AAA797** Thermal printer (120V)
- 12AAA802** Thermal printing paper (10pcs.)
- 12AAA804** Cable for page printer\*\* (2m)
- 12AAA807** RS-232C cable (80" / 2m)
- 12AAA808** RS-232C cable (160" / 4m)

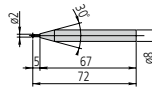
**12AAF666**  
ø1 ball probe



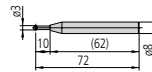
**957261**  
ø2 ball probe



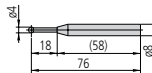
**12AAF667**  
ø2 ruby ball probe



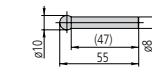
**957262**  
ø3 ball probe



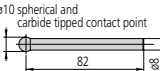
**957263**  
ø4 ball probe



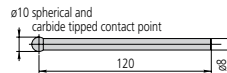
**12AAB552**  
ø10 ball probe, L=55



**12AAF668**  
ø10 ball probe, L=82



**12AAF669**  
ø10 ball probe, L=120

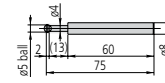


**932361** Mu-checker lever head holder  
CMM ball and disk hard probes are available.

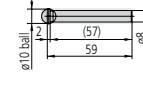
**12AAA787** Block for calibrating probe diameter  
(applicable to taper probe)

**K650986** Styli Kit M3

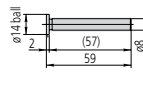
**12AAF670**  
ø5 disk probe



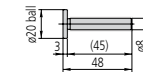
**12AAF671**  
ø10 disk probe



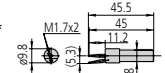
**957264**  
ø14 disk probe



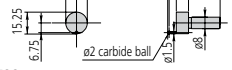
**957265**  
ø20 disk probe



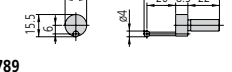
**12AAF672**  
ø1 ball offset probe\*  
\*test indicator stylus (103017)



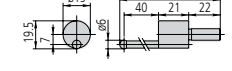
**12AAF673**  
ø2 ball offset probe



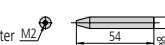
**12AAA788**  
ø4 ball offset probe



**12AAA789**  
ø6 ball offset probe



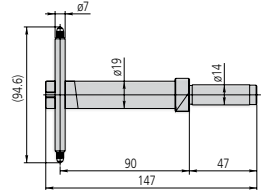
**226117**  
M2 CMM stylus adapter



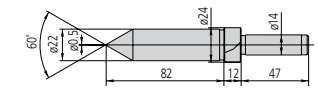
**226118**  
M3 CMM stylus adapter



**12AAC072** Depth probe

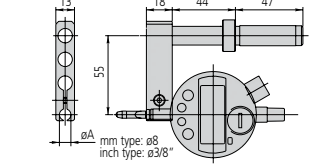


**12AAC073** ø20 taper probe

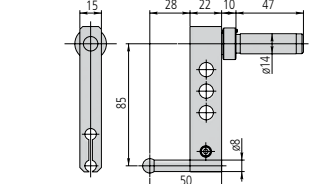


**12AAA792** Dial indicator (ø8 stem) holder

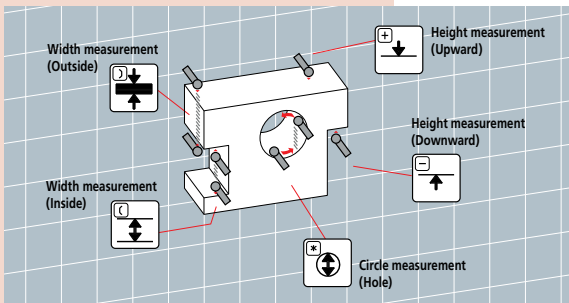
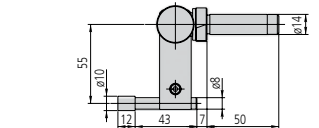
**12AAA837** Dial indicator (ø3/8" stem) holder



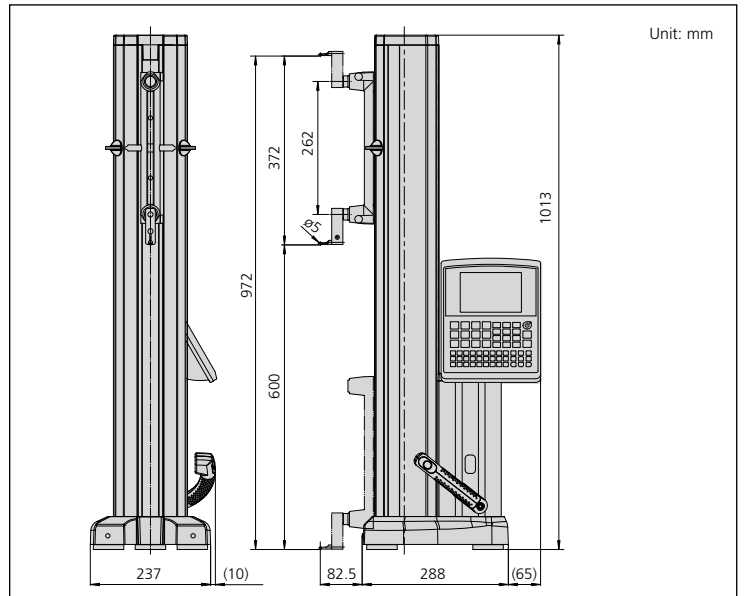
**12AAA793** Probe extension holder (85mm/3.3")



**12AAB136** ø10 cylindrical probe



## DIMENSIONS AND MASS



# QM-Height

## SERIES 518 — High-Precision ABSOLUTE Digital Height Gage

### FEATURES

- Newly developed high-accuracy and high-resolution ABSOLUTE linear encoder for position detection.
- Easy reference icon keys.
- Possible to measure inside/outside diameter via unique process (detect the circle apex and process by tracing measurement).
- Various types of optional probes are available.
- Large size LCD.
- Go/no-go judgment is performed by setting the upper and lower tolerances. If a result is out of tolerance, the display changes from green to red, so tolerance judgment can be made at a glance.
- Slider elevation knob (for travel) / wheel (for measurement).
- With SPC and USB output.



### Technical Data

Measuring range\*: 0 - 18.3" or 0 - 28.1"  
0 - 465mm or 0 - 715mm  
Slider stroke: 14" / 350mm or 24" / 600mm  
Resolution: .00005" / .0001" / .0002" / 0.001mm / 0.005mm  
Accuracy at 20°C: Refer to the list of specifications  
Guiding method: Roller bearing  
Drive method: Manual  
Length standard: ABSOLUTE electromagnetic induction-type linear encoder  
Measuring force: 1.5±0.5N  
Display: LCD  
Power supply: AC adapter (06AEG180JA) 120V battery (LR6x4)  
Battery operation time: Refer to the list of specifications  
\* Maximum values are obtained with the probe at the highest position. Any change of the probe orientation requires the coordinate system be re-zeroed. With the probe in the highest position, minimum measurable height is 4.53"/115mm.

### SPECIFICATIONS

| Inch/Metric               |                 | 64PKA094A  | 64PKA095A                                    | 64PKA129A                                    | 64PKA130A                                    |
|---------------------------|-----------------|--|--|--|--|
| Order No.                 |                 | 64PKA094A  | 64PKA095A                                    | 64PKA129A                                    | 64PKA130A                                    |
| Model                     |                 | QMH-14"A   | QMH-24"A                                     | QMH-14"B                                     | QMH-24"B                                     |
| Range                     |                 | 0 - 14" / 0-350mm  | 0 - 24" / 0-600mm                            | 0 - 14" / 0-350mm                            | 0 - 24" / 0-600mm                            |
| Resolution                |                 | 0.001 / 0.005mm / .00005" / .0001"   |  |  |  |
| Accuracy                  | Accuracy*1      | $\pm(2.4+2.1L/600)\mu\text{m}$ L = Measuring length (mm)   |  |  |  |
|                           | Repeatability*1 | $2\sigma \leq 1.8\mu\text{m}$  |  |  |  |
| Perpendicularity          |                 | 7 $\mu\text{m}$  | 12 $\mu\text{m}$                             | 7 $\mu\text{m}$                              | 12 $\mu\text{m}$                             |
| Guiding method            |                 | Roller bearing   |  |  |  |
| Drive method              |                 | Manual operation   |  |  |  |
| Scale type                |                 | Electromagnetic induction-type ABSOLUTE linear encoder   |  |  |  |
| Measuring force           |                 | 1.5±0.5(N)   |  |  |  |
| Data output               |                 | Digimatic output/USB   |  |  |  |
| Pneumatic floating system |                 | NA   |  | Included (for movement only)                 |  |
| Power supply              |                 | AC adapter battery / (LR6 x 4) Standard accessory / Nickel metal hydride battery (x4)                                |  |  |  |
| Battery life              |                 | Approx. 300 hours (Not using pneumatic floating system)  |  |  |  |
|                           |                 | Approx. 80 hours (Using pneumatic floating system regularly)   |  |  |  |
| Standard accessories      |                 | Stepped probe (05HA148)<br>Probe diameter calibration block (12AAA715)<br>LR6 Battery / AC Adapter (06AEG180JA) 120V |  |  |  |
| Mass                      |                 | 55.16 lbs (25kg)   | 63.93 lbs (29kg)                             | 57.32 lbs (26kg)                             | 66.14 lbs (30kg)                             |
| Dimensions                |                 | 41.85"x21.85x18.94"<br>1063(W)x555(D)x481(H)   | 51.02"x21.85x18.94"<br>1296(W)x555(D)x481(H) | 41.85"x21.85x18.94"<br>1063(W)x555(D)x481(H) | 51.02"x21.85x18.94"<br>1296(W)x555(D)x481(H) |
| Main Unit                 |                 | 518-231  | 518-233                                      | 518-235                                      | 518-237                                      |



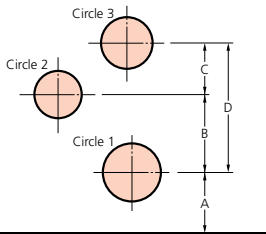
\*1 Guaranteed when using the standard eccentric  $\phi 5$  probe.

## Optional Accessories

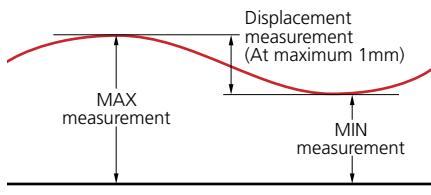
- 12AAC072:** Depth probe
- 12AAA792:** Dial indicator (ø8mm stem) holder
- 12AAA837:** Dial indicator (ø3/8" stem) holder
- 12AAA793:** Probe extension holder (3.3" / 85mm)
- 12AAF667:** ø2mm ruby ball probe
- 957261:** ø2mm ball probe
- 957262:** ø3mm ball probe
- 957263:** ø4mm ball probe
- 05HAA394:** ø5mm ball probe (for 05HZA148)
- 12AAB552:** ø10 mm ball probe, L=55mm
- 12AAF670:** ø5mm ball probe
- 12AAF671:** ø10mm ball probe
- 957264:** ø14mm disk probe
- 957265:** ø20mm disk probe
- 12AAA788:** ø4mm ball offset probe
- 05HAA394:** ø5mm ball offset probe
- 12AAA789:** ø6mm ball offset probe
- 05HZA173:** Scriber
- 264-504-5A:** DP-1VR
- 936937:** SPC cable (40" / 1m)
- 965014:** SPC cable (80" / 2m)

## Circle pitch measurement

The length A, B, C and D can be determined by measuring circles 1 to 3 once each, using the memory of measuring data together with the calculation function. (A maximum of nine circle measurements can be saved.)

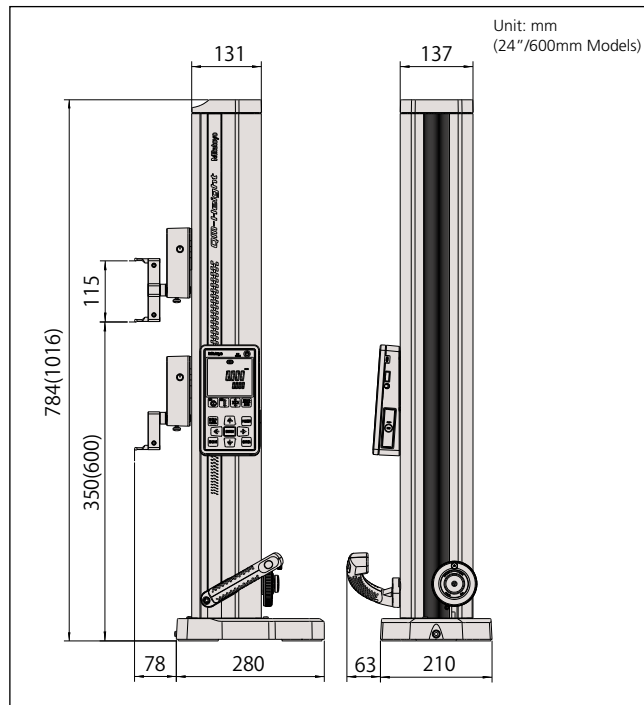


## Maximum/minimum and displacement measurement



Inside diameter measurement

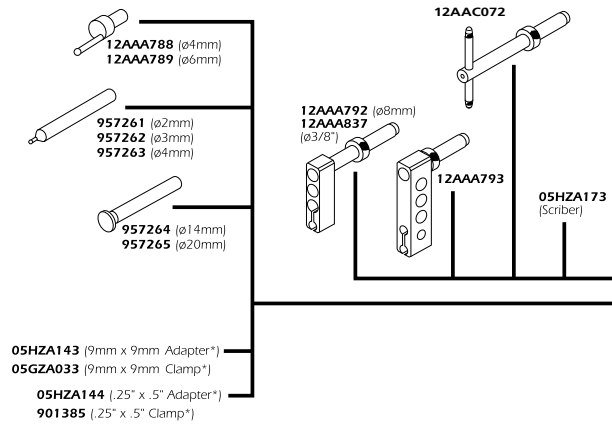
## DIMENSIONS



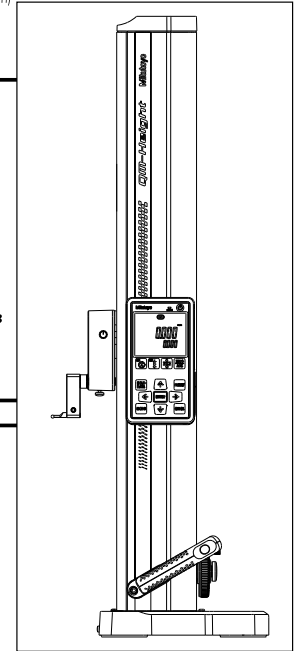
Digimatic mini processor DP-1VR



936937 (1m)  
965014 (2m)



\* Possible to use the scriber for Height Gage.

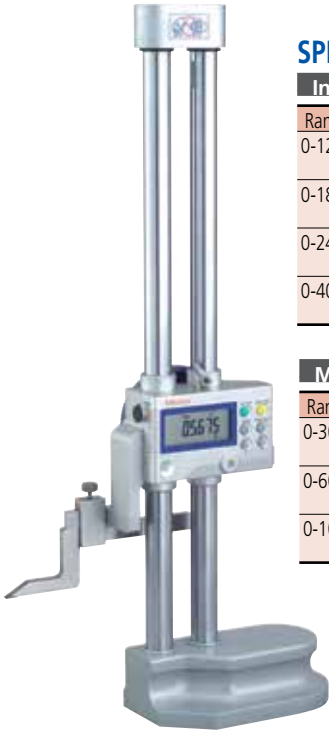


# Digimatic Height Gage

## SERIES 192 — Multi-Function Type with SPC Data Output

### FEATURES

- Highly versatile multi-function type.
- Carbide-tipped long scriber is provided.
- Rigid construction ensures repeatable measurement.
- Switchable resolution (.0002"/0.005mm or .0005"/0.01mm)
- Coarse/fine feed switching.
- Bi-directional touch-signal probe is an optional accessory. It can quickly and accurately measure steps, inside width and outside width.
- With SPC data output.
- Two preset reference heights.



192-670-10

### SPECIFICATIONS

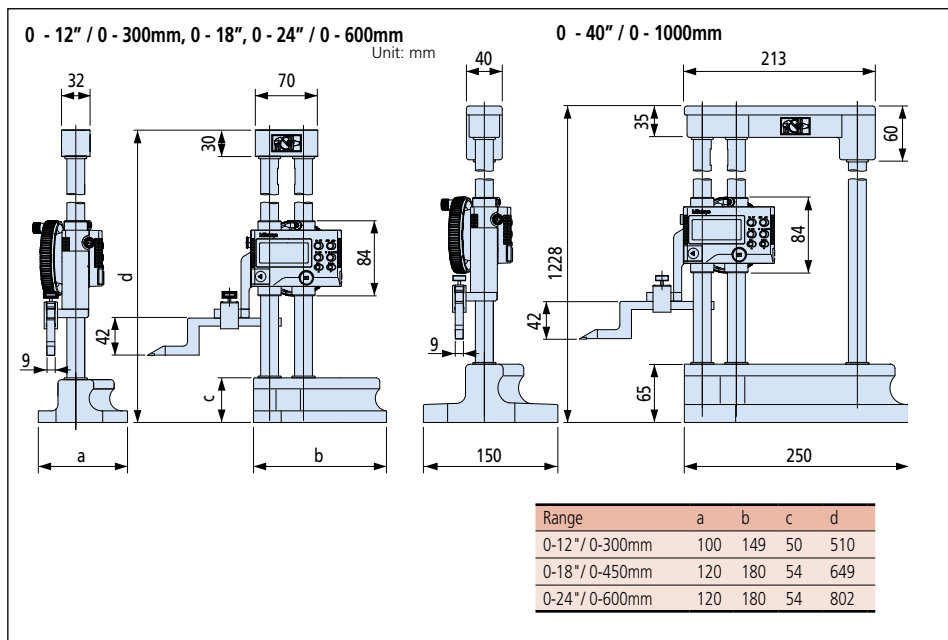
#### Inch/Metric

| Range          | Order No.  | Accuracy | Resolution                                     | Mass (kg) |
|----------------|------------|----------|--|-----------|
| 0-12"/0-300mm  | 192-670-10 | ±001"    | .0005"(0.01mm)<br>[.0002"(0.005mm) Switchable] | 5.7       |
| 0-18"/0-450mm  | 192-671-10 | ±0015"   | .0005"(0.01mm)<br>[.0002"(0.005mm) Switchable] | 7.5       |
| 0-24"/0-600mm  | 192-672-10 | ±0015"   | .0005"(0.01mm)<br>[.0002"(0.005mm) Switchable] | 8.3       |
| 0-40"/0-1000mm | 192-673-10 | ±0025"   | .0005"(0.01mm)<br>[.0002"(0.005mm) Switchable] | 15.7      |

#### Metric

| Range    | Order No.  | Accuracy | Resolution                            | Mass (kg) |
|----------|------------|----------|---------------------------------------|-----------|
| 0-300mm  | 192-663-10 | ±0.02mm  | Switchable between 0.01mm and 0.005mm | 5.7       |
| 0-600mm  | 192-664-10 | ±0.04mm  | Switchable between 0.01mm and 0.005mm | 8.3       |
| 0-1000mm | 192-665-10 | ±0.06mm  | Switchable between 0.01mm and 0.005mm | 15.7      |

### DIMENSIONS



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.01+0.005mm or 0.0005"(0.01mm)  
 [0.0002"(0.005mm) switchable]  
 Display: LCD, 7-digits, character height 11mm  
 Max. response speed: 500mm/s  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2000 hours under normal use

### Function

Zero-setting, ABS/INC switching, Two presets, Probe tip diameter compensation, +/- switching, Power ON/OFF, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Standard Scriber Provided

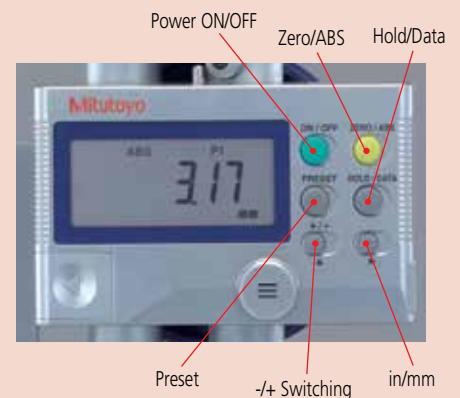
Metric models: Carbide-tipped scriber (**905200**) and scriber clamp (**05GZA033**)  
 Inch/Metric models: Carbide-tipped scriber (**905201**) and scriber clamp (**901385**)

### Optional Accessories

- 905338:** SPC cable (40" / 1m)
- 905409:** SPC cable (80" / 2m)
- 905691:** SPC cable (L-shape, 40" / 1m)
- 905692:** SPC cable (L-shape, 80" / 2m)
- 192-007:** Bi-directional touch-signal probe (metric)
- 192-008:** Bi-directional touch-signal probe (inch)
- 953638:** Holding bar for test indicator (length: 50mm)
- 900209:** Holding bar for test indicator (length: 100mm)
- 953639:** Holding bar for test indicator (length: 2")
- 900306:** Holding bar for test indicator (length: 4")
- 900321:** Swivel clamp used with holding bar (metric)
- 900322:** Swivel clamp used with holding bar (inch)



Shown with optional touch-signal probe





# Digimatic Height Gage

## SERIES 192 — Standard Type with SPC Data Output

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005" (0.01mm) [.0002" (0.005mm)]  
 or 0.01mm and 0.005mm  
 Display: LCD, 7-digit, character height 11mm  
 Max. response speed: 500mm/s  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2000 hours under normal use

### Function

Zero-setting, ABS/INC switching, Two presets, Probe tip diameter compensation, +/- switching, Power ON/OFF, Data hold, With Output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Standard Scriber Provided

Metric models: Carbide-tipped scriber (**07GZA000**) and scriber clamp (**05GZA033**)  
 Inch/Metric models: Carbide-tipped scriber (**900258**) and scriber clamp (**901385**)

### Optional Accessories

**953638:** Holding bar for test indicator (length: 50mm)  
**900209:** Holding bar for test indicator (length: 100mm)  
**953639:** Holding bar for test indicator (length: 2")  
**900306:** Holding bar for test indicator (length: 4")  
**900321:** Swivel clamp used with holding bar (metric)  
**900322:** Swivel clamp used with holding bar (inch)  
**905338:** SPC cable (CD type) 1m  
**905409:** SPC cable (CD type) 2m  
**905691:** CD/Connecting cable L-Type 1m RIG  
**905692:** CD/Connecting cable L-Type 2m RIG

### FEATURES

- Switchable resolution (.0002"/0.005mm or .0005"/0.01mm)
- Easy-to-use standard type.
- Carbide-tipped scriber is provided.
- Double-column structure ensures high measuring accuracy.
- Coarse/fine feed switching.
- Two preset reference heights.



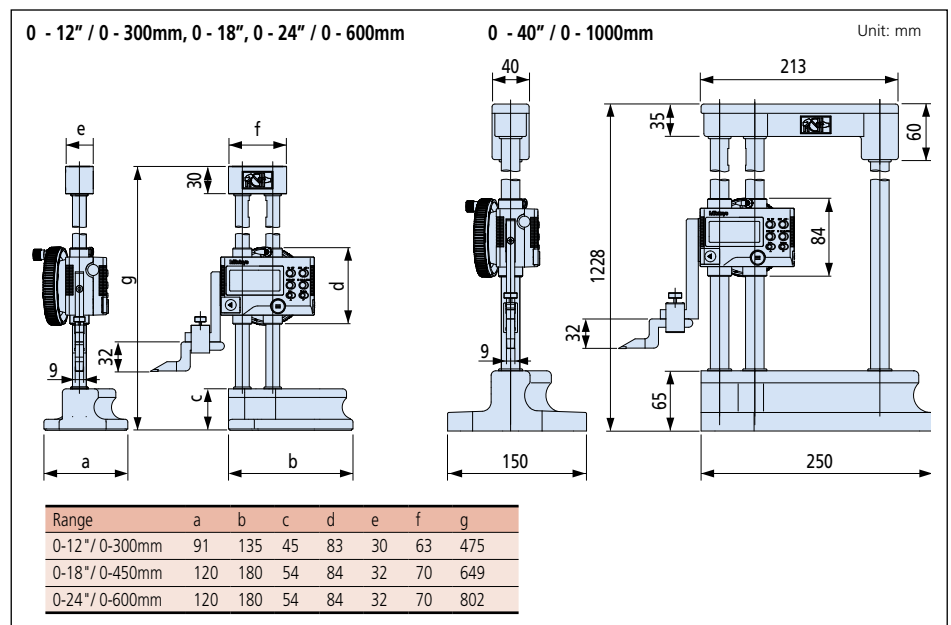
### SPECIFICATIONS

| Inch/Metric    |                   |          |  |           |
|----------------|-------------------|----------|--|-----------|
| Range          | Order No.         | Accuracy | Resolution                                       | Mass (kg) |
| 0-12"/0-300mm  | <b>192-630-10</b> | ±001"    | .0005" (0.01mm)<br>[.0002" (0.005mm) Switchable] | 4.7       |
| 0-18"/0-450mm  | <b>192-631-10</b> | ±002"    | .0005" (0.01mm)<br>[.0002" (0.005mm) Switchable] | 7.5       |
| 0-24"/0-600mm  | <b>192-632-10</b> | ±002"    | .0005" (0.01mm)<br>[.0002" (0.005mm) Switchable] | 8.3       |
| 0-40"/0-1000mm | <b>192-633-10</b> | ±003"    | .0005" (0.01mm)<br>[.0002" (0.005mm) Switchable] | 15.7      |

| Metric   |                   |          |                                       |           |
|----------|-------------------|----------|---------------------------------------|-----------|
| Range    | Order No.         | Accuracy | Resolution                            | Mass (kg) |
| 0-300mm  | <b>192-613-10</b> | ±0.02mm  | Switchable between 0.01mm and 0.005mm | 4.7       |
| 0-600mm  | <b>192-614-10</b> | ±0.05mm  | Switchable between 0.01mm and 0.005mm | 8.3       |
| 0-1000mm | <b>192-615-10</b> | ±0.07mm  | Switchable between 0.01mm and 0.005mm | 15.7      |

192-630-10

### DIMENSIONS



# Dial Height Gage

**SERIES 192 — with Digital Counter**

## FEATURES

- Easy and error-free reading with both up and down digital counters, as well as a dial.
- Provided with a feed wheel for easy coarse feeding.
- Carbide-tipped scriber is provided.
- The counters and dial can be re-zeroed at any scriber position.

## SPECIFICATIONS

### Metric

| Range      | Order No.      | Accuracy | Graduation | Mass (kg) |
|------------|----------------|----------|------------|-----------|
| 0 - 300mm  | <b>192-130</b> | ±0.03mm  | 0.01mm     | 4.2       |
| 0 - 450mm  | <b>192-131</b> | ±0.05mm  | 0.01mm     | 9.2       |
| 0 - 600mm  | <b>192-132</b> | ±0.05mm  | 0.01mm     | 9.8       |
| 0 - 1000mm | <b>192-133</b> | ±0.07mm  | 0.01mm     | 17.0      |

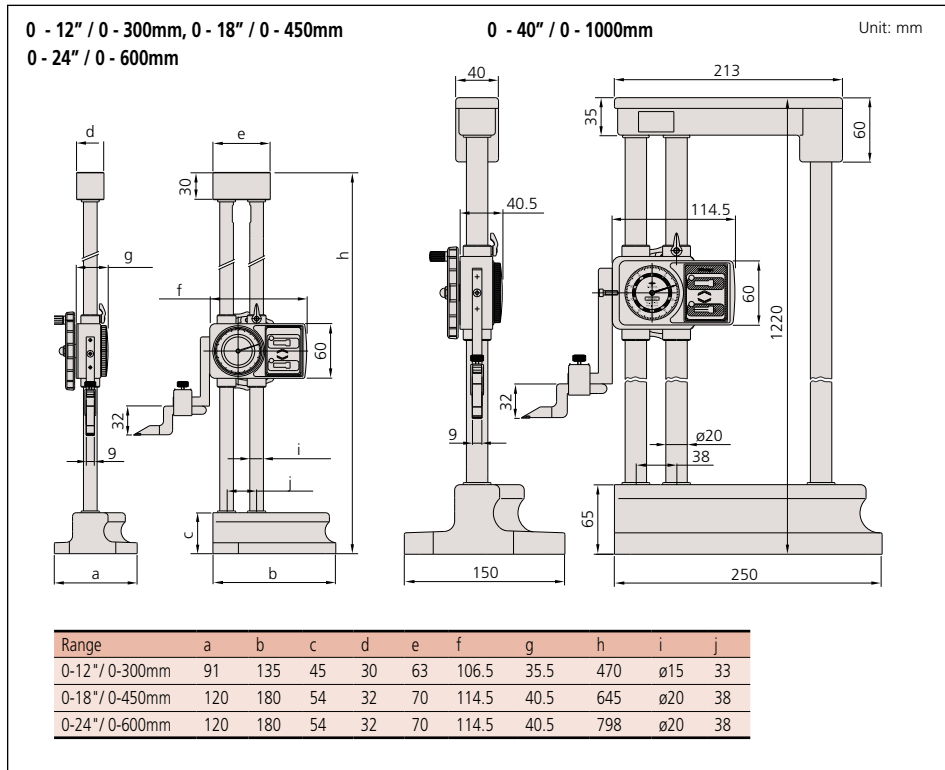
### Inch

| Range   | Order No.      | Accuracy | Graduation | Mass (kg) |
|---------|----------------|----------|------------|-----------|
| 0 - 12" | <b>192-150</b> | ±.0015"  | .001"      | 4.2       |
| 0 - 18" | <b>192-151</b> | ±.002"   | .001"      | 9.2       |
| 0 - 24" | <b>192-152</b> | ±.002"   | .001"      | 9.8       |
| 0 - 40" | <b>192-153</b> | ±.003"   | .001"      | 17.0      |



192-150

## DIMENSIONS



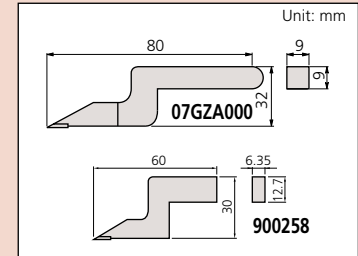
## Technical Data

Dial reading: 0.01mm or .001"

## Standard Scriber Provided

Metric models: Carbide-tipped scriber (**07GZA000**) and scriber clamp (**05GZA033**)  
Inch/Metric models: Carbide-tipped scriber (**900258**) and scriber clamp (**901385**)

## Dimension of scriber



## Optional Accessories

- 953638:** Holding bar for test indicator (length: 50mm)
- 900209:** Holding bar for test indicator (length: 100mm)
- 953639:** Holding bar for test indicator (length: 2")
- 900306:** Holding bar for test indicator (length: 4")
- 900321:** Swivel clamp used with holding bar (metric)
- 900322:** Swivel clamp used with holding bar (inch)



Comfortable grip base



Easy and secure clamping



Easy and error-free reading



# ABSOLUTE Digimatic Height Gage

**SERIES 570 — with ABSOLUTE Linear Encoder**

## FEATURES

- Built-in ABSOLUTE linear encoder  
This encoder eliminates the necessity of setting the reference point at every power-on. It has improved reliability because no over-speed error will occur.
- Fine-adjustment carriage for smooth movement.
- Carbide-tipped scriber is provided.
- With SPC data output.

## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Display: LCD, 6-digit  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 5000 hours under normal use

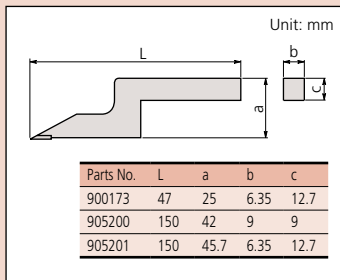
## Function

Origin setting, ABS/INC switching, Presetting, +/- switching, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Standard Scriber Provided

Metric models: Carbide-tipped scriber (900173/905200\*) and scriber clamp (901338/05GZA033\*)  
 \*0 - 1000mm model  
 Inch/Metric models: Carbide-tipped scriber (900173/905201\*) and scriber clamp (901338/901385\*)  
 \*0 - 40" model

## Dimension of scriber



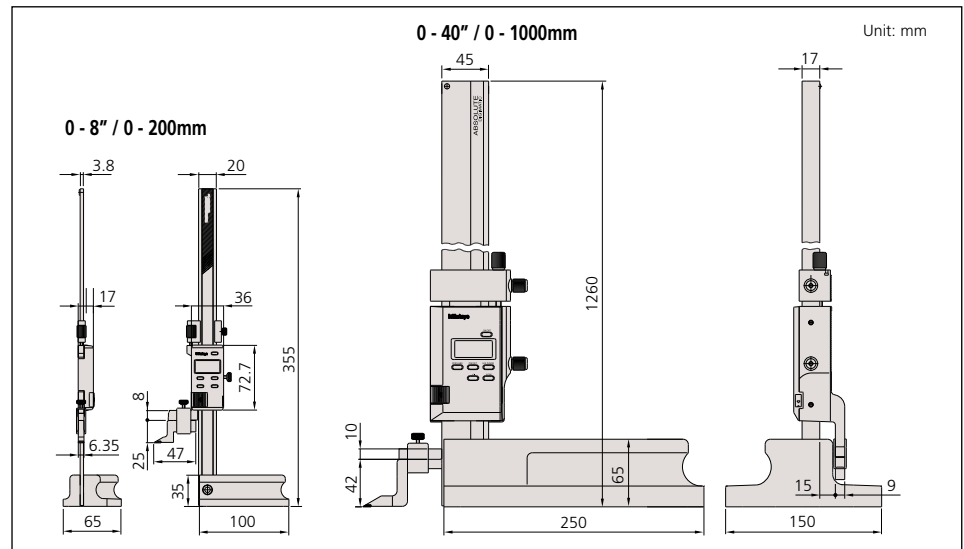
570-244

## SPECIFICATIONS

| Metric     |                |          |            |           |
|------------|----------------|----------|------------|-----------|
| Range      | Order No.      | Accuracy | Resolution | Mass (kg) |
| 0 - 200mm  | <b>570-227</b> | ±0.03mm  | 0.01mm     | 1.4       |
| 0 - 1000mm | <b>570-230</b> | ±0.07mm  | 0.01mm     | 16.8      |

| Inch/Metric          |                |          |                 |          |
|----------------------|----------------|----------|-----------------|----------|
| Range                | Order No.      | Accuracy | Resolution      | Mass(kg) |
| 0 - 8" / 0 - 200mm   | <b>570-244</b> | ±.001"   | .0005" / 0.01mm | 1.4      |
| 0 - 40" / 0 - 1000mm | <b>570-248</b> | ±.003"   | .0005" / 0.01mm | 16.8     |

## DIMENSIONS



## Optional Accessories

- 905338: SPC cable (40" / 1m)
- 905409: SPC cable (80" / 2m)
- 953638: Holding bar for test indicator (length: 50mm)
- 953639: Holding bar for test indicator (length: 2")
- 902053: Swivel clamp used with holding bar (metric)
- 900322: Swivel clamp used with holding bar (inch)

# ABSOLUTE Digimatic Height Gage

**SERIES 570 — with ABSOLUTE Linear Encoder**



## FEATURES

- Built-in ABSOLUTE linear encoder  
This encoder eliminates the necessity of setting the reference point at every power-on. It has improved reliability because no over-speed error will occur.
- Rigid column structure ensures high measuring accuracy.
- With large, smooth slider-feed wheel.
- Carbide-tipped scriber is provided.
- With SPC data output.

## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .0005"/0.01mm or 0.01mm  
 Display: LCD, 6-digit  
 Length standard: ABSOLUTE electrostatic capacitance-type linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 20000 hours under normal use

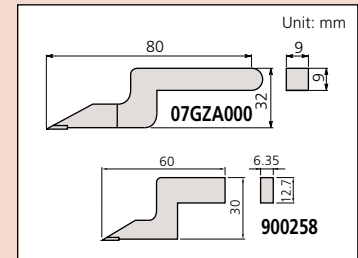
## Function

Origin setting, ABS/INC switching, Power ON/OFF, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Standard Scriber Provided

Metric models: Carbide-tipped scriber (**07GZA000**), scriber clamp (**05GZA033**)  
 Inch/Metric models: Carbide-tipped scriber (**900258**), scriber clamp (**901385**)

## Dimension of scriber



## Optional Accessories

- 905338:** SPC cable (40" / 1m)
- 905409:** SPC cable (80" / 2m)
- 953638:** Holding bar for test indicator (length: 50mm)
- 953639:** Holding bar for test indicator (length: 2")
- 902053:** Swivel clamp used with holding bar (metric)
- 900322:** Swivel clamp used with holding bar (inch)



Large, smooth slider-feed wheel



Large clamp lever



Comfortable grip base

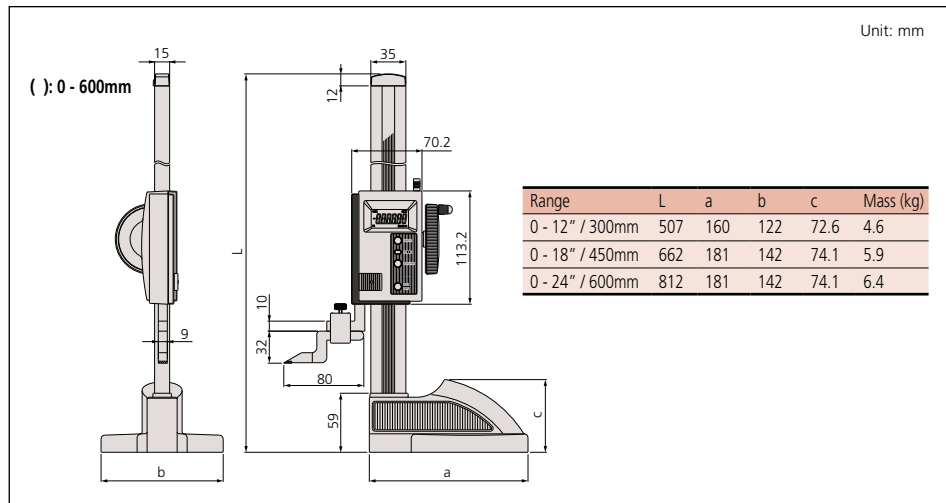


## SPECIFICATIONS

| Metric    |                |          |            |
|-----------|----------------|----------|------------|
| Range     | Order No.      | Accuracy | Resolution |
| 0 - 300mm | <b>570-302</b> | ±0.03mm  | 0.01mm     |
| 0 - 600mm | <b>570-304</b> | ±0.05mm  | 0.01mm     |

| Inch/Metric         |                |          |                 |
|---------------------|----------------|----------|-----------------|
| Range               | Order No.      | Accuracy | Resolution      |
| 0 - 12" / 0 - 300mm | <b>570-312</b> | ±.0015"  | .0005" / 0.01mm |
| 0 - 18" / 0 - 450mm | <b>570-313</b> | ±.002"   | .0005" / 0.01mm |
| 0 - 24" / 0 - 600mm | <b>570-314</b> | ±.002"   | .0005" / 0.01mm |

## DIMENSIONS AND MASS



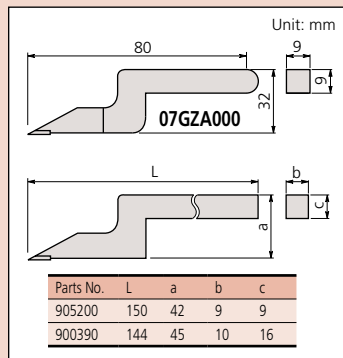
## Technical Data

Main scale adjustment: 15mm or 25mm  
Slider fine feed: 4mm, 6mm, 7mm or 20mm

## Standard Scriber Provided

Up to 600mm: Carbide-tipped scriber (**07GZA000**) and scriber clamp (**05GZA033**)  
0 - 1000mm: Carbide-tipped scriber (**905200**) and scriber clamp (**05GZA033**)  
0 - 1500mm: Carbide-tipped scriber (**900390**) and scriber clamp (**905008**)

## Dimension of scriber



## Optional Accessories

**07GZA003**: Magnifier for 300, 450mm, 600mm models  
**07GZA015**: Magnifier for 1000mm and 1500mm models  
**953638**: Holding bar for test indicator (length: 50mm)  
**902053**: Swivel clamp used with holding bar



# Vernier Height Gage

## SERIES 514 — Standard Height Gage with Adjustable Main Scale

## FEATURES

- Zero reference point can be adjusted.
- Satin chrome-finished scales for glare-free reading.
- Extra-large base for rigidity.
- Optional magnifier for easier reading
- Carbide-tipped scriber is provided.



## SPECIFICATIONS

### Metric

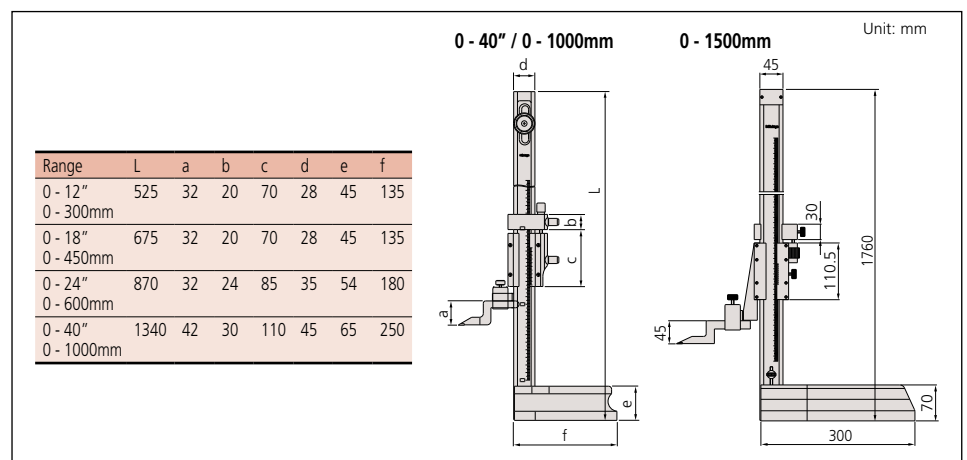
| Range      | Order No.      | Accuracy | Graduation | Mass (kg) |
|------------|----------------|----------|------------|-----------|
| 0 - 300mm  | <b>514-102</b> | ±0.04mm  | 0.02mm     | 3.1       |
| 0 - 450mm  | <b>514-104</b> | ±0.05mm  | 0.02mm     | 3.4       |
| 0 - 600mm  | <b>514-106</b> | ±0.05mm  | 0.02mm     | 7.4       |
| 0 - 1000mm | <b>514-108</b> | ±0.07mm  | 0.02mm     | 20.0      |
| 0 - 1500mm | <b>514-170</b> | ±0.18mm  | 0.02mm     | 26.0      |

### Inch/Metric

Inch model with inch/metric dual scale

| Range                | Order No.      | Accuracy | Graduation     | Mass (kg) |
|----------------------|----------------|----------|----------------|-----------|
| 0 - 12" / 0 - 300mm  | <b>514-103</b> | ±.002"   | .001" / 0.02mm | 3.1       |
| 0 - 18" / 0 - 450mm  | <b>514-105</b> | ±.002"   | .001" / 0.02mm | 3.4       |
| 0 - 24" / 0 - 600mm  | <b>514-107</b> | ±.002"   | .001" / 0.02mm | 7.4       |
| 0 - 40" / 0 - 1000mm | <b>514-109</b> | ±.003"   | .001" / 0.02mm | 20.0      |

## DIMENSIONS



# Vernier Height Gage

## SERIES 506 — Light-Weight Height Gage

### FEATURES

- The Light-Weight Height Gage is designed for scribing from a vertical base or for small parts.
- Satin chrome-finished scales for glare-free reading.
- Beam and slider are made of stainless steel.
- Carbide-tipped scriber is provided.



### SPECIFICATIONS

#### Metric

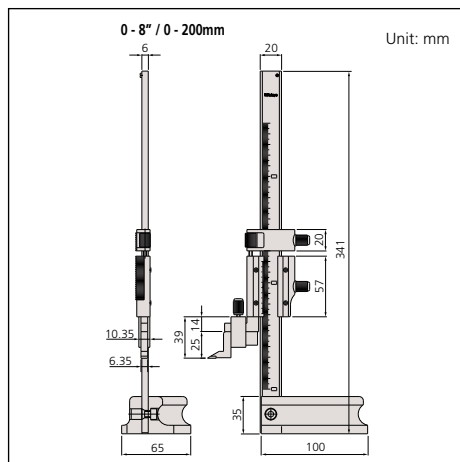
| Range     | Order No. | Accuracy | Graduation | Mass (kg) |
|-----------|-----------|----------|------------|-----------|
| 0 - 200mm | 506-207   | ±0.03mm  | 0.02mm     | 1.4       |

#### Inch/Metric

Inch model with inch/metric double scale

| Range              | Order No. | Accuracy | Graduation     | Mass (kg) |
|--------------------|-----------|----------|----------------|-----------|
| 0 - 8" / 0 - 200mm | 506-208   | ±.001"   | .001" / 0.02mm | 1.4       |

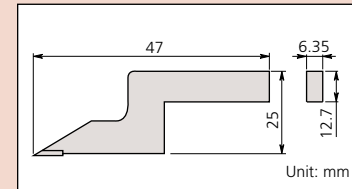
### DIMENSIONS



### Standard Scriber Provided

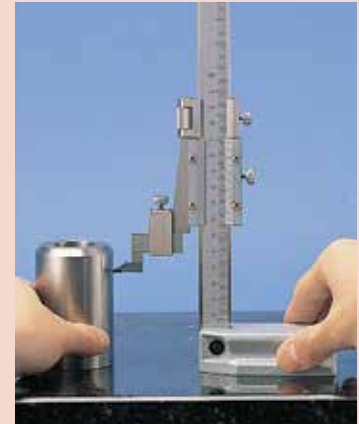
Carbide-tipped scriber (900173) and scriber clamp (901338)

### Dimension of scriber



### Optional Accessories

- 953639: Holding bar for test indicator (length: 2" / 50mm)
- 900322: Swivel clamp used with holding bar

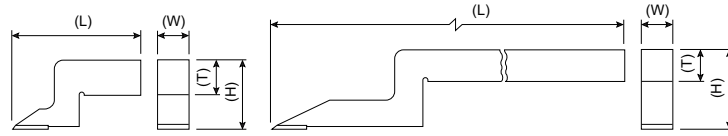


# Carbide-Tipped Scriber

## Optional Accessory for Height Gage

### FEATURES

- Use the appropriate scriber and clamp for each height gage.



### DIMENSIONS

#### Metric

| Scriber Order No. | Clamp Order No. | Scriber Dimensions (mm) |        |       |           |
|-------------------|-----------------|-------------------------|--------|-------|-----------|
|                   |                 | Length                  | Height | Width | Thickness |
| 900167            | 05GZA033        | 143                     | 23     | 9     | 9         |
| 07GZA000          | 07GZA002        | 80                      | 32     | 9     | 9         |
| 905200            | 05GZA033        | 150                     | 42     | 9     | 9         |
| 900390            | 905008          | 144                     | 45     | 10    | 16        |

#### Inch

| Scriber Order No. | Clamp Order No. | Scriber Dimensions (inch) |        |       |           |
|-------------------|-----------------|---------------------------|--------|-------|-----------|
|                   |                 | Length                    | Height | Width | Thickness |
| 900258            | 901385          | 2.4                       | 1.2    | .25   | .5        |
| 905201            | 901385          | 5.9                       | 1.77   | .25   | .5        |
| 900172            | 901385          | 5.3                       | 1.0    | .25   | .5        |
| 900173            | 901338          | 1.9                       | 1.0    | .25   | .5        |

## Optional Accessories

### Optional Accessories for Height Gage



#### Center Master

- Allows quick measurement of center-to-center distance between holes.
- Measurable hole diameters: .040" to 1.50" /  $\varnothing$ 1 -  $\varnothing$ 38mm.

### SPECIFICATIONS

| Order No. | Remarks  |
|-----------|--|
| 951144    | With metric-type holding bar (9x9mm cross-section) |
| 900581    | With inch-type holding bar (.25x.5" cross-section) |



#### Depth Gage Attachment

- Attached to a height gage to measure groove and hole depth.
- Minimum hole diameter: 5.5mm
- Maximum distance from the bottom of the holding bar to the contact point: 2.95" (inch type), 80mm (metric type)
- Uses standard dial indicator points.

### SPECIFICATIONS

| Order No. | Remarks  |
|-----------|--|
| 900764    | With metric-type holding bar (9x9mm cross-section) |
| 900878    | With inch-type holding bar (.25x.5" cross-section) |



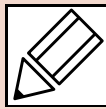
#### Contact Sensor

- The contact sensor eliminates errors caused by jacking-up the height gage while taking measurements. When the scriber of a height gage touches a conductive workpiece, an indicator will light up to indicate that measurement can be taken, which results in consistent height measurement.

### SPECIFICATIONS

| Order No. | Remarks  |
|-----------|--|
| 900872    | Battery (2pcs. SR44, required) is not included |

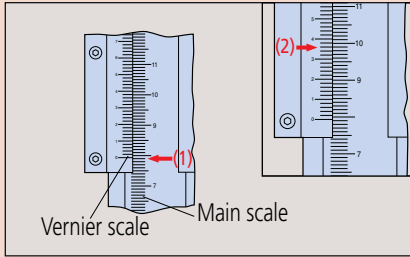
# Quick Guide to Precision Measuring Instruments



## Height Gages

### How to read

#### Vernier Height gage



**Graduation 0.02mm**

|                |          |
|----------------|----------|
| (1) Main scale | 79 mm    |
| (2) Vernier    | 0.36 mm  |
| Reading        | 79.36 mm |

### General notes on use of Height Gages

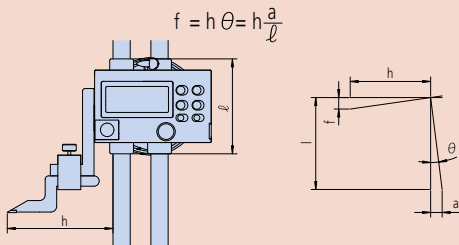
#### 1. Potential causes of error

Like the caliper, the error factors involved include parallax effects, error caused by excessive measuring force due to the fact that a height gage does not conform to Abbe's Principle, and differential thermal expansion due to a temperature difference between the height gage and workpiece.

There are also other error factors caused by the structure of the height gage. In particular, the error factors related to a warped reference edge and scriber installation described below should be studied before use.

#### 2. Reference edge (column) warping and scriber installation

Like the caliper, and as shown in the following figure, measurement errors result when using the height gage if the reference column, which guides the slider, becomes warped. This error can be represented by the same calculation formula for errors caused by nonconformance to Abbe's Principle.

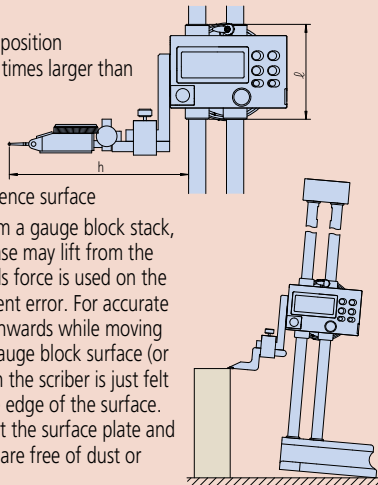


$$f = h \theta = h \frac{a}{L}$$

Installing the scriber (or a lever-type dial indicator) requires careful consideration because it affects the size of any error due to a warped reference column by increasing dimension  $h$  in the above formula. In other words, if an optional long scriber or lever-type dial indicator is used, the measurement error becomes larger.

Example: Effect of measuring point position

When  $h$  is 150 mm, the error is 1.5 times larger than when  $h$  is 100 mm.

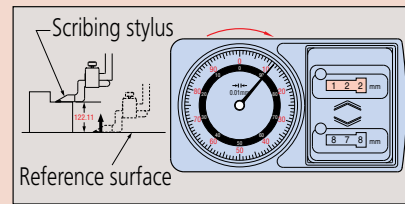


#### 3. Lifting of the base from the reference surface

When setting the scriber height from a gauge block stack, or from a workpiece feature, the base may lift from the surface plate if excessive downwards force is used on the slider, and this results in measurement error. For accurate setting, move the slider slowly downwards while moving the scriber tip to and fro over the gauge block surface (or feature). The correct setting is when the scriber is just felt to lightly touch as it moves over the edge of the surface. It is also necessary to make sure that the surface plate and height gage base reference surface are free of dust or burrs before use.

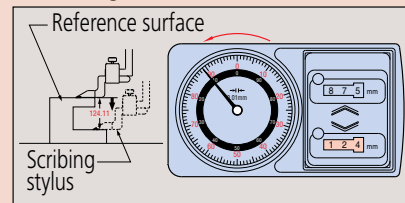
### Mechanical Digit Height gage

#### Measuring upwards from a reference surface



|         |           |
|---------|-----------|
| Counter | 122 mm    |
| Dial    | 0.11 mm   |
| Reading | 122.11 mm |

#### Measuring downwards from a reference surface



|         |           |
|---------|-----------|
| Counter | 124 mm    |
| Dial    | 0.11 mm   |
| Reading | 124.11 mm |

#### 4. Error due to inclination of the main scale (column)

According to JIS standards, the perpendicularity of the column reference edge to the base reference surface should be better than:

$$\left(0.01 + \frac{L}{1000}\right) \text{ mm} \quad L \text{ indicates the measuring length (unit: mm)}$$

This is not a very onerous specification. For example, the perpendicularity limit allowable is 0.61 mm when  $L$  is 600 mm. This is because this error factor has a small influence and does not change the inclination of the slider, unlike a warped column.

#### 5. Relationship between accuracy and temperature

Height gages are made of several materials. Note that some combinations of workpiece material, room temperature, and workpiece temperature may affect measuring accuracy if this effect is not allowed for by performing a correction calculation.

6. The tip of a height gage scriber is very sharp and must be handled carefully if personal injury is to be avoided.

7. Do not damage a digital height gage scale by engraving an identification number or other information on it with an electric marker pen.

8. Carefully handle a height gage so as not to drop it or bump it against anything.

### Notes on using the height gage

1. Keep the column, which guides the slider, clean. If dust or dirt accumulates on it, sliding becomes difficult, leading to errors in setting and measuring.

2. When scribing, securely lock the slider in position using the clamping arrangements provided. It is advisable to confirm the setting after clamping because the act of clamping on some height gages can alter the setting slightly. If this is so, allowance must be made when setting to allow for this effect.

3. Parallelism between the scriber measuring face and the base reference surface should be 0.01 mm or better.

Remove any dust or burrs on the mounting surface when installing the scriber or lever-type dial indicator before measurement. Keep the scriber and other parts securely fixed in place during measurement.

4. If the main scale of the height gage can be moved, move it as required to set the zero point, and securely tighten the fixing nuts.

5. Errors due to parallax error are not negligible. When reading a value, always look straight at the graduations.

6. Handling after use: Completely wipe away any water and oil. Lightly apply a thin coating of anti-corrosion oil and let dry before storage.

7. Notes on storage:

Avoid direct sunlight, high temperatures, low temperatures, and high humidity during storage.

If a digital height gage will not be used for more than three months, remove the battery before storage.

If a protective cover is provided, use the cover during storage to prevent dust from adhering to the column.





# CERA Caliper Checker

## SERIES 515

### FEATURES

- The CERA Caliper Checker is designed to inspect vernier, dial and Digimatic calipers. It is comprised of permanently wrung, high-grade CERA gage blocks in a protective casting.
- The CERA Caliper Checker also stands perpendicular to a surface for height gage inspection.
- The zirconia-based ceramic CERA measuring blocks are corrosion-resistant and dimensionally stable.



### Technical Data

Block pitch accuracy:  $\pm 0.005\text{mm}$  for range up to 300mm  
 $\pm 0.002\text{''}$  for range up to 12''  
 $\pm 0.007\text{mm}$  for range up to 600mm

Parallelism of blocks: 0.002mm for range up to 300mm  
 0.004mm for range up to 600mm

### Optional Accessories

**602162:** Wooden case for 300mm model  
**602164:** Wooden case for 600mm model

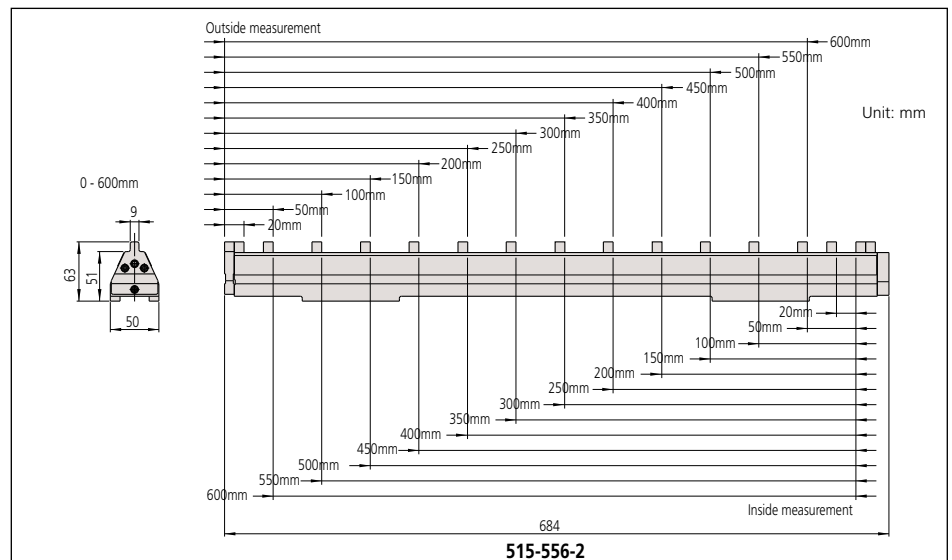
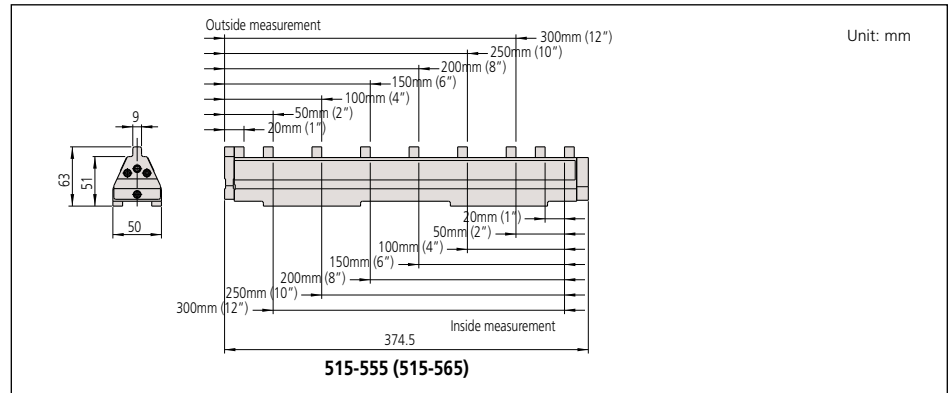
### SPECIFICATIONS

| Metric    |                  |   |           |
|-----------|------------------|---|-----------|
| Range     | Order No.        | Remarks (length to check)   | Mass (kg) |
| 0 - 300mm | <b>515-555</b>   | Outside measurement: 20, 50, 100, 150, 200, 250, 300mm<br>Inside measurement: 20, 50, 100, 150, 200, 250, 300mm | 4.0       |
| 0 - 600mm | <b>515-556-2</b> | Outside, Inside measurement: 20, 50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600mm                    | 8.5       |

| Inch     |                |   |           |
|----------|----------------|---|-----------|
| Range    | Order No.      | Remarks (length to check)   | Mass (kg) |
| 0 - 12'' | <b>515-565</b> | Outside measurement: 1'', 2'', 4'', 6'', 8'', 10'', 12''<br>Inside measurement: 1'', 2'', 4'', 6'', 8'', 10'', 12'' | 4.0       |

### DIMENSIONS



Used for caliper



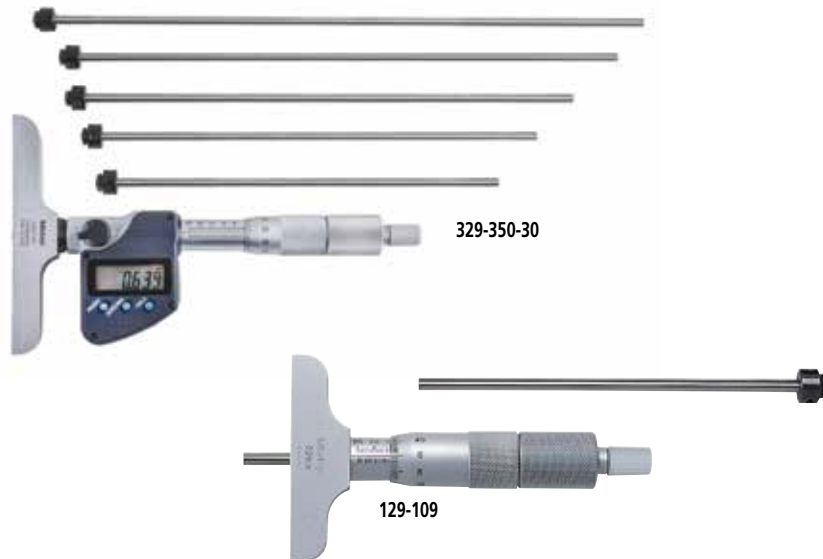
Used for height gage

# Depth Micrometer

## SERIES 329, 129 — Interchangeable Rod Type

### FEATURES

- $\varnothing 4$ mm interchangeable rods, with lapped measuring end, provide a wide measuring range.
- The rod length can be adjusted in 1" or 25mm increments.
- With ratchet stop for constant force.
- With measuring rod clamp.
- With SPC output (Series 329).
- Supplied in fitted plastic case.



### SPECIFICATIONS

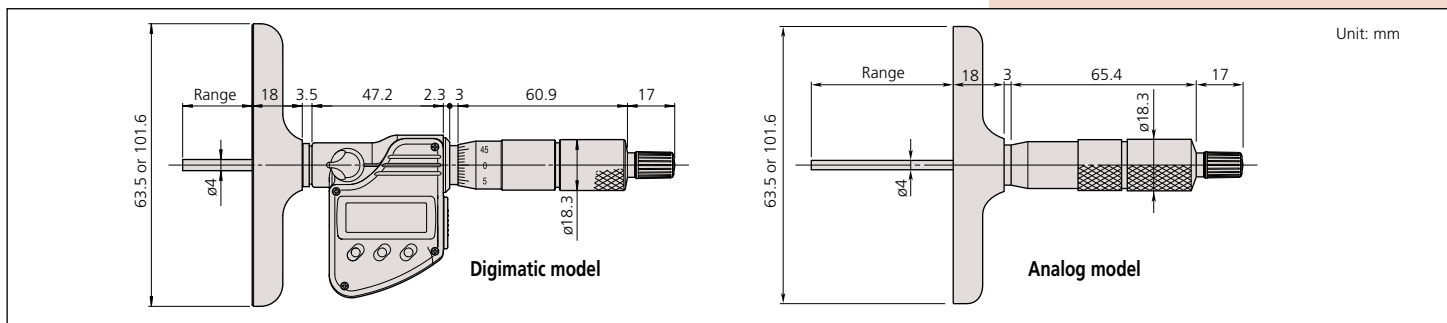
| Metric Digimatic model |                   |            |          |
|------------------------|-------------------|------------|----------|
| Range                  | Order No.         | Base Size  | Rod Qty. |
| 0 - 150mm              | <b>329-250-30</b> | 101.6x16mm | 6 rods   |
| 0 - 300mm              | <b>329-251-30</b> | 101.6x16mm | 12 rods  |

| Metric    |                |            |          |
|-----------|----------------|------------|----------|
| Range     | Order No.      | Base Size  | Rod Qty. |
| 0 - 50mm  | <b>129-109</b> | 63.5x16mm  | 2 rods   |
| 0 - 100mm | <b>129-111</b> | 63.5x16mm  | 4 rods   |
| 0 - 100mm | <b>129-115</b> | 101.6x16mm | 4 rods   |
| 0 - 150mm | <b>129-112</b> | 63.5x16mm  | 6 rods   |
| 0 - 150mm | <b>129-116</b> | 101.6x16mm | 6 rods   |

| Inch/Metric Digimatic model |                   |           |          |
|-----------------------------|-------------------|-----------|----------|
| Range                       | Order No.         | Base Size | Rod Qty. |
| 0 - 6" /<br>0 - 152.4mm     | <b>329-350-30</b> | 4"x.63"   | 6 rods   |
| 0 - 12" /<br>0 - 304.8mm    | <b>329-351-30</b> | 4"x.63"   | 12 rods  |

| Inch    |                |           |          |
|---------|----------------|-----------|----------|
| Range   | Order No.      | Base Size | Rod Qty. |
| 0 - 4"  | <b>129-127</b> | 2.5"x.63" | 4 rods   |
| 0 - 4"  | <b>129-131</b> | 4"x.63"   | 4 rods   |
| 0 - 6"  | <b>129-128</b> | 2.5"x.63" | 6 rods   |
| 0 - 6"  | <b>129-132</b> | 4"x.63"   | 6 rods   |
| 0 - 12" | <b>129-149</b> | 2.5"x.63" | 12 rods  |
| 0 - 12" | <b>129-150</b> | 4"x.63"   | 12 rods  |

### DIMENSIONS



### Technical Data

Accuracy:  $\pm 0.0015"/3\mu\text{m}$  for micrometer head feed  
 $\pm [0.0008 + (0.0004 \times R/3)]"$   
 R = max. measuring length (inch)  
 $\pm (2 + L/75)\mu\text{m}$  for interchangeable rod,  
 L = Max. measuring length (mm)

Resolution\*:  $.00005"/0.001\text{mm}$  or  $0.001\text{mm}$   
 Graduation\*\*:  $.001"$  or  $0.01\text{mm}$   
 Flatness of reference surface (base):  
 $.00005"/1.3\mu\text{m}$  for 2.5"/63.5mm wide base  
 $.00008"/2\mu\text{m}$  for 4"/6mm wide base  
 Flatness of measuring face (rod):  
 $.000012"/0.3\mu\text{m}$   
 Parallelism between reference face and measuring rod face:  
 $[.00016 + (0.0004 \times R/3)]"$   
 R = max. measuring range (inch)  
 $(4 + L/50)\mu\text{m}$   
 L = Max. measuring length (mm)

Zero point error of rods:  
 $\pm 0.0002"/4\mu\text{m}$  for 0-6"/0-150mm models  
 $\pm 0.0003"/6\mu\text{m}$  for 0-12"/0-300mm models

Measuring rod diameter:  $.157"/4\text{mm}$   
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digimatic Model

Origin-set, Zero-setting, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digimatic Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)



# Depth Micrometer

## SERIES 128

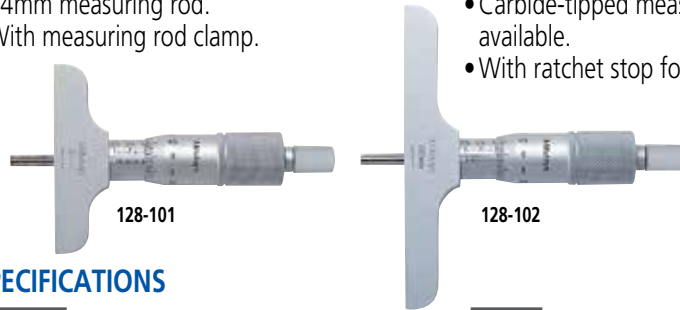
### Technical Data

Accuracy:  $\pm 3\mu\text{m}$  for micrometer head feed  
 Graduation: .001" or 0.01mm  
 Flatness of reference face: 1.3 $\mu\text{m}$  for 63.5mm width base,  
 2 $\mu\text{m}$  for 101.6mm width base  
 Flatness of measuring rod face: 0.3 $\mu\text{m}$   
 Parallelism between reference face and measuring rod face:  
 (4+L/50) $\mu\text{m}$ , L=Max. measuring length (mm)  
 Measuring rod diameter: 4mm



### FEATURES

- $\varnothing 4\text{mm}$  measuring rod.
- With measuring rod clamp.
- Carbide-tipped measuring rod model is available.
- With ratchet stop for constant force.



### SPECIFICATIONS

| Metric   |                 |                |
|----------|-----------------|----------------|
| Range    | Order No.       | Remarks (base) |
| 0 - 25mm | <b>128-101</b>  | 63.5x16mm      |
| 0 - 25mm | <b>128-103*</b> | 63.5x16mm      |
| 0 - 25mm | <b>128-102</b>  | 101.6x16mm     |
| 0 - 25mm | <b>128-104*</b> | 101.6x16mm     |

| Inch   |                |                |
|--------|----------------|----------------|
| Range  | Order No.      | Remarks (base) |
| 0 - 1" | <b>128-105</b> | 2.5"x.63"      |
| 0 - 1" | <b>128-106</b> | 4"x.63"        |

\*with carbide-tipped measuring rod

# Depth Micro Checker

## SERIES 515

### FEATURES

- The Depth Micro Checker is designed to efficiently check the zero point of a depth micrometer.

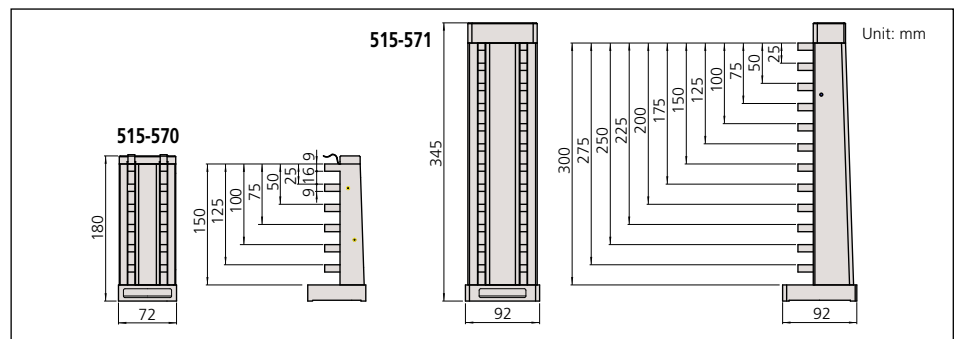


### SPECIFICATIONS

| Metric    |                |   |
|-----------|----------------|---|
| Range     | Order No.      | Remarks (length to check)                                 |
| 0 - 150mm | <b>515-570</b> | 25, 50, 75, 100, 125, 150mm                               |
| 0 - 300mm | <b>515-571</b> | 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300mm |

| Inch   |                |                           |
|--------|----------------|---------------------------|
| Range  | Order No.      | Remarks (length to check) |
| 0 - 6" | <b>515-575</b> | 1", 2", 3", 4", 5", 6"    |

### DIMENSIONS



### Technical Data

Block pitch accuracy:  $\pm(1+L/150)\mu\text{m}$ ,  
 L=Length to check (mm)  
 Anvil block accuracy:  $\pm 0.5\mu\text{m}$



# ABSOLUTE Digimatic Depth Gage

**SERIES 571**



## FEATURES

- ABSOLUTE Digimatic Depth Gage can keep track of the origin point, once set, for the entire life of the battery.
- Base and measuring faces are hardened and micro-lapped.
- Optional wider extension base are available. (up to 450mm range models)
- With SPC data output.



571-263-10



571-201-30

## SPECIFICATIONS

| Metric     |             |            |          |         |
|------------|-------------|------------|----------|---------|
| Range      | Order No.   | Resolution | Accuracy | Mass(g) |
| 0 - 150mm  | 571-201-30  | 0.01mm     | ±0.02mm  | 192     |
| 0 - 150mm  | 571-251-20* | 0.01mm     | ±0.02mm  | 199     |
| 0 - 200mm  | 571-202-30  | 0.01mm     | ±0.02mm  | 212     |
| 0 - 200mm  | 571-252-20* | 0.01mm     | ±0.02mm  | 219     |
| 0 - 300mm  | 571-203-20  | 0.01mm     | ±0.03mm  | 310     |
| 0 - 300mm  | 571-253-10* | 0.01mm     | ±0.03mm  | 320     |
| 0 - 450mm  | 571-204-10  | 0.01mm     | ±0.05mm  | 1270    |
| 0 - 600mm  | 571-205-10  | 0.01mm     | ±0.05mm  | 1400    |
| 0 - 750mm  | 571-206-10  | 0.01mm     | ±0.06mm  | 1530    |
| 0 - 1000mm | 571-207-10  | 0.01mm     | ±0.07mm  | 1760    |

\*IP67 Coolant-Proof model

| Inch/Metric             |             |                    |          |         |
|-------------------------|-------------|--------------------|----------|---------|
| Range                   | Order No.   | Resolution         | Accuracy | Mass(g) |
| 0 - 6" /<br>0 - 150mm   | 571-211-30  | .0005" /<br>0.01mm | ±.001"   | 192     |
| 0 - 6" /<br>0 - 150mm   | 571-261-20* | .0005" /<br>0.01mm | ±.001"   | 199     |
| 0 - 8" /<br>0 - 200mm   | 571-212-30  | .0005" /<br>0.01mm | ±.001"   | 212     |
| 0 - 8" /<br>0 - 200mm   | 571-262-20* | .0005" /<br>0.01mm | ±.001"   | 219     |
| 0 - 12" /<br>0 - 300mm  | 571-213-10  | .0005" /<br>0.01mm | ±.0015"  | 310     |
| 0 - 12" /<br>0 - 300mm  | 571-263-10* | .0005" /<br>0.01mm | ±.0015"  | 320     |
| 0 - 18" /<br>0 - 450mm  | 571-214-10  | .0005" /<br>0.01mm | ±.002"   | 1270    |
| 0 - 24" /<br>0 - 600mm  | 571-215-10  | .0005" /<br>0.01mm | ±.002"   | 1400    |
| 0 - 30" /<br>0 - 750mm  | 571-216-10  | .0005" /<br>0.01mm | ±.0025   | 1530    |
| 0 - 40" /<br>0 - 1000mm | 571-217-10  | .0005" /<br>0.01mm | ±.0025   | 1760    |

\*IP67 Coolant-Proof model



## Technical Data

Resolution: .0005"/0.01mm or 0.01mm  
 Repeatability: 0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance (electromagnetic induction)\* type linear encoder  
 Max. response speed: Unlimited  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 20,000 hours (3 years)\* under normal use  
 Dust/Water protection level: IP67\*  
 \*Coolant-Proof models

## Function

Origin-set, Zero-setting, Automatic power on/off, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

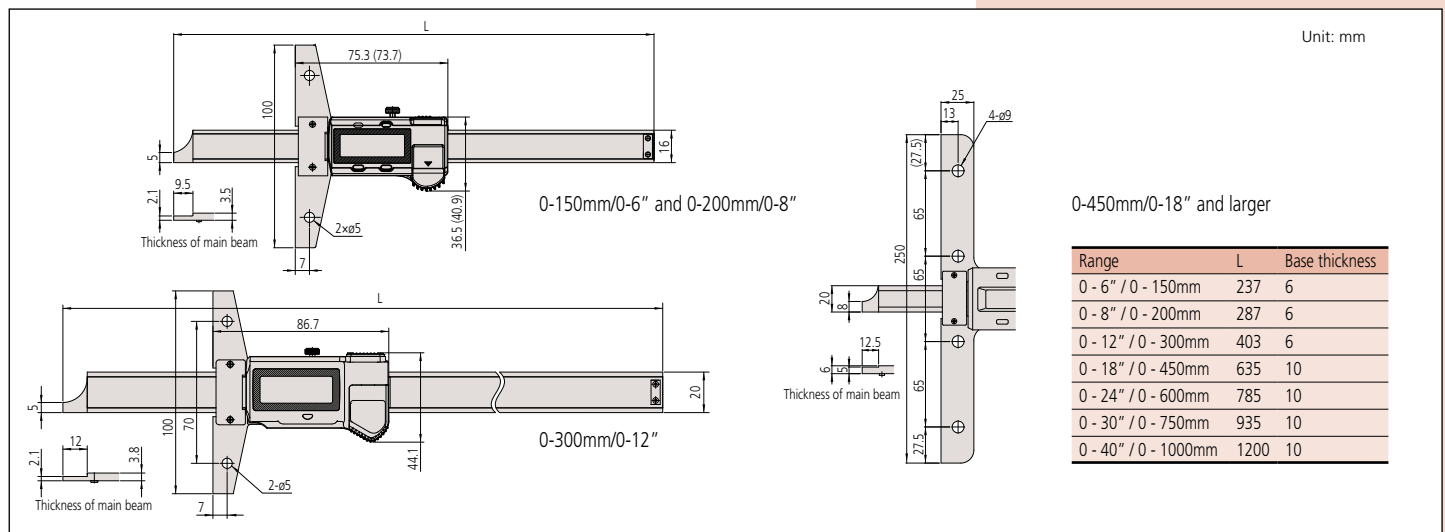
- 959143:** Data hold unit
- 959149:** SPC cable with data switch (40" / 1m)
- 959150:** SPC cable with data switch (80" / 2m)
- 05CZA624:** SPC cable with data switch (40" / 1m)\*
- 05CZA625:** SPC cable with data switch (80" / 2m)\*
- Extension base (see page D-56.)

\*For IP-67 models



Measurement data output function is available with a water-resistant SPC cable.

## DIMENSIONS





**ABSOLUTE®**

Absolute System Patented by MITUTOYO

### Technical Data

Accuracy: Refer to the list of specifications  
Resolution: .0005"/0.01mm or 0.01mm  
Display: LCD  
Battery: SR44 (1 pc.), **938882**  
Battery life: Approx. 2000 hours

### Function

Origin-set, Zero-setting, Power ON/OFF,  
inch/mm conversion (on inch/metric models only)  
Alarm: Low voltage, Counting value composition error

### Optional Accessories

**959143:** Data hold unit  
**959149:** SPC cable with data switch (40" / 1m)  
**959150:** SPC cable with data switch (80" / 2m)



**ABSOLUTE®**

Absolute System Patented by MITUTOYO

### Technical Data

Resolution: .0005"/0.01mm or 0.01mm  
Repeatability: .0005"/0.01mm  
Display: LCD  
Length standard: ABSOLUTE electromagnetic induction-type  
linear encoder  
Max. response speed: Unlimited  
Battery: SR44 (1 pc.), **938882**  
Battery life: Approx. 20,000 hours (3 years) under normal use  
Dust/Water protection level: IP67

### Function

Origin-set, Zero-setting, Automatic power on/off, Data  
output, inch/mm conversion (on inch/metric models only)  
Alarm: Low voltage, Counting value composition error

### Optional Accessories

**05CZA624:** SPC cable with data switch (40" / 1m)  
**05CZA625:** SPC cable with data switch (80" / 2m)  
—: Extension base (see page D-56.)

**05CZA624**



Measurement data output  
function is available with a  
water-resistant SPC cable.

# Tire Tread Depth Gage

**SERIES 571**

### FEATURES

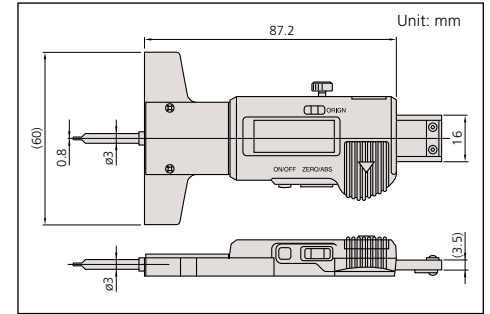
- ABSOLUTE Digimatic Tread Depth Gage can keep track of the origin point, once set, for the life of the battery.

- Specially designed to measure tire tread depth.
- With SPC data output.



**571-100MOT-10**

### DIMENSIONS



### SPECIFICATIONS

#### Metric

| Range    | Order No.            | Resolution | Accuracy |
|----------|----------------------|------------|----------|
| 0 - 25mm | <b>571-100MOT-10</b> | 0.01mm     | ±0.02mm  |

#### Inch/Metric

| Range             | Order No.            | Resolution      | Accuracy |
|-------------------|----------------------|-----------------|----------|
| 0 - 1" / 0 - 25mm | <b>571-200MOT-10</b> | .0005" / 0.01mm | ±.0005"  |

# ABSOLUTE Point-Type Digimatic Depth Gage

**SERIES 571**

### FEATURES

- ABSOLUTE Digimatic Depth Gage can keep track of the origin point, once set, for the life of the battery.

- Base and measuring faces are hardened and micro-lapped.
- Optional wider extension base are available.
- With SPC data output.



### SPECIFICATIONS

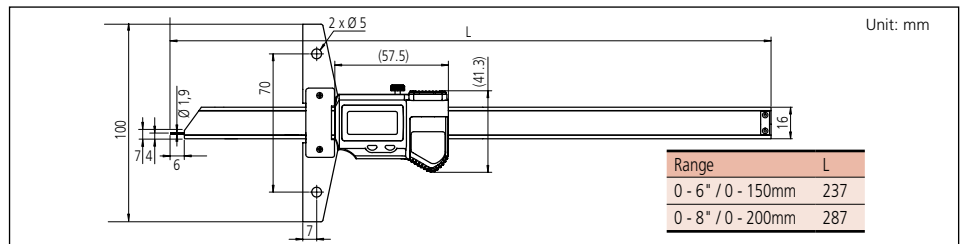
#### Metric

| Range   | Order No.         | Resolution | Accuracy | Mass(g) |
|---------|-------------------|------------|----------|---------|
| 0-150mm | <b>571-301-20</b> | 0.01mm     | ±0.02mm  | 207     |
| 0-200mm | <b>571-302-20</b> | 0.01mm     | ±0.02mm  | 227     |

#### Inch/Metric

| Range          | Order No.         | Resolution      | Accuracy         | Mass(g) |
|----------------|-------------------|-----------------|------------------|---------|
| 0-6" / 0-150mm | <b>571-311-20</b> | .0005" / 0.01mm | ±.001" / ±0.02mm | 207     |
| 0-8" / 0-200mm | <b>571-312-20</b> | .0005" / 0.01mm | ±.001" / ±0.02mm | 227     |

### DIMENSIONS



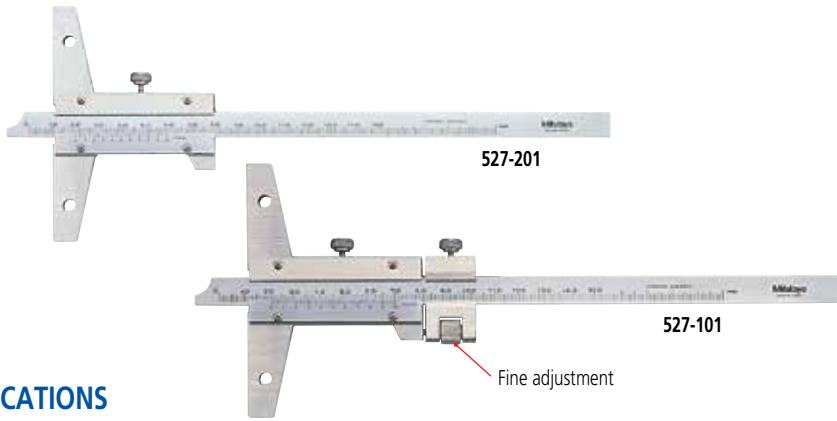
| Range              | L   |
|--------------------|-----|
| 0 - 6" / 0 - 150mm | 237 |
| 0 - 8" / 0 - 200mm | 287 |

# Vernier Depth Gage

## SERIES 527

### FEATURES

- Made of hardened stainless steel.
- Base and measuring faces are hardened and micro-lapped.
- Optional wider extension base are available. (up to 450mm range models)



### SPECIFICATIONS

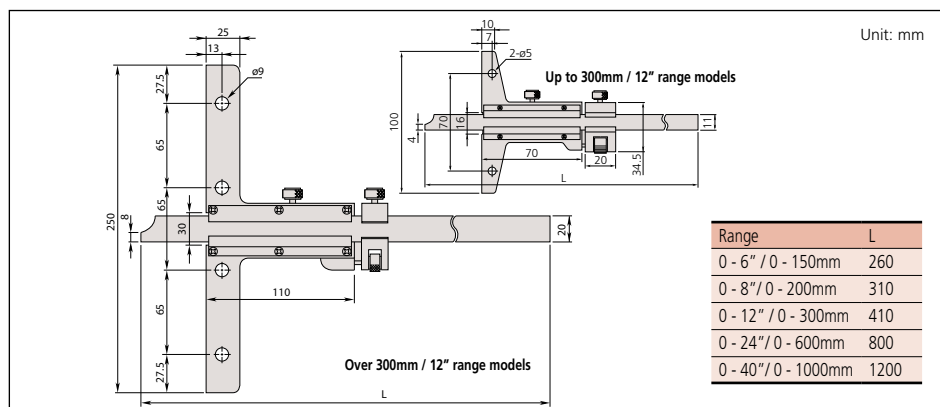
#### Metric

| Range      | Order No. | Vernier reading | Accuracy | Mass (g) | Remarks              |
|------------|-----------|-----------------|----------|----------|----------------------|
| 0 - 150mm  | 527-201   | 0.05mm          | ±0.05mm  | 240      | —                    |
| 0 - 150mm  | 527-121   | 0.02mm          | ±0.03mm  | 215      | —                    |
| 0 - 150mm  | 527-101   | 0.02mm          | ±0.03mm  | 280      | with fine adjustment |
| 0 - 200mm  | 527-202   | 0.05mm          | ±0.05mm  | 260      | —                    |
| 0 - 200mm  | 527-122   | 0.02mm          | ±0.03mm  | 230      | —                    |
| 0 - 200mm  | 527-102   | 0.02mm          | ±0.03mm  | 300      | with fine adjustment |
| 0 - 300mm  | 527-203   | 0.05mm          | ±0.08mm  | 300      | —                    |
| 0 - 300mm  | 527-123   | 0.02mm          | ±0.04mm  | 265      | —                    |
| 0 - 300mm  | 527-103   | 0.02mm          | ±0.04mm  | 350      | with fine adjustment |
| 0 - 600mm  | 527-204   | 0.05mm          | ±0.10mm  | 1511     | —                    |
| 0 - 600mm  | 527-104   | 0.02mm          | ±0.05mm  | 1511     | with fine adjustment |
| 0 - 1000mm | 527-205   | 0.05mm          | ±0.15mm  | 1880     | —                    |
| 0 - 1000mm | 527-105   | 0.02mm          | ±0.07mm  | 1880     | with fine adjustment |

#### Inch

| Range   | Order No. | Vernier reading | Accuracy | Mass (g) | Remarks              |
|---------|-----------|-----------------|----------|----------|----------------------|
| 0 - 6"  | 527-111   | .001"           | ±.001"   | 280      | with fine adjustment |
| 0 - 8"  | 527-112   | .001"           | ±.001"   | 300      | with fine adjustment |
| 0 - 12" | 527-113   | .001"           | ±.0015"  | 350      | with fine adjustment |
| 0 - 24" | 527-114   | .001"           | ±.002"   | 1511     | with fine adjustment |
| 0 - 40" | 527-115   | .001"           | ±.003"   | 1880     | with fine adjustment |

### DIMENSIONS



| Range                | L    |
|----------------------|------|
| 0 - 6" / 0 - 150mm   | 260  |
| 0 - 8" / 0 - 200mm   | 310  |
| 0 - 12" / 0 - 300mm  | 410  |
| 0 - 24" / 0 - 600mm  | 800  |
| 0 - 40" / 0 - 1000mm | 1200 |

### Technical Data

Graduation: .001" or 0.05mm, 0.02mm

### Optional Accessories

—: Extension base (see page D-56.)

# Vernier Depth Gage

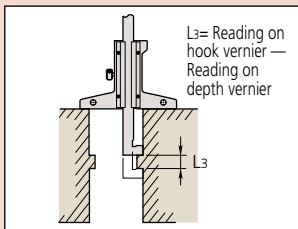
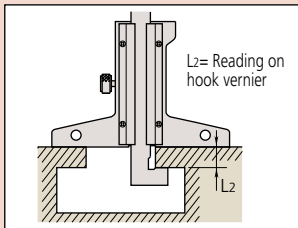
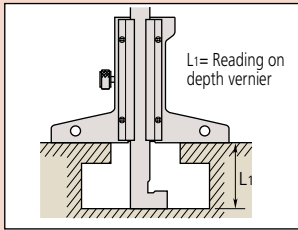
## SERIES 527 — Hook-End Type

### Technical Data

Graduation: 0.05mm or 0.02mm  
Base size: 100x6.5mm (WxT)

### Optional Accessory

—: Extension base (see page D-56.)



### FEATURES

- The end of the main scale is hook-shaped to allow depth and thickness measurements of a projected portion or lip in a hole, in addition to standard depth measurement.
- Fine adjustment models are available.
- Optional wider extension bases are available.



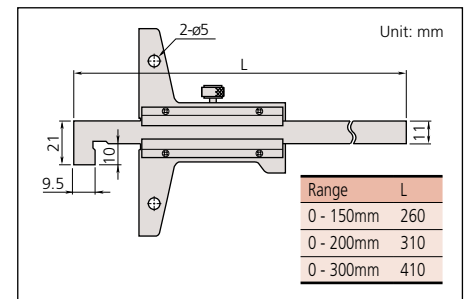
527-401

### SPECIFICATIONS

| Metric    |           |                 |          |          |
|-----------|-----------|-----------------|----------|----------|
| Range     | Order No. | Vernier reading | Accuracy | Mass (g) |
| 0 - 150mm | 527-401   | 0.05mm          | ±0.05mm  | 240      |
| 0 - 200mm | 527-402   | 0.05mm          | ±0.05mm  | 240      |
| 0 - 300mm | 527-403   | 0.05mm          | ±0.08mm  | 270      |

| Metric with fine adjustment |           |                 |          |          |
|-----------------------------|-----------|-----------------|----------|----------|
| Range                       | Order No. | Vernier reading | Accuracy | Mass (g) |
| 0 - 150mm                   | 527-411   | 0.02mm          | ±0.03mm  | 280      |
| 0 - 200mm                   | 527-412   | 0.02mm          | ±0.03mm  | 300      |
| 0 - 300mm                   | 527-413   | 0.02mm          | ±0.04mm  | 350      |

### DIMENSIONS



# ABSOLUTE Digimatic Depth Gage

## SERIES 571 — Hook-End Type

### FEATURES

- ABSOLUTE Digimatic Depth Gage can keep track of the origin point, once set, for the life of the battery.
- Base and measuring faces are hardened and micro-lapped.
- Optional wider extension bases are available.
- With SPC data output.

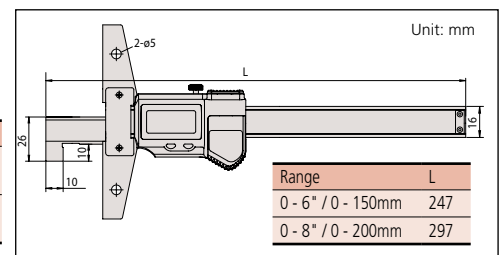


571-264-10

### SPECIFICATIONS

| Inch/Metric        |            |                 |          |          |
|--------------------|------------|-----------------|----------|----------|
| Range              | Order No.  | Resolution      | Accuracy | Mass (g) |
| 0 - 6" / 0 - 150mm | 571-264-20 | .0005" / 0.01mm | ±.0015"  | 578      |
| 0 - 8" / 0 - 200mm | 571-265-20 | .0005" / 0.01mm | ±.0015"  | 598      |

### DIMENSIONS



### Technical Data

Resolution: .0005"/0.01mm  
Repeatability: .0005"/0.01mm  
Display: LCD  
Length standard: ABSOLUTE electrostatic capacitance (electromagnetic induction)\* type linear encoder  
Max. response speed: Unlimited  
Battery: SR44 (1 pc.), 938882  
Battery life: Approx. 20,000 hours (3 years)\* under normal use  
Dust/Water protection level: IP67

### Function

Origin-set, Zero-setting, Automatic power on/off, Data output, inch/mm conversion (on inch/metric models only)  
Alarm: Low voltage, Counting value composition error

### Optional Accessories

05CZA624: SPC cable with data switch (40" / 1m)

05CZA625: SPC cable with data switch (80" / 2m)

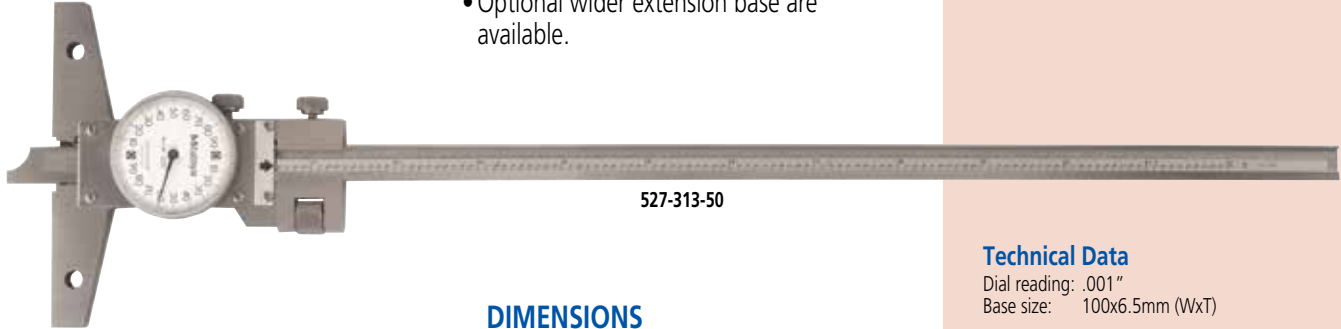
—: Extension base (see page D-56.)

# Dial Depth Gage

**SERIES 527 — With Fine Adjustment**

## FEATURES

- Easier and faster reading of dial.
- Made of hardened stainless steel.
- Base and measuring faces are hardened and micro-lapped.
- Optional wider extension base are available.

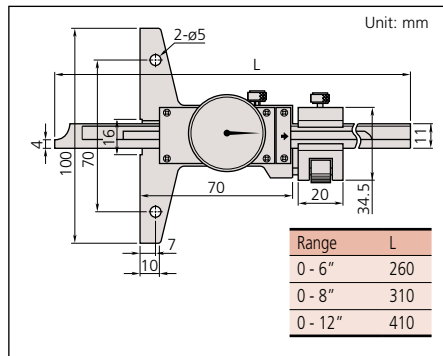


527-313-50

## SPECIFICATIONS

| Inch    |            |              |          |          |
|---------|------------|--------------|----------|----------|
| Range   | Order No.  | Dial reading | Accuracy | Mass (g) |
| 0 - 6"  | 527-311-50 | .001"        | ±.001"   | 280      |
| 0 - 8"  | 527-312-50 | .001"        | ±.001"   | 300      |
| 0 - 12" | 527-313-50 | .001"        | ±.0015"  | 340      |

## DIMENSIONS



## Technical Data

Dial reading: .001"  
Base size: 100x6.5mm (WxT)

# Extension Bases

**Optional Accessory for Depth Gage**

## FEATURES

- Attached to the base (reference face) plate of a depth gage to extend its span.
- These extension base cannot be attached to 0-24" and 0-40", 0-600mm, 0-1000mm, range models.



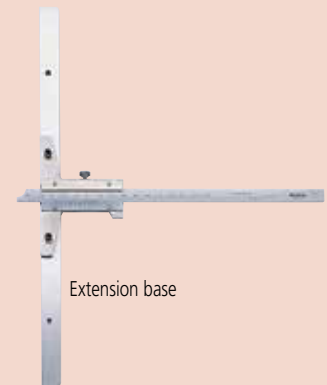
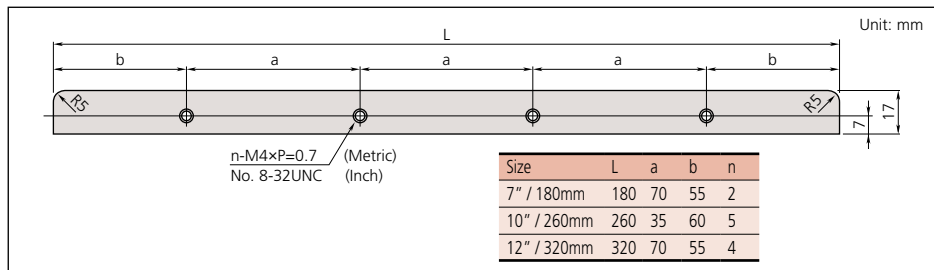
900372

## SPECIFICATIONS

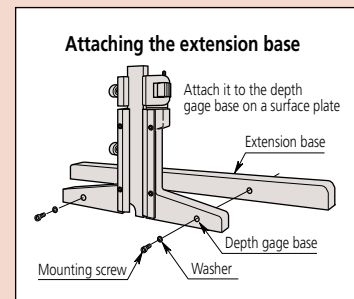
| Metric |           |                              |   |
|--------|-----------|------------------------------|---|
| Size   | Order No. | Remarks (dimension a, b / n) |   |
| 180mm  | 900370    | 70mm, 55mm                   | 2 |
| 260mm  | 900371    | 35mm, 60mm                   | 5 |
| 320mm  | 900372    | 70mm, 55mm                   | 4 |

| Inch |           |                              |   |
|------|-----------|------------------------------|---|
| Size | Order No. | Remarks (dimension a, b / n) |   |
| 7"   | 900367    | 2.76", 2.17"                 | 2 |
| 10"  | 900368    | 1.38", 2.36"                 | 5 |
| 12"  | 900369    | 2.76", 2.17"                 | 4 |

## DIMENSIONS



Extension base







### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .0005"/0.01mm or 0.001mm, 0.01mm, .00005"/0.001mm  
 Dial reading\*\*: .001" or 0.01mm  
 Flatness of base face: 5µm  
 Contact point: Carbide-tipped ball point or needle point (7210, 7222)  
 Measuring force: 1.4N, 1.5N (digital model), 2.5N (7213, 7214, 7217S, 7218S)  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), 938882  
 Battery life\*: Approx. 3.5 years under normal use  
 \*Digital models \*\*Dial models

### Technical Data of Dial Mode

Accuracy: Refer to the list of specifications  
 Dial reading: .001" or 0.01mm  
 Flatness of base face: 5µm or 2µm  
 Contact point: Carbide-tipped ball point (needle point: 7210, 7222)  
 Measuring force: 1.4N (2.5N: 7213, 7214, 7217S, 7218S)

### Function of Digimatic Model

Origin-set, Zero-setting, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

- 905338: SPC cable (40" / 1m)
- 905409: SPC cable (80" / 2m)
- 139167: .5" Extension Rod
- 301655: 1" Extension Rod
- 301657: 2" Extension Rod
- 301659: 4" Extension Rod
- 303611: 10mm Extension Rod
- 303612: 20mm Extension Rod
- 303613: 30mm Extension Rod
- 303614: 100mm Extension Rod

### Base Only (3/8" dia. hole)

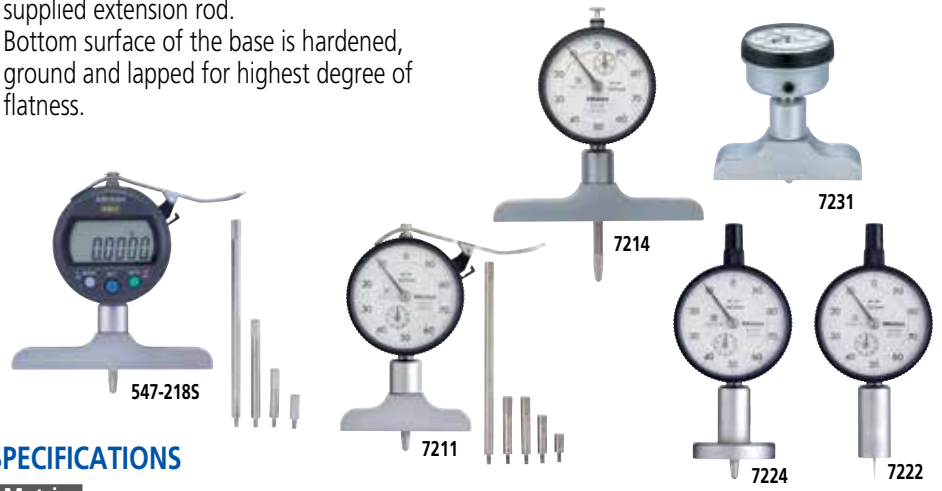
| Part No. | length | remark                          |
|----------|--------|---------------------------------|
| 902164:  | 2.5"   | 7217S, 7237, 547-217S, 547-257S |
| 902165:  | 4"     | 7218S, 7238, 547-218S, 547-258S |

# ABSOLUTE Digimatic/Dial Depth Gage

## SERIES 547, 7

### FEATURES

- ABSOLUTE Digimatic Depth Gage can keep track of the origin point, once set, for the life of the battery. (Series 547)
- Wide probing range is available with the supplied extension rod.
- Bottom surface of the base is hardened, ground and lapped for highest degree of flatness.
- Designed with a back-plunger type dial indicator for upward facing readings. (7231, 7237, 7238)
- With SPC data output. (Series 547)



### SPECIFICATIONS

| Metric Digimatic model |           |            |        |          |                                |            |          |
|------------------------|-----------|------------|--------|----------|--------------------------------|------------|----------|
| Range                  | Order No. | Resolution | Stroke | Accuracy | Extension rod                  | Base (WxT) | Flatness |
| 0 - 200mm              | 547-211   | 0.01mm     | 12mm   | ±0.02mm  | 5 pcs. (10, 20, 30, 30, 100mm) | 63.5x16mm  | 5µm      |
| 0 - 200mm              | 547-212   | 0.01mm     | 12mm   | ±0.02mm  | 5 pcs. (10, 20, 30, 30, 100mm) | 101.6x16mm | 5µm      |
| 0 - 200mm              | 547-251   | 0.001mm    | 12mm   | ±0.005mm | 5 pcs. (10, 20, 30, 30, 100mm) | 63.5x16mm  | 2µm      |
| 0 - 200mm              | 547-252   | 0.001mm    | 12mm   | ±0.005mm | 5 pcs. (10, 20, 30, 30, 100mm) | 101.6x16mm | 2µm      |

0.01mm graduation 0.001mm graduation

| Inch/Metric Digimatic model |           |                   |        |          |                          |            |          |
|-----------------------------|-----------|-------------------|--------|----------|--------------------------|------------|----------|
| Range                       | Order No. | Resolution        | Stroke | Accuracy | Extension rod            | Base (WxT) | Flatness |
| 0 - 8" / 0-200mm            | 547-217S  | .0005" / 0.01mm   | .5"    | ±.001"   | 4 pcs. (.5", 1", 2", 4") | 2.5"x.63"  | .0002"   |
| 0 - 8" / 0-200mm            | 547-218S  | .0005" / 0.01mm   | .5"    | ±.001"   | 4 pcs. (.5", 1", 2", 4") | 4"x.63"    | .0002"   |
| 0 - 8" / 0-200mm            | 547-257S  | .00005" / 0.001mm | .5"    | ±.0003"  | 4 pcs. (.5", 1", 2", 4") | 2.5"x.63"  | .00008"  |
| 0 - 8" / 0-200mm            | 547-258S  | .00005" / 0.001mm | .5"    | ±.0003"  | 4 pcs. (.5", 1", 2", 4") | 4"x.63"    | .00008"  |

.005"/0.01mm graduation .00005"/0.001mm graduation

| Metric Dial Type |           |            |        |          |                                |            |          |
|------------------|-----------|------------|--------|----------|--------------------------------|------------|----------|
| Range            | Order No. | Graduation | Stroke | Accuracy | Extension rod                  | Base (WxT) | Flatness |
| 0 - 10mm         | 7210*     | 0.01mm     | 10mm   | ±0.015mm | —                              | 40x16mm,   | 5µm      |
| 0 - 200mm        | 7211      | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | 63.5x16mm  | 5µm      |
| 0 - 200mm        | 7212      | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | 101.6x16mm | 5µm      |
| 0 - 210mm        | 7213      | 0.01mm     | 30mm   | ±0.03mm  | 3 pcs. (30, 60, 90mm)          | 63.5x16mm  | 5µm      |
| 0 - 210mm        | 7214      | 0.01mm     | 30mm   | ±0.03mm  | 3 pcs. (30, 60, 90mm)          | 101.6x16mm | 5µm      |
| 0 - 200mm        | 7220      | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | 100x18mm   | 5µm      |
| 0 - 200mm        | 7221      | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | 150x18mm   | 5µm      |
| 0 - 10mm         | 7222*     | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | ø16mm      | 5µm      |
| 0 - 10mm         | 7223      | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | ø25mm      | 5µm      |
| 0 - 10mm         | 7224      | 0.01mm     | 10mm   | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | ø40mm      | 5µm      |
| 0 - 200mm        | 7231      | 0.01mm     | 5mm    | ±0.015mm | 5 pcs. (10, 20, 30, 30, 100mm) | 63.5x16mm  | 5µm      |

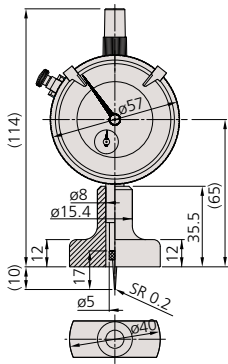
\*with needle probe

| Inch Dial Type |           |            |        |          |                          |            |          |
|----------------|-----------|------------|--------|----------|--------------------------|------------|----------|
| Range          | Order No. | Graduation | Stroke | Accuracy | Extension rod            | Base (WxT) | Flatness |
| 0 - 8"         | 7217S     | .001"      | 1"     | ±.002"   | 4 pcs. (.5", 1", 2", 4") | 2.5"x.63"  | .0002"   |
| 0 - 8"         | 7218S     | .001"      | 1"     | ±.002"   | 4 pcs. (.5", 1", 2", 4") | 4"x.63"    | .0002"   |
| 0 - 8"         | 7237T     | .001"      | .2"    | ±.002"   | 4 pcs. (.5", 1", 2", 4") | 2.5"x.63"  | .0002"   |
| 0 - 8"         | 7238T     | .001"      | .2"    | ±.002"   | 4 pcs. (.5", 1", 2", 4") | 4"x.63"    | .0002"   |

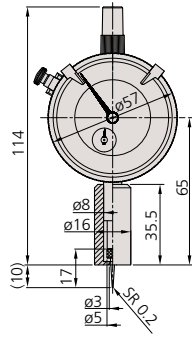


# DIMENSIONS

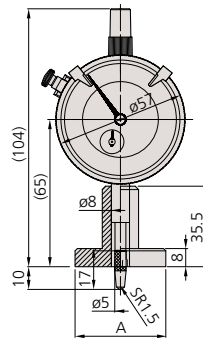
Unit: mm



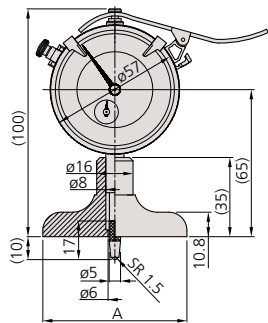
**7210**



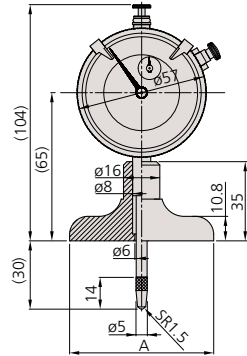
**7222**



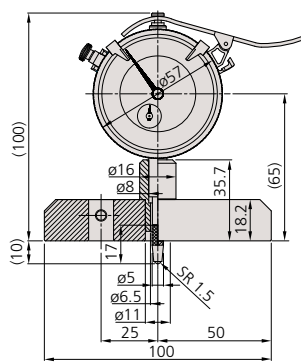
**7223** A=  $\varnothing$ 25mm  
**7224** A=  $\varnothing$ 40mm



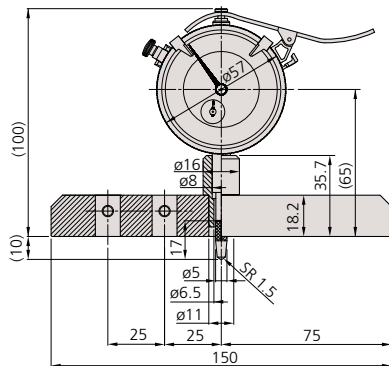
**7211** A= 63.5mm  
**7212** A= 101.6mm



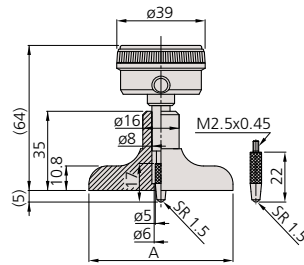
**7213, 7217S** A= 63.5mm  
**7214, 7218S** A= 101.6mm



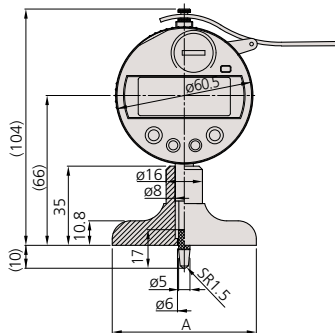
**7220**



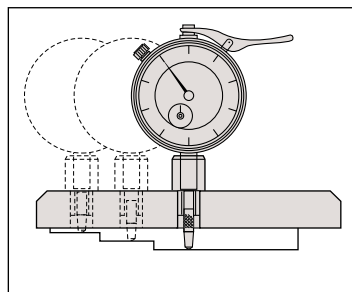
**7221**



**7237T, 7231** A=63.5mm  
**7238T** A=101.6mm



**547-211, 547-251, 547-217S, 547-257S** A= 63.5mm  
**547-212, 547-252, 547-218S, 547-258S** A= 101.6mm





## Gage Blocks



## Height Master



## Reference Gages



## Granite Surface Plates & Bench Comparator



## CERA/Steel Combination Gage Block Sets



## Step Master



## ZERO CERA BLOCK



## Ceramic Straight Master

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| Digital Protractor                       | E-41    |
| Digital Hand Tachometers                 | E-42    |
| Bench Center                             | E-43    |
| <b>Granite Surface Plates</b>            |         |
| Granite Surface Plate Accessories        | E-43    |
| Black Granite Surface Plate              | E-44,45 |
| Steel Stands                             | E-45    |

# Gage Block

## SERIES 516

### FEATURES

Precision gage blocks are the primary standards vital to dimensional quality control in the manufacture of parts. Mitutoyo offers

a complete selection of gage blocks available in a choice of rectangular or square, metric or inch and steel or CERA (ceramic) types.

### Accuracy

Mitutoyo gage blocks guarantee such a high accuracy that users can use them without anxiety. 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 lapping technique, developed for more than a half century, allows us to achieve the best flatness and surface roughness needed for gage blocks.

### Abrasion Resistance and Dimensional Stability

High-carbon, high-chrome steel is employed to sufficiently satisfy a variety of material characteristics required for gage blocks. A high degree of hardness, obtained by our heat treatment technology, as well as methodically repeated heat treatment, have successfully reduced deterioration change over time.

### CERA Blocks

CERA blocks, made of ceramic materials with superior surface quality, were developed by Mitutoyo's ultra-precision machining techniques and solve problems commonly associated with steel gage blocks.

#### 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

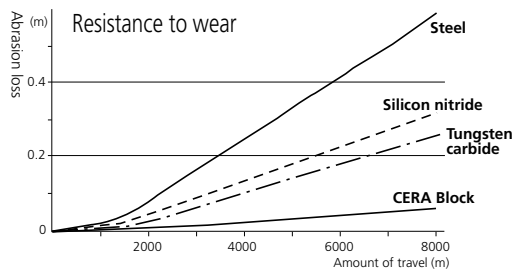
CERA Blocks have 10 times the abrasion resistance of steel gage blocks.

#### 4. Dimensional Stability

CERA Blocks are free from dimensional change over time.

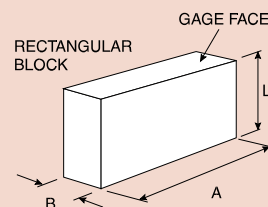
#### 5. Marking

The black characters, indicating the nominal length, are inscribed by laser and are clearly visible against the white surface of the block.



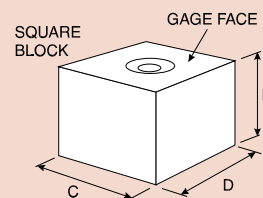
### Selecting Gage Blocks

- Select gage blocks in accordance with the combination range required. If a large length is required, add a long block set.
- Select gage blocks in accordance with the minimum length step required. Add wear block sets if necessary.
- If a set containing a large number of gage blocks is selected, the number of combination gage blocks required for a length is reduced and the number of combinations is increased. The accuracy will be retained and damage will be reduced.
- The specific gage block set for micrometer inspection and caliper inspection is available.
- If using only one length repeatedly, it is a good idea to purchase discrete gage blocks.
- The 2mm-based gage blocks, which take the base of the minimum length step as 2mm, are easy to handle and will not warp, as compared to the 1mm-based gage blocks.



### Rectangular Block

| Gage Size              | Face Width (A) | Face Depth (B) |
|------------------------|----------------|----------------|
| Up to 2"               | 1.181"         | .355"          |
| Over .2" up to 40"     | 1.378"         | .355"          |
| Up to 10mm             | 30mm           | 9mm            |
| Over 10mm up to 1000mm | 35mm           | 9mm            |



### Square Block

| Gage Size             | Face Width (C) | Face Depth (D) |
|-----------------------|----------------|----------------|
| Inch (up to 40")      | .95"           | .95"           |
| Metric (up to 1000mm) | 24.1mm         | 24.1mm         |

## Grade and Application

Refer to the following table to select the gage block grade according to usage.

|                 | Applications   | Grade        |
|-----------------|--|--------------|
| Workshop use    | • Mounting tools and cutters   | AS-1 or AS-2 |
|                 | • Manufacturing gages<br>• Calibrating instruments   | 0 or AS-1    |
| Inspection use  | • Inspecting mechanical parts, tools, etc.   | 0 or AS-1    |
|                 | • Checking the accuracy of gages<br>• Calibrating instruments  | 00 or 0      |
| Calibration use | • Checking the accuracy of gage blocks for workshop<br>• Checking the accuracy of gage blocks for inspection<br>• Checking the accuracy of instruments | K or 00      |
| Reference use   | • Checking the accuracy of gage blocks for calibration<br>• For academic research  | K            |

### Grade AS-1:

These gage blocks are intended for shop-floor use to set and calibrate fixtures, as well as precision instruments.

### Grade 0:

This grade is used within an inspection area to verify the accuracy of plug and snap gages, as well as for setting electronic measuring devices.

### Grade 00:

These higher accuracy gages 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 gage blocks.

### Grade K:

Gage 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 gage blocks which are calibrated by comparison.

### Combination of a Required Length

Multiple combinations of gage blocks can be used to make a required length. Care should be exercised in the following points.

1. Use as few gage blocks as possible to obtain the required length. (Select thick gage blocks whenever possible.)
2. Select gage blocks starting with the one that has the least significant digit required, and then work up to ones with more significant digits.
3. There are multiple combinations for the integer part of a length. To prevent wear as much as possible, do not always use the same gage blocks.

Example combination

Required length = 45.6785mm

#### For the 1mm-based gage block set (112 pcs.)

```

1.005
1.008
1.17
17.5
+ 25
-----
45.6785mm
    
```

#### For the 2mm-based gage block set (112 pcs.)

```

2.005
2.008
2.17
14.5
+ 25
-----
45.6785mm
    
```

## 6. Anti-magnetic Nature Keeps Away Steel Powders

## 7. High Wringing Force

An even, dense tissue can maintain a strong wringing force.



## 8. Material of CERA block

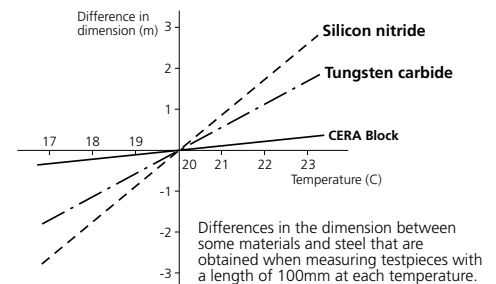
| Property   | Material | CERA Block (ZrO <sub>2</sub> ) | Steel (Fe) | Carbide (WC-Co) | Silicon nitride (Si <sub>3</sub> N <sub>4</sub> ) |
|--|----------|--------------------------------|------------|-----------------|---|
| Hardness (HV)  |          | 1350                           | 800        | 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 by 3-point bending (MPa)             |          | 1270                           | 1960       | 1960            | 580   |
| Fracture toughness K1c (MPa•m <sup>1/2</sup> )         |          | 7                              | 120        | 12              | 6.5   |
| Young's Modulus x104 (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  |

## 9. Closest Expansion Coefficient to Steel

The thermal expansion coefficient of a CERA Block is similar to that of a steel gage block.

## 10. Highly Resistant Against Drops and Other Shocks

The CERA block material is one of the toughest ceramics materials. It is extremely difficult to crack under normal use.



## Features of Square Gage Blocks

### 1. Perfect wringing is possible using the center hole.

After wringing the square gage blocks, an optional tie rod can be inserted through the center hole to fix the blocks using a screw.

### 2. A height reference standard can easily be made.

A precision height reference standard can be made easily and inexpensively using accessories such as the plain jaw and block base.

### 3. A dedicated inspection jig can be easily made.

A dedicated inspection jig for periodic inspection of instruments can be made easily and inexpensively.

### 4. A wide measuring surface with cross section dimensions of [24.1 x 24.1mm / .95 x .95"] is available.

A square gage block can retain stable orientation both longitudinally and laterally. A wide range of application measurements can be made, including cutting tool positioning, angle measurement with a sine bar, taper measurement with a roller, and inspection of depth micrometers.



## Long and Ultra-Thin Gage Blocks

Mitutoyo offers extra thin gage blocks from 0.10 mm to 0.99 mm (increments of 0.01 mm), as well as long gage blocks up to 1,000 mm as standard products.

# Gage Block

## SERIES 516

### Accuracies of Mitutoyo Gage Blocks

All Mitutoyo gage blocks meet or exceed all known specifications. The flatness, parallelism and surface finish necessary to achieve the required accuracies are the same as or better than government requirements.

### ASME (American Society of Mechanical Engineers) Deviations and Tolerance on Length for Metric and inch Gage Blocks: ASME B89.1.9-2002 (USA)

| Nominal Length Range<br>l <sub>n</sub> in inches | Calibration Grade K   |   | Grade 00  |   | Grade 0   |   | Grade AS-1  |   | Grade AS-2  |   |
|--|---|---|---|---|---|---|---|---|---|---|
|  | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μin. | Tolerance for the Variation In Length l <sub>v</sub> μin. | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μin. | Tolerance for the Variation In Length l <sub>v</sub> μin. | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μin. | Tolerance for the Variation In Length l <sub>v</sub> μin. | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μin. | Tolerance for the Variation In Length l <sub>v</sub> μin. | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μin. | Tolerance for the Variation In Length l <sub>v</sub> μin. |
| l <sub>n</sub> ≤ .05                             | 12  | 2   | 4   | 2   | 6   | 4   | 12  | 6   | 24  | 12  |
| .05 l <sub>n</sub> ≤ .4                          | 10  | 2   | 3   | 2   | 5   | 4   | 8   | 6   | 18  | 12  |
| .45 l <sub>n</sub> ≤ 1                           | 12  | 2   | 3   | 2   | 6   | 4   | 12  | 6   | 24  | 12  |
| 1 l <sub>n</sub> ≤ 2                             | 16  | 2   | 4   | 2   | 8   | 4   | 16  | 6   | 32  | 12  |
| 2 l <sub>n</sub> ≤ 3                             | 20  | 2   | 5   | 3   | 10  | 4   | 20  | 6   | 40  | 14  |
| 3 l <sub>n</sub> ≤ 4                             | 24  | 3   | 6   | 3   | 12  | 5   | 24  | 8   | 48  | 14  |
| 4 l <sub>n</sub> ≤ 5                             | 32  | 3   | 8   | 3   | 16  | 5   | 32  | 8   | 64  | 16  |
| 5 l <sub>n</sub> ≤ 6                             | 32  | 3   | 8   | 3   | 16  | 5   | 32  | 8   | 64  | 16  |
| 6 l <sub>n</sub> ≤ 7                             | 40  | 4   | 10  | 4   | 20  | 6   | 40  | 10  | 80  | 16  |
| 7 l <sub>n</sub> ≤ 8                             | 40  | 4   | 10  | 4   | 20  | 6   | 40  | 10  | 80  | 16  |
| 8 l <sub>n</sub> ≤ 10                            | 48  | 4   | 12  | 4   | 24  | 6   | 48  | 10  | 104   | 18  |
| 10 l <sub>n</sub> ≤ 12                           | 56  | 4   | 14  | 4   | 28  | 7   | 56  | 10  | 112   | 20  |
| 12 l <sub>n</sub> ≤ 16                           | 72  | 5   | 18  | 5   | 36  | 8   | 72  | 12  | 144   | 20  |
| 16 l <sub>n</sub> ≤ 20                           | 88  | 6   | 20  | 6   | 44  | 10  | 88  | 14  | 176   | 24  |
| 20 l <sub>n</sub> ≤ 24                           | 104   | 6   | 25  | 6   | 52  | 10  | 104   | 16  | 200   | 28  |
| 24 l <sub>n</sub> ≤ 28                           | 120   | 7   | 30  | 7   | 60  | 12  | 120   | 18  | 240   | 28  |
| 28 l <sub>n</sub> ≤ 32                           | 136   | 8   | 34  | 8   | 68  | 12  | 136   | 20  | 260   | 32  |
| 32 l <sub>n</sub> ≤ 36                           | 152   | 8   | 38  | 8   | 76  | 14  | 152   | 20  | 300   | 36  |
| 36 l <sub>n</sub> ≤ 40                           | 160   | 10  | 40  | 10  | 80  | 16  | 168   | 24  | 320   | 40  |

| Nominal Length Range<br>l <sub>n</sub> in mm | Calibration Grade K   |   | Grade 00  |   | Grade 0   |   | Grade AS-1  |   | Grade AS-2  |   |
|--|---|---|---|---|---|---|---|---|---|---|
|  | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μm | Tolerance for the Variation In Length l <sub>v</sub> μm | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μm | Tolerance for the Variation In Length l <sub>v</sub> μm | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μm | Tolerance for the Variation In Length l <sub>v</sub> μm | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μm | Tolerance for the Variation In Length l <sub>v</sub> μm | Limit Deviations of Length at any Point From Nominal Length ± l <sub>e</sub> μm | Tolerance for the Variation In Length l <sub>v</sub> μm |
| l <sub>n</sub> ≤ 0.5                         | 0.30  | 0.05  | 0.10  | 0.05  | 0.14  | 0.10  | 0.30  | 0.16  | 0.60  | 0.30  |
| 0.5 l <sub>n</sub> ≤ 10                      | 0.20  | 0.05  | 0.07  | 0.05  | 0.12  | 0.10  | 0.20  | 0.16  | 0.45  | 0.30  |
| 10 l <sub>n</sub> ≤ 25                       | 0.30  | 0.05  | 0.07  | 0.05  | 0.14  | 0.10  | 0.30  | 0.16  | 0.60  | 0.30  |
| 25 l <sub>n</sub> ≤ 50                       | 0.40  | 0.06  | 0.10  | 0.06  | 0.20  | 0.10  | 0.40  | 0.18  | 0.80  | 0.30  |
| 50 l <sub>n</sub> ≤ 75                       | 0.50  | 0.06  | 0.12  | 0.06  | 0.25  | 0.12  | 0.50  | 0.18  | 1.00  | 0.35  |
| 75 l <sub>n</sub> ≤ 100                      | 0.60  | 0.07  | 0.15  | 0.07  | 0.30  | 0.12  | 0.60  | 0.20  | 1.20  | 0.35  |
| 100 l <sub>n</sub> ≤ 150                     | 0.80  | 0.08  | 0.20  | 0.08  | 0.40  | 0.14  | 0.80  | 0.20  | 1.60  | 0.40  |
| 150 l <sub>n</sub> ≤ 200                     | 1.00  | 0.09  | 0.25  | 0.09  | 0.50  | 0.16  | 1.00  | 0.25  | 2.00  | 0.40  |
| 200 l <sub>n</sub> ≤ 250                     | 1.20  | 0.10  | 0.30  | 0.10  | 0.60  | 0.16  | 1.20  | 0.25  | 2.40  | 0.45  |
| 250 l <sub>n</sub> ≤ 300                     | 1.4   | 0.10  | 0.35  | 0.10  | 0.70  | 0.18  | 1.40  | 0.25  | 2.80  | 0.50  |
| 300 l <sub>n</sub> ≤ 400                     | 1.80  | 0.12  | 0.45  | 0.12  | 0.90  | 0.20  | 1.80  | 0.30  | 3.60  | 0.50  |
| 400 l <sub>n</sub> ≤ 500                     | 2.20  | 0.14  | 0.50  | 0.14  | 1.10  | 0.25  | 2.20  | 0.35  | 4.40  | 0.60  |
| 500 l <sub>n</sub> ≤ 600                     | 2.60  | 0.16  | 0.65  | 0.16  | 1.30  | 0.25  | 2.60  | 0.40  | 5.00  | 0.70  |
| 600 l <sub>n</sub> ≤ 700                     | 3.00  | 0.18  | 0.75  | 0.18  | 1.50  | 0.30  | 3.00  | 0.45  | 6.00  | 0.70  |
| 700 l <sub>n</sub> ≤ 800                     | 3.40  | 0.20  | 0.85  | 0.20  | 1.70  | 0.30  | 3.40  | 0.50  | 6.50  | 0.80  |
| 800 l <sub>n</sub> ≤ 900                     | 3.80  | 0.20  | 0.95  | 0.20  | 1.90  | 0.35  | 3.80  | 0.50  | 7.50  | 0.90  |
| 900 l <sub>n</sub> ≤ 1000                    | 4.20  | 0.25  | 1.00  | 0.25  | 2.00  | 0.40  | 4.20  | 0.60  | 8.00  | 1.00  |

### Mitutoyo Gage Blocks and Inspection Certificates

A Certificate of Inspection is furnished with all Mitutoyo gage blocks with a serial number on the case and an identification number on each block. The deviation of each block is registered. For this inspection, each gage block is measured relative to the upper level master using a gage block comparator. Grade K gage blocks are manufactured by absolute measurement using an interferometer. The gage block set and discrete gage block are supplied with a Certificate of Calibration. The Certificate of Calibration specifies the deviation from the nominal length. (Comparative measurement, however, is performed for all square gage blocks.)



A Certificate of Accuracy, traceable to the NIST, is furnished with each gage block set and individual block.

### Mitutoyo America Corporation Calibration Laboratory:

ISO 17025-2005 accredited calibration available  
Calibration capability up to 1000mm/40" length  
Low measurement uncertainty

### Contact Information:

965 Corporate Blvd.  
Aurora, Illinois 60502  
Phone: (888) 648-8869 option 7  
Fax: (630) 978-6477

# Metric Rectangular Gage Block Set

## SERIES 516 — 1mm Base Block Set



Steel 112-block set



Steel 103-block set



Steel 47-block set



CERA 112-block set



CERA 56-block set



CERA/Steel combination  
47-block set

Provided with Inspection Certificate



### SPECIFICATIONS

#### 1mm Base Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |       |      |
|----------------|------------|------------|-------|------------------------|-------|------|
|                | Steel      | CERA       |       | Size                   | Step  | Qty. |
| 112            | 516-531-56 | 516-541-56 | K     | 1.0005                 |       | 1    |
|                | 516-937-26 | 516-337-26 | 00    | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-938-26 | 516-338-26 | 0     | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-939-26 | 516-339-26 | AS-1  | 0.5 - 24.5             | 0.5   | 49   |
|                | 516-940-26 | 516-340-26 | AS-2  | 25 - 100               | 25    | 4    |
|                | 516-533-56 | 516-542-56 | K     | 1.005                  |       | 1    |
| 103            | 516-941-26 | 516-341-26 | 00    | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-942-26 | 516-342-26 | 0     | 0.5 - 24.5             | 0.5   | 49   |
|                | 516-943-26 | 516-343-26 | AS-1  | 25 - 100               | 25    | 4    |
|                | 516-944-26 | 516-344-26 | AS-2  |                        |       |      |
|                | 516-535-56 | 515-543-56 | K     | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-945-26 | 516-345-26 | 00    | 1.01 - 1.49            | 0.01  | 49   |
| 87             | 516-946-26 | 516-346-26 | 0     | 0.5 - 9.5              | 0.5   | 19   |
|                | 516-947-26 | 516-347-26 | AS-1  | 10 - 100               | 10    | 10   |
|                | 516-948-26 | 516-348-26 | AS-2  |                        |       |      |
|                | 516-536-56 | 516-544-56 | K     | 0.5                    |       | 1    |
|                | 516-953-26 | 516-353-26 | 00    | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-954-26 | 516-354-26 | 0     | 1.01 - 1.09            | 0.01  | 9    |
| 56             | 516-955-26 | 516-355-26 | AS-1  | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-956-26 | 516-356-26 | AS-2  | 1 - 24                 | 1     | 24   |
|                |            |            |       | 25 - 100               | 25    | 4    |
|                | 516-537-56 | 516-545-56 | K     | 1.005                  |       | 1    |
|                | 516-957-26 | 516-357-26 | 00    | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-958-26 | 516-358-26 | 0     | 1.1 - 1.9              | 0.1   | 9    |
| 47             | 516-959-26 | 516-359-26 | AS-1  | 1 - 24                 | 1     | 24   |
|                | 516-960-26 | 516-360-26 | AS-2  | 25 - 100               | 25    | 4    |



# Metric Rectangular Gage Block Set

**SERIES 516 — Long Block Set, Wear Block Set**



CERA 8-block set



Steel 8-block set

Provided with Inspection Certificate

## SPECIFICATIONS

### Long Block Set

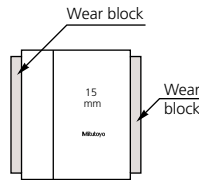
| Blocks per set | Order No.  |            | Grade ASME | Blocks included in set |      |      |
|----------------|------------|------------|------------|------------------------|------|------|
|                | Steel      | CERA       |            | Size                   | Step | Qty. |
| 8              | —          | 516-547-56 | K          | 25-200                 | 25   | 8    |
|                | —          | 516-164-26 | 00         | —                      | —    | —    |
|                | 516-115-26 | 516-165-26 | 0          | —                      | —    | —    |
|                | 516-116-26 | 516-166-26 | AS-1       | —                      | —    | —    |
| 8              | 516-540-56 | 516-546-56 | K          | 125 - 175              | 25   | 3    |
|                | 516-701-26 | 516-731-26 | 00         | 200 - 250              | 50   | 2    |
|                | 516-702-26 | 516-732-26 | 0          | 300 - 500              | 100  | 3    |
|                | 516-703-26 | 516-733-26 | AS-1       | —                      | —    | —    |
|                | —          | —          | —          | —                      | —    | —    |



CERA 2-block set



Carbide 2-block



## SPECIFICATIONS

### Wear Block Set

| Blocks per set | Order No.  |            | Grade ASME | Blocks included in set |      |
|----------------|------------|------------|------------|------------------------|------|
|                | Carbide    | CERA       |            | Size                   | Qty. |
| 2              | 516-807-26 | 516-832-26 | 0          | 1                      | 2    |
|                | 516-806-26 | 516-833-26 | AS-1       | —                      | —    |
|                | —          | —          | —          | —                      | —    |
| 2              | 516-803-26 | 516-830-26 | 0          | 2                      | 2    |
|                | 516-802-26 | 516-831-26 | AS-1       | —                      | —    |
|                | —          | —          | —          | —                      | —    |



# Inch Rectangular Gage Block Set

**SERIES 516 — Inch Block Set, Thin Block Set, Long Block Set, Wear Block Set**

## SPECIFICATIONS

### Inch Block Set

| Blocks per set | Order No.  |            |            | Grade | Blocks included in set |       |      |
|----------------|------------|------------|------------|-------|------------------------|-------|------|
|                | Steel      | CERA       | Steel/CERA |       | Size                   | Step  | Qty. |
| <b>81</b>      | 516-549-56 | 516-557-56 | —          | K     | .1001 – .1009          | .0001 | 9    |
|                | 516-901-26 | 516-301-26 | —          | 00    | .101 – .149            | .001  | 49   |
|                | 516-902-26 | 516-302-26 | —          | 0     | .05 – .95              | .05   | 19   |
|                | 516-903-26 | 516-303-26 | —          | AS-1  | 1 - 4                  | 1     | 4    |
|                | 516-904-26 | 516-304-26 | —          | AS-2  |                        |       |      |
| <b>35</b>      | 516-550-56 | 516-558-56 | —          | K     | .10005                 |       | 1    |
|                | 516-913-26 | 516-313-26 | —          | 00    | .1001 – .1009          | .0001 | 9    |
|                | 516-914-26 | 516-314-26 | —          | 0     | .101 – .109            | .001  | 9    |
|                | 516-915-26 | 516-315-26 | —          | AS-1  | .11 – .19              | .01   | 9    |
|                | 516-916-26 | 516-316-26 | —          | AS-2  | .1 - .3                | .1    | 3    |
|                |            |            |            |       | .5, 1, 2, 4            |       | 4    |
|                |            |            |            |       |                        |       |      |

81-block set: All are CERA blocks, except 2", 3", and 4" are steel blocks

Provided with Inspection Certificate



## SPECIFICATIONS

### Thin Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |       |      |
|----------------|------------|------|-------|------------------------|-------|------|
|                | Steel      | CERA |       | Size                   | Step  | Qty. |
| <b>28</b>      | 516-551-56 | —    | K     | .02005                 |       | 1    |
|                | 516-917-26 | —    | 00    | .0201 – .0209          | .0001 | 9    |
|                | 516-918-26 | —    | 0     | .021 – .029            | .001  | 9    |
|                | 516-919-26 | —    | AS-1  | .01 – .09              | .01   | 9    |
|                | 516-920-26 | —    | AS-2  |                        |       |      |
| <b>10</b>      | 516-926-26 | —    | 0     | .005 - .050            | .005  | 10   |
|                | 516-927-26 | —    | AS-1  |                        |       |      |

## SPECIFICATIONS

### Long Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |      |
|----------------|------------|------------|-------|------------------------|------|------|
|                | Steel      | CERA       |       | Size                   | Step | Qty. |
| <b>8</b>       | 516-126-26 | 516-176-26 | 0     | 1-8                    | 1    | 8    |
|                | 516-127-26 | 516-177-26 | AS-1  |                        |      |      |
| <b>8</b>       | —          | 516-564-56 | K     | 5 - 7                  | 1    | 3    |
|                | —          | 516-741-26 | 00    | 8, 10, 12              | 2    | 3    |
|                | 516-712-26 | 516-742-26 | 0     | 16, 20                 | 4    | 2    |
|                | 516-713-26 | 516-743-26 | AS-1  |                        |      |      |

## SPECIFICATIONS

### Wear Block Set


| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |
|----------------|------------|------------|-------|------------------------|------|
|                | Carbide    | CERA       |       | Size                   | Qty. |
| <b>2</b>       | 516-809-26 | 516-836-26 | 0     | .05                    | 2    |
|                | 516-808-26 | 516-837-26 | AS-1  |                        |      |
| <b>2</b>       | 516-805-26 | 516-834-26 | 0     | .1                     | 2    |
|                | 516-804-26 | 516-835-26 | AS-1  |                        |      |


# Micrometer Inspection Gage Block Sets


## SERIES 516


- Gage blocks for inspecting a variety of micrometers.
- Can be measured in both vertical and horizontal posture.
- Parallelism is measured by attaching the optional parallel (optional accessory) to the gage block set.

### SPECIFICATIONS

| Metric  Micro Checker (holder only) |   |
|--|---|
| <b>Order No.</b>   | <b>516-607</b>                                      |
| Applicable gage block set  | 516-106-26, 516-107-26, 516-156-26, 516-157-26      |
| Applicable gage block size (mm)  | 2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25 |

| Inch/Metric  Micro Checker (holder only) |  |
|---|--|
| <b>Order No.</b>  | <b>516-608</b>   |
| Applicable gage block set   | 516-921-26, 516-922-26, 516-923-26, 516-321-26, 516-322-26, 516-323-26 |
| Applicable gage block size (inch)   | .105, .210, .315, .420, .5, .605, .815, .920                           |

| Metric Block Set  |            |            |       |  |
|--|------------|------------|-------|--|
| Blocks per set   | Order No.  |            | Grade | Blocks included in set   |
|  | Steel      | CERA       |       |  |
| 10   | 516-103-26 | 516-152-26 | 0     | 1.00, 1.25, 1.50, 2, 3, 5, 10, 15, 20, 25mm  |
|  | 516-101-26 | 516-153-26 | AS-1  |  |
| 10   | 516-106-26 | 516-156-26 | 0     | 2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25mm<br>• Optical parallel (t = 12mm) |
|  | 516-107-26 | 516-157-26 | AS-1  |  |

| Inch Block Set  |             |             |       |  |
|--|-------------|-------------|-------|--|
| Blocks per set   | Order No.   |             | Grade | Blocks included in set   |
|  | Steel       | CERA        |       |  |
| 10   | 516-552-56  | 516-559-56  | K     | .105, .210, .315, .420, .500, .605, .710, .815, .920, 1"<br>• Optical parallel (t = .5") |
|  | 516-921-26  | 516-321-26  | 00    |  |
|  | 516-922-26  | 516-322-26  | 0     |  |
|  | 516-923-26  | 516-323-26  | AS-1  |  |
| 10   | 516-529-26* | 516-319-26* | 0     | .087, .189, .307, .409, .472, .598, .669, .772, .890, 1"<br>• Optical parallel (t = .5") |
| 9  | 516-554-56  | 516-561-56  | K     | .0625, .100, .125, .200, .250, .300, .500, 1, 2"<br>• Optical parallel (t = .5")         |
|  | 516-929-26  | 516-333-26  | 00    |  |
|  | 516-930-26  | 516-334-26  | 0     |  |
|  | 516-931-26  | 516-335-26  | AS-1  |  |
| 9  | —           | 516-563-56  | K     | .0625, .100, .125, .200, .250, .300, .500, 1, 2"   |
|  | —           | 516-329-26  | 00    |  |
|  | 516-934-26  | 516-330-26  | 0     |  |
|  | 516-935-26  | 516-331-26  | AS-1  |  |

\* For QuantuMike

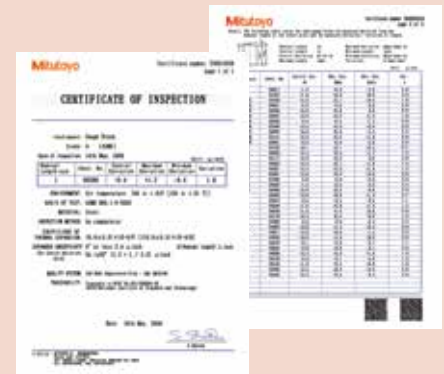
### Micro Checker



(Gage blocks are optional.)



### Provided with Inspection Certificate



# Bore Gage Calibration Kit

## SERIES 516

### SPECIFICATIONS

| Blocks per set | Order No.  |  | Grade | Blocks included in set  |
|----------------|------------|--|-------|---|
|                | Carbide    |  |       |   |
| 9              | 516-120-26 |  | 0     | .04", .08", .16", .2", .4", .8", 1", 2", 3"<br>619018 (plain jaw 2 pc. set) and 619004 (160mm holder) |

# Individual Metric Rectangular Gage Block

## FEATURES

- If using only one length repeatedly, it is good practice to purchase discrete gage blocks.
- Each gage block is supplied with a Certificate of Inspection.
- Each Grade K gage block of ASME standard is specially supplied with a Certificate of Calibration, which certifies that the gage block was manufactured via interferometry.



## Suffix Number for Selecting Standard and Certificate Provided

| ASME  |             |
|-------|-------------|
| Grade | Steel, CERA |
| K     | -516**      |
| 00    | -521*       |
| 0     | -531*       |
| AS-1  | -541*       |
| AS-2  | -551*       |

\* provided with Inspection Certificate  
 \*\* provided with Calibration Certificate and Inspection Certificate

Example: 611821-521  
 0.1mm gage block in grade 00.  
 We make custom length gage blocks:  
 0.1-1000mm



Inspection Certificate

## SPECIFICATIONS

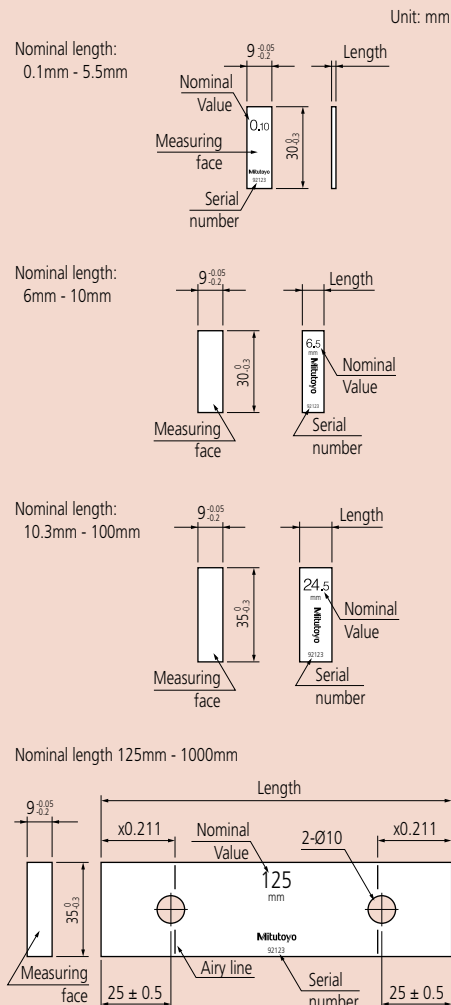
### Metric Block

| Length (mm) | Order No. |        | Length (mm) | Order No. |      | Length (mm) | Order No. |        |
|-------------|-----------|--------|-------------|-----------|------|-------------|-----------|--------|
|             | Steel     | CERA   |             | Steel     | CERA |             | Steel     | CERA   |
| 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    | 613551 |
| 0.15        | 611822    | —      | 0.58        | 611899    | —    | 0.992       | 611552    | 613552 |
| 0.16        | 611864    | —      | 0.59        | 611900    | —    | 0.993       | 611553    | 613553 |
| 0.17        | 611865    | —      | 0.6         | 611901    | —    | 0.994       | 611554    | 613554 |
| 0.18        | 611866    | —      | 0.61        | 611902    | —    | 0.995       | 611555    | 613555 |
| 0.19        | 611867    | —      | 0.62        | 611903    | —    | 0.996       | 611556    | 613556 |
| 0.2         | 611823    | —      | 0.63        | 611904    | —    | 0.997       | 611557    | 613557 |
| 0.21        | 611868    | —      | 0.64        | 611905    | —    | 0.998       | 611558    | 613558 |
| 0.22        | 611869    | —      | 0.65        | 611906    | —    | 0.999       | 611559    | 613559 |
| 0.23        | 611870    | —      | 0.66        | 611907    | —    | 1           | 611611    | 613611 |
| 0.24        | 611871    | —      | 0.67        | 611908    | —    | 1.0005      | 611520    | 613520 |
| 0.25        | 611824    | —      | 0.68        | 611909    | —    | 1.001       | 611521    | 613521 |
| 0.26        | 611872    | —      | 0.69        | 611910    | —    | 1.002       | 611522    | 613522 |
| 0.27        | 611873    | —      | 0.7         | 611911    | —    | 1.003       | 611523    | 613523 |
| 0.28        | 611874    | —      | 0.71        | 611912    | —    | 1.004       | 611524    | 613524 |
| 0.29        | 611875    | —      | 0.72        | 611913    | —    | 1.005       | 611525    | 613525 |
| 0.3         | 611825    | —      | 0.73        | 611914    | —    | 1.006       | 611526    | 613526 |
| 0.31        | 611876    | —      | 0.74        | 611915    | —    | 1.007       | 611527    | 613527 |
| 0.32        | 611877    | —      | 0.75        | 611916    | —    | 1.008       | 611528    | 613528 |
| 0.33        | 611878    | —      | 0.76        | 611917    | —    | 1.009       | 611529    | 613529 |
| 0.34        | 611879    | —      | 0.77        | 611918    | —    | 1.01        | 611561    | 613561 |
| 0.35        | 611826    | —      | 0.78        | 611919    | —    | 1.02        | 611562    | 613562 |
| 0.36        | 611880    | —      | 0.79        | 611920    | —    | 1.03        | 611563    | 613563 |
| 0.37        | 611881    | —      | 0.8         | 611921    | —    | 1.04        | 611564    | 613564 |
| 0.38        | 611882    | —      | 0.81        | 611922    | —    | 1.05        | 611565    | 613565 |
| 0.39        | 611883    | —      | 0.82        | 611923    | —    | 1.06        | 611566    | 613566 |
| 0.4         | 611827    | —      | 0.83        | 611924    | —    | 1.07        | 611567    | 613567 |
| 0.41        | 611884    | —      | 0.84        | 611925    | —    | 1.08        | 611568    | 613568 |
| 0.42        | 611885    | —      | 0.85        | 611926    | —    | 1.09        | 611569    | 613569 |
| 0.43        | 611886    | —      | 0.86        | 611927    | —    | 1.1         | 611570    | 613570 |
| 0.44        | 611887    | —      | 0.87        | 611928    | —    | 1.11        | 611571    | 613571 |
| 0.45        | 611828    | —      | 0.88        | 611929    | —    | 1.12        | 611572    | 613572 |
| 0.46        | 611888    | —      | 0.89        | 611930    | —    | 1.13        | 611573    | 613573 |
| 0.47        | 611889    | —      | 0.9         | 611931    | —    | 1.14        | 611574    | 613574 |
| 0.48        | 611890    | —      | 0.91        | 611932    | —    | 1.15        | 611575    | 613575 |
| 0.49        | 611891    | —      | 0.92        | 611933    | —    | 1.16        | 611576    | 613576 |
| 0.5         | 611506    | 613506 | 0.93        | 611934    | —    | 1.17        | 611577    | 613577 |
| 0.51        | 611892    | —      | 0.94        | 611935    | —    | 1.18        | 611578    | 613578 |
| 0.52        | 611893    | —      | 0.95        | 611936    | —    | 1.19        | 611579    | 613579 |

| Length (mm) | Order No. |        | Length (mm) | Order No. |        | Length (mm) | Order No. |        |
|-------------|-----------|--------|-------------|-----------|--------|-------------|-----------|--------|
|             | Steel     | CERA   |             | Steel     | CERA   |             | Steel     | CERA   |
| 1.2         | 611580    | 613580 | 2.17        | 611717    | —      | 13          | 611623    | 613623 |
| 1.21        | 611581    | 613581 | 2.18        | 611718    | —      | 13.5        | 611653    | 613653 |
| 1.22        | 611582    | 613582 | 2.19        | 611719    | —      | 14          | 611624    | 613624 |
| 1.23        | 611583    | 613583 | 2.2         | 611720    | —      | 14.5        | 611654    | 613654 |
| 1.24        | 611584    | 613584 | 2.21        | 611721    | —      | 15          | 611625    | 613625 |
| 1.25        | 611585    | 613585 | 2.22        | 611722    | —      | 15.5        | 611655    | 613655 |
| 1.26        | 611586    | 613586 | 2.23        | 611723    | —      | 16          | 611626    | 613626 |
| 1.27        | 611587    | 613587 | 2.24        | 611724    | —      | 16.5        | 611656    | 613656 |
| 1.28        | 611588    | 613588 | 2.25        | 611725    | —      | 17          | 611627    | 613627 |
| 1.29        | 611589    | 613589 | 2.26        | 611726    | —      | 17.5        | 611657    | 613657 |
| 1.3         | 611590    | 613590 | 2.27        | 611727    | —      | 17.6        | 611854    | 613854 |
| 1.31        | 611591    | 613591 | 2.28        | 611728    | —      | 18          | 611628    | 613628 |
| 1.32        | 611592    | 613592 | 2.29        | 611729    | —      | 18.5        | 611658    | 613658 |
| 1.33        | 611593    | 613593 | 2.3         | 611730    | —      | 19          | 611629    | 613629 |
| 1.34        | 611594    | 613594 | 2.31        | 611731    | —      | 19.5        | 611659    | 613659 |
| 1.35        | 611595    | 613595 | 2.32        | 611732    | —      | 20          | 611672    | 613672 |
| 1.36        | 611596    | 613596 | 2.33        | 611733    | —      | 20.2        | 611855    | 613855 |
| 1.37        | 611597    | 613597 | 2.34        | 611734    | —      | 20.5        | 611660    | 613660 |
| 1.38        | 611598    | 613598 | 2.35        | 611735    | —      | 21          | 611631    | 613631 |
| 1.39        | 611599    | 613599 | 2.36        | 611736    | —      | 21.5        | 611661    | 613661 |
| 1.4         | 611600    | 613600 | 2.37        | 611737    | —      | 22          | 611632    | 613632 |
| 1.41        | 611601    | 613601 | 2.38        | 611738    | —      | 22.5        | 611662    | 613662 |
| 1.42        | 611602    | 613602 | 2.39        | 611739    | —      | 22.8        | 611856    | 613856 |
| 1.43        | 611603    | 613603 | 2.4         | 611740    | —      | 23          | 611633    | 613633 |
| 1.44        | 611604    | 613604 | 2.41        | 611741    | —      | 23.5        | 611663    | 613663 |
| 1.45        | 611605    | 613605 | 2.42        | 611742    | —      | 24          | 611634    | 613634 |
| 1.46        | 611606    | 613606 | 2.43        | 611743    | —      | 24.5        | 611664    | 613664 |
| 1.47        | 611607    | 613607 | 2.44        | 611744    | —      | 25          | 611635    | 613635 |
| 1.48        | 611608    | 613608 | 2.45        | 611745    | —      | 25.25       | 611754    | 613754 |
| 1.49        | 611609    | 613609 | 2.46        | 611746    | —      | 30          | 611673    | 613673 |
| 1.5         | 611641    | 613641 | 2.47        | 611747    | —      | 35          | 611755    | 613755 |
| 1.6         | 611516    | 613516 | 2.48        | 611748    | —      | 40          | 611674    | 613674 |
| 1.7         | 611517    | 613517 | 2.49        | 611749    | —      | 41.3        | 611857    | 613857 |
| 1.8         | 611518    | 613518 | 2.5         | 611642    | 613642 | 45          | 611756    | 613756 |
| 1.9         | 611519    | 613519 | 2.6         | 611750    | —      | 50          | 611675    | 613675 |
| 2           | 611612    | 613612 | 2.7         | 611751    | —      | 60          | 611676    | 613676 |
| 2.0005      | 611690    | —      | 2.8         | 611752    | —      | 70          | 611677    | 613677 |
| 2.001       | 611691    | —      | 2.9         | 611753    | —      | 75          | 611801    | 613801 |
| 2.002       | 611692    | —      | 3           | 611613    | 613613 | 80          | 611678    | 613678 |
| 2.003       | 611693    | —      | 3.5         | 611643    | 613643 | 90          | 611679    | 613679 |
| 2.004       | 611694    | —      | 4           | 611614    | 613614 | 100         | 611681    | 613681 |
| 2.005       | 611695    | —      | 4.5         | 611644    | 613644 | 125         | 611802    | 613802 |
| 2.006       | 611696    | —      | 5           | 611615    | 613615 | 131.4       | 611858    | 613858 |
| 2.007       | 611697    | —      | 5.1         | 611850    | 613850 | 150         | 611803    | 613803 |
| 2.008       | 611698    | —      | 5.5         | 611645    | 613645 | 175         | 611804    | 613804 |
| 2.009       | 611699    | —      | 6           | 611616    | 613616 | 200         | 611682    | 613682 |
| 2.01        | 611701    | —      | 6.5         | 611646    | 613646 | 250         | 611805    | 613805 |
| 2.02        | 611702    | —      | 7           | 611617    | 613617 | 300         | 611683    | 613683 |
| 2.03        | 611703    | —      | 7.5         | 611647    | 613647 | 400         | 611684    | 613684 |
| 2.04        | 611704    | —      | 7.7         | 611851    | 613851 | 500         | 611685    | 613685 |
| 2.05        | 611705    | —      | 8           | 611618    | 613618 | 600         | 611840    | —      |
| 2.06        | 611706    | —      | 8.5         | 611648    | 613648 | 700         | 611841    | —      |
| 2.07        | 611707    | —      | 9           | 611619    | 613619 | 750         | 611842    | —      |
| 2.08        | 611708    | —      | 9.5         | 611649    | 613649 | 800         | 611843    | —      |
| 2.09        | 611709    | —      | 10          | 611671    | 613671 | 900         | 611844    | —      |
| 2.1         | 611710    | —      | 10.3        | 611852    | 613852 | 1000        | 611845    | —      |
| 2.11        | 611711    | —      | 10.5        | 611650    | 613650 |             |           |        |
| 2.12        | 611712    | —      | 11          | 611621    | 613621 |             |           |        |
| 2.13        | 611713    | —      | 11.5        | 611651    | 613651 |             |           |        |
| 2.14        | 611714    | —      | 12          | 611622    | 613622 |             |           |        |
| 2.15        | 611715    | —      | 12.5        | 611652    | 613652 |             |           |        |
| 2.16        | 611716    | —      | 12.9        | 611853    | 613853 |             |           |        |

| Metric Wear Block |                  |
|-------------------|------------------|
| Length (mm)       | Order No.        |
|                   | Tungsten carbide |
| 1                 | 612611           |
| 2                 | 612612           |

## DIMENSIONS



## Suffix Number for Selecting Standard and Certificate Provided

| ASME | Grade | Steel, CERA |
|------|-------|-------------|
|      | K     | -516**      |
|      | 00    | -521*       |
|      | 0     | -531*       |
|      | AS-1  | -541*       |
|      | AS-2  | -551*       |

\* provided with Inspection Certificate  
 \*\* provided with Calibration Certificate and Inspection Certificate

Example: 611310-521  
 .1" gage block in grade 00.

We make custom length gage blocks:  
 .004 - 20"

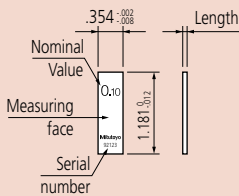


Inspection Certificate

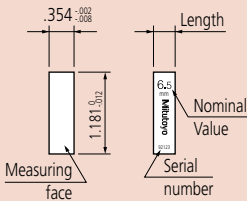
## DIMENSIONS

Unit: Inch

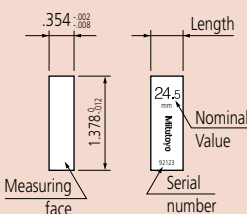
Nominal length:  
 .004 - .25"



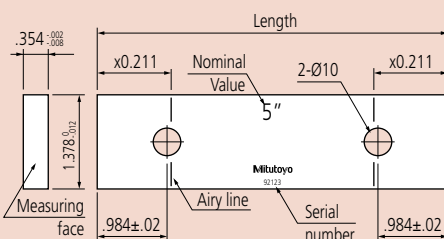
Nominal length:  
 .3 - 4"



Nominal length:  
 .45 - 4"



Nominal length 5 - 20"



# Individual Inch Rectangular Gage Block

## SPECIFICATIONS

### Inch Block

| Length (inch)  | Order No. |        |
|----------------|-----------|--------|
|                | Steel     | CERA   |
| .004           | 611304    | —      |
| .005           | 611305    | —      |
| .006           | 611306    | —      |
| .007           | 611307    | —      |
| .008           | 611308    | —      |
| .009           | 611309    | —      |
| .01            | 611310    | —      |
| .011           | 611311    | —      |
| .012           | 611312    | —      |
| .013           | 611313    | —      |
| .014           | 611314    | —      |
| .015           | 611315    | —      |
| .016           | 611316    | —      |
| .017           | 611317    | —      |
| .018           | 611318    | —      |
| .019           | 611319    | —      |
| .02            | 611320    | —      |
| .02005         | 611240    | —      |
| .0201          | 611231    | —      |
| .0202          | 611232    | —      |
| .0203          | 611233    | —      |
| .0204          | 611234    | —      |
| .0205          | 611235    | —      |
| .0206          | 611236    | —      |
| .0207          | 611237    | —      |
| .0208          | 611238    | —      |
| .0209          | 611239    | —      |
| .021           | 611321    | —      |
| .022           | 611322    | —      |
| .023           | 611323    | —      |
| .024           | 611324    | —      |
| .025           | 611325    | —      |
| .026           | 611326    | —      |
| .027           | 611327    | —      |
| .028           | 611328    | —      |
| .029           | 611329    | —      |
| .03            | 611330    | —      |
| .031           | 611331    | —      |
| .03125 (1/32)  | 611101    | 613103 |
| .032           | 611332    | —      |
| .033           | 611333    | —      |
| .034           | 611334    | —      |
| .035           | 611335    | —      |
| .036           | 611336    | —      |
| .037           | 611337    | —      |
| .038           | 611338    | —      |
| .039           | 611339    | —      |
| .04            | 611340    | —      |
| .041           | 611341    | —      |
| .042           | 611342    | —      |
| .043           | 611343    | —      |
| .044           | 611344    | —      |
| .045           | 611345    | —      |
| .046           | 611346    | —      |
| .046875 (3/64) | 611102    | 613104 |
| .047           | 611347    | —      |
| .048           | 611348    | —      |
| .049           | 611349    | —      |
| .05            | 611105    | 613105 |

| Length (inch)  | Order No. |        |
|----------------|-----------|--------|
|                | Steel     | CERA   |
| .06            | 611106    | —      |
| .0625          | 611303    | 613303 |
| .07            | 611107    | —      |
| .078125 (5/64) | 611103    | 613100 |
| .08            | 611108    | —      |
| .09            | 611109    | —      |
| .09375 (3/32)  | 611104    | 613101 |
| .1             | 611191    | 613191 |
| .100025        | 611111    | 613110 |
| .10005         | 611135    | 613135 |
| .100075        | 611121    | 613111 |
| .1001          | 611121    | 613121 |
| .1002          | 611122    | 613122 |
| .1003          | 611123    | 613123 |
| .1004          | 611124    | 613124 |
| .1005          | 611125    | 613125 |
| .1006          | 611126    | 613126 |
| .1007          | 611127    | 613127 |
| .1008          | 611128    | 613128 |
| .1009          | 611129    | 613129 |
| .101           | 611141    | 613141 |
| .102           | 611142    | 613142 |
| .103           | 611143    | 613143 |
| .104           | 611144    | 613144 |
| .105           | 611145    | 613145 |
| .106           | 611146    | 613146 |
| .107           | 611147    | 613147 |
| .108           | 611148    | 613148 |
| .109           | 611149    | 613149 |
| .109375 (7/64) | 611110    | 613102 |
| .11            | 611150    | 613150 |
| .111           | 611151    | 613151 |
| .112           | 611152    | 613152 |
| .113           | 611153    | 613153 |
| .114           | 611154    | 613154 |
| .115           | 611155    | 613155 |
| .116           | 611156    | 613156 |
| .117           | 611157    | 613157 |
| .118           | 611158    | 613158 |
| .119           | 611159    | 613159 |
| .12            | 611160    | 613160 |
| .121           | 611161    | 613161 |
| .122           | 611162    | 613162 |
| .123           | 611163    | 613163 |
| .124           | 611164    | 613164 |
| .125           | 611165    | 613165 |
| .126           | 611166    | 613166 |
| .127           | 611167    | 613167 |
| .128           | 611168    | 613168 |
| .129           | 611169    | 613169 |
| .13            | 611170    | 613170 |
| .131           | 611171    | 613171 |
| .132           | 611172    | 613172 |
| .133           | 611173    | 613173 |
| .134           | 611174    | 613174 |
| .135           | 611175    | 613175 |
| .136           | 611176    | 613176 |
| .137           | 611177    | 613177 |
| .138           | 611178    | 613178 |

| Length (inch) | Order No. |        |
|---------------|-----------|--------|
|               | Steel     | CERA   |
| .139          | 611179    | 613179 |
| .14           | 611180    | 613180 |
| .141          | 611181    | 613181 |
| .142          | 611182    | 613182 |
| .143          | 611183    | 613183 |
| .144          | 611184    | 613184 |
| .145          | 611185    | 613185 |
| .146          | 611186    | 613186 |
| .147          | 611187    | 613187 |
| .148          | 611188    | 613188 |
| .149          | 611189    | 613189 |
| .15           | 611115    | 613115 |
| .16           | 611116    | 613116 |
| .17           | 611117    | 613117 |
| .18           | 611118    | 613118 |
| .19           | 611119    | 613119 |
| .2            | 611192    | 613192 |
| .21           | 611221    | 613221 |
| .25           | 611212    | 613212 |
| .3            | 611193    | 613193 |
| .315          | 611209    | 613209 |
| .35           | 611213    | 613213 |
| .375 (3/8)    | 611113    | 613112 |
| .4            | 611194    | 613194 |
| .420          | 611210    | 613210 |
| .45           | 611214    | 613214 |
| .5            | 611195    | 613195 |
| .55           | 611215    | 613215 |
| .6            | 611196    | 613196 |
| .605          | 611211    | 613211 |
| .65           | 611216    | 613216 |
| .7            | 611197    | 613197 |
| .710          | 611220    | 613220 |
| .75           | 611217    | 613217 |
| .8            | 611198    | 613198 |
| .815          | 611226    | 613226 |
| .85           | 611218    | 613218 |
| .9            | 611199    | 613199 |
| .920          | 611227    | 613227 |
| .95           | 611219    | 613219 |
| 1             | 611201    | 613201 |
| 2             | 611202    | 613202 |
| 3             | 611203    | 613203 |
| 4             | 611204    | 613204 |
| 5             | 611205    | 613205 |
| 6             | 611206    | 613206 |
| 7             | 611207    | 613207 |
| 8             | 611208    | 613208 |
| 10            | 611222    | 613222 |
| 12            | 611223    | 613223 |
| 16            | 611224    | 613224 |
| 20            | 611225    | 613225 |

### Inch Wear Block

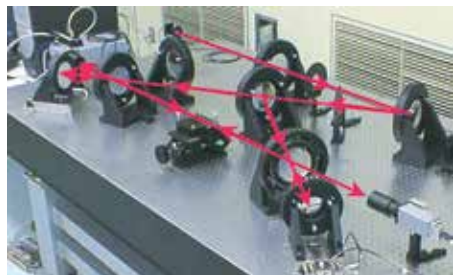
| Length (inch) | Order No.        |
|---------------|------------------|
|               | Tungsten carbide |
| .05           | 612105           |
| .1            | 612191           |

# Rectangular Gage Block with CTE

## Gage Blocks with Thermal Expansion Coefficient Data

### FEATURES

- Mitutoyo offers top-level gage blocks (steel and ceramic) which are superior to K class blocks.
- Comes with a highly accurate thermal expansion coefficient measured with a high-accuracy double-faced interferometer (DFI).
- The high-accuracy gage block interferometer (GBI) guarantees high dimensional accuracy.
- Mitutoyo offers rectangular gage blocks, having nominal values from 100 to 500mm  
Grade: K class in ASME  
Uncertainty of thermal expansion coefficient:  $0.035 \times 10^{-6}/K$  ( $k = 2$ )  
Uncertainty of dimension measurement: 30nm ( $k = 2$ ), for 100mm block



Double-faced interferometer (DFI)

### SPECIFICATIONS

| Metric Block with CTE |                 |                |
|-----------------------|-----------------|----------------|
| Length (mm)           | Order No. Steel | Order No. CERA |
| 100                   | 611681-51B      | 613681-51B     |
| 125                   | 611802-51B      | 613802-51B     |
| 150                   | 611803-51B      | 613803-51B     |
| 175                   | 611804-51B      | 613804-51B     |
| 200                   | 611682-51B      | 613682-51B     |
| 250                   | 611805-51B      | 613805-51B     |
| 300                   | 611683-51B      | 613683-51B     |
| 400                   | 611684-51B      | 613684-51B     |
| 500                   | 611685-51B      | 613685-51B     |

| Inch Block with CTE |                 |                |
|---------------------|-----------------|----------------|
| Length (inch)       | Order No. Steel | Order No. CERA |
| 4                   | 611204-51B      | 613204-51B     |
| 5                   | 611205-51B      | 613205-51B     |
| 6                   | 611206-51B      | 613206-51B     |
| 7                   | 611207-51B      | 613207-51B     |
| 8                   | 611208-51B      | 613208-51B     |
| 10                  | 611222-51B      | 613222-51B     |
| 12                  | 611223-51B      | 613223-51B     |
| 16                  | 611224-51B      | 613224-51B     |
| 20                  | 611225-51B      | 613225-51B     |

### Suffix Number for Selecting Standard and Certificate Provided

| ASME    |             |
|---------|-------------|
| Grade K | Steel, CERA |
|         | -51B        |

-51B: provided with JCSS Calibration Certificate and Inspection Certificate



Inspection Certificate

### ZERO CERA Blocks

- Thermal expansion in the temperature range  $20 \pm 1^\circ C$  less than 1/500 that of steel ( $0 \pm 0.02 \times 10^{-6}/K(20^\circ C)$ )
- Almost no secular change both in dimension and coefficient of thermal expansion
- Complementary ultra-low thermal expansion and high specific rigidity (Young's Modulus/specific gravity)



### SPECIFICATIONS

| Metric Blocks |            |            |             |
|---------------|------------|------------|-------------|
| Order No.     |            |            | Length (mm) |
| JIS/ISO/DIN   | BS         | ASME       |             |
| 617673-016    | 617673-116 | 617673-516 | 30          |
| 617675-016    | 617675-116 | 617675-516 | 50          |
| 617681-016    | 617681-116 | 617681-516 | 100         |
| 617682-016    | 617682-116 | 617682-516 | 200         |
| 617683-016    | 617683-116 | 617683-516 | 300         |
| 617684-016    | 617684-116 | 617684-516 | 400         |
| 617685-016    | 617685-116 | 617685-516 | 500         |
| 617840-016    | 617840-116 | 617840-516 | 600         |
| 617841-016    | 617841-116 | 617841-516 | 700         |
| 617843-016    | 617843-116 | 617843-516 | 800         |
| 617844-016    | 617844-116 | 617844-516 | 900         |
| 617845-016    | 617845-116 | 617845-516 | 1000        |
| 516-771-60    | 516-771-61 | 516-771-66 | Above set   |



# Rectangular Gage Block Accessories

## SERIES 516 – For Gage Blocks over 100mm

Specially designed for long gage blocks over 100mm, which have two holes on the body for coupling.



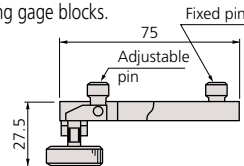
### SPECIFICATIONS

#### Accessories for gage blocks over 100mm

| Order No. 516-605 | Included in set                |
|-------------------|--------------------------------|
| 1 pc.             | Holder A (619031)              |
| 1 pc.             | Holder B (619032)              |
| 1 pc.             | Holder C (619033)              |
| 1 pc.             | Holder D (619034)              |
| 1 pc.             | Holder E (619035)              |
| 3 pcs.            | Adaptor (619036)               |
| 1 pc.             | Holder base 35mm (619009)      |
| 2 pcs.            | Half round jaw 12mm (619013)   |
| 1 pc.             | Plain jaw (2 pc. set) (619018) |
| 1 pc.             | Scriber point (619019)         |

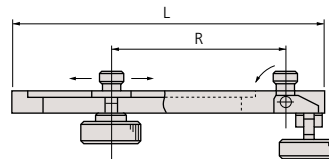
Note: These accessories can be used for inch rectangular gage blocks.

Holder A: **619031**  
Used for coupling two long gage blocks.

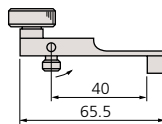


Holder B and C:  
Used for coupling two long gage blocks together with other gage blocks up to 35mm (Holder B) or 140mm (Holder C). Also used for attaching jaws with two adaptors.

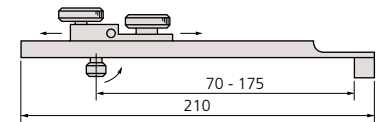
|          | Order No.     | R (max.) | L     |
|----------|---------------|----------|-------|
| Holder B | <b>619032</b> | 90mm     | 126mm |
| Holder C | <b>619033</b> | 200mm    | 236mm |



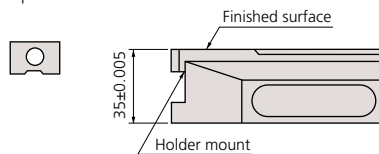
Holder D: **619034**  
Used for attaching to the holder base.



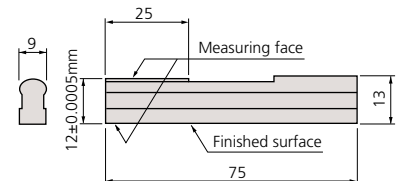
Holder E: **619035**  
Used for attaching to the holder base together with other gage blocks up to 125mm. Used for attaching jaws with one adaptor.



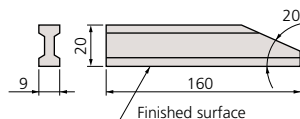
Holder base: **619009**  
Adaptor: **619036**



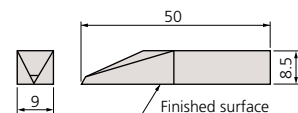
Half-round jaw: **619013**



Plain jaw: **619018** (2 pc. set)



Scriber point: **619019**



# Rectangular Gage Block Accessories

## SERIES 516

To expand the variety of rectangular gage block (steel and CERA) applications, Mitutoyo offers the gage block accessories set. By assembling the items in the set, you can easily and quickly build up a precision measuring instrument.



516-601



516-602

## SPECIFICATIONS

### Assortment of Accessories

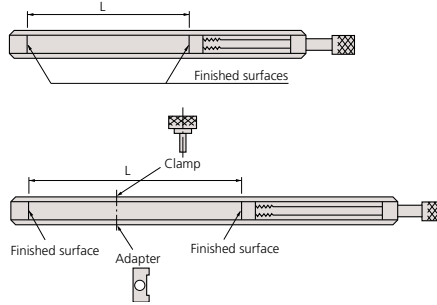
| Order No. | Accessories                        | Metric Set Order No. |         | Accessory (s) included in a set |
|-----------|------------------------------------|----------------------|---------|---------------------------------|
|           |                                    | 516-601              | 516-602 |                                 |
| 619002    | Holder 60mm                        |                      | •       | 1 pc.                           |
| 619003    | Holder 100mm                       | •                    | •       | 1 pc.                           |
| 619004    | Holder 160mm                       | •                    | •       | 1 pc.                           |
| 619005    | Holder 250mm                       | •                    | •       | 1 pc.                           |
| 619009    | Holder Base 35mm                   | •                    | •       | 1 pc.                           |
| 619010    | Half round jaw 2mm                 | •                    | •       | 2 pcs.                          |
| 619011    | Half round jaw 5mm                 | •                    | •       | 2 pcs.                          |
| 619012    | Half round jaw 8mm                 | •                    | •       | 2 pcs.                          |
| 619013    | Half round jaw 12mm                | •                    | •       | 2 pcs.                          |
| 619014    | Half round jaw 20mm                | •                    | •       | 2 pcs.                          |
| 619018    | Plain jaw (2 pc. set) 160mm        | •                    |         | 1 pc.                           |
| 619019    | Scriber point                      | •                    | •       | 1 pc.                           |
| 619020    | Center point                       | •                    | •       | 1 pc.                           |
| 619021    | Tram point                         | •                    | •       | 2 pcs.                          |
| 619022    | Triangular straightness edge 100mm | •                    | •       | 1 pc.                           |
| 619023    | Triangular straight edge 160mm     | •                    |         | 1 pc.                           |
|           | <b>Total Qty. in set</b>           | 22 pcs.              | 14 pcs. |                                 |





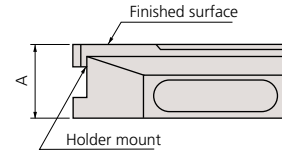
# Rectangular Gage Block Accessories

Holder:  
Used as a clamp if using plain jaws, scriber point, etc.



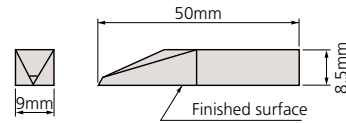
| Order No. | L           |
|-----------|-------------|
| 619002    | 15 - 61mm   |
| 619003    | 4 - 106mm   |
| 619004    | 62 - 165mm  |
| 619005    | 153 - 256mm |

Holder base 35mm: **619009**  
Measures a height on the surface plate and scribes a workpiece if used with the holder.

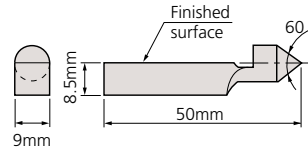


| Order No. | A          |
|-----------|------------|
| 619009    | 35±0.005mm |

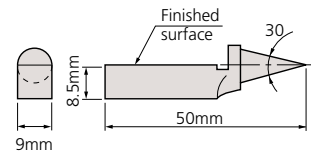
Scriber point: **619019**  
Scribes a workpiece if used with the holder and holder base.



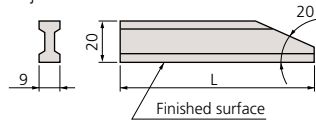
Center point: **619020**  
Scribes a workpiece if used with the holder and holder base.



Tram point: **619021**  
Inspects the scale of the height gage, etc., if used with the holder and holder base.



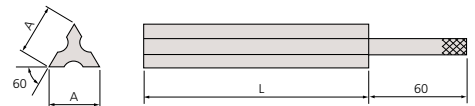
Plain jaw: **619018**  
Measures an outside or inside diameter if used with a pair of jaws and the holder.



| Order No. | L     |
|-----------|-------|
| 619018*   | 160mm |

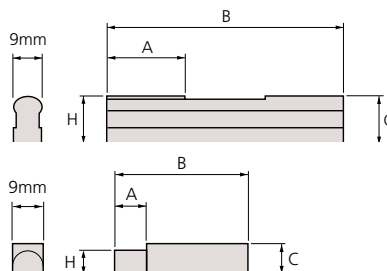
\* 2 pc. set

Triangular straight edge: Measures parallelism.



| Order No. | L     |
|-----------|-------|
| 619022    | 100mm |
| 619023    | 160mm |

Half-round jaw:  
Measures an outside or inside diameter if used with a pair of jaws and the holder.



| Order No. | H           | A    | B     | C      |
|-----------|-------------|------|-------|--------|
| 619010    | 2±0.0005mm  | 6mm  | 40mm  | 8mm    |
| 619011    | 5±0.0005mm  | 6mm  | 50mm  | 8mm    |
| 619012    | 8±0.0005mm  | 12mm | 60mm  | 8mm    |
| 619013    | 12±0.0005mm | 25mm | 75mm  | 13mm   |
| 619014    | 20±0.0005mm | 25mm | 125mm | 20.5mm |

# Metric Square Gage Block Set

## SERIES 516 — Metric Block Set, Long Block Set, Wear Block Set

A square gage block can retain stable orientation both longitudinally and laterally. A wide range of application measurements can be made, including cutting tool positioning, angle measurement with a sine bar, taper measurement with a roller, and inspection of depth micrometers.



Steel 32-block set



Steel 76-block set



Steel 103-block set



Steel 112-block set

## SPECIFICATIONS

### Metric Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |       |      |
|----------------|------------|------|-------|------------------------|-------|------|
|                | Steel      | CERA |       | Size                   | Step  | Qty. |
| <b>112</b>     | 516-437-26 | —    | 00    | 1.0005                 | —     | 1    |
|                | 516-438-26 | —    | 0     | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-439-26 | —    | AS-1  | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-440-26 | —    | AS-2  | 0.5 - 24.5             | 0.5   | 49   |
|                | —          | —    | —     | 25 - 100               | 25    | 4    |
| <b>103</b>     | 516-441-26 | —    | 00    | 1.005                  | —     | 1    |
|                | 516-442-26 | —    | 0     | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-443-26 | —    | AS-1  | 0.5 - 24.5             | 0.5   | 49   |
|                | 516-444-26 | —    | AS-2  | 25 - 100               | 25    | 4    |
|                | —          | —    | —     | —                      | —     | —    |
| <b>76</b>      | 516-449-26 | —    | 00    | 1.005                  | —     | 1    |
|                | 516-450-26 | —    | 0     | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-451-26 | —    | AS-1  | 0.5 - 9.5              | 0.5   | 19   |
|                | 516-452-26 | —    | AS-2  | 10 - 40                | 10    | 4    |
|                | —          | —    | —     | 50 - 100               | 25    | 3    |
| <b>47</b>      | 516-457-26 | —    | 00    | 1.005                  | —     | 1    |
|                | 516-458-26 | —    | 0     | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-459-26 | —    | AS-1  | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-460-26 | —    | AS-2  | 1 - 24                 | 1     | 24   |
|                | —          | —    | —     | 25 - 100               | 25    | 4    |
| <b>32</b>      | 516-465-26 | —    | 00    | 1.005                  | —     | 1    |
|                | 516-466-26 | —    | 0     | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-467-26 | —    | AS-1  | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-468-26 | —    | AS-2  | 1 - 9                  | 1     | 9    |
|                | —          | —    | —     | 10 - 30                | 10    | 3    |
|                | —          | —    | —     | 60                     | —     | 1    |

### Metric Long Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |      |      |
|----------------|------------|------|-------|------------------------|------|------|
|                | Steel      | CERA |       | Size                   | Step | Qty. |
| <b>8</b>       | 516-751-26 | —    | 00    | 125, 150, 175          | 25   | 3    |
|                | 516-752-26 | —    | 0     | 200, 250               | 50   | 2    |
|                | 516-753-26 | —    | AS-1  | 300, 400, 500          | 100  | 3    |
|                | 516-754-26 | —    | AS-2  | —                      | —    | —    |

### Metric Wear Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |      |      |
|----------------|------------|------|-------|------------------------|------|------|
|                | Carbide    | CERA |       | Size                   | Step | Qty. |
| <b>2</b>       | 516-820-26 | —    | 0     | 1                      | —    | 2    |
|                | 516-821-26 | —    | AS-1  | —                      | —    | —    |

Provided with Inspection Certificate



Provided with Inspection Certificate

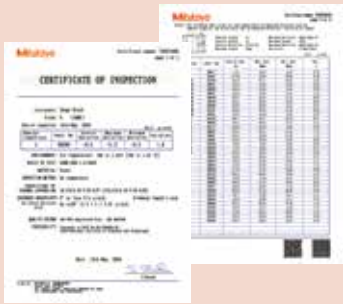
# Inch Square Gage Block Set

**SERIES 516 — Inch Block Set, Long Block Set, Wear Block Set**

## SPECIFICATIONS

### Inch Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set          |                |             |
|----------------|------------|------------|-------|---------------------------------|----------------|-------------|
|                | Steel      | CERA       |       | Size                            | Step           | Qty.        |
| <b>81</b>      | 516-401-26 | 516-201-26 | 00    | .1001 - .1009                   | .0001          | 9           |
|                | 516-402-26 | 516-202-26 | 0     | .101 - .149                     | .001           | 49          |
|                | 516-403-26 | 516-203-26 | AS-1  | .05 - .95                       | .05            | 19          |
|                | 516-404-26 | 516-204-26 | AS-2  | 1 - 4                           | 1              | 4           |
| <b>36</b>      | 516-421-26 | 516-221-26 | 00    | .05"                            |                | 1           |
|                | 516-422-26 | 516-222-26 | 0     | .1001 - .1009                   | .0001          | 10          |
|                | 516-423-26 | 516-223-26 | AS-1  | .101 - .109                     | .001           | 9           |
|                | 516-424-26 | 516-224-26 | AS-2  | .11 - .19<br>.1 - .5<br>1, 2, 4 | .01<br>.1<br>1 | 9<br>5<br>3 |
| <b>28</b>      | 516-417-26 | —          | 00    | .02005"                         |                | 1           |
|                | 516-418-26 | —          | 0     | .0201 - .0209"                  | .0001          | 9           |
|                | 516-419-26 | —          | AS-1  | .021 - .029"                    | .001           | 9           |
|                | 516-420-26 | —          | AS-2  | .021 - .029"<br>.10 - .090"     | .01            | 9           |



Steel 47-block set

### Inch Long Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |        |        |
|----------------|------------|------|-------|------------------------|--------|--------|
|                | Steel      | CERA |       | Size                   | Step   | Qty.   |
| <b>8</b>       | 516-762-26 | —    | 0     | 5 - 7                  | 1      | 3      |
|                | 516-763-26 | —    | AS-1  | 8, 10, 12<br>16, 20    | 2<br>4 | 3<br>2 |



Steel 8-block set

### Inch Wear Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |      |
|----------------|------------|------------|-------|------------------------|------|------|
|                | Carbide    | CERA       |       | Size                   | Step | Qty. |
| <b>2</b>       | 516-824-26 | 516-846-26 | 0     | .05                    | —    | 2    |
|                | 516-825-26 | 516-847-26 | AS-1  |                        |      |      |
| <b>2</b>       | 516-826-26 | 516-844-26 | 0     | .1                     | —    | 2    |
|                | 516-827-26 | 516-845-26 | AS-1  |                        |      |      |



Carbide 2-block set

### 92 pcs. Gage Blocks with accessories set in wooden box

| Blocks in set | Order No.  | Grade | Blocks included in set |       |      | Individual No. | Description            | Qty. |
|---------------|------------|-------|------------------------|-------|------|----------------|------------------------|------|
|               |            |       | Size                   | Step  | Qty. |                |                        |      |
| <b>92</b>     | 516-405-26 | 0     | .0625                  | .0001 | 1    | 619052         | Plain Jaw .500"        | 2    |
|               |            |       | .078125                |       | 1    | 619051         | Half round jaw .250"   | 2    |
|               |            |       | .09375                 |       | 1    | 619055         | Holder base .500"      | 1    |
|               |            |       | .100025                |       | 1    | 619057         | Flat head screw 1 1/4" | 2    |
|               |            |       | .10005                 |       | 1    | 619058         | Flat head screw 5/8"   | 2    |
|               |            |       | .100075                |       | 1    | 619056         | Stud                   | 2    |
|               |            |       | .109375                |       | 1    | 619066         | Knurled head screw     | 2    |
|               |            |       | .1001 - .1009          |       | 9    | 619059         | Slotted head nut       | 2    |
|               |            |       | .101 - .149            |       | 49   | 619062         | Tie rod 3"             | 1    |
|               |            |       | .05 - .95              |       | 4    | 619063         | Tie rod 2 1/4"         | 1    |
|               |            |       | .16 - .19              |       | 19   | 619064         | Tie rod 1 1/2"         | 1    |
|               |            |       | 1 4                    |       | 4    | 619065         | 3/4"                   | 1    |

# Individual Metric Square Gage Block



## SPECIFICATIONS

### Metric Block

| Length (mm) | Order No. |      | Length (mm) | Order No. |      | Length (mm) | Order No. |      |
|-------------|-----------|------|-------------|-----------|------|-------------|-----------|------|
|             | Steel     | CERA |             | Steel     | CERA |             | Steel     | CERA |
| 0.5         | 614506    | —    | 1.33        | 614593    | —    | 13          | 614623    | —    |
| 1           | 614611    | —    | 1.34        | 614594    | —    | 13.5        | 614653    | —    |
| 1.0005      | 614520    | —    | 1.35        | 614595    | —    | 14          | 614624    | —    |
| 1.001       | 614521    | —    | 1.36        | 614596    | —    | 14.5        | 614654    | —    |
| 1.002       | 614522    | —    | 1.37        | 614597    | —    | 15          | 614625    | —    |
| 1.003       | 614523    | —    | 1.38        | 614598    | —    | 15.5        | 614655    | —    |
| 1.004       | 614524    | —    | 1.39        | 614599    | —    | 16          | 614626    | —    |
| 1.005       | 614525    | —    | 1.4         | 614600    | —    | 16.5        | 614656    | —    |
| 1.006       | 614526    | —    | 1.41        | 614601    | —    | 17          | 614627    | —    |
| 1.007       | 614527    | —    | 1.42        | 614602    | —    | 17.5        | 614657    | —    |
| 1.008       | 614528    | —    | 1.43        | 614603    | —    | 18          | 614628    | —    |
| 1.009       | 614529    | —    | 1.44        | 614604    | —    | 18.5        | 614658    | —    |
| 1.01        | 614561    | —    | 1.45        | 614605    | —    | 19          | 614629    | —    |
| 1.02        | 614562    | —    | 1.46        | 614606    | —    | 19.5        | 614659    | —    |
| 1.03        | 614563    | —    | 1.47        | 614607    | —    | 20          | 614672    | —    |
| 1.04        | 614564    | —    | 1.48        | 614608    | —    | 20.5        | 614660    | —    |
| 1.05        | 614565    | —    | 1.49        | 614609    | —    | 21          | 614631    | —    |
| 1.06        | 614566    | —    | 1.5         | 614641    | —    | 21.5        | 614661    | —    |
| 1.07        | 614567    | —    | 1.6         | 614516    | —    | 22          | 614632    | —    |
| 1.08        | 614568    | —    | 1.7         | 614517    | —    | 22.5        | 614662    | —    |
| 1.09        | 614569    | —    | 1.8         | 614518    | —    | 23          | 614633    | —    |
| 1.1         | 614570    | —    | 1.9         | 614519    | —    | 23.5        | 614663    | —    |
| 1.11        | 614571    | —    | 2           | 614612    | —    | 24          | 614634    | —    |
| 1.12        | 614572    | —    | 2.5         | 614642    | —    | 24.5        | 614664    | —    |
| 1.13        | 614573    | —    | 3           | 614613    | —    | 25          | 614635    | —    |
| 1.14        | 614574    | —    | 3.5         | 614643    | —    | 30          | 614673    | —    |
| 1.15        | 614575    | —    | 4           | 614614    | —    | 40          | 614674    | —    |
| 1.16        | 614576    | —    | 4.5         | 614644    | —    | 50          | 614675    | —    |
| 1.17        | 614577    | —    | 5           | 614615    | —    | 60          | 614676    | —    |
| 1.18        | 614578    | —    | 5.5         | 614645    | —    | 75          | 614801    | —    |
| 1.19        | 614579    | —    | 6           | 614616    | —    | 100         | 614681    | —    |
| 1.2         | 614580    | —    | 6.5         | 614646    | —    | 125         | 614802    | —    |
| 1.21        | 614581    | —    | 7           | 614617    | —    | 150         | 614803    | —    |
| 1.22        | 614582    | —    | 7.5         | 614647    | —    | 175         | 614804    | —    |
| 1.23        | 614583    | —    | 8           | 614618    | —    | 200         | 614682    | —    |
| 1.24        | 614584    | —    | 8.5         | 614648    | —    | 250         | 614805    | —    |
| 1.25        | 614585    | —    | 9           | 614619    | —    | 300         | 614683    | —    |
| 1.26        | 614586    | —    | 9.5         | 614649    | —    | 400         | 614684    | —    |
| 1.27        | 614587    | —    | 10          | 614671    | —    | 500         | 614685    | —    |
| 1.28        | 614588    | —    | 10.5        | 614650    | —    |             |           |      |
| 1.29        | 614589    | —    | 11          | 614621    | —    |             |           |      |
| 1.3         | 614590    | —    | 11.5        | 614651    | —    |             |           |      |
| 1.31        | 614591    | —    | 12          | 614622    | —    |             |           |      |
| 1.32        | 614592    | —    | 12.5        | 614652    | —    |             |           |      |

### Metric Wear Block

| Length (mm) | Order No.<br>Tungsten carbide |
|-------------|-------------------------------|
| 1           | 615611                        |
| 2           | 615612                        |

Suffix Number for Selecting Standard and Certificate Provided

### ASME

| Grade | Steel |
|-------|-------|
| K     | —     |
| 00    | -521* |
| 0     | -531* |
| AS-1  | -541* |
| AS-2  | -551* |

\* provided with Inspection Certificate

Example: 614611-521  
1mm gage block in grade 00.

We make custom length gage blocks:  
0.5 - 500mm.



Inspection Certificate

# Individual Inch Square Gage Block

## Suffix Number for Selecting Standard and Certificate Provided

| ASME  |             |
|-------|-------------|
| Grade | Steel, CERA |
| K     | —           |
| 00    | -521*       |
| 0     | -531*       |
| AS-1  | -541*       |
| AS-2  | -551*       |

\* provided with Inspection Certificate

Example: 614310-521  
.01" gage block in grade 00.

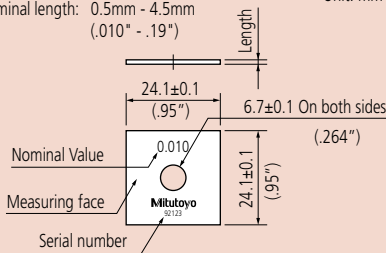
We make custom length gage blocks:  
.01 - 20"



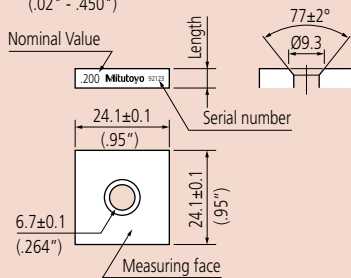
Inspection Certificate

## DIMENSIONS

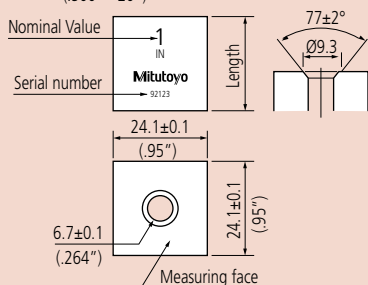
Nominal length: 0.5mm - 4.5mm  
(.010" - .19") Unit: mm



Nominal length: 5mm - 14.5mm  
(.02" - .450")



Nominal length: 15mm - 500mm  
(.500" - 20")



## SPECIFICATIONS

### Inch Block

| Length (inch)  | Order No. |        | Length (inch)  | Order No. |        | Length (inch) | Order No. |        |
|----------------|-----------|--------|----------------|-----------|--------|---------------|-----------|--------|
|                | Steel     | CERA   |                | Steel     | CERA   |               | Steel     | CERA   |
| .01            | 614310    | —      | .106           | 614146    | 616146 | .25           | 614212    | 616212 |
| .02005         | 614240    | —      | .107           | 614147    | 616147 | .3            | 614193    | 616193 |
| .0201          | 614231    | —      | .108           | 614148    | 616148 | .35           | 614213    | 616213 |
| .0202          | 614232    | —      | .109           | 614149    | 616149 | .375 (3/8)    | 614309    | —      |
| .0203          | 614233    | —      | .109375 (7/64) | 614306    | —      | .4            | 614194    | 616194 |
| .0204          | 614234    | —      | .11            | 614150    | 616150 | .45           | 614214    | 616214 |
| .0205          | 614235    | —      | .111           | 614151    | 616151 | .5            | 614195    | 616195 |
| .0206          | 614236    | —      | .112           | 614152    | 616152 | .55           | 614215    | 616215 |
| .0207          | 614237    | —      | .113           | 614153    | 616153 | .6            | 614196    | 616196 |
| .0208          | 614238    | —      | .114           | 614154    | 616154 | .65           | 614216    | 616216 |
| .0209          | 614239    | —      | .115           | 614155    | 616155 | .7            | 614197    | 616197 |
| .02            | 614320    | —      | .116           | 614156    | 616156 | .75           | 614217    | 616217 |
| .021           | 614321    | —      | .117           | 614157    | 616157 | .8            | 614198    | 616198 |
| .022           | 614322    | —      | .118           | 614158    | 616158 | .85           | 614218    | 616218 |
| .023           | 614323    | —      | .119           | 614159    | 616159 | .9            | 614199    | 616199 |
| .024           | 614324    | —      | .12            | 614160    | 616160 | .95           | 614219    | 616219 |
| .025           | 614325    | —      | .121           | 614161    | 616161 | 1             | 614201    | 616201 |
| .026           | 614326    | —      | .122           | 614162    | 616162 | 2             | 614202    | 616202 |
| .027           | 614327    | —      | .123           | 614163    | 616163 | 3             | 614203    | 616203 |
| .028           | 614328    | —      | .124           | 614164    | 616164 | 4             | 614204    | 616204 |
| .029           | 614329    | —      | .125           | 614165    | 616165 | 5             | 614205    | —      |
| .03            | 614330    | —      | .126           | 614166    | 616166 | 6             | 614206    | —      |
| .03125 (1/32)  | 614301    | —      | .127           | 614167    | 616167 | 7             | 614207    | —      |
| .04            | 614340    | —      | .128           | 614168    | 616168 | 8             | 614208    | —      |
| .046875 (3/64) | 614302    | —      | .129           | 614169    | 616169 | 10            | 614222    | —      |
| .05            | 614105    | 616105 | .13            | 614170    | 616170 | 12            | 614223    | —      |
| .06            | 614106    | —      | .131           | 614171    | 616171 | 16            | 614224    | —      |
| .0625          | 614303    | 616303 | .132           | 614172    | 616172 | 20            | 614225    | —      |
| .07            | 614107    | —      | .133           | 614173    | 616173 |               |           |        |
| .078125 (5/64) | 614304    | —      | .134           | 614174    | 616174 |               |           |        |
| .08            | 614108    | —      | .135           | 614175    | 616175 |               |           |        |
| .09            | 614109    | —      | .136           | 614176    | 616176 |               |           |        |
| .09375 (3/32)  | 614305    | —      | .137           | 614177    | 616177 |               |           |        |
| .1             | 614191    | 616191 | .138           | 614178    | 616178 |               |           |        |
| .100025        | 614307    | —      | .139           | 614179    | 616179 |               |           |        |
| .10005         | 614135    | 616135 | .14            | 614180    | 616180 |               |           |        |
| .100075        | 614308    | —      | .141           | 614181    | 616181 |               |           |        |
| .1001          | 614121    | 616121 | .142           | 614182    | 616182 |               |           |        |
| .1002          | 614122    | 616122 | .143           | 614183    | 616183 |               |           |        |
| .1003          | 614123    | 616123 | .144           | 614184    | 616184 |               |           |        |
| .1004          | 614124    | 616124 | .145           | 614185    | 616185 |               |           |        |
| .1005          | 614125    | 616125 | .146           | 614186    | 616186 |               |           |        |
| .1006          | 614126    | 616126 | .147           | 614187    | 616187 |               |           |        |
| .1007          | 614127    | 616127 | .148           | 614188    | 616188 |               |           |        |
| .1008          | 614128    | 616128 | .149           | 614189    | 616189 |               |           |        |
| .1009          | 614129    | 616129 | .15            | 614115    | 616115 |               |           |        |
| .101           | 614141    | 616141 | .16            | 614116    | 616116 |               |           |        |
| .102           | 614142    | 616142 | .17            | 614117    | 616117 |               |           |        |
| .103           | 614143    | 616143 | .18            | 614118    | 616118 |               |           |        |
| .104           | 614144    | 616144 | .19            | 614119    | 616119 |               |           |        |
| .105           | 614145    | 616145 | .2             | 614192    | 616192 |               |           |        |

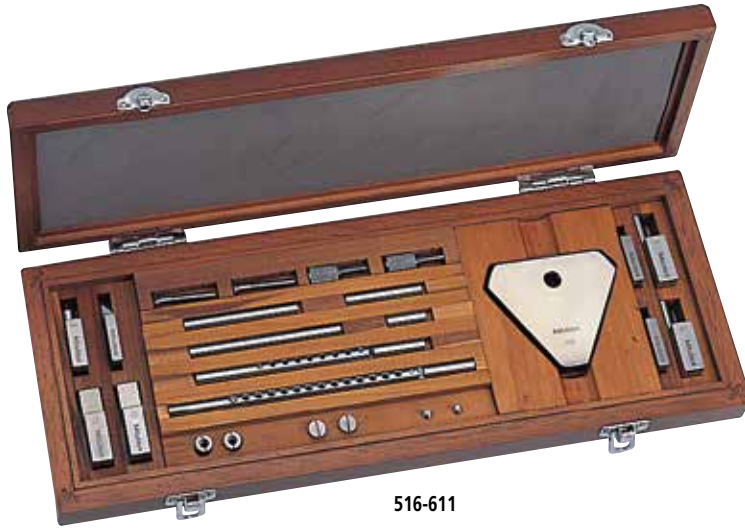
### Inch Wear Block

| Length (inch) | Order No. Tungsten carbide |
|---------------|----------------------------|
| .05           | 615105                     |
| .1            | 615191                     |

# Square Gage Block Accessories

## SERIES 516

To expand the variety of square gage block applications, Mitutoyo offers the gage block accessories set. By assembling the items in the set, you can easily and quickly build up a precision measuring instrument.

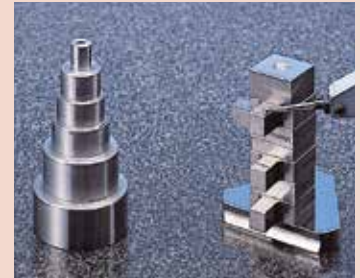


516-611

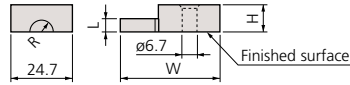
### SPECIFICATIONS

| Metric            |                                    |
|-------------------|------------------------------------|
| Order No. 516-611 | Included in set                    |
| 2 pcs.            | Half round jaw 2mm (619070)        |
| 2 pcs.            | Half round jaw 5mm (619071)        |
| 2 pcs.            | Plain jaw (619072)                 |
| 1 pc.             | Center point (619073)              |
| 1 pc.             | Scriber point (619054)             |
| 1 pc.             | Block base (619074)                |
| 2 pcs.            | Flat head screw 1-1/4" (619057)    |
| 2 pcs.            | Flat head screw 5/8" (619058)      |
| 2 pcs.            | Slotted head nut (619059)          |
| 2 pcs.            | Adjustable tie rod 6" (619060)     |
| 2 pcs.            | Adjustable tie rod 4-1/2" (619061) |
| 1 pc.             | Tie rod 3" (619062)                |
| 1 pc.             | Tie rod 2-1/4" (619063)            |
| 1 pc.             | Tie rod 1-1/2" (619064)            |
| 1 pc.             | Tie rod 3/4" (619065)              |
| 2 pcs.            | Stud (619056)                      |
| 2 pcs.            | Knurled head screw (619066)        |

| Inch              |                                    |
|-------------------|------------------------------------|
| Order No. 516-612 | Included in set                    |
| 2 pcs.            | Half round jaw .125" (619050)      |
| 2 pcs.            | Half round jaw .25" (619051)       |
| 2 pcs.            | Plain jaw (619052)                 |
| 1 pc.             | Center point (619053)              |
| 1 pc.             | Scriber point (619054)             |
| 1 pc.             | Block base (619055)                |
| 2 pcs.            | Flat head screw 1-1/4" (619057)    |
| 2 pcs.            | Flat head screw 5/8" (619058)      |
| 2 pcs.            | Slotted head nut (619059)          |
| 2 pcs.            | Adjustable tie rod 6" (619060)     |
| 2 pcs.            | Adjustable tie rod 4-1/2" (619061) |
| 1 pc.             | Tie rod 3" (619062)                |
| 1 pc.             | Tie rod 2-1/4" (619063)            |
| 1 pc.             | Tie rod 1-1/2" (619064)            |
| 1 pc.             | Tie rod 3/4" (619065)              |
| 2 pcs.            | Stud (619056)                      |
| 2 pcs.            | Knurled head screw (619066)        |

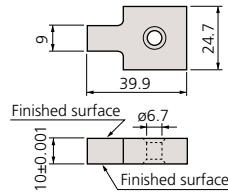


Half round jaw:  
Used to measure an inside or outside diameter.

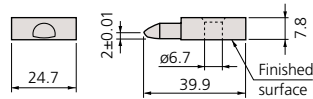


| Order No.     | R      | L     | W      | H      |
|---------------|--------|-------|--------|--------|
| <b>619070</b> | 1.95mm | 2mm   | 33.6mm | 5.3mm  |
| <b>619071</b> | 4.95mm | 5mm   | 39.9mm | 10.3mm |
| <b>619050</b> | .123"  | .125" | 33.6mm | 5.3mm  |
| <b>619051</b> | .248"  | .25"  | 39.9mm | 10.3mm |

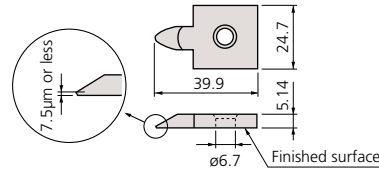
Plain jaw: **619072** (10mm), **619052** (.5")  
Used to measure an inside or outside diameter.



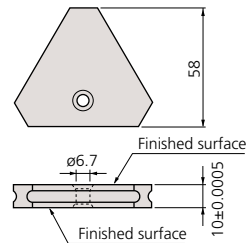
Center point: **619073** (2mm), **619053** (.1")  
Used to scribe a workpiece.



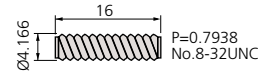
Scriber point: **619054**  
Used to scribe a workpiece.



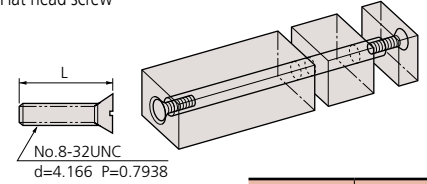
Base: **619074** (10mm), **619055** (.5")  
Used as clamps by inserting them into the center hole of a square gage block.



Stud: **619056**

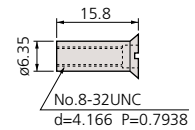


Flat head screw

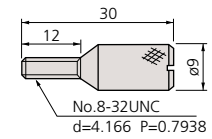


| Order No.     | L      |
|---------------|--------|
| <b>619057</b> | 31.6mm |
| <b>619058</b> | 15.8mm |

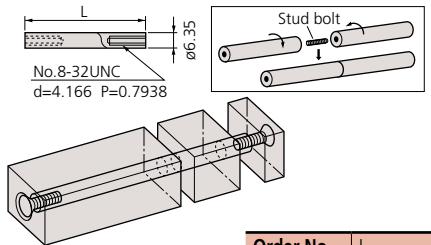
Slotted head nut: **619059**



Knurled head screw: **619066**

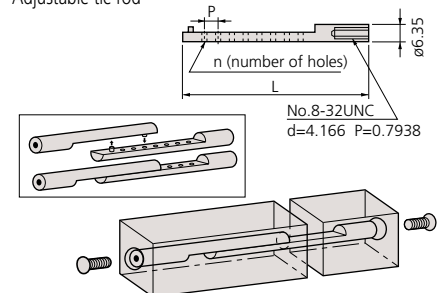


Tie rod



| Order No.     | L    |
|---------------|------|
| <b>619065</b> | 19mm |
| <b>619064</b> | 38mm |
| <b>619063</b> | 57mm |
| <b>619062</b> | 76mm |

Adjustable tie rod



| Order No.     | L       | P      | n  |
|---------------|---------|--------|----|
| <b>619060</b> | 124.5mm | 6.35mm | 14 |
| <b>619061</b> | 86.5mm  | 6.35mm | 8  |

# Ceraston

## Accessory for Gage Blocks

### FEATURES

- Alumina-ceramic grinding stone for removing burrs from hard materials such as ceramics that ordinary grinding stones cannot handle.
- Can be used both for steel gage blocks and CERA Blocks.



### SPECIFICATIONS

| Order No. | Dimensions (W x D x H) | Mass |
|-----------|------------------------|------|
| 601645    | 100 x 25 x 12mm        | 110g |
| 601644    | 150 x 50 x 20mm        | 530g |

# Maintenance Kit for Gage Blocks

## SERIES 516

### FEATURES

- Includes all necessary maintenance tools for daily care and storage of gage blocks.
- Supplied in a fitted wooden case for portable use.



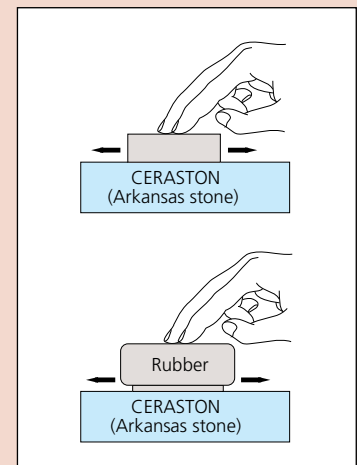
### SPECIFICATIONS

| Order No. | Assortment of tools and accessories   |
|-----------|---|
| 516-650E  | Ceraston (601645): Used for removing burrs on the measuring surface.                |
|           | Optical flat (158-117): Used for checking whether burrs exist.                      |
|           | Tweezers (600004): Used for handling thin gage blocks.                              |
|           | Blower brush (600005): Used for blowing out dust on the measuring surface.          |
|           | Cleaning paper (600006): Used for wiping off rust preventive oil and contamination. |
|           | Artificial leather mat (600007): Used as a gage block mat.                          |
|           | Reagent bottle (600008): Bottle of wiping solution (100mL)                          |
|           | Gloves  |



### Removing burrs

- (1) Wipe any dust and oil films from the gage block and the Ceraston (or Arkansas stone) using a solvent.
- (2) Place the gage 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 gage block to and fro about ten times (Fig. 1). Use a block rubber for thin gage 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 a grinding stone. If so, discard the gage 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 to prevent the surface of the gage block from being scratched. Mitutoyo does not carry the Arkansas stone.





# Step Master

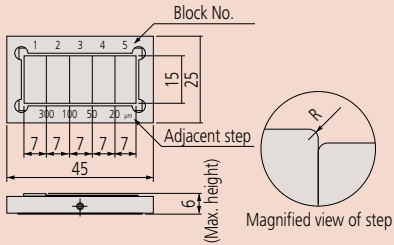
**SERIES 516**

## FEATURES

Step master is a master gage used for the z-axis (vertical direction) calibration of optical instruments.

- Each adjacent step is measured down to  $0.01\mu\text{m}$  by using an interferometer within  $\pm 0.20\mu\text{m}$  allowance.
- Steel and ceramic types are available.

## Dimension



**516-498**  
Ceramic type



**516-199**  
Steel type



## SPECIFICATIONS

### Metric

| Order No.      | Step value between adjacent blocks |                   |                  |                  | Remarks      |
|----------------|------------------------------------|-------------------|------------------|------------------|--------------|
|                | No. 1 - No. 2                      | No. 2 - No. 3     | No. 3 - No. 4    | No. 4 - No. 5    |              |
| <b>516-198</b> | 10 $\mu\text{m}$                   | 5 $\mu\text{m}$   | 2 $\mu\text{m}$  | 1 $\mu\text{m}$  | Steel type   |
| <b>516-199</b> | 300 $\mu\text{m}$                  | 100 $\mu\text{m}$ | 50 $\mu\text{m}$ | 20 $\mu\text{m}$ | Steel type   |
| <b>516-498</b> | 10 $\mu\text{m}$                   | 5 $\mu\text{m}$   | 2 $\mu\text{m}$  | 1 $\mu\text{m}$  | Ceramic type |
| <b>516-499</b> | 300 $\mu\text{m}$                  | 100 $\mu\text{m}$ | 50 $\mu\text{m}$ | 20 $\mu\text{m}$ | Ceramic type |

# Made-to-order Block & Reference

## Available Dimension

Nominal size: .004 to 20" / 0.1 to 1000mm (steel)  
.1 to 20" / 0.5 to 500mm (ceramic)

Nominal pitch: 0.0005mm (up to 100mm)  
0.001mm (over 100mm)

Minimum section dimension:  
Approx. .24 x .24" / 6 x 6mm

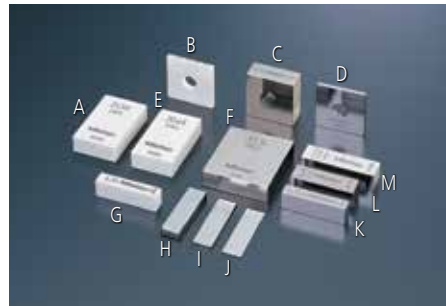
Maximum section dimension:  
Approx. 5.5 x 5.5" / 140 x 140mm (steel)  
Approx. 6.3" Dia. /  $\phi$ 160mm (steel, cylindrical)  
Approx. 3.94 x 1.97" / 100 x 50mm (ceramic)  
Approx. .24" Dia. /  $\phi$ 60mm (ceramic, cylindrical)

Accuracy: Gage Block Grade level

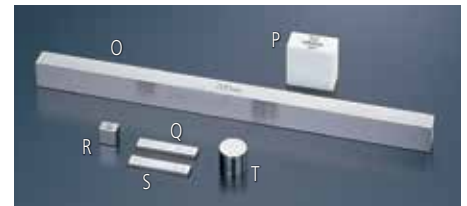
Special materials of low expansion glass and low expansion ceramic are available.

## FEATURES

- Mitutoyo can provide gage blocks and reference gages to your size and design.



- A: Ceramic rectangular gage block (21.94mm)
- B: Ceramic square gage block (2.1005mm)
- C: Steel square gage block (10.72mm)
- D: Steel square gage block (2.2065mm)
- E: Ceramic rectangular gage block (20.64mm)
- F: Steel rectangular gage block (31.5mm)
- G: Ceramic rectangular gage block (6.34mm)
- H: Steel rectangular gage block (3.603mm)
- I: Steel rectangular gage block (1.1505mm)
- J: Steel rectangular gage block (0.555mm)
- K: Steel rectangular gage block (6.156mm)
- L: Steel rectangular gage block (9.694mm)
- M: Steel rectangular gage block (10.02mm)



- O: Steel long rectangular block (15 x 10 x 200mm)
- P: Ceramic square block (24.1 x 24.1 x 12.3mm)
- Q: Steel thin rectangular block (30 x 6 x 1.9mm)
- R: Steel square block (9 x 9 x 6mm)
- S: Steel thin rectangular block (30 x 6 x 2.1mm)
- T: Steel cylindrical block ( $\phi$ 13.08 x 12mm)



- U: Cylindrical reference block for depth micrometer ( $\phi$ 60 x 150mm)
- V: Ceramic reference plate (50 x 50 x 50mm, flatness 0.3 $\mu\text{m}$ )
- W: Ceramic stepped block (30 x 18 x 5mm, step: 0.15mm)

# Gage Block Comparator GBCD-250

**SERIES 565 — Manual Comparator with Dual Gage Heads**

## FEATURES

- Gage blocks between 0.1mm and 250mm easily can be compared with the standard gage block on the GBCD-250.
- The differential dual gaging heads assure the operator of a high-accuracy measurement with ease of use.

## SPECIFICATIONS

| Inch/Metric                     |  |
|---------------------------------|--|
| Model No.                       | GBCD-250   |
| Order No.                       | 565-151A   |
| Range                           | 0.1mm - 250mm / .004 - 10"                                       |
| Resolution                      | 0.00001mm(0.01μm)/.000001in(.1μin)                               |
| Accuracy in narrow range (20°C) | $\pm(0.03+0.3L/1000)\mu\text{m}^*$<br>L = Gage block length (mm) |
| Measuring units                 | Laser Hologage (upper and lower)                                 |
| Operating condition             | Temperature: 20°C $\pm$ 1°C<br>Humidity: 30% RH to 60% RH        |
| Data output                     | Via SPC output port  |
| Dimensions (W x D x H)          | Main unit: 455 x 318 x 691mm Display unit: 345 x 397 x 187mm     |
| Mass                            | Main unit: Approx. 52kg Display unit: Approx. 9kg                |

\* 95% confidence interval (not including the calibration error of the standard gage block).



## Optional Accessories

- 962723: Gage head calibration kit
- 02ASD130: Square gage block holder kit
- 02ASF040: Heat protection shield
- 02ASQ953: GBPAK-M  
Supporting OS: Windows XP, Vista, 7, or 10
- 937179T: Foot Switch
- 936937: Connecting cable

# Gage Block Comparator GBCD-100A

**SERIES 565 — Automatic-Type Comparator with Dual Gage Heads**

## SPECIFICATIONS

|                                 |  |
|---------------------------------|--|
| Model No.                       | GBCD-100A  |
| Order No.                       | 565-160A   |
| Resolution                      | 0.00001mm (0.01μm) / .000001"                                      |
| Range                           | 0.5mm - 100mm / .02 - 4"   |
| Measuring unit                  | Differential (dual-head) type Mu-Checker                           |
| Accuracy in narrow range (20°C) | $\pm(0.03+0.3L/1000)\mu\text{m}^*$<br>L = Gage block length (mm)   |
| Measuring force                 | Upper gage head: 1N (100gf)<br>Lower gage head: 0.6N (60gf)        |
| Air requirement                 | 400kPa (4kgf/cm <sup>2</sup> )                                     |
| Operating condition             | Temperature: 20°C $\pm$ 1°C<br>Humidity: 58%RH $\pm$ 15%RH         |
| Dimensions (W x D x H)          | Main unit: 710 x 366 x 783mm<br>Electronic unit: 160 x 410 x 382mm |
| Mass                            | Main unit: 120kg<br>Electronic unit: 14kg                          |

\* 95% confidence interval (not including the calibration error of the standard gage block).



The GBCD-100A Automatic Gage Block Comparator is an easy-to-operate dual-head gage block inspecting system. It automatically compares workpieces with a standard gage block and determines accuracies such as central length, maximum length, minimum length and parallelism through the operation of an optional personal computer.

## Standard Accessories

GBPAK-A (software)

## Optional Accessories

516-146-E1: Gage block set for GBCD calibration



### Technical Data

Graduation: .00001" or 0.001mm  
 Counter Resolution: .001" or 0.01mm  
 Character Height: .16" / 4mm  
 Micrometer Head  
 Travel stroke: 1" or 20mm  
 Pitch: .025"/rev or 0.5mm/rev  
 Hysteresis: .00004" or 1µm  
 Provided with inspection certificate.

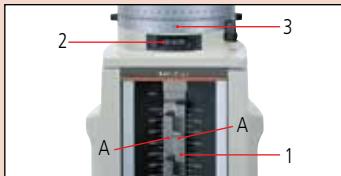
### Standard Accessories

Reference Block: 11mm for 515-322  
 Reference Block: .3" for 515-310, 515-311

### Optional Accessories

515-112: Auxiliary block kit for bore gage (mm)  
 515-119: Auxiliary block kit for bore gage (for 515-310)  
 515-121: Auxiliary block kit for bore gage (for 515-311)  
 ———: Riser block

### Reading



#### Height A

1. Scale 280. mm  
 2. Counter 5.67 mm  
 3. Thimble 0.000 mm

285.670 mm



# Height Master

## SERIES 515

### FEATURES

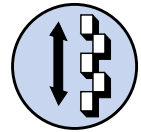
- Models with staggered arrangement of block stack have two measuring faces on the same level, one facing up and the other down (except for 515-310).
- Each height master is supplied with a gage block for zero-setting.
- Supplied in fitted wooden case.



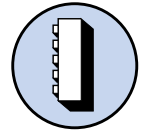
515-322



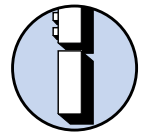
515-310



Staggered 20mm blocks (movable)



Vertical orientation



Riser block

### SPECIFICATIONS

#### Metric

| Range (H)     | Order No. | Block step       | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|---------------|-----------|------------------|------------|----------------------|----------------------|--------------------------|-----------|
| 5 < H ≤ 310mm | 515-322   | 20mm (staggered) | 0.001mm    | ±1.5µm               | 1µm                  | ±1µm                     | 23        |

#### Inch

| Range (H)       | Order No. | Block step     | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|-----------------|-----------|----------------|------------|----------------------|----------------------|--------------------------|-----------|
| .2" < H ≤ 12.2" | 515-310   | .5" (straight) | .00001"    | ±.00005"             | .00004"              | ±.00005"                 | 23        |
| .2" < H ≤ 12.2" | 515-311   | 1" (staggered) | .00001"    | ±.00005"             | .00004"              | ±.00005"                 | 23        |

# Digital Height Master

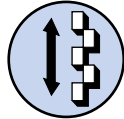
**SERIES 515**

## FEATURES

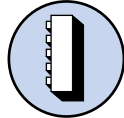
- Standard model with a digital display, featuring all essential specifications required for versatile height standard.
- With SPC output.
- Each height master is supplied with a gage block for zero setting.



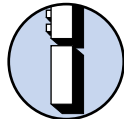
515-374



Staggered 20mm blocks (movable)



Vertical orientation



Riser block



## Technical Data

Resolution (LCD): .0001" or 0.001mm  
 Graduation: .0001" or 0.002mm  
 Character Height .21" / 5.4mm

### Micrometer Head

Travel Stroke: 1" or 20mm  
 Pitch: .025"/rev or 0.5mm/rev  
 Hysteresis: .0001" for all inch models  
 0.002mm for 300mm models  
 0.0025mm for 450 & 600mm models  
 Battery: SR44 (2 pcs.), **938882**  
 Battery life: Approx. 1.8 years under normal use

## Function

Zero-setting, Presetting, ABS/INC switching, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Standard Accessories

Reference Block: 11mm for Metric Height Master **611621-031**  
 Reference Block: .6" for Inch Height Master **611196-531**  
 Provided with inspection certificate.

## Optional Accessories

- 515-111:** Auxiliary block kit for bore gage (mm)
- 515-120:** Auxiliary block kit for bore gage (inch)
- : Riser block (see page E-27.)
- 959149:** SPC cable (40" / 1m)
- 959150:** SPC cable (80" / 2m)
- 050019:** Fitted mahogany case for 12" / 300mm model
- 050059:** Fitted mahogany case for 18" / 450mm model  
24" / 600mm model

## SPECIFICATIONS

### Metric

| Range (H)      | Order No.      | Block step       | Resolution | Block Pitch Accuracy | Parallelism | Micrometer Head Accuracy | Mass (kg) |
|----------------|----------------|------------------|------------|----------------------|-------------|--------------------------|-----------|
| 10 < H ≤ 310mm | <b>515-374</b> | 20mm (staggered) | 0.001mm    | ±1.5µm               | 2µm         | ±2µm                     | 9.5       |
| 10 < H ≤ 460mm | <b>515-376</b> | 20mm (staggered) | 0.001mm    | ±2.5µm               | 2.5µm       | ±2µm                     | 13.6      |
| 10 < H ≤ 610mm | <b>515-378</b> | 20mm (staggered) | 0.001mm    | ±3.5µm               | 2.5µm       | ±2.5µm                   | 16.0      |

### Inch/Metric

| Range (H)     | Order No.      | Block step     | Resolution       | Block Pitch Accuracy | Parallelism | Micrometer Head Accuracy | Mass (kg) |
|---------------|----------------|----------------|------------------|----------------------|-------------|--------------------------|-----------|
| .5" < H ≤ 12" | <b>515-375</b> | 1" (staggered) | .0001" / 0.001mm | ±.0001"              | .00005"     | ±.0001"                  | 9.5       |
| .5" < H ≤ 18" | <b>515-377</b> | 1" (staggered) | .0001" / 0.001mm | ±.0001"              | .0001"      | ±.0001"                  | 13.6      |
| .5" < H ≤ 24" | <b>515-379</b> | 1" (staggered) | .0001" / 0.001mm | ±.0001"              | .0001"      | ±.0001"                  | 16.0      |

# Riser Blocks

## SERIES 515

### FEATURES

- These riser blocks are specially designed for standard/digimatic height masters.



515-113

515-114

515-115

### SPECIFICATIONS

| Metric |           |                      |           |
|--------|-----------|----------------------|-----------|
| Height | Order No. | Accuracy of height   | Mass (kg) |
| 150mm  | 515-113   | $\pm 0.6\mu\text{m}$ | 5.7       |
| 300mm  | 515-114   | $\pm 1.0\mu\text{m}$ | 11.3      |
| 600mm  | 515-115   | $\pm 2.0\mu\text{m}$ | 31        |

| Inch   |           |                      |           |
|--------|-----------|----------------------|-----------|
| Height | Order No. | Accuracy of height   | Mass (kg) |
| 6"     | 515-116   | $\pm 20\mu\text{in}$ | 5.7       |
| 12"    | 515-117   | $\pm 40\mu\text{in}$ | 11.3      |
| 24"    | 515-118   | $\pm 80\mu\text{in}$ | 31        |

# Auxiliary Block Kit

## SERIES 515 — for Bore Gage

### FEATURES

- Used for efficient zero-setting of dial bore gages and tubular inside micrometers (18 - 150mm) on a Height Master.



515-112

Bore gage zero-setting



### SPECIFICATIONS

| Metric    |                          |
|-----------|--------------------------|
| Order No. | Applicable height master |
| 515-110   | Universal Height Master  |
| 515-111   | Digimatic Height Master  |
| 515-112   | Height Master            |

| Inch      |  |
|-----------|--|
| Order No. | Applicable height master                         |
| 515-119   | Universal Height Master, Height Master (515-310) |
| 515-120   | Digimatic Height Master                          |
| 515-121   | Height Master (515-311)                          |

# Universal Height Master

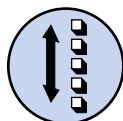
## SERIES 515 — Use in Vertical and Horizontal Orientation

### FEATURES

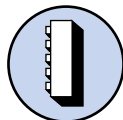
- The Universal Height Master is designed for both vertical and horizontal orientations, providing a wide range of applications, such as accuracy checking of machine tool table movements.
- Fitted wooden case supplied.



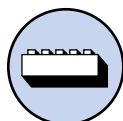
515-520



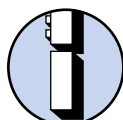
Single-row 10mm blocks (movable)



Vertical orientation



Horizontal orientation



Riser block

### SPECIFICATIONS

#### Metric

| Range (R)                  | Order No.      | Block step      | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|----------------------------|----------------|-----------------|------------|----------------------|----------------------|--------------------------|-----------|
| $5 < R \leq 610\text{mm}$  | <b>515-520</b> | 10mm (straight) | 0.001mm    | $\pm 1.5\mu\text{m}$ | $1.0\mu\text{m}$     | $\pm 1.2\mu\text{m}$     | 42        |
| $5 < R \leq 1010\text{mm}$ | <b>515-523</b> | 10mm (straight) | 0.001mm    | $\pm 3.5\mu\text{m}$ | $2.5\mu\text{m}$     | $\pm 1.5\mu\text{m}$     | 63.5      |

#### Inch

| Range (R)            | Order No.      | Block step     | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|----------------------|----------------|----------------|------------|----------------------|----------------------|--------------------------|-----------|
| $.2" < R \leq 18.2"$ | <b>515-512</b> | .5" (straight) | .00001"    | $\pm .00005"$        | .00006"              | $\pm .00004"$            | 42        |
| $.2" < R \leq 24.2"$ | <b>515-510</b> | .5" (straight) | .00001"    | $\pm .0001"$         | .00006"              | $\pm .00004"$            | 50        |
| $.2" < R \leq 40.2"$ | <b>515-513</b> | .5" (straight) | .00001"    | $\pm .00015"$        | .00008"              | $\pm .00006"$            | 63.5      |



### Technical Data

Graduation: 0.001mm or .00001"  
 Counter Resolution: .001" or 0.01mm  
 Character Height: .16" / 4mm  
 Block arrangement: Straight arrangement

#### Micrometer Head

Travel stroke: 1" or 20mm  
 Pitch: .025"/rev or 0.5mm/rev  
 Hysteresis: .00004" / 1.2μm up to 24.2" / 610mm  
 .00006" / 1.5μm for 40.2" / 1010mm

Block pitch accuracy:  $\pm 1.5\mu\text{m}$  ( $0 < R \leq 310\text{mm}$ )  
 $\pm 2.5\mu\text{m}$  ( $310 < R \leq 610\text{mm}$ )  
 $\pm 3.5\mu\text{m}$  ( $610 < R \leq 1010\text{mm}$ )

Parallelism of blocks:  $1.0\mu\text{m}$  ( $0 < R \leq 310\text{mm}$ )  
 $2.5\mu\text{m}$  ( $310 < R \leq 1010\text{mm}$ )

Provided with inspection certificate.

### Optional Accessories

- 900574\***: Supporting base for vertical operation  
 Mass: 3kg  
 (\*supplied as a standard for **515-523** and **515-513**)
- 515-112**: Auxiliary block kit for bore gage (mm)  
**515-119**: Auxiliary block kit for bore gage (inch)



Using in horizontal orientation



Supporting base



# High-Accuracy Check Master HMC-H

## SERIES 515

### Technical Data

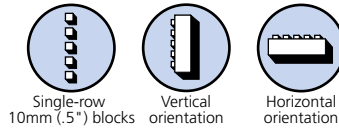
Measuring range (R): Refer to the list of specifications.  
 Block pitch accuracy:  $\pm 1.2\mu\text{m}$  ( $0 < R \leq 310\text{mm}$ )  
 $\pm 1.8\mu\text{m}$  ( $310 < R \leq 610\text{mm}$ )  
 $\pm 2.5\mu\text{m}$  ( $610 < R \leq 1010\text{mm}$ )  
 $\pm 4.0\mu\text{m}$  ( $1010 < R \leq 1510\text{mm}$ )  
 Parallelism of blocks:  $1.0\mu\text{m}$  ( $0 < R \leq 450\text{mm}$ )  
 $1.5\mu\text{m}$  ( $450 < R \leq 1010\text{mm}$ )  
 $2.0\mu\text{m}$  ( $1010 < R \leq 1510\text{mm}$ )  
 Provided with inspection certificate.

### FEATURES

- Designed to check the accuracy of table movements of machine tools and calibrate CMMs. Permanently wrung stack of gage blocks is housed in a rigid frame.
- Can be used in either vertical and horizontal orientation.
- Fitted wooden case supplied.

### Specifications for Ceramic Check Master:

- Each measuring block is made of zirconia-based ceramic that requires no anti-corrosion treatment for measuring faces.
- Free from deterioration and dimensional changes over time.



### SPECIFICATIONS

| Range (R) | Order No. |         | Pitch |      | Accuracy of block pitch for the range shown below as measured from the bottom block |                      |                      |                      | Length | Parallelism      | Mass (kg) |
|-----------|-----------|---------|-------|------|---|----------------------|----------------------|----------------------|--------|------------------|-----------|
|           | Steel     | Ceramic | P     | P    | up to 300mm   | 300-600mm            | 600-1000mm           | 1000-1500mm          |        |                  |           |
|           |           |         |       |      |   |                      |                      |                      |        |                  |           |
| 300mm     | 515-740   | 515-760 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$  | —                    | —                    | —                    | 331mm  | $1\mu\text{m}$   | 3.6       |
| 450mm     | 515-741   | 515-761 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$  | $\pm 1.8\mu\text{m}$ | —                    | —                    | 482mm  | $1\mu\text{m}$   | 5.4       |
| 600mm     | 515-742   | 515-762 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$  | $\pm 1.8\mu\text{m}$ | —                    | —                    | 631mm  | $1.5\mu\text{m}$ | 7.2       |
| 1000mm    | 515-743   | 515-763 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$  | $\pm 1.8\mu\text{m}$ | $\pm 2.5\mu\text{m}$ | —                    | 1037mm | $1.5\mu\text{m}$ | 12.0      |
| 1500mm    | 515-744   | 515-764 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$  | $\pm 1.8\mu\text{m}$ | $\pm 2.5\mu\text{m}$ | $\pm 4.0\mu\text{m}$ | 1546mm | $2\mu\text{m}$   | 18.0      |

### Inch

| Range (R) | Order No. |         | Pitch |     | Accuracy of block pitch for the range shown below as measured from the bottom block |                      |                       |                       | Length | Parallelism      | Mass (kg) |
|-----------|-----------|---------|-------|-----|---|----------------------|-----------------------|-----------------------|--------|------------------|-----------|
|           | Steel     | Ceramic | P     | P   | up to 12"   | 12-24"               | 24-40"                | 40-60"                |        |                  |           |
|           |           |         |       |     |   |                      |                       |                       |        |                  |           |
| 12"       | 515-730   | 515-750 | 1"    | .5" | $\pm 50\mu\text{in}$  | —                    | —                     | —                     | 13.0"  | $40\mu\text{in}$ | 3.4       |
| 18"       | 515-731   | 515-751 | 1"    | .5" | $\pm 50\mu\text{in}$  | $\pm 70\mu\text{in}$ | —                     | —                     | 19.0"  | $40\mu\text{in}$ | 5.2       |
| 24"       | 515-732   | 515-752 | 1"    | .5" | $\pm 50\mu\text{in}$  | $\pm 70\mu\text{in}$ | —                     | —                     | 25.0"  | $60\mu\text{in}$ | 6.9       |
| 40"       | 515-733   | 515-753 | 1"    | .5" | $\pm 50\mu\text{in}$  | $\pm 70\mu\text{in}$ | $\pm 100\mu\text{in}$ | —                     | 41.0"  | $60\mu\text{in}$ | 11.5      |
| 60"       | 515-734   | 515-754 | 1"    | .5" | $\pm 50\mu\text{in}$  | $\pm 70\mu\text{in}$ | $\pm 100\mu\text{in}$ | $\pm 158\mu\text{in}$ | 61.5"  | $80\mu\text{in}$ | 17.3      |

### Optional Accessories

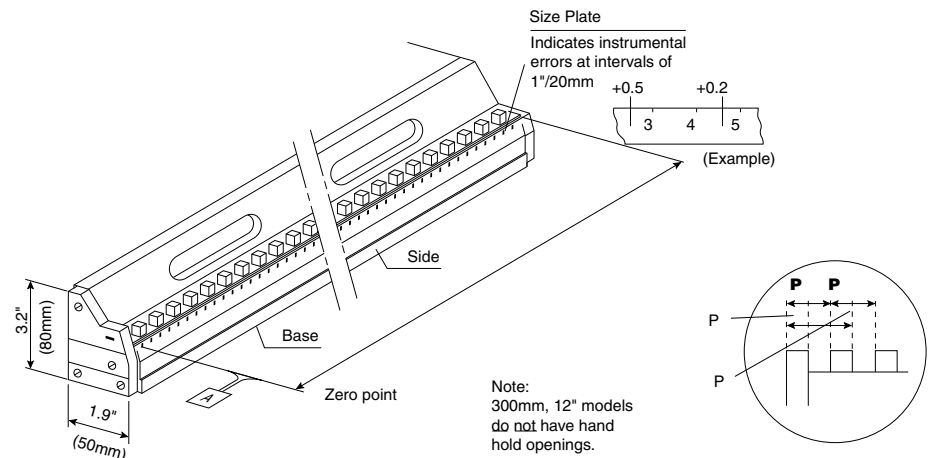
**601167:** Supporting base for vertical operation

Dimensions: 14.2" (W) x 8.7" (D) x 8.3" (H)  
 360mm (W) x 220mm (D) x 210mm (H)

Mass: 3kg



Supporting base



# CERA Straight Master SM-C

## SERIES 311 — Straightness Measuring Instrument

### FEATURES

CERA Straight master is a master gage used for the straightness inspection of each axis movement such as a CMM, machine tool, semiconductor-related equipment and form measuring machine.

- Made from Alumina-ceramic
- 50mm/2" pitch gradation scales
- Precision-lapped measuring surface
- Double-faced type is lapping the double face, which can be used for straightness in horizontal and vertical as a reference square.
- Lightweight
- Supplied with fitted wooden case.



### SPECIFICATIONS

| Metric         |            | Inch           |            | High-accuracy model |                  |       |
|----------------|------------|----------------|------------|---------------------|------------------|-------|
| Nominal length | Order No.* | Nominal length | Order No.* | Straightness        | Size (L x H x W) | Mass  |
| 400mm          | 311-302-33 | 16"            | 311-322-33 | 0.3μm               | 440 x 35 x 50mm  | 1.8kg |
| 700mm          | 311-305-33 | 28"            | 311-325-33 | 0.5μm               | 740 x 35 x 50mm  | 3kg   |
| 1000mm         | 311-307-33 | 40"            | 311-327-33 | 1.0μm               | 1040 x 45 x 80mm | 8kg   |
| 1300mm         | 311-309-33 | 52"            | 311-329-33 | 1.5μm               | 1340 x 45 x 80mm | 10kg  |

| Metric         |            | Inch           |            | Ultra-high accuracy model |                  |       |
|----------------|------------|----------------|------------|---------------------------|------------------|-------|
| Nominal length | Order No.* | Nominal length | Order No.* | Straightness              | Size (L x H x W) | Mass  |
| 400mm          | 311-332-33 | 16"            | 311-342-33 | 0.2μm                     | 440 x 35 x 50mm  | 1.8kg |
| 700mm          | 311-335-33 | 28"            | 311-345-33 | 0.4μm                     | 740 x 35 x 50mm  | 3kg   |
| 1000mm         | 311-337-33 | 40"            | 311-347-33 | 0.5μm                     | 1040 x 45 x 80mm | 8kg   |
| 1300mm         | 311-339-33 | 52"            | 311-349-33 | 0.7μm                     | 1340 x 45 x 80mm | 10kg  |

Double-faced type



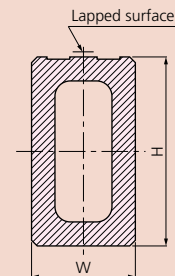
### SPECIFICATIONS

| Metric         |            | Inch           |            | Double-faced model |                  |       |
|----------------|------------|----------------|------------|--------------------|------------------|-------|
| Nominal length | Order No.* | Nominal length | Order No.* | Straightness       | Size (L x H x W) | Mass  |
| 400mm          | 311-352-33 | 16"            | 311-362-33 | 0.3μm              | 440 x 45 x 80mm  | 3.2kg |
| 700mm          | 311-355-33 | 28"            | 311-365-33 | 0.5μm              | 740 x 45 x 80mm  | 5.5kg |
| 1000mm         | 311-357-33 | 40"            | 311-367-33 | 1.0μm              | 1040 x 45 x 80mm | 8kg   |
| 1300mm         | 311-359-33 | 52"            | 311-369-33 | 1.5μm              | 1340 x 45 x 80mm | 10kg  |

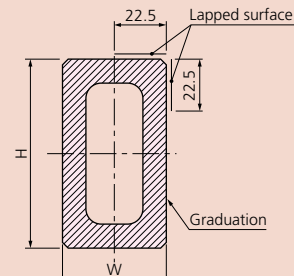
### Technical Data

Provided with inspection certificate.

### Cross section



### Double-faced type





# Square Master

## SERIES 311 — Squareness / Straightness Measuring Instrument

### Technical Data

Squareness: Refer to the list of specifications  
 Straightness: Refer to the list of specifications  
 Dial test indicator provided  
 Range: 0.2mm  
 Graduation: 0.002mm  
 Accuracy: 3µm

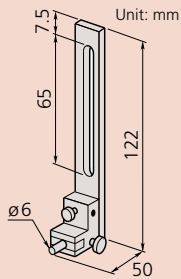
### Optional Accessory

—: Riser blocks (see page E-27.)\*  
**900571:** Adjustable holder  
**900551:** Extension holder  
**900565:** Feeler\*\*

\*Not available for 450mm model.  
 \*\*Adapter (**902803**) is required for metric model.

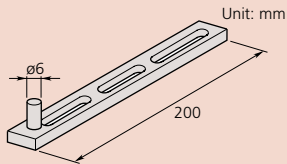
### Adjustable holder

No.900571



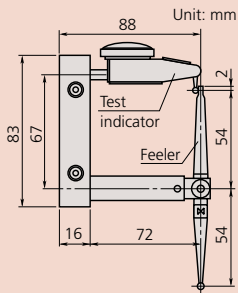
### Extension holder

No.900551



### Feeler

No.900565



### FEATURES

- Squareness (perpendicularity) and straightness measurements can be performed accurately and efficiently by moving a lever.
- With a dial test indicator for reading displacements.
- Its own squareness is adjustable for high-accuracy measurement.



311-215



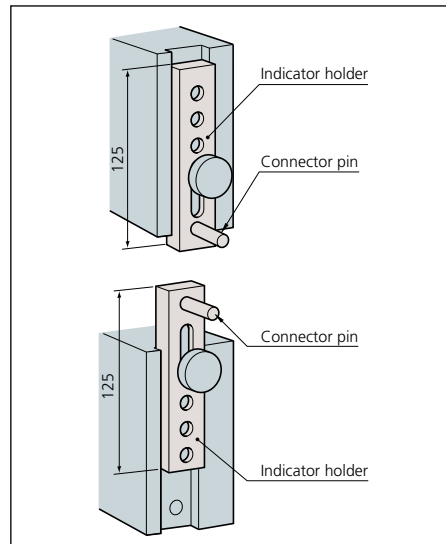
311-225



311-245

### SPECIFICATIONS

| Metric          |                |            |              |           |
|-----------------|----------------|------------|--------------|-----------|
| Vertical travel | Order No.      | Squareness | Straightness | Mass (kg) |
| 150mm           | <b>311-215</b> | 3µm        | 2µm          | 13.7      |
| 250mm           | <b>311-225</b> | 6µm        | 2.5µm        | 16.2      |
| 450mm           | <b>311-245</b> | 9µm        | 3.5µm        | 24        |

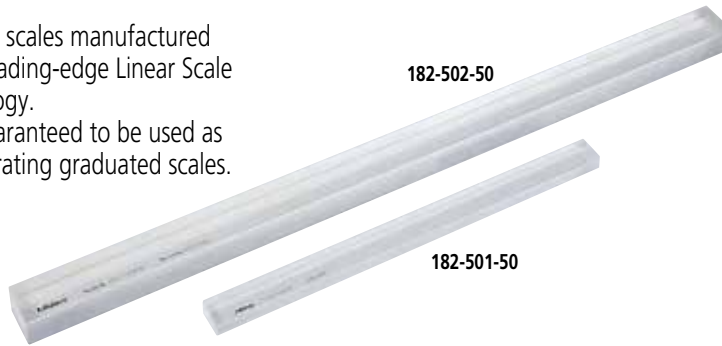


# Standard Scales

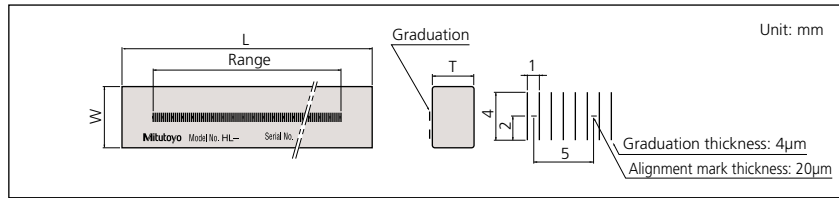
**SERIES 182 — Made of Low-Expansion Glass**

## FEATURES

- High-precision glass scales manufactured under Mitutoyo's leading-edge Linear Scale production technology.
- High accuracy is guaranteed to be used as a standard for calibrating graduated scales.



## DIMENSIONS



## Technical Data

Accuracy (at 20°C):  $(0.5+L/1000)\mu\text{m}$ ,  
 L = Measured length (mm)  
 Glass material: Low expansion glass  
 Thermal expansion coefficient:  $8 \times 10^{-6}/\text{K}$   
 Graduation: 1mm  
 Graduation thickness: 4µm  
 Mass: 0.75kg (250mm), 1.8kg (500mm)

## SPECIFICATIONS

### Metric

| Range | Order No.          | L     | W    | T    |
|-------|--------------------|-------|------|------|
| 250mm | <b>182-501-50</b>  | 280mm | 20mm | 10mm |
| 250mm | <b>182-501-60*</b> | 280mm | 20mm | 10mm |
| 500mm | <b>182-502-50</b>  | 530mm | 30mm | 20mm |
| 500mm | <b>182-502-60*</b> | 530mm | 30mm | 20mm |

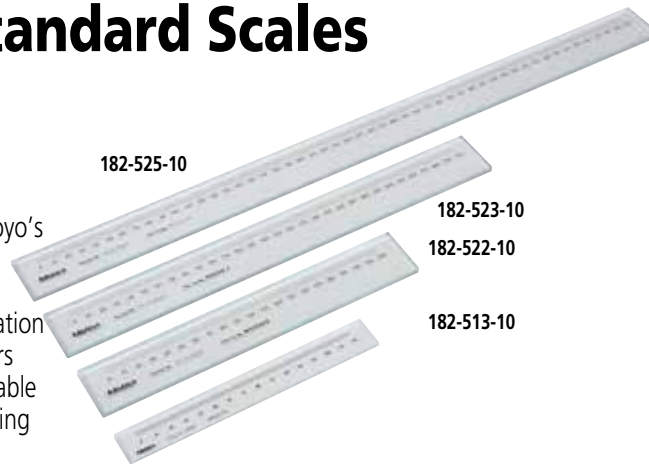
\*with English JCSS certificate.

# Working Standard Scales

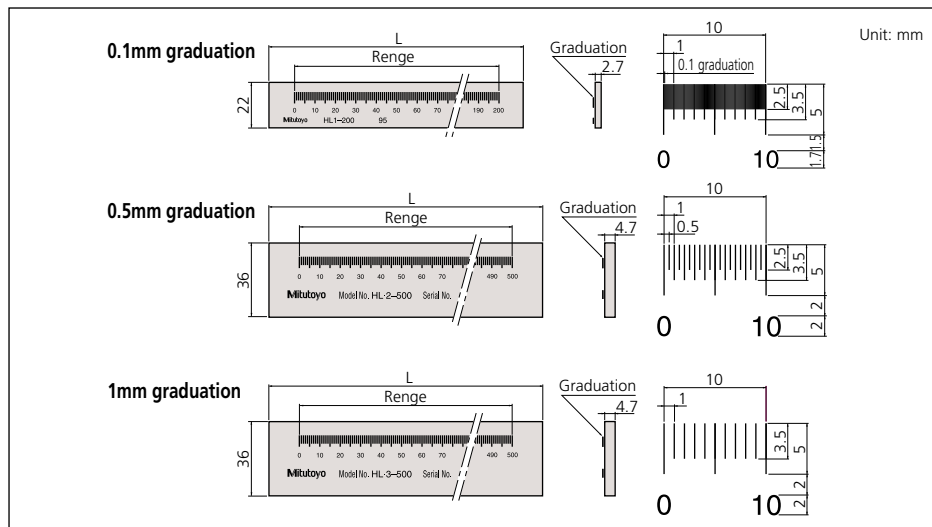
**SERIES 182**

## FEATURES

- High-precision glass scales manufactured under Mitutoyo's leading-edge linear scale production technology.
- Ideal for checking magnification accuracy of profile projectors and microscopes, and the table feeding accuracy of measuring equipment.



## DIMENSIONS



## Technical Data

Accuracy (at 20°C):  $(1.5+2L/1000)\mu\text{m}$ ,  
 L = Measured length (mm)  
 Glass material: Sodium glass  
 Thermal expansion coefficient:  $8.5 \times 10^{-6}/\text{K}$   
 Graduation: 0.1mm (thickness: 20µm)  
 0.5mm (thickness: 50µm)  
 1mm (thickness: 100µm)

## SPECIFICATIONS

### Metric

| Range  | Order No.         | Graduation | L      | Mass   |
|--------|-------------------|------------|--------|--------|
| 50mm   | <b>182-511-10</b> | 0.1mm      | 75mm   | 0.23kg |
| 100mm  | <b>182-512-10</b> | 0.1mm      | 125mm  | 0.24kg |
| 150mm  | <b>182-513-10</b> | 0.1mm      | 175mm  | 0.35kg |
| 200mm  | <b>182-514-10</b> | 0.1mm      | 225mm  | 0.36kg |
| 100mm  | <b>182-521-10</b> | 0.5mm      | 130mm  | 0.27kg |
| 200mm  | <b>182-522-10</b> | 0.5mm      | 230mm  | 0.32kg |
| 300mm  | <b>182-523-10</b> | 0.5mm      | 330mm  | 0.57kg |
| 400mm  | <b>182-524-10</b> | 0.5mm      | 430mm  | 0.71kg |
| 500mm  | <b>182-525-10</b> | 0.5mm      | 530mm  | 0.86kg |
| 250mm  | <b>182-531-10</b> | 1mm        | 280mm  | 0.55kg |
| 500mm  | <b>182-532-10</b> | 1mm        | 530mm  | 0.86kg |
| 750mm  | <b>182-533-10</b> | 1mm        | 780mm  | 1.22kg |
| 1000mm | <b>182-534-10</b> | 1mm        | 1030mm | 1.54kg |

# High-Precision Square

## SERIES 311

### FEATURES

The High-Precision Square gage is used for inspecting the travel straightness and axial perpendicularity of moving elements on equipment, such as machine tools, CMMs, form measuring machines and semiconductor-related equipment.

- Four precision-lapped reference surfaces.
- Better than 1 $\mu$ m/300mm straightness and perpendicularity.



311-111



311-112



311-113

### SPECIFICATIONS

#### Metric

| Order No. | Dimension (W x L x T) | Mass   |
|-----------|-----------------------|--------|
| 311-111   | 90 x 110 x 25mm       | 1.5kg  |
| 311-112   | 160 x 210 x 25mm      | 5.0kg  |
| 311-113   | 260 x 310 x 30mm      | 14.0kg |

\* 311-113 is supplied with a removable handle.

# Spring Dividers and Calipers

## SERIES 950

### FEATURES

- Spring Divider — Fully hardened and tempered joints, spring, washers and divider points.
- Outside Spring Caliper — Contact ends fully rounded to give accurate dimensions.
- Inside Spring Caliper — Ends fully rounded to give accurate contact with a workpiece.



Spring divider



Outside spring calipers



Inside spring calipers

### SPECIFICATIONS

| Range      | Order No.      |                         |                        |
|------------|----------------|-------------------------|------------------------|
|            | Spring divider | Outside spring calipers | Inside spring calipers |
| 6" (150mm) | 950-212        | 950-222                 | 950-232                |
| 8" (200mm) | 950-213        | 950-223                 | 950-233                |

# Steel Rules

## SERIES 182

### FEATURES

- Clear graduations on satin-chrome finish.
- Stainless tempered.



182-125

### SPECIFICATIONS

#### Wide Rigid Rules (thickness 3/64")

| Order No. | Size        | Graduations |       |      |         | Width  | Accuracy (Length)                         |
|-----------|-------------|-------------|-------|------|---------|--------|---|
|           |             | 1/8         | 1/16  | 1/32 | 1/64th  |        |   |
| 182-101   | 6" (4R)     | 1/8         | 1/16  | 1/32 | 1/64th  | 3/4"   | + .004" / - .0035"<br>(+0.1mm / -0.09mm)  |
| 182-102   | 6" (16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 3/4"   |   |
| 182-103   | 6" (5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 3/4"   |   |
| 182-104   | 6" (3R)     | 1/32        | 1/64  | 1/10 | 1/50th  | 3/4"   |   |
| 182-105   | 6" x 150mm  | 1/32        | 1/64  | 1mm  | 0.5mm   | 3/4"   |   |
| 182-106   | 6" x 150mm  | 1/50        | 1/100 | 1mm  | 0.5mm   | 3/4"   |   |
| 182-107   | 6" x 150mm  | 1/10        | 1/100 | 1mm  | 0.5mm   | 3/4"   |   |
| 182-108   | 6" x 150mm  | 1/10        | 1/50  | 1mm  | 0.5mm   | 3/4"   |   |
| 182-111   | 150mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 19mm   |   |
| 182-121   | 12" (4R)    | 1/8         | 1/16  | 1/32 | 1/64th  | 1"     |   |
| 182-122   | 12" (16R)   | 1/32        | 1/64  | 1/50 | 1/100th | 1"     |   |
| 182-123   | 12" (5R)    | 1/32        | 1/64  | 1/10 | 1/100th | 1"     |   |
| 182-124   | 12" (3R)    | 1/32        | 1/64  | 1/10 | 1/50th  | 1"     |   |
| 182-125   | 12" x 300mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 1"     |   |
| 182-126   | 12" x 300mm | 1/50        | 1/100 | 1mm  | 0.5mm   | 1"     |   |
| 182-131   | 300mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 25mm   |   |
| 182-241   | 18" (4R)    | 1/8         | 1/16  | 1/32 | 1/64    | 13/16" | + .006" / - .035"<br>(+0.15mm / -0.09mm)  |
| 182-142   | 18" (16R)   | 1/32        | 1/64  | 1/50 | 1/100th | 13/16" |   |
| 182-143   | 18" (5R)    | 1/32        | 1/64  | 1/10 | 1/100th | 13/16" |   |
| 182-145   | 18" x 450mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 13/16" |   |
| 182-151   | 450mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 30mm   | + .007" / - .0035"<br>(+0.18mm / -0.09mm) |
| 182-161   | 24" (4R)    | 1/8         | 1/16  | 1/32 | 1/64    | 13/16" |   |
| 182-162   | 24" (16R)   | 1/32        | 1/64  | 1/50 | 1/100th | 13/16" |   |
| 182-163   | 24" (5R)    | 1/32        | 1/64  | 1/10 | 1/100th | 13/16" |   |
| 182-165   | 24" x 600mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 13/16" |   |
| 182-171   | 600mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 30mm   |   |

# Steel Rules

## SERIES 182

### FEATURES

- Clear graduations on satin-chrome finish.
- Stainless tempered.



182-265



182-223

### SPECIFICATIONS

#### Full-Flexible Rules (thickness 1/64")

| Order No. | Size        | Graduations |       |      |         | Width | Accuracy (Length)                         |
|-----------|-------------|-------------|-------|------|---------|-------|---|
| 182-201   | 6"(4R)      | 1/8         | 1/16  | 1/32 | 1/64th  | 1/2"  | +0.004" / -0.0035"<br>(+0.1mm / -0.09mm)  |
| 182-202   | 6"(16R)     | 1/32        | 1/64  | 1/50 | 1/100th | 1/2"  |   |
| 182-203   | 6"(5R)      | 1/32        | 1/64  | 1/10 | 1/100th | 1/2"  |   |
| 182-204   | 6"(3R)      | 1/32        | 1/64  | 1/10 | 1/50th  | 1/2"  |   |
| 182-205   | 6" x 150mm  | 1/32        | 1/64  | 1mm  | 0.5mm   | 1/2"  |   |
| 182-206   | 6" x 150mm  | 1/50        | 1/100 | 1mm  | 0.5mm   | 1/2"  |   |
| 182-207   | 6" x 150mm  | 1/10        | 1/100 | 1mm  | 0.5mm   | 1/2"  |   |
| 182-208   | 6" x 150mm  | 1/10        | 1/50  | 1mm  | 0.5mm   | 1/2"  |   |
| 182-211   | 150mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 12mm  | +0.005" / -0.0035"<br>(+0.13mm / -0.09mm) |
| 182-221   | 12"(4R)     | 1/8         | 1/16  | 1/32 | 1/64th  | 1/2"  |   |
| 182-222   | 12"(16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 1/2"  |   |
| 182-223   | 12"(5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 1/2"  |   |
| 182-224   | 12"(3R)     | 1/32        | 1/64  | 1/10 | 1/50th  | 1/2"  |   |
| 182-225   | 12" x 300mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 1/2"  |   |
| 182-226   | 12" x 300mm | 1/50        | 1/100 | 1mm  | 0.5mm   | 1/2"  | +0.006" / -0.0035"<br>(+0.15mm / -0.09mm) |
| 182-231   | 300mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 12mm  |   |
| 182-141   | 18"(4R)     | 1/8         | 1/16  | 1/32 | 1/64    | 3/4"  |   |
| 182-242   | 18"(16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 3/4"  |   |
| 182-243   | 18"(5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 3/4"  |   |
| 182-245   | 18" x 450mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 3/4"  | +0.007" / -0.0035"<br>(+0.18mm / -0.09mm) |
| 182-251   | 450mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 18mm  |   |
| 182-261   | 24"(4R)     | 1/8         | 1/16  | 1/32 | 1/64    | 3/4"  |   |
| 182-262   | 24"(16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 3/4"  |   |
| 182-263   | 24"(5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 3/4"  | +0.007" / -0.0035"<br>(+0.18mm / -0.09mm) |
| 182-264   | 24"(3R)     | 1/32        | 1/64  | 1/10 | 1/50th  | 3/4"  |   |
| 182-265   | 24" x 600mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 3/4"  |   |
| 182-271   | 600mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 18mm  |   |

## Semi-Flexible Rules

### SERIES 182

### FEATURES

- Engraved on frontside only

### SPECIFICATIONS

| Inch/Metric |              | Graduations |     |      |      | Width  | Accuracy (Length) |   |
|-------------|--------------|-------------|-----|------|------|--------|-------------------|---|
| 182-301     | 4" x 100mm   | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | 5/8"              | +0.004" / -0.0035"<br>(+0.1mm / -0.09mm)  |
| 182-302     | 6" x 150mm   | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | 5/8"              | +0.005" / -0.0035"<br>(+0.13mm / -0.09mm) |
| 182-303     | 8" x 200mm   | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | 5/8"              |   |
| 182-305     | 12" x 300mm  | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | 5/8"              | +0.007" / -0.0035"<br>(+0.18mm / -0.09mm) |
| 182-307     | 20" x 500mm  | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | 5/8"              |   |
| 182-309     | 40" x 1000mm | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | 5/8"              | +0.008" / -0.004" (+0.2mm / -0.1mm)       |

# Thickness/Feeler Gages

**SERIES 950, 184**

## FEATURES

- Each leaf is marked with its thickness.
- Each leaf is detachable.



184-303S

## SPECIFICATIONS

### Inch

| Range                         | Order No.      | Type of Blade                | Blade Length | Composition of leaves  |
|-------------------------------|----------------|------------------------------|--------------|--|
| .0015" - .035"<br>(26 leaves) | <b>950-251</b> | Straight<br>1/2" width       | 3"           | .002 thru .018" by .001" step plus .0015, .020, .022, .024, .025, .028, .030, .032"        |
| .0015" - .025"<br>(26 leaves) | <b>950-252</b> | Tapered<br>1/4" width at tip | 3"           | .002 thru .025 by .001" step plus .0015, .0025"  |
| .0015" - .200"<br>(15 leaves) | <b>950-254</b> | Straight<br>1/2" width       | 3"           | .0015, .002, .003, .004, .006, .008, .010, .012, .015, .020, .030, .040, .075, .100, .200" |
| .0015" - .200"<br>(13 leaves) | <b>950-255</b> | Straight<br>1/2" width       | 4.5"         | .0015, .002, .003, .004, .006, .008, .010, .020, .030, .040, .075, .100, .200"             |
| .0015" - .015"<br>(9 leaves)  | <b>950-256</b> | Straight<br>1/2" width       | 6"           | .0015, .002, .003, .004, .006, .008, .010, .012, .015"                                     |

### Metric

| Range        | Order No.       | Type of Blade          | Blade Length | Composition of leaves   |
|--------------|-----------------|------------------------|--------------|---|
| 0.05 - 1mm   | <b>184-313S</b> | Straight<br>13mm width | 100mm        | 28 leaves: 0.05 - 0.15mm by 0.01mm, 0.2 - 1mm by 0.05mm         |
|              | <b>184-303S</b> |                        | 150mm        | 28 leaves: 0.05 - 0.15mm by 0.01mm, 0.2 - 1mm by 0.05mm         |
| 0.05 - 1mm   | <b>184-304S</b> | Straight<br>13mm width | 150mm        | 20 leaves: 0.05 - 1mm by 0.05mm                                 |
|              | <b>184-305S</b> |                        | 100mm        | 13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm           |
| 0.05 - 1mm   | <b>184-301S</b> | Straight<br>13mm width | 100mm        | 13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm           |
|              | <b>184-301S</b> |                        | 150mm        | 13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm           |
| 0.05 - 0.8mm | <b>184-306S</b> | Straight<br>13mm width | 100mm        | 10 leaves: 0.05 - 0.2mm by 0.05mm, 0.3 - 0.8mm by 0.1mm         |
|              | <b>184-308S</b> |                        | 150mm        | 10 leaves: 0.05 - 0.2mm by 0.05mm, 0.3 - 0.8mm by 0.1mm         |
| 0.03 - 0.5mm | <b>184-307S</b> | Straight<br>13mm width | 100mm        | 13 leaves: 0.03 - 0.1mm by 0.01mm, 0.2 - 0.5mm by 0.1mm, 0.15mm |
|              | <b>184-302S</b> |                        | 150mm        | 13 leaves: 0.03 - 0.1mm by 0.01mm, 0.2 - 0.5mm by 0.1mm, 0.15mm |

## Technical Data

Accuracy of Leaves Thickness

**Nominal Thickness**

Metric

0.01mm to less than 0.06mm:

0.06mm to less than 0.10mm:

0.10mm to less than 0.35mm:

0.35mm to less than 0.65mm:

0.65mm to less than 3.0mm:

Inch

.0015 to less than .007":

.007 to less than .015":

.015 to less than .025":

.026 to less than .030":

.031 to less than .040":

.041 to less than .075":

.076 to less than .100":

.101 to less than .200":

.200" and over:

**Tolerance**

±0.003mm

±0.004mm

±0.005mm

±0.008mm

±0.01mm

±.0002"

±.0003"

±.0004"

±.00045"

±.0005"

±.00055"

±.0006"

±.00065"

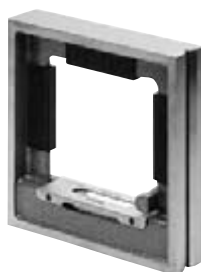
±.00075"

# Precision Levels

**SERIES 960**

## FEATURES

- High-precision longitudinal and transverse vials make it possible to check or level surfaces.
- Supplied in wooden box.



960-703



960-611

## SPECIFICATIONS

### Metric

| Order No.      | Sensitivity | Accuracy | Dimensions<br>(W x D x H) |
|----------------|-------------|----------|---------------------------|
| <b>960-703</b> | 0.02mm/m    | ±0.006mm | 200 x 44 x 200mm          |

### Inch

| Order No.      | Sensitivity | Accuracy | Dimensions |       |       |
|----------------|-------------|----------|------------|-------|-------|
|                |             |          | W          | D     | H     |
| <b>960-611</b> | .0012"/12"  | ±.0006"  | 7.87"      | 1.73" | 1.50" |
| <b>960-612</b> | .0006"/12"  | ±.0003"  | 7.87"      | 1.73" | 1.50" |
| <b>960-613</b> | .00024"/12" | ±.00017" | 7.87"      | 1.73" | 1.50" |

## Wooden Box Part No.

| Part No. | Spare          |
|----------|----------------|
| 073112   | <b>960-703</b> |
| 063413   | <b>960-611</b> |
|          | <b>960-611</b> |
|          | <b>960-613</b> |

# Digital Universal Protractor

## SERIES 187

### Technical Data

|                |                 |
|----------------|-----------------|
| Range:         | -360° to +360°  |
| Tolerance:     | ±2' (±0.03°)    |
| Repeatability: | 1'              |
| Resolution:    | 1' (0.01°)      |
| Battery:       | Lithium Battery |
| Battery life:  | 2,000 hours     |

### Function

Presetting

### Standard Accessories

12" Blade (Code No. 187-103)  
 Battery (CR2032) (Part No. 05SAA217)  
 Clamp box for Inch Height Gage (Part No. 950749)  
 Plastic Case

### Optional Accessories

|                |                                  |
|----------------|----------------------------------|
| <b>187-104</b> | 6" blade                         |
| <b>187-105</b> | Acute angle attachment           |
| <b>950750</b>  | Clamp box for Metric Height Gage |
| <b>905338</b>  | Connecting cable (40" / 1m)      |
| <b>905409</b>  | Connecting cable (80" / 2m)      |

### FEATURES

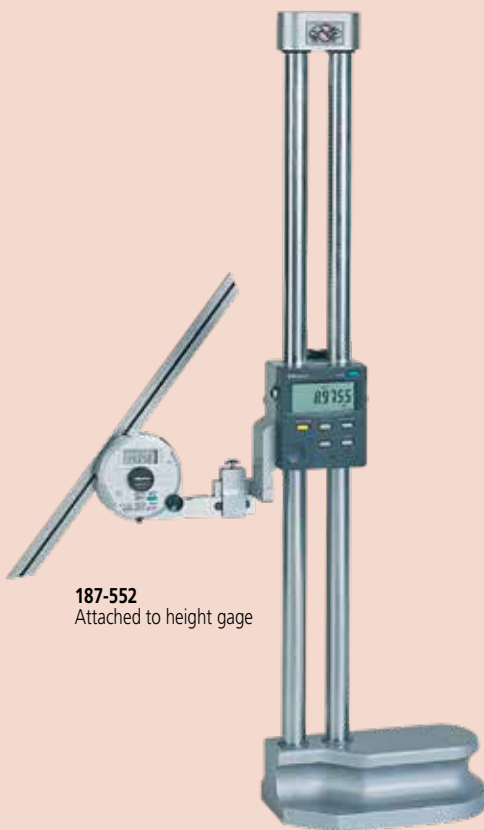
- Data output function make it easy to see the statistical data.
- Can be attached to height gages, gage holder (950750, metric)
- Setting preset value.
- Removable blade.



187-552

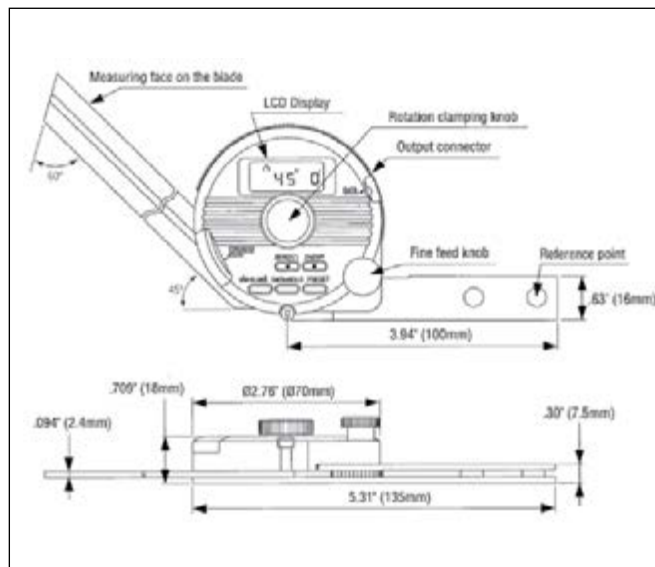
### SPECIFICATIONS

| Code No.                      | 187-552  |
|-------------------------------|--|
| Model                         | BP-D300E   |
| Blade                         | 12" (187-103)  |
| Display                       | LCD - 5 digit, (-) sign, character height 6.5mm  |
| Measuring range               | -360° ~ +360°  |
| Resolution                    | 1' (0.01°)   |
| Accuracy                      | ± 2' (±0.03°)  |
| Repeatability                 | 1' (0.01°)   |
| Mass                          | 1.45 lbs (659g)  |
| Dust / Water protection level | IP40   |
| Function                      | Zero, Direction select, Data output / Data hold, Preset, Switchable Seagesimal or Decimal Notation |
| Max. response speed           | 3 rps  |
| Battery                       | Lithium battery (CR2032) 1 pc. (Part No. 05SAA217)   |
| Battery life                  | 2,000 hours  |
| Alarm                         | Battery voltage low, Over speed error (Err)  |
| Temperature                   | Operation temperature: 0 to 40°C<br>Storage temperature: -10 to 60°C                               |



187-552  
Attached to height gage

### DIMENSIONS

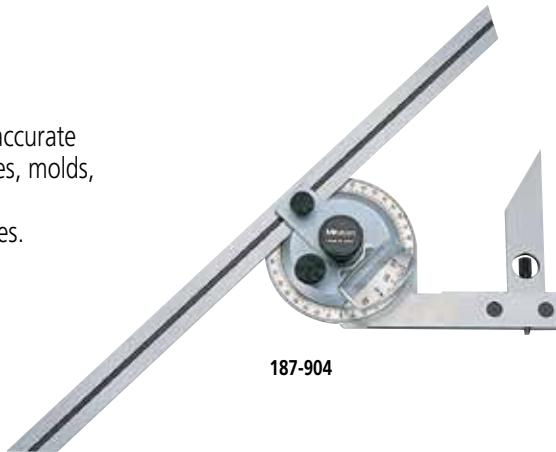


# Universal Bevel Protractor

## SERIES 187

### FEATURES

- High-precision angle gage for accurate angle measurement of machines, molds, and jigs.
- Can be attached to height gages.



187-904

### SPECIFICATIONS

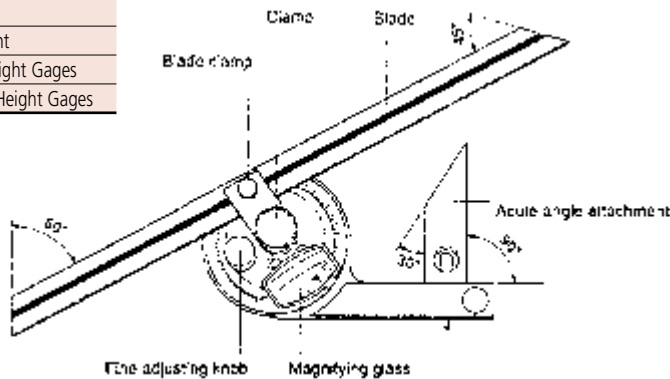
#### Universal Bevel Protractors

| Graduation |      |         |   |
|------------|------|---------|---|
| Order No.  | Dial | Vernier | Remarks   |
| 187-904    | 1°   | 5 min   | with 6" blade (187-104) and Clamp box for Inch Height Gages (950749)  |
| 187-906    | 1°   | 5min    | with 12" blade (187-103) and Clamp box for Inch Height Gages (950749) |

#### Universal Bevel Protractor Accessories and Parts

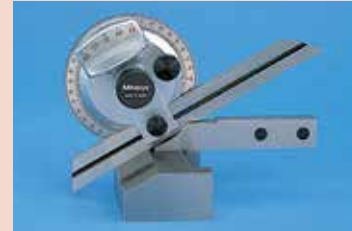
| Order No. | Remarks                           |
|-----------|-----------------------------------|
| 187-103   | 12" Blade                         |
| 187-104   | 6" Blade                          |
| 187-105   | Acute angle attachment            |
| 950749    | Clamp box for Inch Height Gages   |
| 950750    | Clamp box for Metric Height Gages |

### DIMENSIONS



### Technical Data

|                    |                           |
|--------------------|---------------------------|
| Graduation:        | 5min. (0° - 90° - 0°)     |
| Accuracy           |                           |
| Vernier            | ±5'                       |
| Straightness       | [.00016" + (.00005xL/2)]" |
| Parallelism        | [.00016" + (.00005xL/2)]" |
| L = Length in inch |                           |
| Diameter:          | 2.56" / 70mm              |



# Bevel Protractor

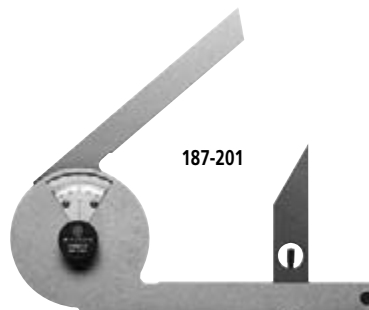
## SERIES 187

### FEATURES

- Consists of three sheets of stainless steel, the middle one of which is made for angle measurements.

### SPECIFICATIONS

| Order No. | Graduation | Remarks  |
|-----------|------------|--|
| 187-201   | 1° / 5 min | Center black knob locks the blade position<br>Protractor Graduation: 0°-90° , 90°-0° |



187-201

### Technical Data

|                   |                        |
|-------------------|------------------------|
| Graduation:       | 5 min. (0° - 90° - 0°) |
| Blade edge angle: | 30° and 60°            |
| Diameter:         | 2.56" / 70mm           |

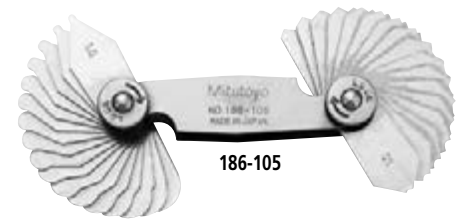


# Radius Gages

## SERIES 186

### FEATURES

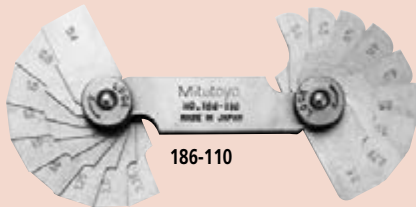
- Radius size is stamped on each gage.
- Both concave and convex radius gages become a pair.
- With a locking clamp.



186-105

### Technical Data

Accuracy:  $\pm 0.02''$



186-110

### SPECIFICATIONS

#### Metric

| Range       | Order No.      | Composition of leaves   | Remarks  |
|-------------|----------------|---|----------|
| 0.4 - 6mm   | <b>186-110</b> | 18 leaves: 0.4, 0.8, 1, 1.2, 1.5, 1.6mm, 1.75 - 3mm by 0.25mm, 3.5 - 6mm by 0.5mm | 90° arc  |
| 1 - 7mm     | <b>186-105</b> | 34 pairs: 1 - 3mm by 0.25mm, 3.5 - 7mm by 0.5mm                                   | 180° arc |
| 7.5 - 15mm  | <b>186-106</b> | 32 pairs: 7.5 - 15mm by 0.5mm   | 180° arc |
| 15.5 - 25mm | <b>186-107</b> | 15 pairs: 15.5 - 20mm by 0.5mm, 21 - 25mm by 1mm                                  | 180° arc |

#### Inch

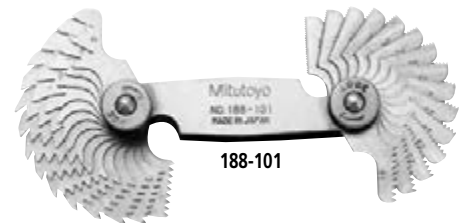
| Range          | Order No.      | Composition of leaves              | Remarks  |
|----------------|----------------|------------------------------------|----------|
| 1/32" - 17/64" | <b>186-103</b> | 16 leaves: 1/32" - 17/64" by 64ths | 90° arc  |
| 1/32" - 1/4"   | <b>186-101</b> | 15 pairs: 1/32" - 1/4" by 64ths    | 180° arc |
| 17/64" - 1/2"  | <b>186-102</b> | 16 pairs: 17/64" - 1/2" by 64ths   | 180° arc |
| 9/32" - 33/64" | <b>186-104</b> | 16 leaves: 9/32" - 33/64" by 64ths | 90° arc  |

# Pitch Gages

## SERIES 188, 950

### FEATURES

- Thread pitch size is stamped on each gage.
- Metric, Unified, and Whitworth screw pitch gages.



188-101

### Technical Data

| TPI   | Metric    | Accuracy   |                   |
|-------|-----------|------------|-------------------|
|       |           | Pitch (mm) | Angular (minutes) |
| 4-6   | 6.35-4.23 | $\pm 0.05$ | $\pm 35$          |
| 7-12  | 3.63-2.12 | $\pm 0.05$ | $\pm 40$          |
| 13-25 | 1.95-1.02 | $\pm 0.05$ | $\pm 45$          |
| 26-48 | 0.98-0.53 | $\pm 0.05$ | $\pm 50$          |
| 60    | 0.42      | $\pm 0.05$ | $\pm 60$          |

### SPECIFICATIONS

#### Metric Screw Pitch Gages (60°)

| Range        | Order No.      | Composition of leaves  |
|--------------|----------------|--|
| 0.25 - 2.5mm | <b>188-153</b> | 28 leaves: 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 1.00, 1.10, 1.20, 1.25, 1.30, 1.40, 1.50, 1.60, 1.70, 1.75, 1.80, 1.90, 2.00, 2.50 mm |
| 0.35 - 6mm   | <b>188-130</b> | 22 leaves: 0.35, 0.4, 0.45, 0.5, 0.6, 0.7, 0.75, 0.8, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6mm and 60° angle gage   |
| 0.4 - 7mm    | <b>188-122</b> | 21 leaves: 0.4, 0.5, 0.7, 0.75, 0.8, 0.9, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm  |
| 0.4 - 7mm    | <b>188-121</b> | 18 leaves: 0.4, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm   |

#### Unified Screw Pitch Gages (60°)

| Range      | Order No.      | Composition of leaves   |
|------------|----------------|---|
| 4 - 42 TPI | <b>188-111</b> | 30 leaves: 4, 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI   |
| 4 - 84 TPI | <b>950-253</b> | 51 leaves: 4, 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84 TPI |

Note: Metric and Unified Pitch Gage Set (**188-151**) is available. It consists of **188-122** (Metric) and **188-111** (Unified).

#### Metric and Unified Screw Pitch Gage Set (60°)

| Range                  | Order No.      | Composition of leaves   |
|------------------------|----------------|---|
| 0.4 - 7mm / 4 - 42 TPI | <b>188-151</b> | 51 leaves: Set of 188-122 and 188-111   |
| 0.5 - 6mm / 4 - 56 TPI | <b>188-152</b> | 28 leaves: 4, 6, 8, 10, 11, 11-1/2, 12, 13, 16, 20, 28, 32, 40, 56 TPI<br>0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00, 6.00 mm |

#### Whitworth Screw Pitch Gages (55°)

| Range      | Order No.      | Composition of leaves   |
|------------|----------------|---|
| 4 - 42 TPI | <b>188-101</b> | 30 leaves: 4, 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI |
| 4 - 60 TPI | <b>188-102</b> | 28 leaves: 4, 4 1/2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40, 48, 60 TPI                |

# Radius Gages-Sets

## SERIES 186

### FEATURES

Radius Gages are recommended for checking or laying out concave or convex radii. An individual gage for each dimension makes it possible to verify radius or fillet dimensions easier, faster and more accurately in machining, layout, inspection and pattern-making work. The measuring surfaces are precisely finished with smooth, accurate edges. Radius gages are available separately or in six sets. Each radius gage has five measuring locations, and it is identified with its particular radius dimensions. The gages have a satin or dull-chrome finish.

The holding cases, provided to protect the sets of radius gages, have indexed pockets to facilitate the selection of the proper size gage. A 4" long holder is furnished with Set No. 186-901 to make it possible to check radii in confined or hard-to-reach locations.



186-901

### SPECIFICATIONS

#### Metric

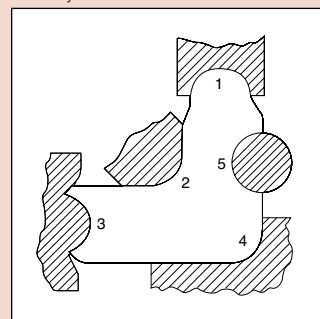
| Order No. | No. of Leaves | Sizes               | Remarks |
|-----------|---------------|---------------------|---------|
| 186-902   | 26            | 0.5 - 13mm by 0.5mm | 90° arc |

#### Inch

| Order No. | No. of Leaves | Sizes  | Remarks |
|-----------|---------------|--|---------|
| 186-901   | 25            | 1/64"-17/64" by 64ths and 9/32"-1/2" by 32nds  | Holder  |
| 186-903   | 17            | 1/64"-17/64" by 64ths  |         |
| 186-904   | 8             | 9/32"-1/2" by 32nds  |         |
| 186-905   | 8             | 9/16"-1" by 16ths  | Holder  |
| 186-906   | 26            | .010-.030" by .005"<br>.040-.100" by .010"<br>.120-.300" by .020"<br>.350-.500" by .050" | Holder  |
| 186-907   | 10            | .550-1" by .050"   |         |

Replacement handle: 950753

Accuracy:  $\pm .0016" / 0.04\text{mm}$



5 concave and convex radii per leaf.

#### Decimal

| Radius | Part No. | Radius | Part No. |
|--------|----------|--------|----------|
| .010"  | 211798   | .240"  | 211816   |
| .015"  | 211799   | .260"  | 211817   |
| .020"  | 211800   | .280"  | 211818   |
| .025"  | 211801   | .300"  | 211819   |
| .030"  | 211802   | .350"  | 211820   |
| .040"  | 211803   | .400"  | 211821   |
| .050"  | 211804   | .450"  | 211822   |
| .060"  | 211805   | .500"  | 211823   |
| .070"  | 211806   | .550"  | 211824   |
| .080"  | 211807   | .600"  | 211825   |
| .090"  | 211808   | .650"  | 211826   |
| .100"  | 211809   | .700"  | 211827   |
| .120"  | 211810   | .750"  | 211828   |
| .140"  | 211811   | .800"  | 211829   |
| .160"  | 211812   | .850"  | 211830   |
| .180"  | 211813   | .900"  | 211831   |
| .200"  | 211814   | .950"  | 211832   |
| .220"  | 211815   | 1.000" | 211833   |

#### Fraction

| Radius | Part No. | Radius | Part No. |
|--------|----------|--------|----------|
| 1/64"  | 201441   | 5/16"  | 201459   |
| 1/32"  | 201442   | 11/32" | 201460   |
| 3/64"  | 201443   | 3/8"   | 201461   |
| 1/16"  | 201444   | 13/32" | 201462   |
| 5/64"  | 201445   | 7/16"  | 201463   |
| 3/32"  | 201446   | 15/32" | 201464   |
| 7/64"  | 201447   | 1/2"   | 201465   |
| 1/8"   | 201448   | 9/16"  | 211790   |
| 9/64"  | 201449   | 5/8"   | 211791   |
| 5/32"  | 201450   | 11/16" | 211792   |
| 11/64" | 201451   | 3/4"   | 211793   |
| 3/16"  | 201452   | 13/16" | 211794   |
| 13/64" | 201453   | 7/8"   | 211795   |
| 7/32"  | 201454   | 15/16" | 211796   |
| 15/64" | 201455   | 1"     | 211797   |
| 1/4"   | 201456   |        |          |
| 17/64" | 201457   |        |          |
| 9/32"  | 201458   |        |          |

# Digital Protractor

## SERIES 950

### FEATURES

These digital protractors present inclination values on an easy-to-read LCD. The measurements are generated by an electronic gravity sensor and processed by the latest low-power electronic circuit technology.

- Full 360° range (90° x 4).
- Machined aluminum frame.
- Alternate reference (zero).
- Reading hold.
- Simple calibration requiring no special fixtures.
- Display remains upright to view at all angles. (950-317, Pro 360 Model).
- RS232C output. (950-318 Pro 3600 Model).
- Supplied in fitted carrying case.



Front View



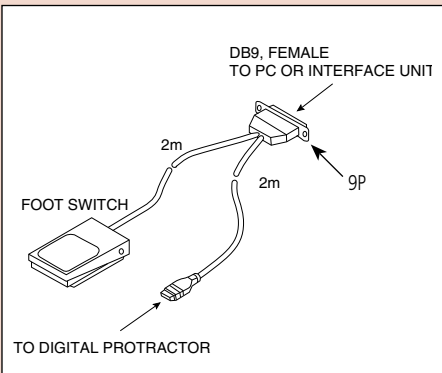
950-317 Back View



950-318 Back View

### Optional Accessories

**50AAA983A** RS-232C Output cable w/foot switch



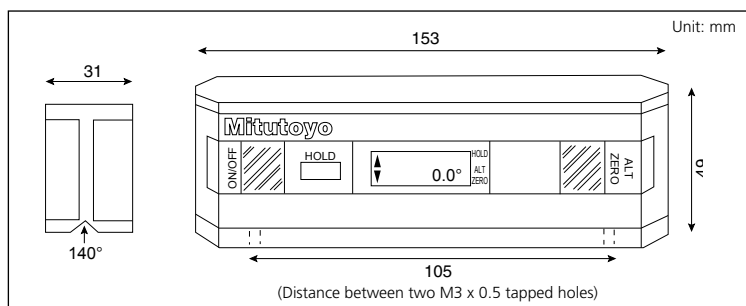
**50AAA983A** RS-232C Output cable w/foot switch 10P-9P

### SPECIFICATIONS

| Order No.             | 950-317   | 950-318  |
|-----------------------|---|--|
| Model                 | Pro 360   | Pro 3600   |
| Range                 | 360° (90°x4)  | 360° (90°x4)   |
| Resolution            | 0.1°  | 0.01° (0° to 9.99°)<br>0.1° (10° to 90°)                       |
| Accuracy              | ±0.1° Level ±10°, Plumb ±10°<br>±0.2° Maximum error | ±0.05° (0° to 10°)<br>±0.1° (80° to 90°)<br>±0.2° (10° to 80°) |
| Repeatability         | ±0.1°   | ±0.05°   |
| Cross Axis Error      | Minimal   | Minimal  |
| Battery Life          | 500 Hrs. Standard 9-Volt Battery                    | 500 Hrs. Standard 9-Volt Battery                               |
| Temperature Operation | -5°C to 50°C (23° to 122°F)                         | -5°C to 50°C (23° to 122°F)                                    |
| Storage               | -20°C to 65°C (-4°F to 149°F)                       | -20°C to 65°C (-4°F to 149°F)                                  |
| Weight                | 289g (10.2oz.)                                      | 295g (10.4oz.)   |
| Output                | N/A   | RS-232C Compatible   |
| Standard Accessories  | Plastic Case  | Plastic Case   |

±Represents clockwise or counter-clockwise slope.

### DIMENSIONS



# Digital Hand Tachometers

## SERIES 982

### FEATURES

- New digital hand tachometers are compact and easy to handle.
- NIST certification is supplied with each digital hand tachometer.
- Model PH-200LC (982-552) has laser diode detection and a combination of contact and non-contact measurement.
- Supplied with plastic carrying case.



982-551



982-552

### SPECIFICATIONS

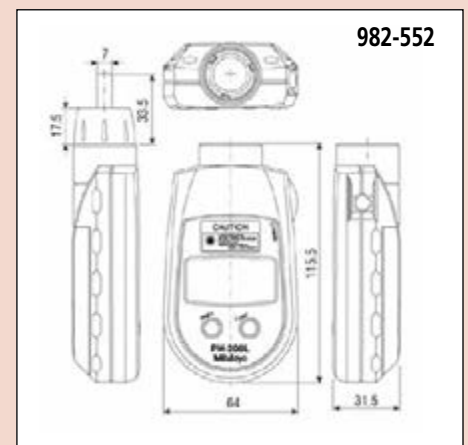
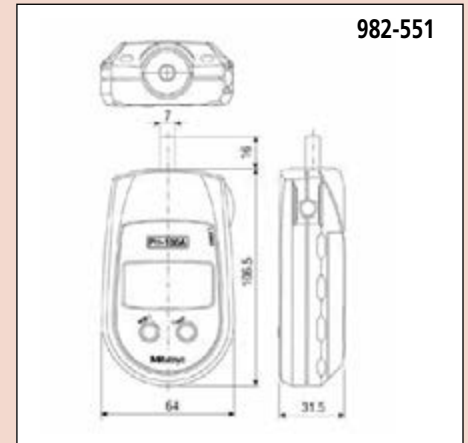
| Order No.              | 982-551   | 982-552   |
|------------------------|---|---|
| Model No.              | PH-100A   | PH-200LC  |
| Revolution per minute  | 1.0 – 25,000 rpm  | —   |
| Rotation speed         | —   | Non-contact: 6.0 – 99,999 rpm;<br>Contact: 6.0 – 25,000 rpm                           |
| Measuring accuracy     | 1.0 – 599.9rpm: $\pm 1$ rpm, 600.0 – 25,000 rpm:<br>$\pm 0.006\%$ and $\pm 0.5$ digit | 6.0 – 599.9 rpm: $\pm 1$ rpm, 600.0 – 99,999 rpm<br>$\pm 0.006\%$ and $\pm 0.5$ digit |
| Surface, Speed, Length | $\pm 0.4\%$ and 1 digit   | $\pm 0.4\%$ and $\pm 1$ digit   |
| Detection              | Optical coupler, 20 pulses per revolution   | Laser diode   |
| Outside dimensions     | 4.83" L x 2.52" W x 1.24" H<br>(122.5mm x 64mm x 31.5mm)                              | 4.55" L x 2.52" W x 1.24" H<br>Overall length with contact adapter: 149mm             |
| Mass                   | 170 g   | 160 g   |
| Power                  | Battery: AA 3 pcs.  | Battery: AA 3 pcs.  |

### Optional Accessories for Digital Hand Tachometers

| Order No. | Description                            | Dimension              | Drawing |
|-----------|--|------------------------|---------|
| 010049    | Cone Adapter, Standard                 | D = 1/2"               |         |
| 010051    | Cone Adapter, 3/4"                     | D = 3/4"               |         |
| 010052    | Cone Adapter, 1-1/4"                   | D = 1-1/4"<br>d = 1/2" |         |
| 010053    | Funnel Adapter, Standard               | D = 1/2"               |         |
| 010054    | Funnel Adapter, 3/4"                   | D = 3/4"               |         |
| 010055    | Measuring Wheel FPM (6" cir), Standard | D = 1.91"              |         |
| 010056    | Measuring Wheel FPM (12" cir)          | D = 3.82"              |         |
| 010057    | Measuring Wheel YPM (0.1 yard cir)     | D = 1.15"              |         |
| 010058    | Measuring Wheel MPM (0.1 meter cir)    | D = 1.25"              |         |
| 010059    | Reflective Tabs 1/2" square (35 pcs)   |                        |         |
| 010060    | Extension Shaft (3" length)            |                        |         |



### DIMENSIONS



# Bench Center

## SERIES 967

### Technical Data

Spindle tip material: Hardened Steel

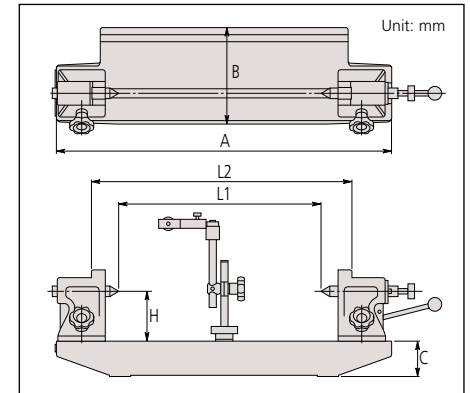
### FEATURES

- Used with a dial test indicator (optional), the bench center provides precision measurement of concentricity verification on cylindrical workpieces.
- With an indicator clamp. (Holding stem diameter: 9.53mm / .375")

967-201-10



### DIMENSIONS



| Order No.  | A   | B   | C   | H   | L1  | L2  |
|------------|-----|-----|-----|-----|-----|-----|
| 967-203-10 | 310 | 113 | 40  | 50  | 150 | 220 |
| 967-201-10 | 500 | 144 | 55  | 75  | 300 | 400 |
| 967-204-10 | 700 | 202 | 80  | 100 | 450 | 590 |
| 967-202-10 | 900 | 222 | 100 | 125 | 600 | 730 |

### Standard Accessories:

**56AAK066** Indicator rod assembly  
**967-201-10**  
**967-203-10**

**56AAK961R** Indicator rod assembly

**967-202-10**  
**967-204-10**

### Optional Accessories:

**56AAJ988** Special attachment for mounting **967-201-10** in vertical position.

**56AAJ987** Special attachment for mounting **967-203-10** in vertical position.

### SPECIFICATIONS

| Order No.  | Center-to-Center | Workpiece Capacity Diameter | Max. Weight Hold | Parallelism of Centers | Flatness of Surface | Attachment Diameter | Mass (kg) |
|------------|------------------|-----------------------------|------------------|------------------------|---------------------|---------------------|-----------|
| 967-203-10 | 5.9" / 150mm     | 3.8"                        | 15.5lbs.(7kg)    | .00024"                | .0005"              | 3/8", 8mm           | 7         |
| 967-201-10 | 11.8" / 300mm    | 5.8"                        | 35 lbs. (16kg)   | .0004"                 | .0006"              | 3/8", 8mm           | 13        |
| 967-204-10 | 17.7" / 450mm    | 7.8"                        | 44 lbs. (20kg)   | .0004"                 | .0007"              | 3/8", 8mm           | 60        |
| 967-202-10 | 23.6" / 600mm    | 9.8"                        | 66 lbs. (30kg)   | .00047"                | .00075"             | 3/8", 8mm           | 70        |

# Granite Surface Plate Accessories

## SERIES 517

These accessories are made from the same high-quality black granite as Mitutoyo surface plates, allowing flexibility in work holding and positioning.

### SPECIFICATIONS

**Angle Blocks** with or without inserts

| Grade      | Laboratory*    |                |                | Master**       |                |                |
|------------|----------------|----------------|----------------|----------------|----------------|----------------|
|            | Size           | 4 Face         |                | 2 Face         | 4 Face         |                |
| 2 Face     |                | no inserts     | w/ inserts     |                | no inserts     | w/ inserts     |
| 4 x 4 x 4" | <b>517-767</b> | <b>517-761</b> | <b>517-773</b> | <b>517-867</b> | <b>517-861</b> | <b>517-873</b> |
| 6 x 6 x 6" | <b>517-768</b> | <b>517-762</b> | <b>517-774</b> | <b>517-868</b> | <b>517862</b>  | <b>517-874</b> |

\*Laboratory overall accuracy: .000025" per 6".

\*\*Master overall accuracy: .000050" per 6".

### Parallels

| Grade          | Pair Accuracy | Laboratory     |                | Master   |                |                |
|----------------|---------------|----------------|----------------|----------|----------------|----------------|
|                |               | 2 Face         | 4 Face         | Accuracy | 2 Face         | 4 Face         |
| .75 x 1 x 6"   | .00003"       | <b>517-755</b> | <b>517-750</b> | .00006"  | <b>517-855</b> | <b>517-850</b> |
| .75 x 1.5 x 9" | .00004"       | <b>517-756</b> | <b>517-751</b> | .00008"  | <b>517-856</b> | <b>517-851</b> |
| 1 x 2 x 12"    | .00006"       | <b>517-757</b> | <b>517-752</b> | .0001"   | <b>517-857</b> | <b>517-852</b> |

### V-Blocks Matching Pair

V-1 type have matching accuracy on "V" from the bottom face only.  
 V-5 type have four face matching accuracy plus "V".

| Grade        | Laboratory*    |                | Master**       |                |
|--------------|----------------|----------------|----------------|----------------|
|              | V-1            | V-5            | V-1            | V-5            |
| 2 x 2 x 2.5" | <b>517-787</b> | <b>517-783</b> | <b>517-887</b> | <b>517-883</b> |
| 3 x 3 x 3"   | <b>517-788</b> | <b>517-784</b> | <b>517-888</b> | <b>517-884</b> |
| 6 x 6 x 6"   | <b>517-789</b> | <b>517-785</b> | <b>517-889</b> | <b>517-885</b> |

\*Laboratory overall accuracy: .00005" per 6".

\*\*Master overall accuracy: .0001" per 6"

Angle Blocks



**517-862**  
(without inserts)

**517-884** V-Blocks (matching pair)



**517-852**  
Parallels  
(in pairs)

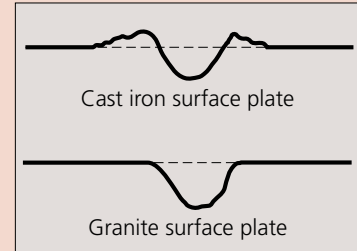
# Mitutoyo

# Black Granite Surface Plate

## SERIES 517

### FEATURES

- Natural granite seasoned for thousands of years is free from deterioration or dimensional change over time.
- Granite surface plate has many advantages over cast iron surface plates: Twice as hard as cast iron. Minimal changes in dimension due to temperature changes. Free from wringing, so there is no interruption of work. Free from burrs or protrusions because of the fine grain structure and insignificant stickiness; this ensures a high degree of flatness over a long service life and causes no damage to other parts or instruments.
- Trouble-free operation for use with magnetic materials.
- Long life and rust-free, resulting in low maintenance costs.
- Mitutoyo granite surface plates meet or exceed federal specification GGG-P-463c. Each surface plate is shipped with a Certificate of Accuracy which guarantees its accuracy and verifies its traceability to NIST.
- All plates from 48" x 108" and larger are machine base gray granite. Smaller plates are black granite.
- Surface plates, to size of specifications other than standard, available by special order.
- Surface plates, with the bolt screws, available by special order.
- All Mitutoyo surface plates shipped F.O.B. Escondido, CA.



### SPECIFICATIONS

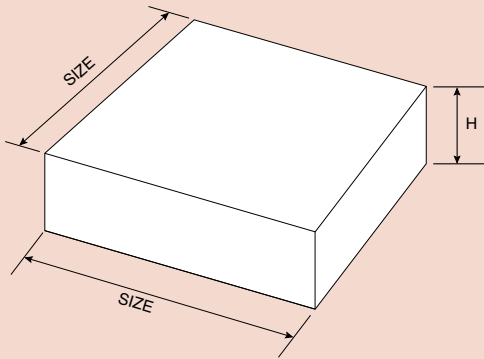
**Inch** 100 lbs.-Load / sq. ft. no ledge

| Size      | AA Laboratory Grade |       |           |           | A Inspection Grade |       |           |           | B Shop Grade |       |           |           |
|-----------|---------------------|-------|-----------|-----------|--------------------|-------|-----------|-----------|--------------|-------|-----------|-----------|
|           | H                   | Acc.* | Order No. | Wt. (lbs) | H                  | Acc.* | Order No. | Wt. (lbs) | H            | Acc.* | Order No. | Wt. (lbs) |
| 8 x 12"   | 3"                  | 50    | 517-700   | 30        | 2"                 | 100   | 517-800   | 25        | 2"           | 200   | 517-900   | 25        |
| 9 x 12"   | 3"                  | 50    | 517-701   | 40        | 3"                 | 100   | 517-801   | 40        | 2"           | 200   | 517-901   | 30        |
| 12 x 12"  | 3"                  | 50    | 517-702   | 50        | 3"                 | 100   | 517-802   | 50        | 3"           | 200   | 517-902   | 50        |
| 12 x 18"  | 4"                  | 50    | 517-703   | 100       | 4"                 | 100   | 517-803   | 100       | 4"           | 200   | 517-903   | 100       |
| 18 x 18"  | 4"                  | 50    | 517-704   | 150       | 4"                 | 100   | 517-804   | 150       | 3"           | 200   | 517-904   | 100       |
| 18 x 24"  | 4"                  | 65    | 517-705   | 200       | 4"                 | 130   | 517-805   | 200       | 4"           | 260   | 517-905   | 200       |
| 24 x 24"  | 5"                  | 70    | 517-706   | 310       | 4"                 | 140   | 517-806   | 259       | 3"           | 280   | 517-906   | 200       |
| 24 x 30"  | 5"                  | 75    | 517-707   | 400       | 5"                 | 150   | 517-807   | 400       | 4"           | 300   | 517-907   | 300       |
| 24 x 36"  | 6"                  | 85    | 517-708   | 600       | 5"                 | 170   | 517-808   | 500       | 4"           | 340   | 517-908   | 400       |
| 24 x 48"  | 8"                  | 150   | 517-709   | 1000      | 6"                 | 300   | 517-809   | 800       | 5"           | 600   | 517-909   | 650       |
| 30 x 36"  | 6"                  | 100   | 517-710   | 800       | 5"                 | 200   | 517-810   | 600       | 5"           | 400   | 517-910   | 600       |
| 30 x 48"  | 8"                  | 150   | 517-711   | 1300      | 6"                 | 300   | 517-811   | 1000      | 6"           | 600   | 517-911   | 1000      |
| 30 x 60"  | 12"                 | 200   | 517-712   | 1900      | 10"                | 500   | 517-812   | 1535      | 8"           | 1000  | 517-912   | 1150      |
| 36 x 36"  | 6"                  | 100   | 517-713   | 900       | 5"                 | 200   | 517-813   | 780       | 5"           | 400   | 517-913   | 700       |
| 36 x 48"  | 8"                  | 150   | 517-714   | 1500      | 6"                 | 300   | 517-814   | 1200      | 6"           | 600   | 517-914   | 1200      |
| 36 x 60"  | 12"                 | 200   | 517-715   | 2850      | 10"                | 400   | 517-815   | 2350      | 8"           | 800   | 517-915   | 1900      |
| 36 x 72"  | 12"                 | 250   | 517-716   | 3400      | 10"                | 500   | 517-816   | 2850      | 8"           | 1000  | 517-916   | 2300      |
| 48 x 48"  | 8"                  | 200   | 517-717   | 2025      | 6"                 | 400   | 517-817   | 1525      | 6"           | 800   | 517-917   | 1500      |
| 48 x 60"  | 12"                 | 250   | 517-718   | 3800      | 10"                | 500   | 517-818   | 3150      | 8"           | 1000  | 517-918   | 2525      |
| 48 x 72"  | 12"                 | 300   | 517-719   | 4500      | 10"                | 600   | 517-819   | 3800      | 8"           | 1200  | 517-919   | 3050      |
| 48 x 84"  | 14"                 | 350   | 517-720   | 6150      | 12"                | 700   | 517-820   | 5325      | 10"          | 1400  | 517-920   | 4450      |
| 48 x 96"  | 14"                 | 400   | 517-721   | 7000      | 12"                | 800   | 517-821   | 6050      | 10"          | 1600  | 517-921   | 5150      |
| 48 x 108" | 14"                 | 500   | 517-722   | 7900      | 12"                | 1000  | 517-822   | 6830      | 10"          | 2000  | 517-922   | 5700      |
| 48 x 120" | 18"                 | 700   | 517-723   | 11300     | 16"                | 1400  | 517-823   | 10160     | 14"          | 2800  | 517-923   | 8800      |
| 48 x 144" | 18"                 | 800   | 517-724   | 13500     | 16"                | 1600  | 517-824   | 12200     | 14"          | 3200  | 517-924   | 10500     |
| 60 x 60"  | 14"                 | 250   | 517-725   | 5500      | 12"                | 500   | 517-825   | 4800      | 10"          | 1000  | 517-925   | 4000      |
| 60 x 72"  | 14"                 | 350   | 517-726   | 6600      | 12"                | 700   | 517-826   | 5750      | 10"          | 1400  | 517-926   | 4900      |
| 60 x 96"  | 14"                 | 500   | 517-727   | 8800      | 12"                | 1000  | 517-827   | 7600      | 10"          | 2000  | 517-927   | 6500      |
| 60 x 120" | 16"                 | 700   | 517-728   | 11050     | 14"                | 1400  | 517-828   | 11100     | 12"          | 2800  | 517-928   | 9800      |
| 60 x 144" | 18"                 | 900   | 517-729   | 16950     | 16"                | 1800  | 517-829   | 15100     | 14"          | 3600  | 517-929   | 14200     |
| 72 x 72"  | 14"                 | 400   | 517-730   | 8000      | 12"                | 800   | 517-830   | 7000      | 10"          | 1600  | 517-930   | 5700      |
| 72 x 96"  | 16"                 | 500   | 517-731   | 12025     | 14"                | 1000  | 517-831   | 10800     | 12"          | 2000  | 517-931   | 9200      |
| 72 x 120" | 16"                 | 700   | 517-732   | 15070     | 14"                | 1400  | 517-832   | 13400     | 12"          | 2800  | 517-932   | 11400     |
| 72 x 144" | 18"                 | 1000  | 517-733   | 20300     | 16"                | 2000  | 517-833   | 18100     | 14"          | 4000  | 517-933   | 15900     |

\* Accuracies shown in microinches (µin)

# Black Granite Surface Plate

## SERIES 517



**Inch** 50 lbs.-Load / sq. ft. no ledge

| Size     | AA Laboratory Grade |      |                |      | A Inspection Grade |      |                |      | B Shop Grade |      |                |     |
|----------|---------------------|------|----------------|------|--------------------|------|----------------|------|--------------|------|----------------|-----|
|          | H                   | Acc. | Order No.      | Wt.  | H                  | Acc. | Order No.      | Wt.  | H            | Acc. | Order No.      | Wt. |
| 8 x 12"  | 2"                  | 50   | <b>517-740</b> | 25   | 2"                 | 100  | <b>517-840</b> | 25   | 2"           | 200  | <b>517-940</b> | 25  |
| 12 x 18" | 3"                  | 50   | <b>517-741</b> | 80   | 3"                 | 100  | <b>517-841</b> | 80   | 2"           | 200  | <b>517-941</b> | 60  |
| 18 x 24" | 4"                  | 65   | <b>517-742</b> | 200  | 3"                 | 130  | <b>517-842</b> | 165  | 2"           | 260  | <b>517-942</b> | 100 |
| 24 x 36" | 5"                  | 85   | <b>517-743</b> | 500  | 4"                 | 170  | <b>517-843</b> | 400  | 3"           | 340  | <b>517-943</b> | 300 |
| 36 x 48" | 6"                  | 150  | <b>517-746</b> | 1200 | 5"                 | 300  | <b>517-846</b> | 1000 | 4"           | 600  | <b>517-946</b> | 800 |

## Steel Stands

### SERIES 517

Steel stands for supporting black granite surface plates, at working levels, are available either stationary or with casters. Sizes and weights are given below.

#### SPECIFICATIONS

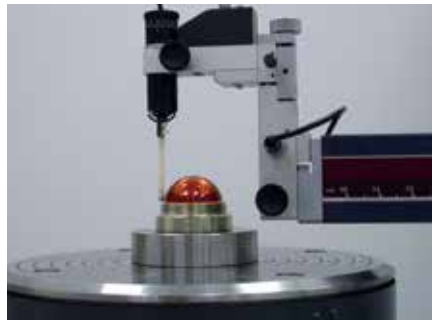
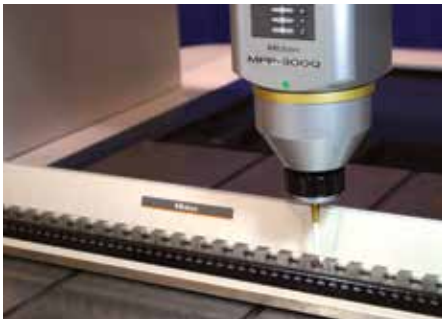
| Size      | Stationary     |        | With Casters     |        |
|-----------|----------------|--------|------------------|--------|
|           | Order No.      | Wt.    | Order No.        | Wt.    |
| 12 x 18"  | <b>517-950</b> | 42lbs  | <b>517-950-1</b> | 46lbs  |
| 18 x 18"  | <b>517-951</b> | 46lbs  | <b>517-951-1</b> | 50lbs  |
| 18 x 24"  | <b>517-952</b> | 50lbs  | <b>517-952-1</b> | 56lbs  |
| 24 x 24"  | <b>517-954</b> | 65lbs  | <b>517-954-1</b> | 69lbs  |
| 24 x 30"  | <b>517-955</b> | 70lbs  | <b>517-955-1</b> | 74lbs  |
| 24 x 36"  | <b>517-956</b> | 73lbs  | <b>517-956-1</b> | 77lbs  |
| 24 x 48"  | <b>517-957</b> | 90lbs  | <b>517-957-1</b> | 94lbs  |
| 30 x 36"  | <b>517-960</b> | 85lbs  | <b>517-960-1</b> | 89lbs  |
| 30 x 48"  | <b>517-961</b> | 95lbs  | <b>517-961-1</b> | 99lbs  |
| 30 x 60"  | <b>517-962</b> | 105lbs | <b>517-962-1</b> | 109lbs |
| 36 x 36"  | <b>517-963</b> | 95lbs  | <b>517-963-1</b> | 99lbs  |
| 36 x 48"  | <b>517-964</b> | 105lbs | <b>517-964-1</b> | 109lbs |
| 36 x 60"  | <b>517-965</b> | 160lbs | <b>517-965-1</b> | 164lbs |
| 36 x 72"  | <b>517-966</b> | 180lbs | <b>517-966-1</b> | 184lbs |
| 48 x 48"  | <b>517-967</b> | 190lbs | <b>517-967-1</b> | 194lbs |
| 48 x 60"  | <b>517-968</b> | 200lbs | <b>517-968-1</b> | 204lbs |
| 48 x 72"  | <b>517-969</b> | 205lbs | <b>517-969-1</b> | 209lbs |
| 48 x 84"  | <b>517-970</b> | 320lbs | <b>517-970-1</b> | 324lbs |
| 48 x 96"  | <b>517-971</b> | 335lbs | <b>517-971-1</b> | 339lbs |
| 48 x 108" | <b>517-972</b> | 350lbs | <b>517-972-1</b> | 354lbs |
| 48 x 120" | <b>517-973</b> | 365lbs | <b>517-973-1</b> | 369lbs |
| 48 x 144" | <b>517-974</b> | 430lbs | <b>517-974-1</b> | 434lbs |
| 60 x 60"  | <b>517-975</b> | 245lbs |                  |        |
| 60 x 72"  | <b>517-976</b> | 340lbs |                  |        |
| 60 x 96"  | <b>517-977</b> | 375lbs |                  |        |
| 60 x 120" | <b>517-978</b> | 455lbs |                  |        |
| 60 x 144" | <b>517-979</b> | 480lbs |                  |        |
| 72 x 72"  | <b>517-980</b> | 380lbs |                  |        |
| 72 x 96"  | <b>517-981</b> | 465lbs |                  |        |
| 72 x 120" | <b>517-982</b> | 510lbs |                  |        |
| 72 x 144" | <b>517-983</b> | 530lbs |                  |        |

48x72 and smaller include keepers to prevent the surface plate from being pushed off the stand.

Note: Stands can only be purchased with granite surface plates. Working height is 36" unless otherwise specified.



# MITUTOYO CALIBRATION SERVICES



Mitutoyo America has expanded three-dimensional calibration and inspection services at our new precision measurement facility located in our corporate headquarters in Aurora, IL. Equipped with multiple Mitutoyo Legex CMMs, along with high-accuracy vision and form measuring instruments, our laboratory offers accredited dimensional measurement services with uncertainty as low as  $0.25\ \mu\text{m}$  (10  $\mu\text{inches}$ ). And for form measurement, our uncertainty goes as low as 5 nanometers (0.2  $\mu\text{inches}$ ).

Our experienced staff is ready for your challenges – we specialize in specialty gage calibration, complex prototype or master parts, specialty and custom-built 3D gages, and long length standards such as ball bars, step gages and gage blocks. We can also assist you in the validation of your measurement processes by providing accredited reference values on your parts.

Mitutoyo America calibration and inspection services are accredited to ISO/IEC 17025 by A2LA (Certificate 0750.01). We welcome customer tours of our laboratory.

If you have any questions or would like more information regarding Mitutoyo Calibration Services, contact: [mim@mitutoyo.com](mailto:mim@mitutoyo.com)







### Digimatic Indicators



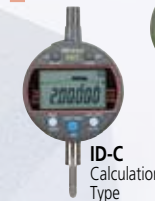
### Dial Indicators



### Dial Test Indicators



### Dial Indicator Applications and Stands



ID-C  
Calculation  
Type



ID-C  
Max./  
Min. Value  
Holding  
Function



ID-C  
Bore Gage  
Application



ID-N / ID-B



ID-H



Dial Test Indicators

### INDEX

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|                                       |      |
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#### Dial Indicators

|                                 |                |
|---------------------------------|----------------|
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# ABSOLUTE Solar Digimatic Indicator ID-S

## 543 Series – With Simple Design

### FEATURES

- Mitutoyo's unique ABSOLUTE sensor automatically restores the last origin position when the indicator is turned on. This allows quick-start operation, which is particularly useful in multipoint measurement.
- Measurement tool with a solar power source. Ready for use from 40 lux illumination.
- Similar in size to Series 2 dial indicators.
- SPC output provided.
- Two large buttons (three on inch/mm models) improve functionality.



543-502B  
ID-S112ESB

543-500  
ID-S112S

### SPECIFICATIONS

**Inch/Metric** with 3/8" dia. Stem, #4-48UNF Thread

| Order    | Model       | Range      | Resolution      | Accuracy       | Stem Diameter   | Measuring Force | Back Type |
|----------|-------------|------------|-----------------|----------------|-----------------|-----------------|-----------|
| 543-502  | ID-S112ES   | .5"/12.7mm | .00005"/0.001mm | .0001"/0.003mm | 3/8" (ANSI/AGD) | 1.5N or less    | Lug Back  |
| 543-502B | ID-S112ESB  | .5"/12.7mm | .00005"/0.001mm | .0001"/0.003mm | 3/8" (ANSI/AGD) | 1.5N or less    | Flat Back |
| 543-507  | ID-S1012ES  | .5"/12.7mm | .0005"/0.01mm   | .001"/0.02mm   | 3/8" (ANSI/AGD) | 1.5N or less    | Lug Back  |
| 543-507B | ID-S1012ESB | .5"/12.7mm | .0005"/0.01mm   | .001"/0.02mm   | 3/8" (ANSI/AGD) | 1.5N or less    | Flat Back |

**Metric** with 8mm dia. Stem, M2.5x.45 Thread

| Order    | Model      | Range  | Resolution | Accuracy | Stem Diameter | Measuring Force | Back Type |
|----------|------------|--------|------------|----------|---------------|-----------------|-----------|
| 543-500  | ID-S112S   | 12.7mm | 0.001mm    | 0.003mm  | 8mm (ISO)     | 1.5N or less    | Lug Back  |
| 543-500B | ID-S112SB  | 12.7mm | 0.001mm    | 0.003mm  | 8mm (ISO)     | 1.5N or less    | Flat Back |
| 543-505  | ID-S1012S  | 12.7mm | 0.01mm     | 0.02mm   | 8mm (ISO)     | 1.5N or less    | Lug Back  |
| 543-505B | ID-S1012SB | 12.7mm | 0.01mm     | 0.02mm   | 8mm (ISO)     | 1.5N or less    | Flat Back |

**Inch/Metric** with 8mm dia. Stem, M2.5x.45 Thread

| Order    | Model       | Range      | Resolution      | Accuracy       | Stem Diameter | Measuring Force | Back Type |
|----------|-------------|------------|-----------------|----------------|---------------|-----------------|-----------|
| 543-501  | ID-S112MS   | .5"/12.7mm | .00005"/0.001mm | .0001"/0.003mm | 8mm (ISO)     | 1.5N or less    | Lug Back  |
| 543-501B | ID-S112MSB  | .5"/12.7mm | .00005"/0.001mm | .0001"/0.003mm | 8mm (ISO)     | 1.5N or less    | Flat Back |
| 543-506  | ID-S1012MS  | .5"/12.7mm | .0005"/0.01mm   | .001"/0.02mm   | 8mm (ISO)     | 1.5N or less    | Lug Back  |
| 543-506B | ID-S1012MSB | .5"/12.7mm | .0005"/0.01mm   | .001"/0.02mm   | 8mm (ISO)     | 1.5N or less    | Flat Back |

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm, 0.001mm, .00005"/0.001mm, or .0005"/0.01mm  
 Display: LCD  
 Length Standard: ABSOLUTE electrostatic capacitance-type linear encoder  
 Max. Response Speed: Unlimited  
 Measuring Force: Refer to the list of specifications  
 Battery: Solar Battery\*  
 Dust/Water Protection Level: IP42  
 \*Can be used continuously above 40 lux

### Function

Origin Set, Counting Direction Switching, in/mm conversion

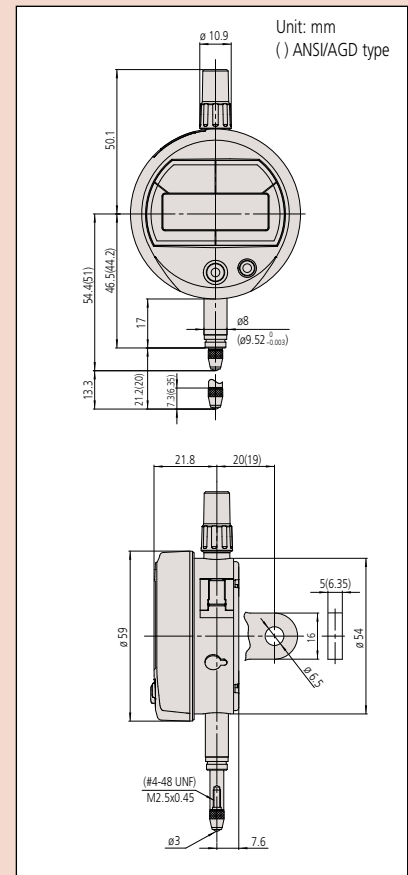
### Optional Accessories

- 21EZA198 Lifting lever (mm)
- 21EZA199 Lifting lever (inch)
- 540774 Lifting cable
- 21EZA105 Lifting knob (mm)
- 21EZA150 Lifting knob (inch)
- 905338 SPC cable (1m)
- 905409 SPC cable (2m)
- : Backs (See page F-33.)
- : Contact points (See page F-34.)

### About the charge function:

Reserve capacity allows a fully charged ID-S Solar to be used for about 3.5 hours under light conditions below the minimum level. The charging time differs depending on the environment, but it usually takes about 1.5 hours for a fully discharged ID-S Solar to fully recharge under light conditions of 500 lux.

### DIMENSIONS





### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm, 0.001mm, .0005"/0.01mm, .0001"/0.001mm or .00005"/0.001mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance-type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: Refer to the list of specifications  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 20,000 hours under normal use  
 Dust/Water protection level: IP42 (IP53: **543-794B**, **543-795B**, **543-796B**)  
 Inspection certificate is included.

### Function

Origin-set, Zeroset, Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error, Over-flow error

### Optional Accessories

- 905338:** SPC cable (40" / 1m)
- 905409:** SPC cable (80" / 2m)
- 21EZA198:** Spindle lifting lever (ISO/JIS type)
- 21EZA199:** Spindle lifting lever (ANSI/AGD type)
- 540774:** Spindle lifting cable (stroke: .4" / 10mm)
- 21EZA105:** Lifting knob (mm)
- 21EZA150:** Lifting knob (inch)
- 125317:** Spare rubber boot (for dust-proof type)
- : Backs (See page F-33.)
- : Contact points (See page F-34.)

# ABSOLUTE Digimatic Indicator ID-S

## SERIES 543 — with Simple Design

### FEATURES

- After the initial zero-setting with the Origin button, the repeated absolute positioning is no longer necessary over entire battery life.
- Similar in size to standard Series 2 dial indicators.
- SPC data output.
- Unlimited response speed eliminates over-speed errors



543-782B



543-792B

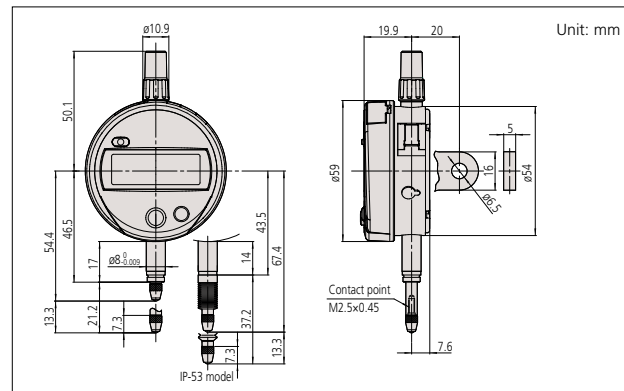
### SPECIFICATIONS

| Inch/Metric     |              | Stem dia. 3/8", #4-48 UNF Thread |                 | ISO/JIS type | ANSI/AGD type |                 |            |
|-----------------|--------------|----------------------------------|-----------------|--------------|---------------|-----------------|------------|
| Resolution      | Range        | Order No.                        |                 | Model        | Accuracy      | Measuring force | Remarks    |
|                 |              | w/ lug back                      | w/ flat-back    |              |               |                 |            |
| .00005"/0.001mm | .5" / 12.7mm | <b>543-792</b>                   | <b>543-792B</b> | ID-S112EX    | ±.0001"       | 1.5N or less    | —          |
| .00005"/0.001mm | .5" / 12.7mm | <b>543-796</b>                   | <b>543-796B</b> | ID-S112PEX   | ±.0001"       | 2.5N            | Dust-proof |
| .0001"/0.001mm  | .5" / 12.7mm | <b>543-793</b>                   | <b>543-793B</b> | ID-S112TX    | ±.0001"       | 1.5N or less    | —          |
| .0005"/0.01mm   | .5" / 12.7mm | <b>543-783</b>                   | <b>543-783B</b> | ID-S1012EX   | ±.0010"       | 1.5N or less    | —          |

| Inch/Metric     |              | Stem ø 8mm, M2.5 x 0.45 Thread |                 |            |          |                 |            |
|-----------------|--------------|--------------------------------|-----------------|------------|----------|-----------------|------------|
| Resolution      | Range        | Order No.                      |                 | Model      | Accuracy | Measuring force | Remarks    |
|                 |              | w/ lug back                    | w/ flat-back    |            |          |                 |            |
| .00005"/0.001mm | .5" / 12.7mm | <b>543-791</b>                 | <b>543-791B</b> | ID-S112MX  | ±.0001"  | 1.5N or less    | —          |
| .00005"/0.001mm | .5" / 12.7mm | <b>543-795</b>                 | <b>543-795B</b> | ID-S112PMX | ±.0001"  | 2.5N or less    | Dust-proof |
| .0005"/0.01mm   | .5" / 12.7mm | <b>543-782</b>                 | <b>543-782B</b> | ID-S1012MX | ±.0008"  | 1.5N or less    | —          |

| Metric     |        | Stem ø 8mm, M2.5 x 0.45 Thread |                 |           |          |                 |            |
|------------|--------|--------------------------------|-----------------|-----------|----------|-----------------|------------|
| Resolution | Range  | Order No.                      |                 | Model     | Accuracy | Measuring force | Remarks    |
|            |        | w/ lug back                    | w/ flat-back    |           |          |                 |            |
| 0.001mm    | 12.7mm | <b>543-790</b>                 | <b>543-790B</b> | ID-S112X  | 0.003mm  | 1.5N or less    | —          |
| 0.001mm    | 12.7mm | <b>543-794</b>                 | <b>543-794B</b> | ID-S112PX | 0.003mm  | 2.5N or less    | Dust-proof |
| 0.01mm     | 12.7mm | <b>543-781</b>                 | <b>543-781B</b> | ID-S1012X | 0.02mm   | 1.5N or less    | —          |

### DIMENSIONS



- Note 1: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.
- Note 2: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.



# ABSOLUTE Digimatic Indicator ID-U

**SERIES 575 — With Slim and Simple Design**

## FEATURES

- Slim digital indicator with low price.
- Large LCD and simple key operation.
- After the initial origin setting, the ID-U no longer needs absolute positioning over entire battery life; the origin is remembered even after power-off.
- Ideal for installation into measuring devices because of compact design and long battery life.
- Employing the ABSOLUTE linear encoder, the ID-U always displays the spindle "Absolute Position" from the origin at power-on. Also unlimited response speed eliminates over-speed errors.
- Flat back type only has no option for backs.
- SPC data output.



## SPECIFICATIONS

**Inch/Metric** Stem dia. 3/8", #4-48 UNF Thread  ISO/JIS type  ANSI/AGD type

| Resolution    | Range       | Order No.      | Model     | Accuracy | Measuring force |
|---------------|-------------|----------------|-----------|----------|-----------------|
| .0005"/0.01mm | 1" / 25.4mm | <b>575-123</b> | ID-U1025E | .0008"   | 1.8N or less    |

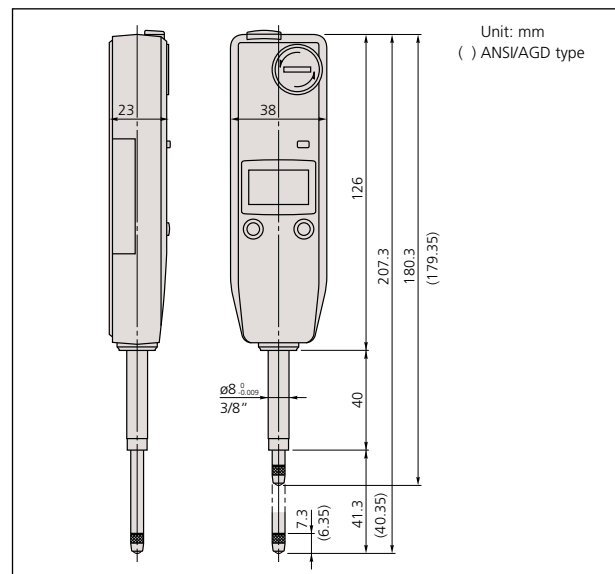
**Inch/Metric** Stem  $\varnothing$  8mm, M2.5 x 0.45 Thread

| Resolution    | Range       | Order No.      | Model     | Accuracy | Measuring force |
|---------------|-------------|----------------|-----------|----------|-----------------|
| .0005"/0.01mm | 1" / 25.4mm | <b>575-122</b> | ID-U1025M | .0008"   | 1.8N or less    |

**Metric** Stem  $\varnothing$  8mm, M2.5 x 0.45 Thread

| Resolution | Range  | Order No.      | Model    | Accuracy | Measuring force |
|------------|--------|----------------|----------|----------|-----------------|
| 0.01mm     | 25.4mm | <b>575-121</b> | ID-U1025 | 0.02mm   | 1.8N or less    |

## DIMENSIONS



## Technical Data

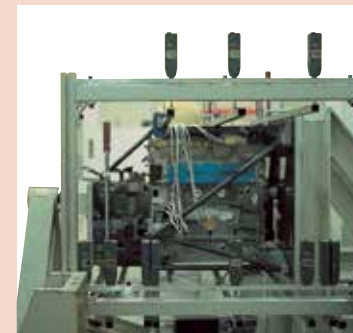
Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm or .0005"/0.01mm,  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: Refer to the list of specifications  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 20,000 hours under normal use  
 Dust/Water protection level: IP42

## Function

Origin-set, Zeroset, Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error, Over-flow error

## Optional Accessories

- 905338:** SPC cable (40" / 1m)
- 905409:** SPC cable (80" / 2m)
- 540774:** Spindle lifting cable (stroke: 4" / 10mm)
- \_\_\_\_\_: Contact points (See page F-34.)



Application example



# ABSOLUTE Digimatic Indicator ID-C

## SERIES 543 — Standard Type

### FEATURES

- Similar in size to Series 2 dial indicators.
- Large, easy-to-read LCD.
- Go/no-go judgment can be performed by setting upper and lower tolerance limits. The judgment result (go/no-go) can be displayed in full-size characters.
- The positive/negative count resulting from the spindle's up/down movement can be toggled.
- Internal calculations using the simple formula of  $[F(x) = Ax]$  are available.
- Employing the ABSOLUTE linear encoder, the ID-C always displays the spindle "Absolute Position" from the origin at power-on. Also unlimited response speed eliminates over-speed errors.
- The ID-C indicator face can be rotated 330° to an appropriate angle for easy reading.
- With SPC data output.

### Technical Data

Accuracy: Refer to the list of specifications

|             |                       |                                      |
|-------------|-----------------------|--------------------------------------|
| Resolution: | 0.01mm type           | 0.01mm                               |
|             | 0.001mm type*         | 0.001mm/0.01mm                       |
|             | .0005"/0.01mm type    | .0005"/0.01mm                        |
|             | .00005"/0.001mm type* | .0005"/.0001"/.00005"/0.01mm/0.001mm |

\* Switchable resolution

Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: Refer to the list of specifications  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 7,000 hours under normal use  
 Dust/Water protection level: IP42  
 Inspection certificate is included

### Function

Origin-set/Preset, Zeroset, go/no-go judgment, Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error, Over-flow error, Tolerance limit setting error  
 Internal calculations using the simple formula of  $[F(x) = Ax]$  are available.

### Optional Accessories

- 905338:** SPC cable (40" / 1m)
- 905409:** SPC cable (80" / 2m)
- 21EZA198:** Spindle lifting lever (ISO/JIS type)\*
- 21EZA199:** Spindle lifting lever (ANSI/AGD type)\*
- 21EZA105:** Spindle lifting knob (12.7mm/.5" ISO/JIS type)\*\*
- 21EZA150:** Spindle lifting knob (12.7mm/.5" ANSI/AGD type)\*\*
- 21EZA197:** Spindle lifting knob (25.4mm/1" , 50.8mm/2" models)
- 21EZA200:** Spindle lifting knob (50.8mm/2")
- 540774:** Spindle lifting cable (stroke: (1"/ 25.4mm)
- 02ACA571:** Auxiliary spindle spring for 25mm/1" models\*\*\*
- 02ACA773:** Auxiliary spindle spring for 50mm/2" models\*\*\*
- : Backs (See page F-33.)
- : Contact points (See page F-34.)

\*Can be used on 12mm/.5" models only.  
 \*\*Not available for low measuring force models.  
 \*\*\*Required when orienting gage upside down.



543-392  
IP42



543-402  
IP42



543-472B  
IP42



543-492B  
IP42

# SPECIFICATIONS

**Inch/Metric** Stem dia. 3/8", #4-48 UNF Thread  ISO/JIS type  ANSI/AGD type

| Resolution       | Range        | Order No. (w/lug, flat-back) |                 | Model       | Accuracy | Measuring force | Remarks             |
|------------------|--------------|------------------------------|-----------------|-------------|----------|-----------------|---------------------|
| .00005"/0.001mm* | .5" / 12.7mm | <b>543-392</b>               | <b>543-392B</b> | ID-C112EXB  | .0001"   | 1.5N or less    | —                   |
| .00005"/0.001mm* | .5" / 12.7mm | <b>543-396</b>               | <b>543-396B</b> | ID-C112CEX  | .0001"   | 0.4N - 0.7N     | Low measuring force |
| .00005"/0.001mm* | 1" / 25.4mm  | —                            | <b>543-472B</b> | ID-C125EXB  | .0001"   | 1.8N or less    | —                   |
| .00005"/0.001mm* | 2" / 50.8mm  | —                            | <b>543-492B</b> | ID-C150EXB  | .0002"   | 2.3N or less    | —                   |
| .0005"/0.01mm    | .5" / 12.7mm | <b>543-402</b>               | <b>543-402B</b> | ID-C1012EX  | .001"    | 0.9N or less    | —                   |
| .0005"/0.01mm    | .5" / 12.7mm | <b>543-406</b>               | <b>543-406B</b> | ID-C1012CEX | .001"    | 0.2N - 0.5N     | Low measuring force |
| .0005"/0.01mm    | 1" / 25.4mm  | —                            | <b>543-476B</b> | ID-C1025EXB | .001"    | 1.8N or less    | —                   |
| .0005"/0.01mm    | 2" / 50.8mm  | —                            | <b>543-496B</b> | ID-C112CEXB | .0016"   | 2.3N or less    | —                   |

\* Switchable Resolution Type

**Inch/Metric** Stem ø 8mm, M2.5 x 0.45 Thread

| Resolution       | Range        | Order No. (w/lug, flat-back) |                 | Model       | Accuracy | Measuring force | Remarks             |
|------------------|--------------|------------------------------|-----------------|-------------|----------|-----------------|---------------------|
| .00005"/0.001mm* | .5" / 12.7mm | <b>543-391</b>               | <b>543-391B</b> | ID-C112MX   | .0001"   | 1.5N or less    | —                   |
| .00005"/0.001mm* | .5" / 12.7mm | <b>543-395</b>               | <b>543-395B</b> | ID-C112CMX  | .0001"   | 0.4N - 0.7N     | Low measuring force |
| .00005"/0.001mm* | 1" / 25.4mm  | —                            | <b>543-471B</b> | ID-C125MXB  | .0001"   | 1.8N or less    | —                   |
| .00005"/0.001mm* | 2" / 50.8mm  | —                            | <b>543-491B</b> | ID-C150MXB  | .0002"   | 2.3N or less    | —                   |
| .0005"/0.01mm    | .5" / 12.7mm | <b>543-401</b>               | <b>543-401B</b> | ID-C1012MX  | .001"    | 0.9N or less    | —                   |
| .0005"/0.01mm    | .5" / 12.7mm | <b>543-405</b>               | <b>543-405B</b> | ID-C1012CMX | .001"    | 0.2N - 0.5N     | Low measuring force |
| .0005"/0.01mm    | 1" / 25.4mm  | —                            | <b>543-475B</b> | ID-C1025MXB | .001"    | 1.8N or less    | —                   |
| .0005"/0.01mm    | 2" / 50.8mm  | —                            | <b>543-495B</b> | ID-C1050MXB | .0016"   | 2.3N or less    | —                   |

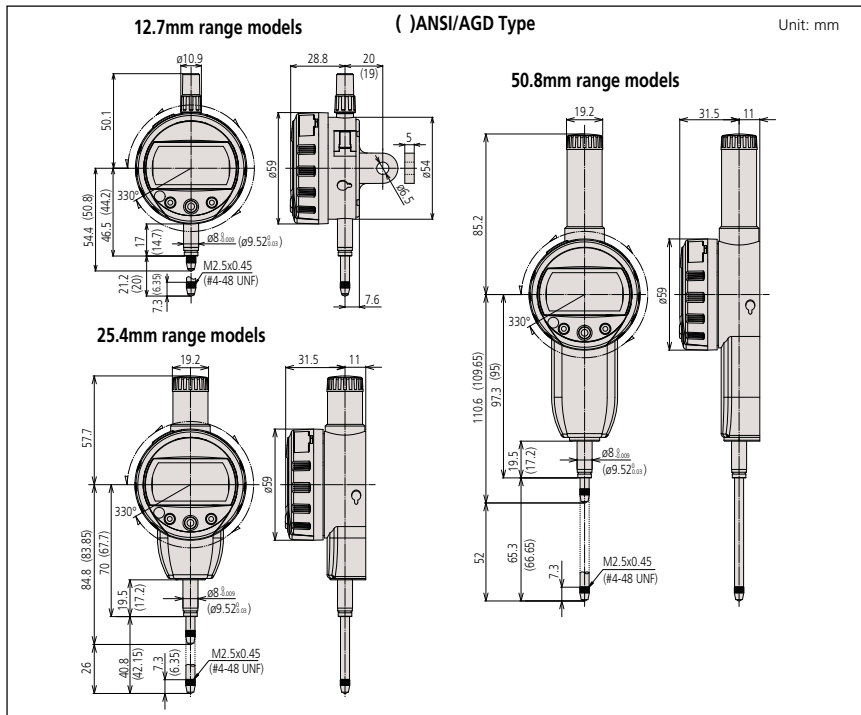
\* Switchable Resolution Type

**Metric** Stem ø 8mm, M2.5 x 0.45 Thread

| Resolution | Range  | Order No. (w/lug, flat-back) |                 | Model      | Accuracy | Measuring force | Remarks             |
|------------|--------|------------------------------|-----------------|------------|----------|-----------------|---------------------|
| 0.001mm*   | 12.7mm | <b>543-390</b>               | <b>543-390B</b> | ID-C112X   | 0.003mm  | 1.5N or less    | —                   |
| 0.001mm*   | 12.7mm | <b>543-394</b>               | <b>543-394B</b> | ID-C112CX  | 0.003mm  | 0.4N - 0.7N     | Low measuring force |
| 0.001mm*   | 25.4mm | —                            | <b>543-470B</b> | ID-C125XB  | 0.003mm  | 1.8N or less    | —                   |
| 0.001mm*   | 50.8mm | —                            | <b>543-490B</b> | ID-C150XB  | 0.006mm  | 2.3N or less    | —                   |
| 0.01mm     | 12.7mm | <b>543-400</b>               | <b>543-400B</b> | ID-C1012X  | 0.02mm   | 0.9N or less    | —                   |
| 0.01mm     | 12.7mm | <b>543-404</b>               | <b>543-404B</b> | ID-C1012CX | 0.02mm   | 0.2N - 0.5N     | Low measuring force |
| 0.01mm     | 25.4mm | —                            | <b>543-474B</b> | ID-C1025XB | 0.03mm   | 1.8N or less    | —                   |
| 0.01mm     | 50.8mm | —                            | <b>543-494B</b> | ID-C1050XB | 0.04mm   | 2.3N or less    | —                   |

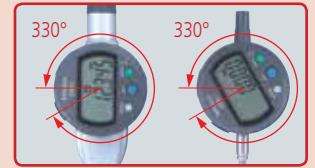
\* Switchable Resolution Type

# DIMENSIONS



## 330° Rotary display

The display can be rotated 330°, allowing use at a position where you can easily read the measurement value.



## Calculation: f(x) = Ax

Mounting the ID-C on a measuring jig and setting the multiplying factor A (to any value) allows direct measurement without using a conversion table and improves measurement efficiency.



## Function locking

Ensures reliability of measurement by locking the settings to prevent preset function settings from being changed by mistake.



## Setting measuring force on low measuring force models.

### •543-404/404B/405/405B/406/406B

| 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                    |

Note: Operation using configurations other than shown above is not guaranteed.

### •543-394/394B/395/395B/396/396B

| 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 guaranteed          |
| Horizontal                   | Not guaranteed |                             |                         |

Note: Operation using configurations other than shown above is not guaranteed.



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 12 Steps  
                   .00005/.0001/.0005"  
                   0.001/0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance-type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: Refer to the list of specifications  
 Battery: CR2032 (1 pc.), **05SAA217**  
 Battery life: Approx. 12 months under normal use  
 IP Rating: Equivalent to IP-42<sup>1</sup>

<sup>1</sup> A protection class indication (IP=International Protection) is based on the IEC 60529 /DIN40050 part 1/JIS D0207, C0920. The level indicated is valid only if the output connector cap is installed.

### Function

Key Lock, Parameter Lock, PC-USB Input, Analog Bar, FAST measurement frequency, Preset (up to 3 values), Tolerance Judgment, Peak Detection, Calculation, inch/mm conversion (on inch/metric models only), Counting direction switching, Data Output  
 Alarm: Low voltage, Counting value composition error, Over-flow error, Tolerance limit setting error

### Optional Accessories

- 905338:** Connecting Cable (1m)
- 905409:** Connecting Cable (2m)
- 21EZA313:** Parameter Setting USB Cable
- 21EZA198:** Spindle lifting lever (12.7mm ISO/JIS type)
- 21EZA199:** Spindle lifting lever (12.7mm ASME/AGD type)
- 21EZA105:** Lifting Knob (12.7mm/.5" ISO/JIS Models)
- 21EZA150:** Lifting Knob (12.7mm/.5" ASME/AGD Models)
- 21EZA197:** Lifting Knob (for 25.4/1" mm models)
- 21EZA200:** Lifting Knob (for 50.8/2" mm models)
- 540774:** Spindle lifting cable
- : Backs (See page F-33.)
- : Contact points (See page F-34.)

### APPLICATIONS



- Various fixtures suited for individual workpieces can be prepared.
- Measuring accuracy is subject to fixture accuracy

# ABSOLUTE Digimatic Indicator ID-C

## SERIES 543 — Calculation Type

### FEATURES

- The new Calculation-Type Digimatic Indicator features both a Key-Lock and Parameter-Lock to prevent accidental changing of settings during operation.
- Improved parameter setting software makes easy to set all available parameters, and determine and upload the proper coefficients for calculation. (optional)
- Fast measurement frequency allows the user to increase the number of readings per second from 10 to 50, allowing higher accuracy measurements of TIR and MAX/MIN.
- An analog bar provides easy-to-read values when scanning for Max, Min, and TIR Values.
- The Absolute Digimatic indicator performs internal calculations using the formula  $Ax+B+Cx-1$  (assuming spindle displacement as  $x$ ) while the specified coefficients  $A$ ,  $B$  and  $C$  can be set with respect to the purpose of measurement or dimensions of the fixtures. This unique features allows you to read your measurements directly, without the need for conversions.



543-342B

### SPECIFICATIONS

ISO/JIS type      ANSI/AGD type

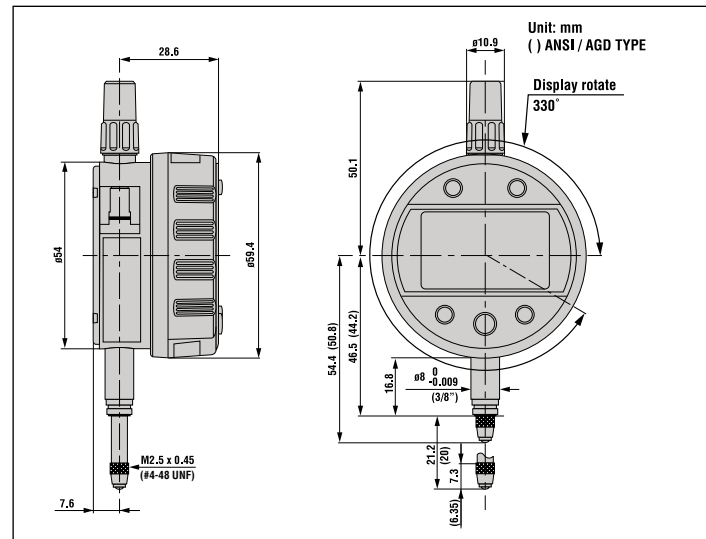
| Inch/Metric         |            | Stem dia. 3/8" #4-48 UNF Thread |             |                  |                 |
|---------------------|------------|---------------------------------|-------------|------------------|-----------------|
| Resolution          | Range      | Order No.*                      | Model       | Accuracy         | Measuring Force |
| .00005/.0001/.0005" | .5"/12.7mm | <b>543-342B</b>                 | ID-C112REXB | ±.00010"/0.003mm | 1.5N or less    |
| 0.001/0.01mm        | 1"/25.4mm  | <b>543-592B</b>                 | ID-C125REXB | ±.00010"/0.003mm | 1.8N or less    |
| Selectable          | 2"/50.8mm  | <b>543-597B</b>                 | ID-C150REXB | ±.00025"/0.006mm | 2.3N or less    |

| Inch/Metric         |            | Stem ø 8mm, M2.5 x 0.45 Thread |             |                  |                 |
|---------------------|------------|--------------------------------|-------------|------------------|-----------------|
| Resolution          | Range      | Order No.*                     | Model       | Accuracy         | Measuring Force |
| .00005/.0001/.0005" | .5"/12.7mm | <b>543-341B</b>                | ID-C112RMXB | ±.00010"/0.003mm | 1.5N or less    |
| 0.001/0.01mm        | 1"/25.4mm  | <b>543-591B</b>                | ID-C125RMXB | ±.00010"/0.003mm | 1.8N or less    |
| Selectable          | 2"/50.8mm  | <b>543-596B</b>                | ID-C150RMXB | ±.00025"/0.006mm | 2.3N or less    |

| Metric       |            | Stem ø 8mm, M2.5 x 0.45 Thread |            |          |                 |
|--------------|------------|--------------------------------|------------|----------|-----------------|
| Resolution   | Range      | Order No.*                     | Model      | Accuracy | Measuring Force |
| 0.001/0.01mm | .5"/12.7mm | <b>543-340B</b>                | ID-C112RXB | 0.003mm  | 1.5N or less    |
| Selectable   | 1"/25.4mm  | <b>543-590B</b>                | ID-C125RXB | 0.003mm  | 1.8N or less    |
|              | 2"/50.8mm  | <b>543-595B</b>                | ID-C150RXB | 0.006mm  | 2.3N or less    |

\*Flat back

### DIMENSIONS



# ABSOLUTE Digimatic Indicator ID-C

**SERIES 543 — With Max./Min. Value Holding Function**

## FEATURES

- The new Peak Hold-Type Digimatic Indicator features both a Key-Lock and Parameter-Lock to prevent accidental changing of settings during operation.
- Parameter setting software makes it even easy to set all available parameters.
- An analog bar provides easy-to-read values when scanning for Max, Min and TIR Values.
- The maximum, minimum or runout value can be displayed during measurement.
- Go/no-go judgment is performed by setting the upper and lower tolerances for max., min. and runout values.
- High speed sampling ratio of 50 times/s.
- Employing the ABSOLUTE linear encoder, the Signal ID-C always displays the spindle Absolute Position from the origin when turned on.



543-302B

## SPECIFICATIONS

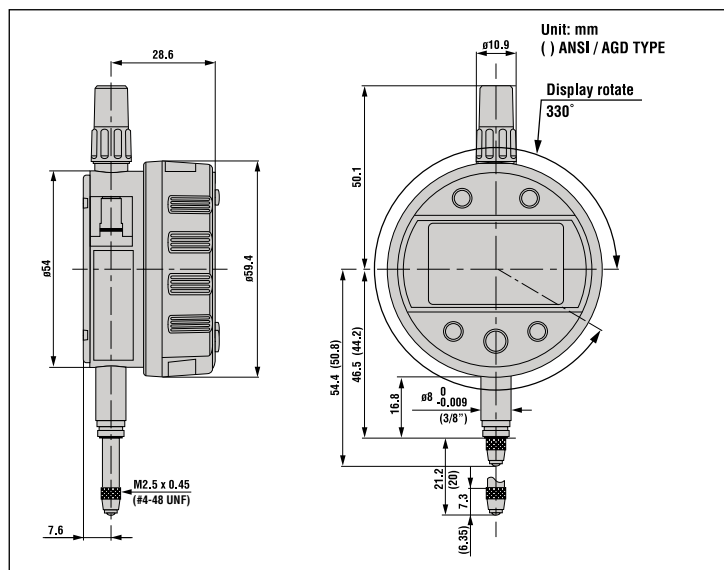
ISO/JIS type    ANSI/AGD type

| Resolution  | Range      | Order No.      |                 | Model         | Accuracy         |
|---|------------|----------------|-----------------|---------------|------------------|
|   |            | w/lug          | Flat-back       |               |                  |
| .00005/.0001/.0005"<br>0.001/0.01mm<br>Selectable | .5"/12.7mm | <b>543-302</b> | <b>543-302B</b> | ID-C112AEX(B) | ±.00010"/0.003mm |

| Resolution  | Range      | Order No.      |                 | Model         | Accuracy         |
|---|------------|----------------|-----------------|---------------|------------------|
|   |            | w/lug          | Flat-back       |               |                  |
| .00005/.0001/.0005"<br>0.001/0.01mm<br>Selectable | .5"/12.7mm | <b>543-301</b> | <b>543-301B</b> | ID-C112AMX(B) | ±.00010"/0.003mm |

| Resolution                 | Range  | Order No.      |                 | Model        | Accuracy |
|----------------------------|--------|----------------|-----------------|--------------|----------|
|                            |        | w/lug          | Flat-back       |              |          |
| 0.001-0.01mm<br>Selectable | 12.7mm | <b>543-300</b> | <b>543-300B</b> | ID-C112AX(B) | 0.003mm  |

## DIMENSIONS



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.001-0.01mm or .00005-.0005"/  
 0.001-0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance-type  
 linear encoder  
 Max. response speed: Unlimited  
 Measuring force: 1.5N or less  
 Battery: CR2032 (1 pc.), **05SAA217**  
 Battery life: Approx. 12 months under normal use  
 IP Rating: Equivalent to IP-42<sup>\*1</sup>

<sup>\*1</sup> A protection class indication (IP=International Protection) is based on the IEC 60529/DIN40050 part 1/JIS D0207, C0920. The level indicated is valid only if the output connector cap is installed.

## Function

Key Lock, Parameter Lock, PC-USB Input, Analog Bar, Fast measurement frequency, Preset (up to 3 values), Tolerance Judgment, Peak Detection, Calculation (Ax), inch/mm conversion (on inch/metric models only) Counting direction switching, Data Output  
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

## Optional Accessories

- 905338:** Connecting Cable (1m)
- 905409:** Connecting Cable (2m)
- 21EZA313:** Parameter Setting USB Cable
- 21EZA198:** Spindle lifting lever (12.7mm ISO/JIS type)
- 21EZA199:** Spindle lifting lever (12.7mm ASME/AGD type)
- 21EZA105:** Lifting Knob (12.7mm/.5" ISO/JIS models)
- 21EZA150:** Lifting Knob (12.7mm/.5" ASME/AGD models)
- 21EZA197:** Lifting Knob (for 25.4/1" mm models)
- 21EZA200:** Lifting Knob (for 50.8/2" mm models)
- 540774:** Spindle lifting cable
- : Backs (See page F-33.)
- : Contact points (See page F-34.)





### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.001-0.01mm or  
 .00005-.0005"/0.001-0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type  
 linear encoder  
 Max. response speed: Unlimited  
 Measuring force: 1.5N or less  
 Battery: CR2032 (1 pc.), **055AA217**  
 Battery life: Approx. 12 months under normal use  
 IP Rating: Equivalent to IP-42<sup>1</sup>

<sup>1</sup> A protection class indication (IP=International Protection) is based on the IEC 60529 /DIN40050 part 1/JIS D0207, C0920. The level indicated is valid only if the output connector cap is installed.

### Function

Key Lock, Parameter Lock, PC-USB Input, Analog Bar, Fast measurement frequency, Preset (up to 3 values), Tolerance Judgment, Peak Detection (Min Only), inch/mm conversion (on inch/metric models only), Data Output  
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

### Optional Accessories

**905338:** Connecting Cable (1m)  
**905409:** Connecting Cable (2m)  
**21EZA313:** Parameter Setting USB Cable  
 Applicable Gages Series 511 and 526



Installed on optional bore gage probe (511-703)

# ABSOLUTE Digimatic Indicator ID-C

## SERIES 543 — Specially Designed for Bore Gage Application

### FEATURES

- The new Bore Gage-Type Digimatic Indicator features both a Key-Lock and Parameter-Lock to prevent accidental changing of settings during operation.
- Parameter setting software makes it easy to set all available parameters. (optional)
- Fast measurement frequency allows the user to increase the number of readings per second from 10 to 50.
- The minimum value holding function provides the easy detection of hole diameter.
- An analog bar indicator is integrated to enhance the intuition in reading.
- Go/no-go judgment is performed by setting the upper and lower tolerances.
- Up to three sets of master values and upper/lower tolerance values can be memorized.
- Employing the ABSOLUTE linear encoder, the ID-C always displays the spindle Absolute Position from the origin when turned on.



543-310B

### SPECIFICATIONS

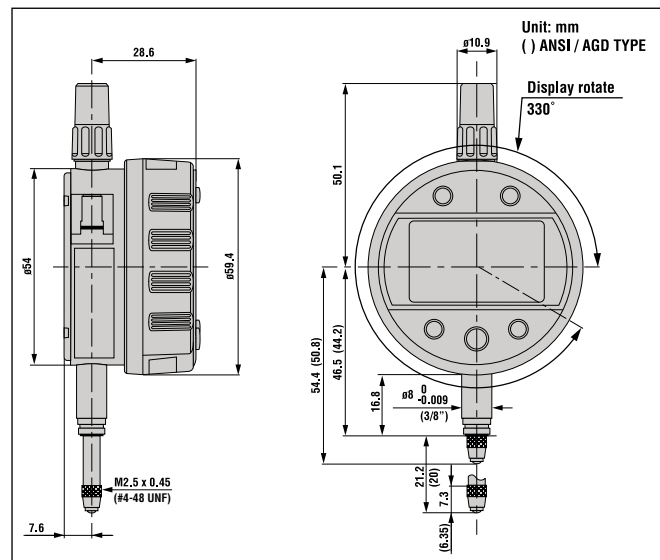
ISO/JIS type    ANSI/AGD type

| Inch/Metric                                    |            | Stem dia. 3/8" #4-48 UNF Thread |             |                  |                 |
|--|------------|---------------------------------|-------------|------------------|-----------------|
| Resolution                                     | Range      | Order No.                       | Model       | Accuracy         | Measuring Force |
| .00005/.0001/.0005"<br>0.001/0.01mm Selectable | .5"/12.7mm | <b>543-312B</b>                 | ID-C112GEXB | ±.00010"/0.003mm | 1.5N or less    |

| Inch/Metric                                    |            | Stem ø 8mm, M2.5 x 0.45 Thread |             |                  |                 |
|--|------------|--------------------------------|-------------|------------------|-----------------|
| Resolution                                     | Range      | Order No.                      | Model       | Accuracy         | Measuring Force |
| .00005/.0001/.0005"<br>0.001/0.01mm Selectable | .5"/12.7mm | <b>543-311B</b>                | ID-C112GMXB | ±.00010"/0.003mm | 1.5N or less    |

| Metric                  |        | Stem ø 8mm, M2.5 x 0.45 Thread |            |          |                 |
|-------------------------|--------|--------------------------------|------------|----------|-----------------|
| Resolution              | Range  | Order No.                      | Model      | Accuracy | Measuring Force |
| 0.001/0.01mm Selectable | 12.7mm | <b>543-310B</b>                | ID-C112GXB | 0.003mm  | 1.5N or less    |

### DIMENSIONS



# ABSOLUTE Digimatic Indicator ID-C

SERIES 543 — With Green/Red LED and Go/No-go Signal Output Function

**ABSOLUTE**<sup>®</sup>  
Absolute System Patented by MITUTOYO



## FEATURES

- With the max./min. value holding function, the signal ID-C can output the go/no-go judgment result against the peak values set. Substitute for the mechanical/electrical contact, the judgment is carried out by calculating the measurement data obtained. This provides high reliability with no deterioration of the contact point and volume adjustment.
- The signal can be output to an external device such as a sequencer through the NPN open-collector.
- The go/no-go judgment result is also indicated by the green/red LED and the "<, O, >" signs on LCD.
- Employing the ABSOLUTE linear encoder, the Signal ID-C always displays the spindle Absolute Position from the origin when powered up.
- The Signal ID-C achieves the IP54 protection level to resist dust and contaminants for safe operation in harsh machine shop environments.
- The high-speed detector measures 100 times per second.
- Analog Bar



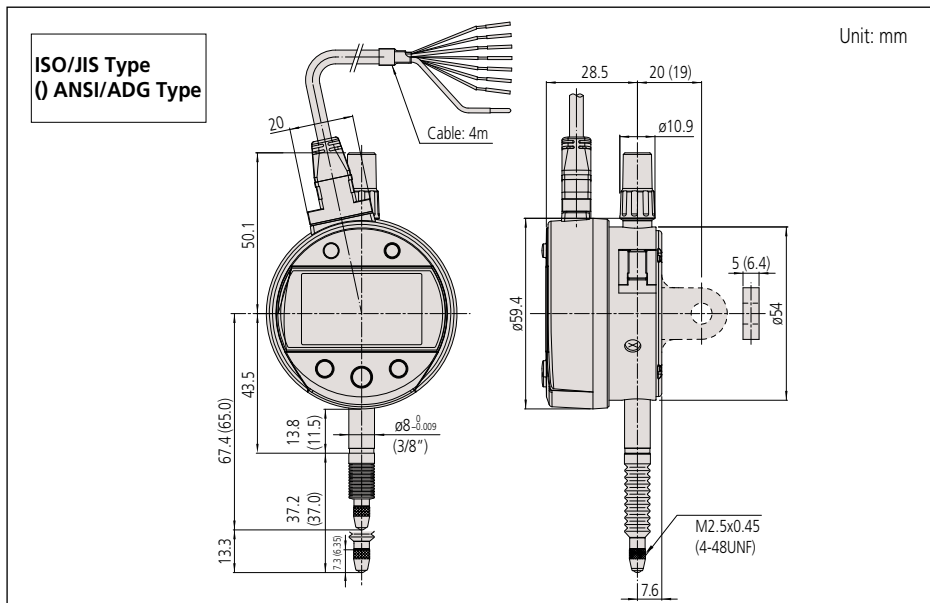
## SPECIFICATIONS

| Inch/Metric                         |              | Stem dia. 3/8" #4-48 UNF Thread |               | ISO/JIS type    | ANSI/AGD type   |
|-------------------------------------|--------------|---------------------------------|---------------|-----------------|-----------------|
| Resolution                          | Range        | Order No. (w/ lug, flat-back)   | Model         | Accuracy        | Measuring force |
| .00005/.0001/.0005"<br>0.001/0.01mm | .5" / 12.7mm | <b>543-352</b> <b>543-352B</b>  | ID-C112JEX(B) | ±.00010/0.003mm | 2.5N or less    |

| Inch/Metric                         |              | Stem ø 8mm, M2.5 x 0.45 Thread |               | ISO/JIS type    | ANSI/AGD type   |
|-------------------------------------|--------------|--------------------------------|---------------|-----------------|-----------------|
| Resolution                          | Range        | Order No. (w/ lug, flat-back)  | Model         | Accuracy        | Measuring force |
| .00005/.0001/.0005"<br>0.001/0.01mm | .5" / 12.7mm | <b>543-351</b> <b>543-351B</b> | ID-C112JMX(B) | ±.00010/0.003mm | 2.5N or less    |

| Metric       |        | Stem ø 8mm, M2. x 0.45 Thread  |              | ISO/JIS type | ANSI/AGD type   |
|--------------|--------|--------------------------------|--------------|--------------|-----------------|
| Resolution   | Range  | Order No. (w/ lug, flat-back)  | Model        | Accuracy     | Measuring force |
| 0.001/0.01mm | 12.7mm | <b>543-350</b> <b>543-350B</b> | ID-C112JX(B) | 0.003mm      | 2.5N or less    |

## DIMENSIONS



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.001mm, .00005"/0.001mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: 2.5N or less  
 Power supply: DC 5-24V±10%  
 Dust/Water protection level: IP54

## Function

Data output (-NG/OK/NG signal, NPN open collector), Remote control (hold-preset, preset-recall, zero-set), Origin-Set, Preset (up to 3 values), Zero-Set, Analog-Bar, go/no-go judgment, Max/Min/Runout value holding, Counting direction switching, Power ON/OFF, inch/mm conversion (on inch/metric models only), calibration mode

Internal calculations using the simple formula of [F(x) = Ax] are available.

Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

## Optional Accessories

- 902011:** Spindle lifting lever\* (ISO/JIS type)
- 902794:** Spindle lifting lever\* (ANSI/AGD type)
- 540774:** Spindle lifting cable\* (Stroke: .4" / 10mm)
- 125317:** Rubber boot
- Backs (See page F-33.)
- Contact points (See page F-34.)

- 21EAA194:** Connecting Cable (1m)\*\*
- 21EAA190:** Connecting Cable (2m)\*\*
- 21EZA345A:** Digimatic Power Supply Unit\*\*

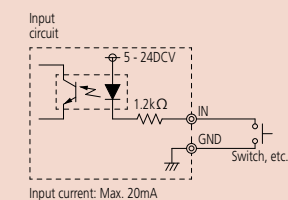
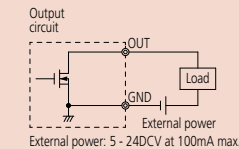
\*When using the spindle lifting lever/cable, IP54 is not guaranteed.  
 \*\* Used only for calibration mode and for automated testing with an i-Checker

## Output pattern

| Wire          | - NG | OK    | + NG | Composition error |
|---------------|------|-------|------|-------------------|
| Orange (- NG) | Low  | High  | High | High              |
| Green (OK)    | High | Low   | High | High              |
| Brown (+ NG)  | High | High  | Low  | High              |
| LED           | Red  | Green | Red  | Red (blinking)    |
| LCD           | <    | O     | >    | "x.xx" indication |

## I/O Specifications

| Wire   | Signal              | I/O | Description   |
|--------|---------------------|-----|---|
| Black  | - V (GND)           | —   | Connected to minus (-) terminal   |
| Red    | + V (GND)           | I   | Power supply (5-24VDC)  |
| Orange | - NG                | O   | Tolerance judgment result output: Only the terminal corresponding to a judgment result is set to the below level. |
| Green  | OK                  | O   |   |
| Brown  | + NG                | O   |   |
| Yellow | PRESET_REC-ALL ZERO | I   | External input terminal: If the relevant terminal is set to the low level, its signal becomes true.               |
| Blue   | PEAK_START          | I   |   |
| Shield | FG                  | —   | Connected to GND  |





### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.0005mm/0.001mm or .00002"/.00005"  
 /.0001"/0.0005mm/0.001mm  
 Display: LCD  
 Length standard: Linear encoder  
 Max. response speed: 1000mm/s  
 Measuring force: 2.0N/2.5N\* or less (\*60mm range models)  
 Power supply: 6V DC (via AC adaptor)

### Function

Origin-set/Preset, Zeroset, go/no-go judgment, Max/Min value hold, Runout measurement, Resolution switching, Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

### Standard Accessories

**06AEG180JA:** AC Adapter 120v  
**137693:** Lifting Lever

### Optional Accessories

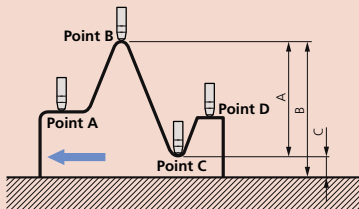
**936937:** SPC cable (40" / 1m)  
**965014:** SPC cable (80" / 2m)  
**21EAA131:** RS-232C cable (80" / 2m)  
**21EZA099:** Remote controller  
**540774:** Spindle lifting cable (stroke: .4" / 10mm)  
**21EZA101:** Spindle lifting knob  
**264-504-5A:** Digimatic Min-processor DP-1VR  
**21EZA152A:** FREE PARAMETER SETTING SOFTWARE  
 ———: Backs (See page F-33.)  
 ———: Contact points (See page F-34.)

### Application

#### 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.



| Order No.       | A      | B     | C     | D  | E    |
|-----------------|--------|-------|-------|----|------|
| <b>543-561A</b> | 251.3  | 47.3  | 30.48 | 60 | 7.3  |
| <b>543-562A</b> | 250.35 | 46.35 | 30.48 | 60 | 6.35 |
| <b>543-563A</b> | 311.3  | 77.3  | 60.96 | 90 | 7.3  |
| <b>543-564A</b> | 310.35 | 76.35 | 60.96 | 90 | 6.35 |

# Digimatic Indicator ID-H

## SERIES 543 — High-Accuracy and High-Functional Type

### FEATURES

- This new generation digital indicator offers the excellent accuracy and functionality expected from this class of indicator. Take advantage of its high accuracy backed by 0.5µm / .00002" resolution, remote control functionality via a handheld controller (or an RS-232C interface) and easy runout measurements with the analog bar display.
- The maximum, minimum, or runout value can be displayed during measurement.
- Go/no-go judgment is performed by setting the upper and lower tolerances. If a judgment result is out of tolerance, the display backlighting changes from green to red, so tolerance judgment can be made at a glance.
- With SPC data output.
- With RS-232C input/output.



### SPECIFICATIONS

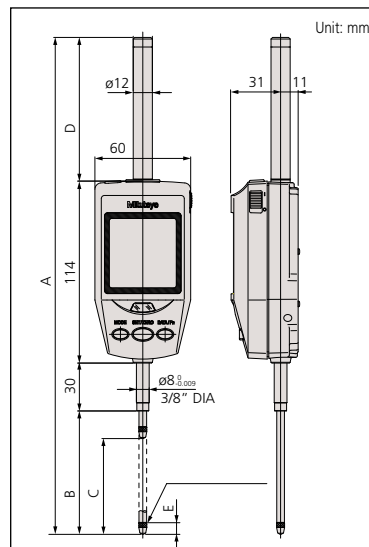
**Inch/Metric** Stem dia. 3/8" #4-48 UNF Thread

| Resolution                             | Range         | Order No.       | Model    | Accuracy |
|--|---------------|-----------------|----------|----------|
| .00002", .00005",<br>.0001", 0.0005mm, | 1.2" / 30.4mm | <b>543-562A</b> | ID-H530E | 0.0015mm |
| 0.001mm                                | 2.4" / 60.9mm | <b>543-564A</b> | ID-H560E | 0.0025mm |

**Metric** Stem ø 8mm M2.5 X 0.45 Thread

| Resolution           | Range  | Order No.       | Model   | Accuracy |
|----------------------|--------|-----------------|---------|----------|
| 0.0005mm,<br>0.001mm | 30.4mm | <b>543-561A</b> | ID-H530 | 0.0015mm |
|                      | 60.9mm | <b>543-563A</b> | ID-H560 | 0.0025mm |

### DIMENSIONS



Tolerance judgment



Analog bar display



Max/Min value measurement



Runout measurement



Resolution switching



# ABSOLUTE Digimatic Indicator ID-F

SERIES 543 — With Back-lit LCD



## FEATURES

- With ABSOLUTE linear encoder technology, once the measurement reference point has been set it, will not be lost when the power is turned on.
- Go/no-go judgment is performed by setting the upper and lower tolerances. If a judgment result is out of tolerance, the display backlighting changes from green to red, so tolerance judgment can be made at a glance.
- The maximum, minimum, or runout value can be displayed during measurement.
- An analog bar indicator has been integrated to handle upper/lower limit approaching and zero approaching. The display range can be changed.
- With SPC data output.



## SPECIFICATIONS

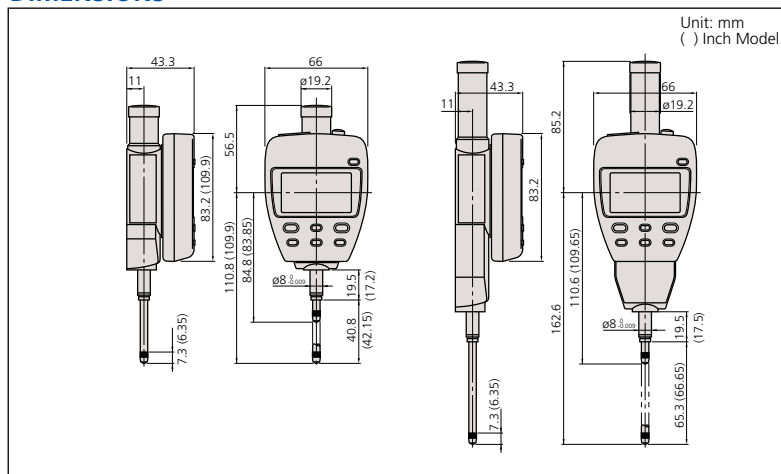
**Inch/Metric** Stem dia. 3/8" #4-48 UNF Thread

| Resolution                                      | Range       | Order No.       | Model     | Accuracy |
|---|-------------|-----------------|-----------|----------|
| .00005", .0001", .0005", .001", 0.001mm, 0.01mm | 1" / 25.4mm | <b>543-552A</b> | ID-F125E  | .00012"  |
|   | 2" / 50.8mm | <b>543-558A</b> | ID-F150HE | .00012"  |

**Metric** Stem ø 8mm M2.5 X 0.45 Thread

| Resolution      | Range | Order No.       | Model    | Accuracy |
|-----------------|-------|-----------------|----------|----------|
| 0.001mm, 0.01mm | 25mm  | <b>543-551A</b> | ID-F125  | 0.003mm  |
|                 | 50mm  | <b>543-557A</b> | ID-F150H | 0.003mm  |

## DIMENSIONS



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm/0.001mm or .00005"/.0001"/.0005"/.001"/.001mm/0.01mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: 1.8N/2.3N\* or less (\*50mm range models)  
 Power supply: 9V DC (via AC adaptor)

## Function

Origin-set/Preset, Zeroset, Go/no-go judgment, Max/Min value hold, Runout measurement, Resolution switching, Counting direction switching, Power ON/OFF, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

## Standard Accessories

**06AEG302JA**: AC Adapter 120V  
**137693**: Lifting Level

## Optional Accessories

**936937**: SPC cable (40" / 1m)  
**965014**: SPC cable (80" / 2m)  
**540774**: Spindle lifting cable (stroke: .4" / 10mm)  
**02ACA571**: Auxiliary spindle spring for 25mm/1" models\*  
**02ACA773**: Auxiliary spindle spring for 50mm/2" models\*  
**264-504-5A**: Digimatic Min-processor DP-1VR  
**543-004-1**: Digimatic presetter  
 ———: Backs (See page F-33.)  
 ———: (See page F-34.)

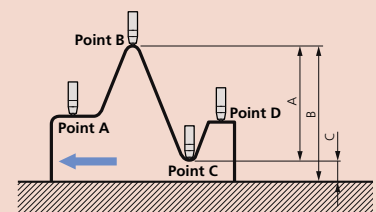
\*Required when orienting the indicator upside down.

## Application

### 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.





### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.01mm, 0.01mm/0.001mm, .0005"/0.01mm or .0005"/0.0005"/0.01mm/0.001mm  
 Display: LCD  
 Length standard: ABSOLUTE electrostatic capacitance-type linear encoder  
 Max. response speed: Unlimited  
 Measuring force: 2.5N (2.0N: Back plunger type)  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 7000 hours under normal use  
 Dust/Water protection level: IP66

### Function

Zero-setting, Presetting, Direction switching, Tolerance judgment, Display hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

### Optional Accessories

- 21EZA105:** Lifting knob (for ISO/JIS model, ID-N only)
- 21EZA150:** Lifting knob (for AGD model, ID-N only)
- 21EZA145:** Lug (for JIS/ISO model)
- 21EZA146:** Lug (for AGD model)
- 02ACA376:** Rubber boot (for ID-N, NBR)
- 238774:** Rubber boot (for ID-N, silicon)
- 125317:** Rubber boot (for ID-B, NBR)
- 21EAA212:** Rubber boot (for ID-B, silicon)
- 21EAA194:** SPC cable (40" / 1m)
- 21EAA190:** SPC cable (80" / 2m)
- 21EAA210:** Bifurcated connecting cable with zero-setting terminal (40" / 1m)
- 21EAA211:** Bifurcated connecting cable with zero-setting terminal (80" / 2m)
- : Contact points (See page F-34.)



# ABSOLUTE Digimatic Indicator ID-N / B

**SERIES 543 — With Dust/Water Protection Conforming to IP66**

## FEATURES

- Proven ABSOLUTE sensor.
- Rated to IP66 water- and dust-proofing standard, and oil resistance improved.
- Slim body design is advantageous for multi-point measurements.
- Improvement in workability with the LCD readout-rotation function.
- Back plunger design (ID-B).
- Built-in tolerance judgment function.
- Switchable resolution.
- Waterproof data output connector.
- Built-in hold/preset function.



Slim type ID-N  
**543-576**

Back plunger type ID-B  
**543-586**



## ID-B Digimatic Indicators

### SPECIFICATIONS

| Metric     |       | Stem ø 8mm M2.5 X 0.45 Thread |           |          |                 |
|------------|-------|-------------------------------|-----------|----------|-----------------|
| Resolution | Range | Order No.                     | Model No. | Accuracy | Measuring Force |
| 0.01mm     | 5.0mm | <b>543-580</b>                | ID-B1005  | 0.02mm   | 2.0N or less    |
| 0.001mm    | 5.0mm | <b>543-585</b>                | ID-B105   | 0.003mm  | 2.0N or less    |

| Inch / Metric                        |              | Stem dia. 3/8" #4-48 UNF Thread |           |                   |                 |
|--------------------------------------|--------------|---------------------------------|-----------|-------------------|-----------------|
| Resolution                           | Range        | Order No.                       | Model No. | Accuracy          | Measuring Force |
| .0005" / 0.01mm                      | .22" / 5.6mm | <b>543-581</b>                  | ID-B1005E | .0008" / 0.02mm   | 2.0N or less    |
| .0005" / 0.01mm<br>.00005" / 0.001mm | .22" / 5.6mm | <b>543-586*</b>                 | ID-B105E  | .00012" / 0.003mm | 2.0N or less    |

\* Switchable resolution

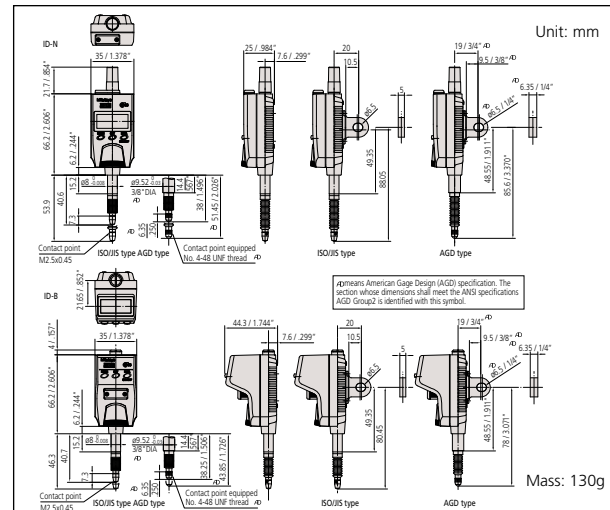
## ID-N Digimatic Indicators

| Metric           |       | Stem ø 8mm M2.5 X 0.45 Thread |           |          |                 |
|------------------|-------|-------------------------------|-----------|----------|-----------------|
| Resolution       | Range | Order No.                     | Model No. | Accuracy | Measuring Force |
| 0.01mm           | 5.0mm | <b>543-570</b>                | ID-N1012  | 0.02mm   | 2.0N or less    |
| 0.001mm / 0.01mm | 5.0mm | <b>543-575</b>                | ID-N112   | 0.003mm  | 2.0N or less    |

| Inch / Metric                        |              | Stem dia. 3/8" #4-48 UNF Thread |           |                   |                 |
|--------------------------------------|--------------|---------------------------------|-----------|-------------------|-----------------|
| Resolution                           | Range        | Order No.                       | Model No. | Accuracy          | Measuring Force |
| .0005" / 0.01mm                      | .5" / 12.7mm | <b>543-571</b>                  | ID-N1012E | .0008" / 0.02mm   | 2.0N or less    |
| .0005" / 0.01mm<br>.00005" / 0.001mm | .5" / 12.7mm | <b>543-576*</b>                 | ID-N112E  | .00012" / 0.003mm | 2.0N or less    |

\* Switchable resolution

## DIMENSIONS AND MASS



# EC Counter

## SERIES 542 — Low-Cost, Assembly-Type Display Unit

### FEATURES

- Employed the DIN size (96 X 48mm) and mount-on-panel configuration, which greatly facilitates the incorporation into a system.
- Possible to produce either tolerance judgment output or Digimatic output.

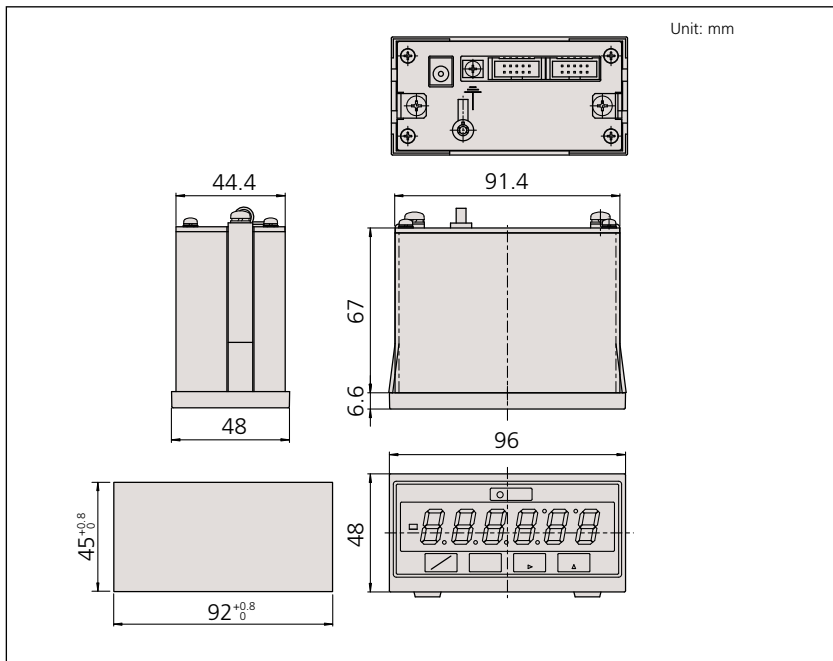


542-007A

### SPECIFICATIONS

| Order No. | Description |
|-----------|-------------|
| 542-007A  | EC Counter  |

### DIMENSIONS



### EC Counter

#### Technical Data

Applicable gage: LGD, LGS, All SPC output gages  
 Resolution: 0.001mm, 0.01mm, .00005, .0005", .0001"  
 No. of gage input: 1  
 Display: 6-digit LED and a negative [-] sign  
 Function: Preset  
 Go/no-go judgment  
 Output (open-collector): 3-Step limit signal\*, Digimatic  
 External control: Preset, Data hold  
 Power supply: Via AC adaptor  
 Dimensions (W x D x H): 96 x 48 x 84.6mm  
 Mass: 500g  
 \*Requires C162-155 (see Optional Accessories)

#### Standard Accessories

06AEG302JA: AC Adaptor

#### Optional Accessories

936937: SPC cable (40"/1m)  
 965014: SPC cable (80"/1m)  
 214938: PJ-2 (DC Plug)  
 C162-155: Go/no-go judgment cable

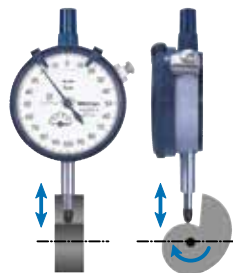
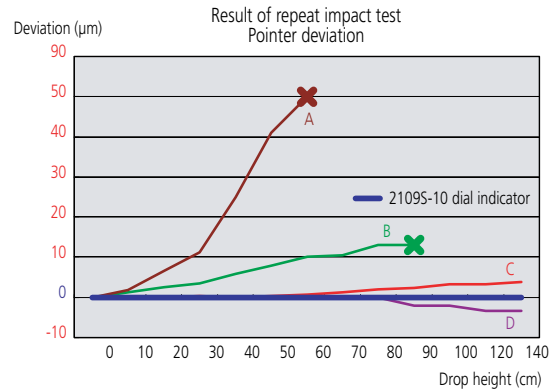
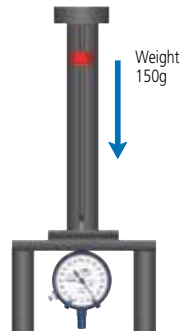
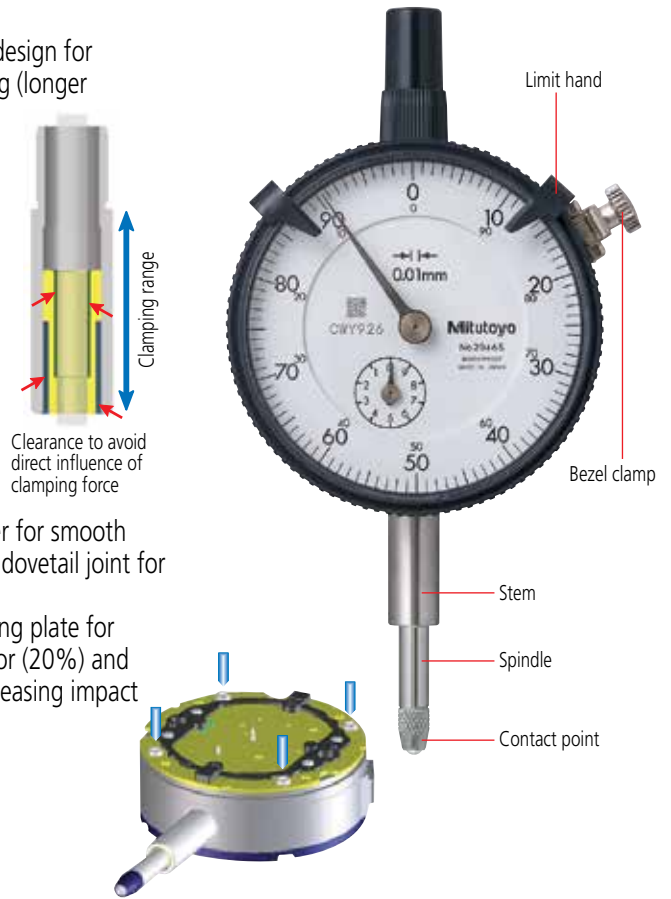
# Dial Indicators

## Description of Icon

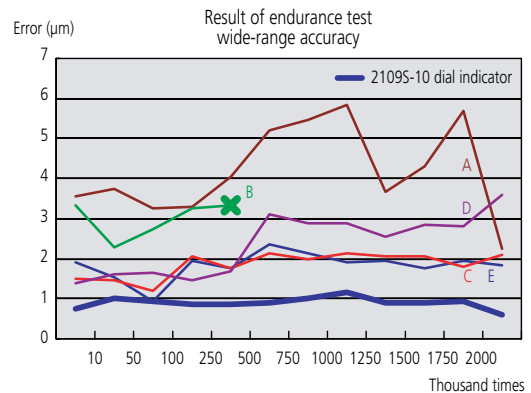
| Icon | Description  |
|------|--|
|      | Reverse reading type suitable for depth and step measurement |
|      | One revolution type for easy and error-free reading          |
|      | Double scale spacing type, easy to read                      |
|      | Shockproof   |
|      | Waterproof   |
|      | With damper at lowest rest point                             |
|      | Jeweled bearing  |
|      | Peak retaining   |
|      | Long stem  |
|      | Dustproof  |
|      | With coaxial revolution counter                              |
|      | Back plunger   |
|      | Adjustable hand  |
|      | Double-face type   |

## FEATURES: S Series

- Revolutionary stem-bush design for trouble-free stem clamping (longer clamping range).
- No through screw hole on the frame for high dust-resistance.
- Involute curved lifting lever for smooth movement of spindle and dovetail joint for tool-less connection.
- Grater rigidity in the bearing plate for reducing the retracing error (20%) and 4-screw mounting for increasing impact resistance.



Endurance testing with cam  
Rotation speed: 120rpm



# Dial Indicators


## SERIES 0 - Compact type



1911T-10


 **Balanced scale**




1911T-10  
 **Jeweled bearing**


 **Balanced scale**





1913T-10  
 **Jeweled bearing**

## SPECIFICATIONS

**Inch** Stem dia. 3/8", #4-48 UNF Thread  ANSI/AGD type

| Graduation | Range | Range/rev | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring force |  |
|------------|-------|-----------|--------------|-----------------|------------------|---------------|------------------|-----------------|---|
|            |       |           |              | w/ lug          | Flat-back        | First 2.5 Rev | Overall Accuracy |                 |   |
| .0001"     | .025" | .01"      | 0-5-0        | <b>1925T-10</b> | <b>1925TB-10</b> | ±.0002"       | ±.0002"          | 0.3 - 1.8N      | ✓   |
| .0005"     | .05"  | .02"      | 0-10-0       | <b>1923T-10</b> | <b>1923TB-10</b> | ±.0005"       | ±.0005"          | 0.3 - 1.8N      | ✓   |
| .001"      | .1"   | .04"      | 0-20-0       | <b>1921T-10</b> | <b>1921TB-10</b> | ±.001"        | ±.001"           | 0.3 - 1.8N      | ✓   |

**Metric** Stem ø 8mm, M2.5 x 0.45 Thread  ISO/JIS type

| Graduation | Range | Range/Rev | Dial reading | Order No.       |                  | Accuracy |                  | Measuring force |  |
|------------|-------|-----------|--------------|-----------------|------------------|----------|------------------|-----------------|---|
|            |       |           |              | w/ lug          | Flat-back        | Any Rev  | Overall Accuracy |                 |   |
| 0.002mm    | 0.5mm | 0.2mm     | 0-100-0      | <b>1913T-10</b> | <b>1913TB-10</b> | ±5µm     | ±6µm             | 0.3 - 1.8N      | ✓   |
| 0.01mm     | 2.5mm | 1mm       | 0-50-0       | <b>1911T-10</b> | <b>1911TB-10</b> | ±10µm    | ±12µm            | 0.3 - 1.8N      | ✓   |

 Jeweled bearing

## DIMENSIONS

**Inch Model** Unit: Inch

| Order Number | A     | B    |
|--------------|-------|------|
| 1925T-10     | 1.48" | .28" |
| 1923T-10     | 1.51" | .31" |
| 1921T-10     | 1.58" | .37" |

**Metric Model** Unit: mm

| Order Number | A    | B    |
|--------------|------|------|
| 1911T-10     | 42   | 11.5 |
| 1913T-10     | 39.5 | 9    |



# Dial Indicators

## SERIES 1



18035-10



14115



15065

### SPECIFICATIONS

**Inch** Stem dia. 3/8" #4-48 UNF Thread □ ANSI/AGD type

| Graduation | Range | Range / Rev | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring force | Shockproof | Jeweled bearing |
|------------|-------|-------------|--------------|-----------------|------------------|---------------|------------------|-----------------|------------|-----------------|
|            |       |             |              | (W/Lug)         | (Flat-back)      | First 2.5 Rev | Overall Accuracy |                 |            |                 |
| .0001"     | .025" | .01"        | 0-10         | <b>18025-10</b> | <b>18025B-10</b> | ±.0001"       | ±.0001"          | 1.4N or less    | ✓          | ✓               |
| .0001"     | .025" | .01"        | 0-5-0        | <b>18035-10</b> | <b>18035B-10</b> | ±.0001"       | ±.0001"          | 1.4N or less    | ✓          | ✓               |
| .0005"     | .1"   | .04"        | 0-40         | <b>16705</b>    | <b>16705B</b>    | ±.0005"       | ±.0005"          | 1.4N or less    |            |                 |
| .0005"     | .1"   | .04"        | 0-20-0       | <b>16715</b>    | <b>16715B</b>    | ±.0005"       | ±.0005"          | 1.4N or less    |            |                 |
| .0005"     | .125" | .05"        | 0-50         | <b>15065</b>    | <b>15065B</b>    | ±.0005"       | ±.0005"          | 1.4N or less    |            |                 |
| .0005"     | .125" | .05"        | 0-25-0       | <b>15075</b>    | <b>15075B</b>    | ±.0005"       | ±.0005"          | 1.4N or less    |            |                 |
| .001"      | .125" | .05"        | 0-50         | <b>17805</b>    | <b>17805B</b>    | ±.001"        | ±.001"           | 1.4N or less    |            |                 |
| .001"      | .125" | .025"       | 0-25-0       | <b>17815</b>    | <b>17815B</b>    | ±.001"        | ±.001"           | 1.4N or less    |            |                 |
| .001"      | .25"  | .1"         | 0-100        | <b>14105</b>    | <b>14105B</b>    | ±.001"        | ±.001"           | 1.4N or less    |            |                 |
| .001"      | .25"  | .1"         | 0-100        | <b>14105-10</b> | <b>14105B-10</b> | ±.001"        | ±.001"           | 1.4N or less    |            | ✓               |
| .001"      | .25"  | .1"         | 0-50-0       | <b>14115</b>    | <b>14115B</b>    | ±.001"        | ±.001"           | 1.4N or less    |            |                 |



Shockproof

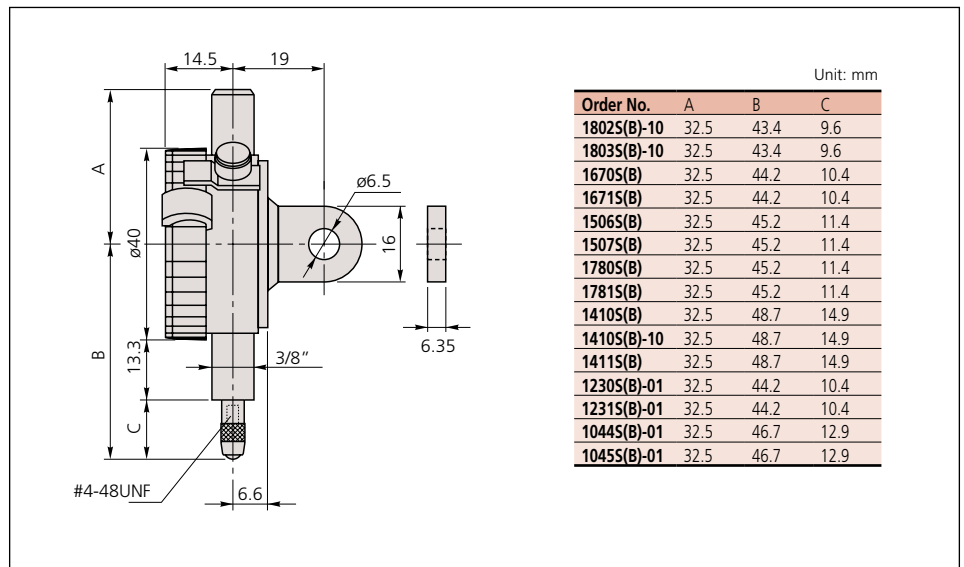


Jeweled bearing

**Metric** Metric - ANSI Standard Stem dia. 3/8" #4-48 UNF Thread yellow dial face □ ANSI/AGD type

| Graduation | Range | Range / Rev | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring force |
|------------|-------|-------------|--------------|-----------------|------------------|---------------|------------------|-----------------|
|            |       |             |              | (W/Lug)         | (Flat-back)      | First 2.5 Rev | Overall Accuracy |                 |
| 0.002mm    | 0.5mm | 0.2mm       | 0-20         | <b>10105-11</b> | <b>10105B-11</b> | ±0.002mm      | ±0.002mm         | 1.5N or less    |
| 0.002mm    | 0.5mm | 0.2mm       | 0-10-0       | <b>10115-11</b> | <b>10115B-11</b> | ±0.002mm      | ±0.002mm         | 1.5N or less    |
| 0.01mm     | 2.5mm | 1mm         | 0-100        | <b>12305-01</b> | <b>12305B-01</b> | ±0.01mm       | -                | 1.4N or less    |
| 0.01mm     | 2.5mm | 1mm         | 0-50-0       | <b>12315-01</b> | <b>12315B-01</b> | ±0.01mm       | -                | 1.4N or less    |
| 0.01mm     | 5mm   | 1mm         | 0-100        | <b>10445-01</b> | <b>10445B-01</b> | ±0.01mm       | ±0.013mm         | 1.4N or less    |
| 0.01mm     | 5mm   | 1mm         | 0-50-0       | <b>10455-01</b> | <b>10455B-01</b> | ±0.01mm       | ±0.013mm         | 1.4N or less    |

### DIMENSIONS



# Dial Indicators

## SERIES 1



1040S



1013S



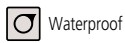
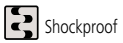
1045S



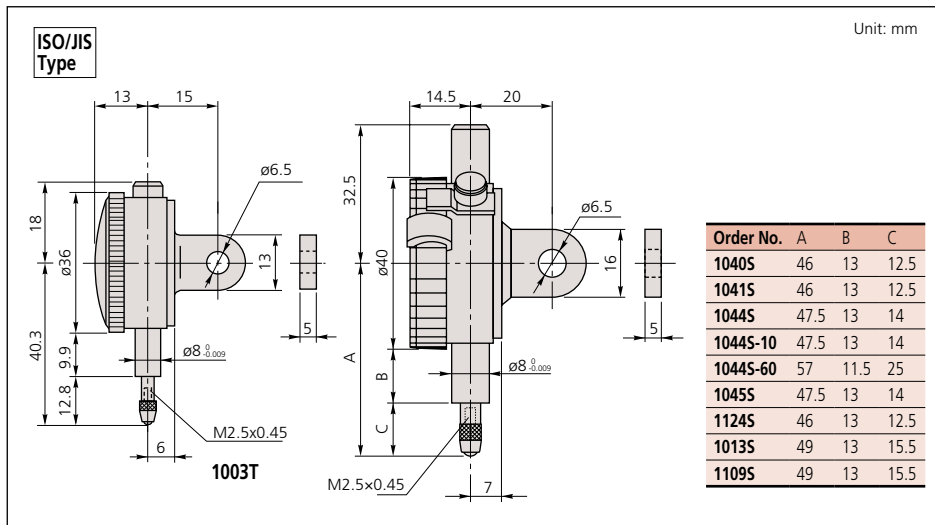
1109S-10

**Metric** Stem  $\varnothing$  8mm M2.5 X 0.45 Thread ISO/JIS type

| Graduation | Range | Range / Rev | Dial reading | Order No.       |                  | Accuracy       |                  | Measuring force | Shockproof | Waterproof | Jeweled bearing |
|------------|-------|-------------|--------------|-----------------|------------------|----------------|------------------|-----------------|------------|------------|-----------------|
|            |       |             |              | (W/Lug)         | (Flat-back)      | First 2.5 Rev  | Overall Accuracy |                 |            |            |                 |
| 0.001mm    | 1mm   | 0.2mm       | 0-100-0      | <b>1109S-10</b> | <b>1109SB-10</b> | $\pm 0.001$ mm | $\pm 0.007$ mm   | 1.5N or less    | ✓          |            | ✓               |
| 0.002mm    | 1mm   | 0.2mm       | 0-100-0      | <b>1013S-10</b> | <b>1013SB-10</b> | $\pm 0.002$ mm | $\pm 0.01$ mm    | 1.5N or less    | ✓          |            | ✓               |
| 0.005mm    | 3.5mm | 0.5mm       | 0-50         | <b>1124S</b>    | <b>1124SB</b>    | $\pm 0.005$ mm | $\pm 0.013$ mm   | 1.4N or less    |            |            | ✓               |
| 0.01mm     | 3.5mm | 0.5mm       | 0-50         | <b>1040S</b>    | <b>1040SB</b>    | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 1.5N or less    |            |            |                 |
| 0.01mm     | 3.5mm | 0.5mm       | 0-25-0       | <b>1041S</b>    | <b>1041SB</b>    | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 1.5N or less    |            |            |                 |
| 0.01mm     | 4mm   | 1mm         | 0-50-0       | <b>1003T</b>    | <b>1003TB</b>    | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 0.3 - 1.4N      |            |            |                 |
| 0.01mm     | 5mm   | 1mm         | 0-100        | <b>1044S</b>    | <b>1044SB</b>    | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 1.5N or less    |            |            |                 |
| 0.01mm     | 5mm   | 1mm         | 0-100        | <b>1044S-60</b> | <b>1044SB-60</b> | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 2N or less      |            | ✓          |                 |
| 0.01mm     | 5mm   | 1mm         | 0-100        | <b>1044S-15</b> | <b>1044SB-15</b> | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 1.4N or less    | ✓          |            |                 |
| 0.01mm     | 5mm   | 1mm         | 0-50-0       | <b>1045S</b>    | <b>1045SB</b>    | $\pm 0.01$ mm  | $\pm 0.013$ mm   | 1.4N or less    |            |            |                 |



## DIMENSIONS



1044S

### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)



# Dial Indicators

## SERIES 1 — Compact One Revolution Type for Error-free Reading



One revolution type



1929S  
1929S-62



1900S-10  
1900S-72



1929S

Unlike many other dial indicators, the one-revolution dial indicator shows the entire spindle travel or range as one sweep of the hand, eliminating the possibility of reading errors due to miscounting the multiple revolutions. With one-revolution dial indicators, within tolerance and out of tolerance can't be misinterpreted. Unique shock-proof mechanism provides improved immunity to shock due to sudden spindle retraction caused by high impact.



Shockproof type



Dustproof type



Waterproof type



Jeweled bearing type

### SPECIFICATIONS

**Inch** Stem dia. 3/8", #4-48 UNF Thread □ ANSI/AGD type

| Graduation | Range (range/full stroke) | Dial reading | Order No.       |                  | Accuracy | Measuring force |   |   |   |   |
|------------|---------------------------|--------------|-----------------|------------------|----------|-----------------|---|---|---|---|
|            |                           |              | w/lug           | Flat-back        |          |                 |   |   |   |   |
| .0001"     | .006" / .0079"            | 3-0-3        | <b>1910S-72</b> | <b>1910SB-72</b> | ±.0001"  | 1.4N or less    | ✓ | ✓ | — | — |
| .0005"     | .04" / .055"              | 20-0-20      | <b>1909S-62</b> | <b>1909SB-62</b> | ±.0005"  | 1.4N or less    | ✓ | ✓ | — | — |

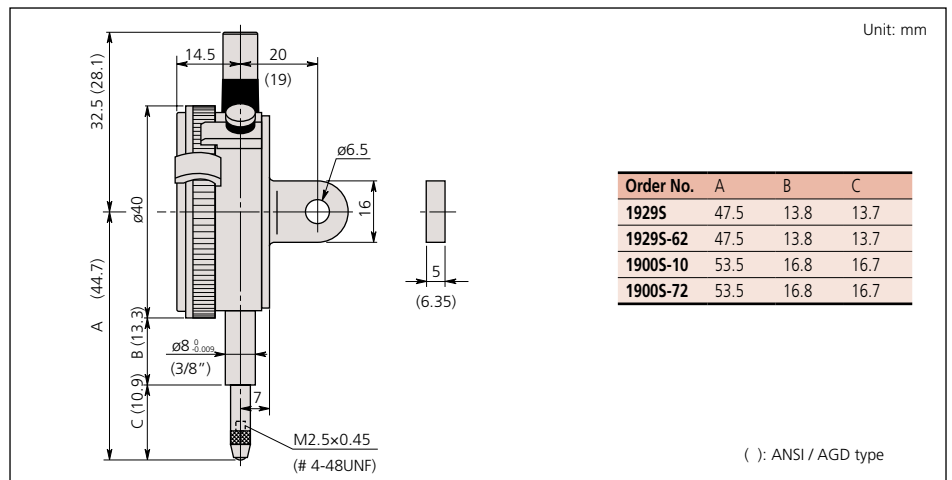
**Metric** Stem  $\phi$  8mm, M2.5 x 0.45 Thread □ ISO/JIS type

| Graduation | Range (range/full stroke) | Dial reading | Order No.       |                  | Accuracy | Measuring force |   |   |   |   |
|------------|---------------------------|--------------|-----------------|------------------|----------|-----------------|---|---|---|---|
|            |                           |              | w/lug           | Flat-back        |          |                 |   |   |   |   |
| 0.001mm    | 0.1mm / 0.14mm            | 50-0-50      | <b>1900S-10</b> | <b>1900SB-10</b> | ±0.005mm | 1.5N or less    | ✓ | — | — | ✓ |
| 0.001mm    | 0.1mm / 0.14mm            | 50-0-50      | <b>1900S-72</b> | <b>1900SB-72</b> | ±0.006mm | 1.5N or less    | ✓ | ✓ | — | ✓ |
| 0.01mm     | 1mm / 1.4mm               | 50-0-50      | <b>1929S</b>    | <b>1929SB</b>    | ±0.011mm | 1.4N or less    | ✓ | — | — | — |
| 0.01mm     | 1mm / 1.4mm               | 50-0-50      | <b>1929S-62</b> | <b>1929SB-62</b> | ±0.011mm | 1.4N or less    | ✓ | ✓ | — | — |

### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

### DIMENSIONS



# Dial Indicators

## SERIES 2 — Standard One Revolution Type for Error-free Reading



One revolution type.



Shockproof type



Waterproof type



Dustproof type



Jeweled bearing type

### SPECIFICATIONS

**Metric** Stem  $\varnothing$  8mm, M2.5 x 0.45 Thread □ ISO/JIS type

| Graduation | Range (range/full stroke) | Dial reading | Order No.       |                  | Accuracy       | Measuring force | Shockproof | Waterproof | Dustproof | Jeweled bearing |
|------------|---------------------------|--------------|-----------------|------------------|----------------|-----------------|------------|------------|-----------|-----------------|
|            |                           |              | w/ lug          | Flat-back        |                |                 |            |            |           |                 |
| 0.001mm    | 0.08mm / 0.1mm            | 40-0-40      | <b>2900S-10</b> | <b>2900SB-10</b> | $\pm 0.003$ mm | 1.4N or less    | ✓          | —          | —         | ✓               |
| 0.001mm    | 0.08mm / 0.1mm            | 40-0-40      | <b>2900S-70</b> | <b>2900SB-70</b> | $\pm 0.003$ mm | 2.0N or less    | ✓          | ✓          | —         | ✓               |
| 0.001mm    | 0.08mm / 0.1mm            | 40-0-40      | <b>2900S-72</b> | <b>2900SB-72</b> | $\pm 0.003$ mm | 2.0N or less    | ✓          | —          | ✓         | ✓               |
| 0.001mm    | 0.16mm / 0.2mm            | 80-0-80      | <b>2901S-10</b> | <b>2901SB-10</b> | $\pm 0.004$ mm | 1.4N or less    | ✓          | —          | —         | ✓               |
| 0.01mm     | 0.8mm / 1mm               | 40-0-40      | <b>2929S</b>    | <b>2929SB</b>    | $\pm 0.009$ mm | 2.0N or less    | ✓          | —          | —         | —               |
| 0.01mm     | 0.8mm / 1mm               | 40-0-40      | <b>2929S-60</b> | <b>2929SB-60</b> | $\pm 0.009$ mm | 2.0N or less    | ✓          | ✓          | —         | —               |
| 0.01mm     | 0.8mm / 1mm               | 40-0-40      | <b>2929S-62</b> | <b>2929SB-62</b> | $\pm 0.009$ mm | 2.0N or less    | ✓          | —          | ✓         | —               |
| 0.01mm     | 1.6mm / 2mm               | 80-0-80      | <b>2959S</b>    | <b>2959SB</b>    | $\pm 0.013$ mm | 1.4N or less    | ✓          | —          | —         | —               |
| 0.01mm     | 0.5mm / 0.7mm             | 25-0-25      | —               | <b>2971TB*</b>   | $\pm 0.008$ mm | 0.4 - 1.4N      | ✓          | —          | ✓         | —               |
| 0.01mm     | 1mm / 1.4mm               | 50-0-50      | —               | <b>2972TB*</b>   | $\pm 0.008$ mm | 0.4 - 1.4N      | ✓          | —          | ✓         | —               |
| 0.02mm     | 1.6mm / 2mm               | 80-0-80      | —               | <b>2973TB*</b>   | $\pm 0.016$ mm | 0.4 - 1.4N      | ✓          | —          | ✓         | —               |
| 0.1mm      | 4mm / 10mm                | 2-0-2        | <b>2928S</b>    | <b>2928SB</b>    | $\pm 0.040$ mm | 1.4N or less    | ✓          | —          | —         | —               |

\* Flat-back type only. (Lug-on-center back is not available.)

### DIMENSIONS

ISO/JIS Type

Unit: mm

| Order No.       | A    | B    | C  | D    | E    | F    | H  |
|-----------------|------|------|----|------|------|------|----|
| <b>2971TB</b>   | 43.2 | 65.6 | 57 | 16.5 | 19.8 | 16.8 | 55 |
| <b>2972TB</b>   | 43.2 | 66.0 | 57 | 16.5 | 19.8 | 17.2 | 55 |
| <b>2973TB</b>   | 43.2 | 66.3 | 57 | 16.5 | 19.8 | 17.5 | 55 |
| <b>2929S</b>    | 48.8 | 65.2 | 57 | 17.7 | 12.3 | 29.2 | 52 |
| <b>2929S-62</b> | 48.8 | 65.2 | 57 | 17.7 | 16.9 | 19.8 | 52 |
| <b>2929S-60</b> | 48.8 | 70   | 57 | 17.7 | 12.3 | 29.2 | 52 |
| <b>2959S</b>    | 48.8 | 65.2 | 57 | 17.7 | 16.9 | 19.8 | 52 |
| <b>2900S-10</b> | 48.8 | 66   | 57 | 17.7 | 16.9 | 20.6 | 52 |
| <b>2900S-72</b> | 48.8 | 66   | 57 | 17.7 | 16.9 | 20.6 | 52 |
| <b>2900S-70</b> | 48.8 | 67   | 57 | 17.7 | 12.3 | 26.2 | 52 |
| <b>2901S-10</b> | 48.8 | 66.1 | 57 | 17.7 | 16.9 | 20.7 | 52 |
| <b>2928S</b>    | 48.8 | 65.2 | 57 | 17.7 | 16.9 | 19.8 | 52 |



### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)



# Dial Indicators

## SERIES 2 — Standard One Revolution Type for Error-free Reading

### FEATURES

- Unique shock-proof mechanism provides improved immunity to shock due to sudden spindle retraction caused by high impact.
- The crystal is hard coated for durability and scratch resistance.
- Approximately 40% lighter than conventional dial indicator.
- Improved resistance to shop-floor contaminants such as water and dust.
- Due to the spindle bushing being offset from the stem, spindle movement will not be hindered or jammed when clamping along the stem.
- A pair of limit hands are provided for quick and easy tolerance judgment (go/no-go).



One revolution type.



29095-62



2978TB

### SPECIFICATIONS

**Inch** Stem 3/8" dia., #4-48 UNF Thread

ANSI/AGD type

| Graduation | Range | Range/full stroke | Dial reading | Order No.       |                  | Accuracy | Measuring force |  |
|------------|-------|-------------------|--------------|-----------------|------------------|----------|-----------------|--|
|            |       |                   |              | w/ lug          | Flat-back        |          |                 |  |
| .0001"     | .008" | .01"              | 4-0-4        | <b>2910S-10</b> | <b>2910SB-10</b> | ±.0001"  | 1.8N or less    |  |
| .0001"     | .008" | .01"              | 4-0-4        | <b>2910S-72</b> | <b>2910SB-72</b> | ±.0001"  | 2.5N or less    |  |
| .0005"     | .04"  | .05"              | 20-0-20      | <b>2909S-62</b> | <b>2909SB-62</b> | ±.0005"  | 2.5N or less    |  |
| .0005"     | .02"  | .028"             | 10-0-10      | —               | <b>2976TB*</b>   | ±.0005"  | 0.4 - 1.4N      |  |
| .0005"     | .04"  | .055"             | 20-0-20      | —               | <b>2977TB*</b>   | ±.0005"  | 0.4 - 1.4N      |  |
| .001"      | .06"  | .079"             | 30-0-30      | —               | <b>2978TB*</b>   | ±.001"   | 0.4 - 1.4N      |  |

\*Flat-back type only. (Lug-on-center back is not available.)

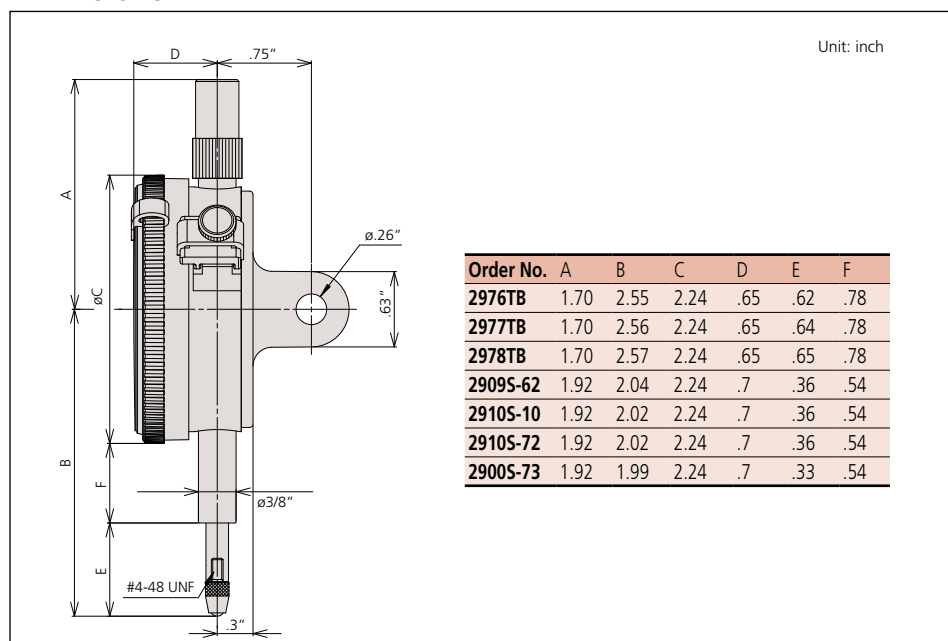
**Metric** Stem 3/8" dia., #4-48 UNF Thread Yellow Dial Face

ANSI/AGD type

| Graduation | Range  | Range/full stroke) | Dial reading | Order No.       |                  | Accuracy | Measuring force |  |
|------------|--------|--------------------|--------------|-----------------|------------------|----------|-----------------|--|
|            |        |                    |              | w/ lug          | Flat-back        |          |                 |  |
| 0.001mm    | 0.08mm | 0.1mm              | 40-0-40      | <b>2900S-73</b> | <b>2900SB-73</b> | ±0.003mm | 2.0N or less    |  |

\*Flat-back type only. (Lug-on-center back is not available.)

### DIMENSIONS



### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

# Special Dial Indicators

## SERIES 2



Adjustable hand



20485-10

### Adjustable hand dial gage

The hand position can be adjusted independently of the vertical movement of the spindle by rotating the top knob.



Peak hold



20465-80

### Peak hold dial gage

A mechanism that stops the pointer and the spindle at the depressed position where the spindle is depressed makes the pointer stop and display the maximum value.

## SPECIFICATIONS

**Inch** Stem dia. 3/8" #4-48 UNF Thread ANSI/AGD type

| Graduation | Range | Range /rev | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring force |   |   |   |
|------------|-------|------------|--------------|-----------------|------------------|---------------|------------------|-----------------|---|---|---|
|            |       |            |              | w/lug           | Flat-back        | First 2.5 Rev | Overall Accuracy |                 |   |   |   |
| .001"      | .5"   | .1"        | 0-100        | <b>29155-10</b> | <b>29155B-10</b> | ±.001"        | ±.001"           | 1.8N or less    | ✓ | ✓ | ✓ |
| .001"      | .5"   | .1"        | 0-50-0       | <b>29185-10</b> | <b>29185B-10</b> | ±.001"        | ±.001"           | 1.8N or less    | ✓ | ✓ | ✓ |

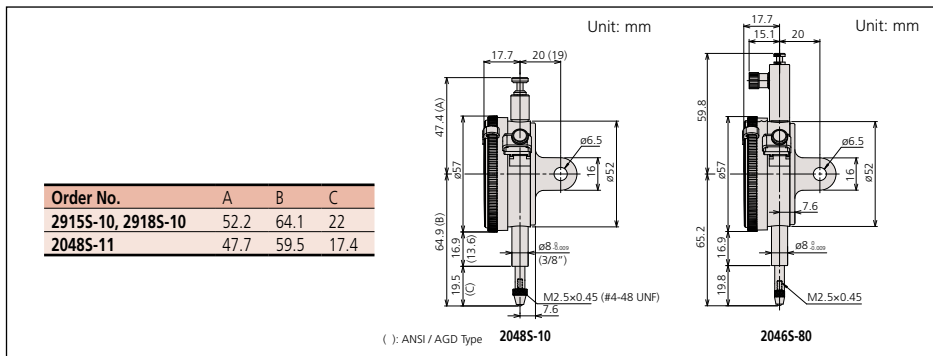
**Metric** Stem dia. 3/8" #4-48 UNF Thread, Yellow Dial Face ANSI/AGD type

| Graduation | Range | Range /rev | Dial reading | Order No.       |                  | Accuracy      |          | Measuring force |   |   |   |
|------------|-------|------------|--------------|-----------------|------------------|---------------|----------|-----------------|---|---|---|
|            |       |            |              | w/lug           | Flat-back        | First 2.5 Rev | Overall  |                 |   |   |   |
| 0.01mm     | 10mm  | 1mm        | 0-100        | <b>20485-11</b> | <b>20485B-11</b> | ±13μm         | ±0.013mm | 1.4N or less    | ✓ | ✓ | ✓ |

**Metric** Stem ø 8mm, M2.5 x 0.45 Thread ISO/JIS type

| Graduation | Range | Range /rev | Dial reading | Order No.       |                  | Accuracy | Measuring force |   |   |   |   |
|------------|-------|------------|--------------|-----------------|------------------|----------|-----------------|---|---|---|---|
|            |       |            |              | w/lug           | Flat-back        |          |                 |   |   |   |   |
| 0.01mm     | 10mm  | 1mm        | 0-100        | <b>20485-10</b> | <b>20485B-10</b> | ±0.015mm | 1.4N or less    | ✓ | ✓ | ✓ |   |
| 0.01mm     | 10mm  | 1mm        | 0-100        | <b>20465-80</b> | <b>20465B-80</b> | ±0.015mm | 5.0N or less    |   |   |   | ✓ |

## DIMENSIONS





# Dial Indicators

## SERIES 2 — Standard Type, Inch Reading



2416S



2803S-10

### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

### SPECIFICATIONS

| Graduation | Range | Range /Rev | Dial Reading | Order No.        |                   | Accuracy      |         | Measuring force | Shockproof | Reverse Reading | Jeweled Bearing |
|------------|-------|------------|--------------|------------------|-------------------|---------------|---------|-----------------|------------|-----------------|-----------------|
|            |       |            |              | w/lug            | Flat-back         | First 2.5 Rev | Overall |                 |            |                 |                 |
| .0001"     | .025" | .01"       | 0-10         | <b>2802S-10</b>  | <b>2802SB-10</b>  | ±.0001"       | ±.0001" | 2.5N or less    | ✓          |                 | ✓               |
| .0001"     | .025" | .01"       | 0-5-0        | <b>2803S-10</b>  | <b>2803SB-10</b>  | ±.0001"       | ±.0001" | 2.5N or less    | ✓          |                 | ✓               |
| .0001"     | .05"  | .01"       | 0-10         | <b>2804S-10</b>  | <b>2804SB-10</b>  | ±.0001"       | ±.0002" | 2.0N or less    | ✓          |                 | ✓               |
| .0001"     | .05"  | .01"       | 0-5-0        | <b>2805S-10</b>  | <b>2805SB-10</b>  | ±.0001"       | ±.0002" | 2.0N or less    | ✓          |                 | ✓               |
| .0001"     | .05"  | .01"       | 10-0         | <b>2905S-10</b>  | <b>2905SB-10</b>  | ±.0001"       | ±.0002" | 2.0N or less    | ✓          | ✓               | ✓               |
| .0001"     | .05"  | .01"       | 0-5-0        | <b>2923S-10</b>  | <b>2923SB-10</b>  | ±.0001"       | ±.0002" | 2.0N or less    | ✓          | ✓               | ✓               |
| .0001"     | .25"  | .01"       | 0-10         | <b>2356S-10</b>  | <b>2356SB-10</b>  | ±.0001"       | ±.0005" | 2.0N or less    |            |                 | ✓               |
| .0001"     | .5"   | .01"       | 0-10         | <b>2358S-10</b>  | <b>2358SB-10</b>  | ±.0001"       | ±.0008" | 2.0N or less    |            |                 | ✓               |
| .0005"     | .125" | .05"       | 0-50         | <b>2506S</b>     | <b>2506SB</b>     | ±.0005"       | ±.0005" | 1.8N or less    |            |                 |                 |
| .0005"     | .125" | .05"       | 0-25-0       | <b>2507S</b>     | <b>2507SB</b>     | ±.0005"       | ±.0005" | 1.8N or less    |            |                 |                 |
| .0005"     | .125" | .05"       | 0-25-0       | <b>2922S</b>     | <b>2922SB</b>     | ±.0005"       | ±.0005" | 1.8N or less    |            | ✓               |                 |
| .0005"     | .5"   | .05"       | 0-50         | <b>2514S</b>     | <b>2514SB</b>     | ±.0005"       | ±.0015" | 1.8N or less    |            |                 |                 |
| .0005"     | 1"    | .05"       | 0-50         | <b>2776S</b>     | <b>2776SB</b>     | ±.0005"       | ±.002"  | 2.5N or less    |            |                 |                 |
| .001"      | .5"   | .1"        | 0-100        | <b>2414S</b>     | <b>2414SB</b>     | ±.001"        | ±.001"  | 1.8N or less    |            |                 |                 |
| .001"      | .5"   | .1"        | 100-0        | <b>2914S</b>     | <b>2914SB</b>     | ±.001"        | ±.001"  | 0.4-1.8N        |            | ✓               |                 |
| .001"      | .5"   | .1"        | 0-50-0       | <b>2415S</b>     | <b>2415SB</b>     | ±.001"        | ±.001"  | 1.8N or less    |            |                 |                 |
| .001"      | 1"    | .1"        | 0-100        | <b>2416S</b>     | <b>2416SB</b>     | ±.001"        | ±.002"  | 1.8N or less    |            |                 |                 |
| .001"      | 1"    | .1"        | 0-100        | <b>2416S-06*</b> | <b>2416SB-06*</b> | ±.001"        | ±.002"  | 1.8N or less    |            |                 |                 |
| .001"      | 1"    | .1"        | 0-100        | <b>2416S-10</b>  | <b>2416SB-10</b>  | ±.001"        | ±.002"  | 1.8N or less    |            |                 | ✓               |
| .001"      | 1"    | .1"        | 0-50-0       | <b>2417S</b>     | <b>2417SB</b>     | ±.001"        | ±.002"  | 1.8N or less    |            |                 |                 |
| .001"      | 1"    | .1"        | 100-0        | <b>2904S</b>     | <b>2904SB</b>     | ±.001"        | ±.002"  | 1.8N or less    |            | ✓               |                 |
| .001"      | 2"    | 1"         | 0-100        | <b>2424S-19</b>  | <b>2424SB-19</b>  | ±.001"        | ±.003"  | 2.5N or less    | ✓          |                 | ✓               |

\* Black Face



Shockproof type



Reverse reading type



Jeweled bearing type

# Dial Indicators

## SERIES 2 — Standard Type, Inch Reading



2506S

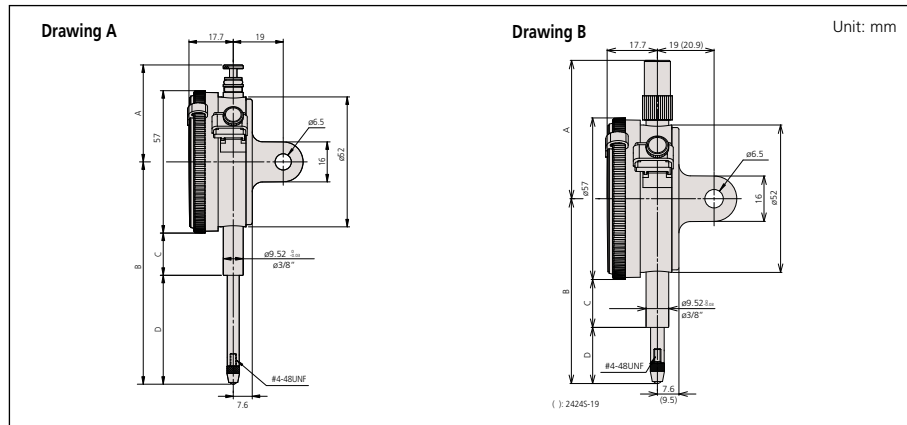


2923S-10



2424S-19

### DIMENSIONS



### 2 Group Inch

| Order No.   | A     | B     | C    | D    | Drawing |
|-------------|-------|-------|------|------|---------|
| 2356S(B)-10 | 48.8  | 57.2  | 13.6 | 15.1 | B       |
| 2358S(B)-10 | 38.9  | 63.6  | 13.6 | 21.5 | A       |
| 2414S(B)    | 38.9  | 64.1  | 13.6 | 22   | A       |
| 2415S(B)    | 38.9  | 64.1  | 13.6 | 22   | A       |
| 2416S(B)    | 38.9  | 76.8  | 13.6 | 34.7 | A       |
| 2416S(B)-06 | 38.9  | 76.8  | 13.6 | 34.7 | A       |
| 2416S(B)-10 | 38.9  | 76.8  | 13.6 | 34.7 | A       |
| 2417S(B)    | 38.9  | 76.8  | 13.6 | 34.7 | A       |
| 2424S(B)-19 | 118.5 | 142.5 | 54.3 | 59.7 | B       |
| 2506S(B)    | 48.8  | 54.3  | 13.6 | 12.2 | B       |
| 2507S(B)    | 48.8  | 54.3  | 13.6 | 12.2 | B       |
| 2514S(B)    | 38.9  | 64.1  | 13.6 | 22   | A       |

| Order No.   | A    | B    | C    | D    | Drawing |
|-------------|------|------|------|------|---------|
| 2776S(B)    | 38.9 | 76.8 | 13.6 | 34.7 | A       |
| 2802S(B)-10 | 48.8 | 51.4 | 13.6 | 9.3  | B       |
| 2803S(B)-10 | 48.8 | 51.4 | 13.6 | 9.3  | B       |
| 2804S(B)-10 | 48.8 | 51.7 | 13.6 | 9.6  | B       |
| 2805S(B)-10 | 48.8 | 51.7 | 13.6 | 9.6  | B       |
| 2904S(B)    | 38.9 | 76.8 | 13.6 | 34.7 | A       |
| 2905S(B)-10 | 48.8 | 51.7 | 13.6 | 9.6  | B       |
| 2914S(B)    | 38.9 | 64.1 | 13.6 | 22   | A       |
| 2915S(B)-10 | 52.2 | 63.3 | 13.6 | 21.2 | A       |
| 2918S(B)-10 | 52.2 | 63.3 | 13.6 | 21.2 | A       |
| 2922S(B)    | 48.8 | 54.3 | 13.6 | 12.2 | B       |
| 2923S(B)-10 | 48.8 | 51.7 | 13.6 | 9.6  | B       |



# Dial Indicators

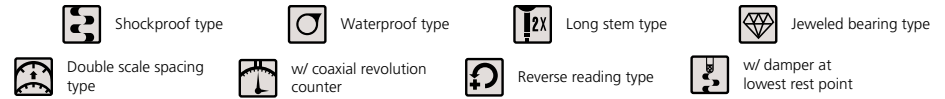
## SERIES 2 — Metric Standard Type

Series 2 dial indicators are Mitutoyo's most popular and have the widest application.



### FEATURES

- Standard 0.01mm graduation dial gages having an outer frame with an outside diameter of 57mm. All types come with limit pins and an outer-frame clamp as standard.
- The outer clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- Secured adhesion between the outer frame and crystal, as well as the use of an O-ring, protect against water and oil permeation via the front face.
- The stem spindle is made of high-strength quench-hardened stainless steel for longevity.
- A carbide contact point is used.
- The grand gear uses stainless steel that is resistant to wear and deformation.
- Application of a hard coating on the surface of the crystal makes the gage highly scratch- and chemical-resistant.



### SPECIFICATIONS

| Graduation | Range | Range / Rev | Dial reading | Order No. |           | Accuracy | Measuring Force | ISO/JIS type |            |           |                 |              |                 |                 |        |   |
|------------|-------|-------------|--------------|-----------|-----------|----------|-----------------|--------------|------------|-----------|-----------------|--------------|-----------------|-----------------|--------|---|
|            |       |             |              | w/ lug    | Flat-back |          |                 | Shockproof   | Waterproof | Long stem | Jeweled bearing | Double scale | Coaxial counter | Reverse reading | Damper |   |
| 0.001mm    | 1mm   | (0.1mm)     | 0-100        | 2110S-10  | 2110SB-10 | ±0.005mm | 1.5N or less    | ✓            |            |           | ✓               | ✓            |                 |                 |        |   |
| 0.001mm    | 1mm   | (0.1mm)     | 0-100        | 2110S-70  | 2110SB-70 | ±0.005mm | 2.0N or less    | ✓            | ✓          |           | ✓               | ✓            |                 |                 |        |   |
| 0.001mm    | 1mm   | (0.2mm)     | 0-100-0      | 2109S-10  | 2109SB-10 | ±0.005mm | 1.5N or less    | ✓            |            |           | ✓               |              |                 |                 |        |   |
| 0.001mm    | 1mm   | (0.2mm)     | 0-100-0      | 2109S-70  | 2109SB-70 | ±0.005mm | 2.0N or less    | ✓            | ✓          |           | ✓               |              |                 |                 |        |   |
| 0.001mm    | 2mm   | (0.2mm)     | 0-100-0      | 2113S-10  | 2113SB-10 | ±0.007mm | 1.5N or less    | ✓            |            |           | ✓               |              |                 |                 |        |   |
| 0.001mm    | 5mm   | (0.2mm)     | 0-100-100    | 2118S-10  | 2118SB-10 | ±0.010mm | 1.5N or less    |              |            |           | ✓               |              |                 |                 |        |   |
| 0.001mm    | 5mm   | (0.2mm)     | 0-100-0      | 2119S-10  | 2119SB-10 | ±0.010mm | 1.5N or less    |              |            |           | ✓               |              |                 |                 |        |   |
| 0.005mm    | 5mm   | (0.5mm)     | 0-50         | 2124S-10  | 2124SB-10 | ±0.012mm | 1.5N or less    |              |            |           | ✓               |              |                 |                 |        |   |
| 0.01mm     | 5mm   | (1mm)       | 0-100        | 2044S     | 2044SB    | ±0.012mm | 1.4N or less    |              |            |           |                 |              |                 |                 |        |   |
| 0.01mm     | 5mm   | (1mm)       | 0-100        | 2044S-09  | 2044SB-09 | ±0.013mm | 1.4N or less    | ✓            |            |           |                 |              |                 |                 |        |   |
| 0.01mm     | 5mm   | (1mm)       | 0-100        | 2044S-60  | 2044SB-60 | ±0.012mm | 2.5N or less    |              | ✓          |           |                 |              |                 |                 |        |   |
| 0.01mm     | 5mm   | (1mm)       | 0-50-0       | 2045S     | 2045SB    | ±0.012mm | 1.4N or less    |              |            |           |                 |              |                 |                 | ✓      |   |
| 0.01mm     | 10mm  | (1mm)       | 0-100        | 2046S     | 2046SB    | ±0.013mm | 1.4N or less    |              |            |           |                 |              |                 |                 |        |   |
| 0.01mm     | 10mm  | (1mm)       | 0-100        | 2046S-09  | 2046SB-09 | ±0.015mm | 1.4N or less    | ✓            |            |           |                 |              |                 |                 |        |   |
| 0.01mm     | 10mm  | (1mm)       | 0-100        | 2046S-60  | 2046SB-60 | ±0.013mm | 2.5N or less    |              | ✓          |           |                 |              |                 |                 |        |   |
| 0.01mm     | 10mm  | (1mm)       | 0-100        | 2310S-10  | 2310SB-10 | ±0.015mm | 1.4N or less    |              |            |           | ✓               |              | ✓               |                 |        |   |
| 0.01mm     | 10mm  | (1mm)       | 100-0        | 2902S     | 2902SB    | ±0.013mm | 1.4N or less    |              |            |           |                 |              |                 |                 | ✓      |   |
| 0.01mm     | 10mm  | (1mm)       | 0-50-0       | 2047S     | 2047SB    | ±0.013mm | 1.4N or less    |              |            |           |                 |              |                 |                 |        |   |
| 0.01mm     | 20mm  | (1mm)       | 0-100        | 2050S     | 2050SB    | ±0.020mm | 2.0N or less    |              |            |           |                 |              |                 |                 |        | ✓ |
| 0.01mm     | 20mm  | (1mm)       | 0-100        | 2050S-60  | 2050SB-60 | ±0.020mm | 2.5N or less    |              | ✓          |           |                 |              |                 |                 |        |   |
| 0.01mm     | 20mm  | (1mm)       | 0-100        | 2050S-19  | 2050SB-19 | ±0.020mm | 2.0N or less    | ✓            |            |           | ✓               |              |                 |                 |        | ✓ |
| 0.01mm     | 20mm  | (1mm)       | 0-100        | 2320S-10  | 2320SB-10 | ±0.020mm | 2.0N or less    |              |            |           | ✓               |              | ✓               |                 |        | ✓ |
| 0.01mm     | 30mm  | (1mm)       | 0-100        | 2052S     | 2052SB    | ±0.025mm | 2.5N or less    |              |            |           |                 |              |                 |                 |        | ✓ |
| 0.01mm     | 30mm  | (1mm)       | 0-100        | 2052S-19  | 2052SB-19 | ±0.025mm | 2.5N or less    | ✓            |            |           | ✓               |              |                 |                 |        | ✓ |
| 0.01mm     | 30mm  | (1mm)       | 0-100        | 2330S-10  | 2330SB-10 | ±0.025mm | 2.5N or less    |              |            |           | ✓               |              | ✓               |                 |        | ✓ |
| 0.01mm     | 30mm  | (1mm)       | 100-0        | 2952S     | 2952SB    | ±0.025mm | 2.5N or less    |              |            |           |                 |              |                 |                 | ✓      | ✓ |

\*Use in a vertical position only (contact point downward).



2046S  
2046S-09



2046S-60



2047S

# Dial Indicators

## SERIES 2 — Metric Standard Type



### DIMENSIONS

ISO/JIS Type

Unit: mm

| Order No. | A    | B    | C    |
|-----------|------|------|------|
| 21245-10  | 60.3 | 16.9 | 14.9 |
| 21105-10  | 66.5 | 16.9 | 21.1 |
| 21105-70  | 67.5 | 12.3 | 26.7 |
| 21095-10  | 60.5 | 16.9 | 15.1 |
| 21095-70  | 65.3 | 12.3 | 24.5 |
| 21135-10  | 61   | 16.9 | 15.6 |
| 21185-10  | 60.3 | 16.9 | 14.9 |
| 21195-10  | 60.3 | 16.9 | 14.9 |
| 20445     | 65.2 | 16.9 | 19.8 |
| 20445-09  | 65.2 | 16.9 | 19.8 |
| 20445-60  | 70   | 12.3 | 29.2 |
| 20455     | 65.2 | 16.9 | 19.8 |
| 20465     | 65.2 | 16.9 | 19.8 |
| 20465-09  | 65.2 | 16.9 | 19.8 |
| 20465-60  | 70   | 12.3 | 29.2 |
| 23105-10  | 65.2 | 16.9 | 19.8 |
| 29025     | 65.2 | 16.9 | 19.8 |
| 20475     | 65.2 | 16.9 | 19.8 |



29025



23105-10



20445  
20445-60  
20445-09



20455

ISO/JIS Type

Unit: mm

| Order No. | A    | B    | C    | D    |
|-----------|------|------|------|------|
| 20505     | 38.8 | 75.2 | 16.9 | 29.8 |
| 20505-60  | 59.8 | 87.2 | 12.3 | 46.4 |
| 20505-19  | 38.8 | 75.2 | 16.9 | 29.8 |
| 23205-10  | 38.8 | 75.2 | 16.9 | 29.8 |
| 20525     | 38.8 | 88.7 | 16.9 | 43.3 |
| 20525-19  | 38.8 | 88.7 | 16.9 | 43.3 |
| 23305-10  | 38.8 | 88.7 | 16.9 | 43.3 |
| 29525     | 38.8 | 88.7 | 16.9 | 43.3 |



### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

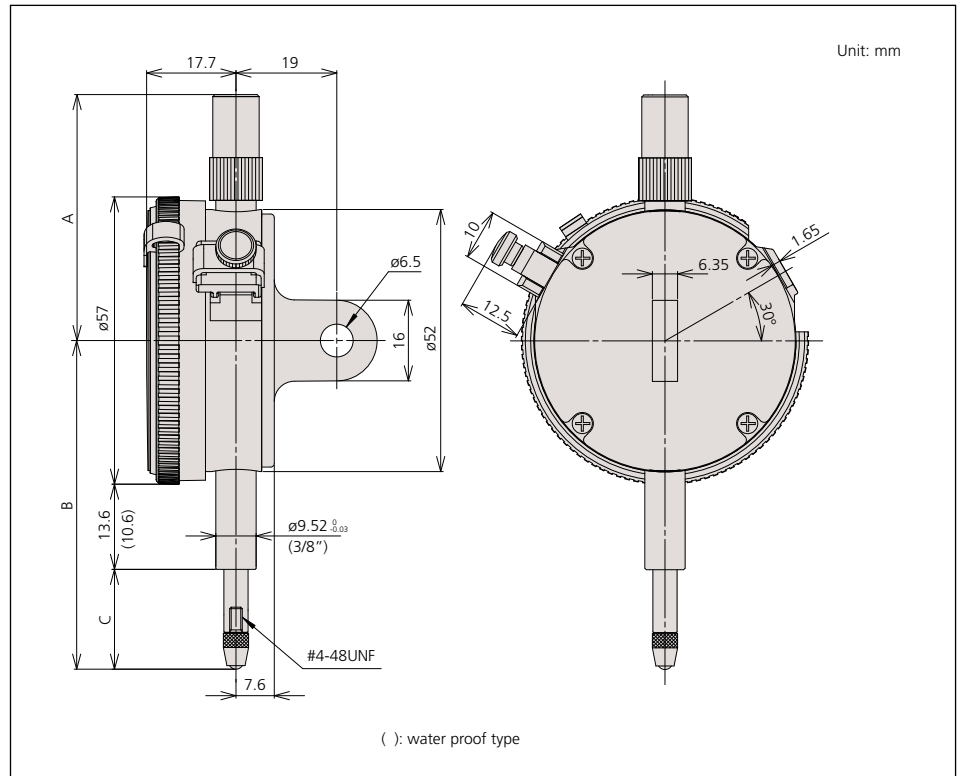
# Dial Indicators

## SERIES 2 — ANSI / AGD Type Metric Dial Indicator

### SPECIFICATIONS

| Graduation | Range | Range / Rev | Dial reading | Order No.       |                  | Accuracy      |          | Measuring force |   |
|------------|-------|-------------|--------------|-----------------|------------------|---------------|----------|-----------------|---|
|            |       |             |              | w/ lug          | Flat-back        | First 2.5 Rev | Overall  |                 |   |
| 0.001mm    | 1mm   | 0.2mm       | 0-100-0      | <b>2109S-11</b> | <b>2109SB-11</b> | ±0.003mm      | ±0.004mm | 1.5N or less    | ✓ ✓   |
| 0.001mm    | 5mm   | 0.2mm       | 0-100-0      | <b>2119S-11</b> | <b>2119SB-11</b> | ±0.007mm      | ±0.01mm  | 1.5N or less    | ✓   |
| 0.01mm     | 2.5mm | 1mm         | 0-100        | <b>2230S-01</b> | <b>2230SB-01</b> | ±0.01mm       | ±0.01mm  | 1.4N or less    |   |
| 0.01mm     | 2.5mm | 1mm         | 0-50-0       | <b>2231S-01</b> | <b>2231SB-01</b> | ±0.01mm       | ±0.01mm  | 1.4N or less    |   |
| 0.01mm     | 10mm  | 1mm         | 0-100        | <b>2046S-01</b> | <b>2046SB-01</b> | ±0.01mm       | ±0.013mm | 1.4N or less    |   |
| 0.01mm     | 10mm  | 1mm         | 0-100        | <b>2046S-11</b> | <b>2046SB-11</b> | ±0.01mm       | ±0.013mm | 1.4N or less    | ✓   |
| 0.01mm     | 10mm  | 1mm         | 0-50-0       | <b>2047S-01</b> | <b>2047SB-01</b> | ±0.01mm       | ±0.013mm | 1.4N or less    |   |
| 0.01mm     | 10mm  | 1mm         | 0-50-0       | <b>2047S-11</b> | <b>2047SB-11</b> | ±0.01mm       | ±0.013mm | 1.4N or less    | ✓   |
| 0.01mm     | 10mm  | 1mm         | 100-0        | <b>2902S-01</b> | <b>2902SB-01</b> | ±0.01mm       | ±0.013mm | 1.4N or less    |   |
| 0.01mm     | 20mm  | 1mm         | 0-100        | <b>2050S-01</b> | <b>2050SB-01</b> | ±0.01mm       | ±0.02mm  | 2.0N or less    |   |
| 0.01mm     | 20mm  | 1mm         | 0-100        | <b>2050S-11</b> | <b>2050SB-11</b> | ±0.01mm       | ±0.02mm  | 2.0N or less    | ✓   |
| 0.01mm     | 25mm  | 1mm         | 0-100        | <b>2056S-01</b> | <b>2056SB-01</b> | ±0.01mm       | ±0.025mm | 2.5N or less    |   |

### DIMENSIONS



| Order No.       | A    | B    | C    |
|-----------------|------|------|------|
| <b>2109S-11</b> | 48.8 | 51.4 | 9.3  |
| <b>2119S-11</b> | 48.8 | 55.8 | 13.7 |
| <b>2230S-01</b> | 48.8 | 53.6 | 11.5 |
| <b>2231S-01</b> | 48.8 | 53.6 | 11.5 |
| <b>2046S-01</b> | 48.8 | 61.1 | 19.0 |
| <b>2046S-11</b> | 48.8 | 61.1 | 19.0 |
| <b>2047S-01</b> | 48.8 | 61.1 | 19.0 |
| <b>2902S-01</b> | 48.8 | 61.1 | 19.0 |
| <b>2050S-01</b> | 38.8 | 71.1 | 29.0 |
| <b>2050S-11</b> | 38.8 | 71.1 | 29.0 |
| <b>2056S-01</b> | 38.8 | 76.1 | 34.0 |

#### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

# Dial Indicators

## SERIES 3 — Large Dial Face and Long Stroke

- Dial gages with a large-diameter (78mm / 3.07") graduation face for easy reading.



3046S



3047S

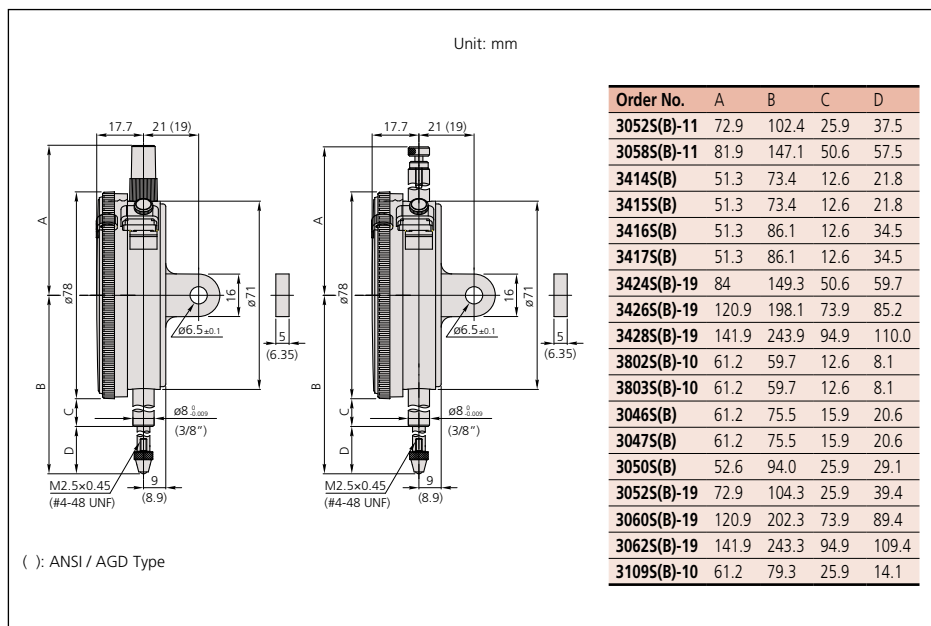


3050S



3052S-19

## DIMENSIONS







# Dial Indicators





## SERIES 3 — Large Dial Face

### SPECIFICATIONS






**Inch** Stem 3/8" DIA. #4-48 UNF Thread ANSI/AGD type

| Graduation | Range | Range /rev | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring Force |  |  |  |  |
|------------|-------|------------|--------------|-----------------|------------------|---------------|------------------|-----------------|---|---|---|---|
|            |       |            |              | W/ lug          | Flat-back        | First 2.5 Rev | Overall Accuracy |                 |   |   |   |   |
| .0001"     | .025" | .01"       | 0-10         | <b>3802S-10</b> | <b>3802SB-10</b> | ±.0001"       | ±.0001"          | 2.0N or less    | ✓   | ✓   |   |   |
| .0001"     | .025" | .01"       | 0-5-0        | <b>3803S-10</b> | <b>3803SB-10</b> | ±.0001"       | ±.0001"          | 2.0N or less    | ✓   | ✓   |   |   |
| .001"      | .5"   | .1"        | ±0-100       | <b>3414S</b>    | <b>3414SB</b>    | ±.001"        | ±.001"           | 1.8N or less    |   |   |   |   |
| .001"      | .5"   | .1"        | 0-50-0       | <b>3415S</b>    | <b>3415SB</b>    | ±.001"        | ±.001"           | 1.8N or less    |   |   |   |   |
| .001"      | 1"    | .1"        | ±0-100       | <b>3416S</b>    | <b>3416SB</b>    | ±.001"        | ±.002"           | 1.8N or less    |   |   |   |   |
| .001"      | 1"    | .1"        | 0-50-0       | <b>3417S</b>    | <b>3417SB</b>    | ±.001"        | ±.002"           | 1.8N or less    |   |   |   |   |
| .001"      | 2"    | .1"        | ±0-100       | <b>3424S-19</b> | <b>3424SB-19</b> | ±.001"        | ±.003"           | 3.0N or less    | ✓   | ✓   | ✓   | ✓   |
| .001"      | 3"    | .1"        | ±0-100       | <b>3426S-19</b> | <b>3426SB-19</b> | ±.001"        | ±.005"           | 3.0N or less    | ✓   | ✓   | ✓   | ✓   |
| .001"      | 4"    | .1"        | ±0-100       | <b>3428S-19</b> | <b>3428SB-19</b> | ±.001"        | ±.005"           | 3.2N or less    | ✓   | ✓   | ✓   | ✓   |

**Metric** Stem 3/8" DIA. #4-48 UNF Thread, Yellow dial face ANSI/AGD type

| Graduation | Range | Range /rev | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring Force |  |  |  |  |
|------------|-------|------------|--------------|-----------------|------------------|---------------|------------------|-----------------|---|---|---|---|
|            |       |            |              | W/ lug          | Flat-back        | First 2.5 Rev | Overall Accuracy |                 |   |   |   |   |
| 0.01mm     | 30mm  | 1mm        | ±0-100       | <b>3052S-11</b> | <b>3052SB-11</b> | ±0.01mm       | ±0.03mm          | 2.5N or less    | ✓   | ✓   | ✓   | ✓   |
| 0.01mm     | 50mm  | 1mm        | ±0-100       | <b>3058S-11</b> | <b>3058SB-11</b> | ±0.01mm       | ±0.04mm          | 3.0N or less    | ✓   | ✓   | ✓   | ✓   |

**Metric** Stem ø 8mm M2.5x0.45 Thread ISO/IS type

| Graduation | Range | Range /rev | Dial reading | Order No.        |                   | Accuracy | Measuring Force |  |  |  |  |  |
|------------|-------|------------|--------------|------------------|-------------------|----------|-----------------|---|---|---|---|---|
|            |       |            |              | W/ lug           | Flat-back         |          |                 |   |   |   |   |   |
| 0.001mm    | 1mm   | 0.2mm      | 0-10-0       | <b>3109S-10</b>  | <b>3109SB-10</b>  | ±0.005mm | 1.5N or less    | ✓   | ✓   |   |   |   |
| 0.01mm     | 10mm  | 1mm        | 0-100        | <b>3046S</b>     | <b>3046SB</b>     | ±0.015mm | 1.4N or less    |   |   |   |   |   |
| 0.01mm     | 10mm  | 1mm        | 0-50-0       | <b>3047S</b>     | <b>3047SB</b>     | ±0.015mm | 1.4N or less    |   |   |   |   |   |
| 0.01mm     | 20mm  | 1mm        | 0-100        | <b>3050S</b>     | <b>3050SB</b>     | ±0.020mm | 2.0N or less    |   |   |   |   | ✓   |
| 0.01mm     | 30mm  | 1mm        | 0-100        | <b>3052S-19</b>  | <b>3052SB-19</b>  | ±0.025mm | 2.5N or less    | ✓   | ✓   | ✓   | ✓   |   |
| 0.01mm     | 50mm  | 1mm        | 0-100        | <b>3058S-19</b>  | <b>3058SB-19</b>  | ±0.035mm | 3.0N or less    | ✓   | ✓   | ✓   | ✓   |   |
| 0.01mm     | 80mm  | 1mm        | 0-100        | <b>3060S-19*</b> | <b>3060SB-19*</b> | ±0.045mm | 3.0N or less    | ✓   | ✓   | ✓   | ✓   |   |
| 0.01mm     | 100mm | 1mm        | 0-100        | <b>3062S-19*</b> | <b>3062SB-19*</b> | ±0.050mm | 3.2N or less    | ✓   | ✓   | ✓   | ✓   |   |

\*use in a vertical position only



Shockproof type



w/ coaxial revolution counter



w/ damper at lowest rest point



Jeweled bearing type

### Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

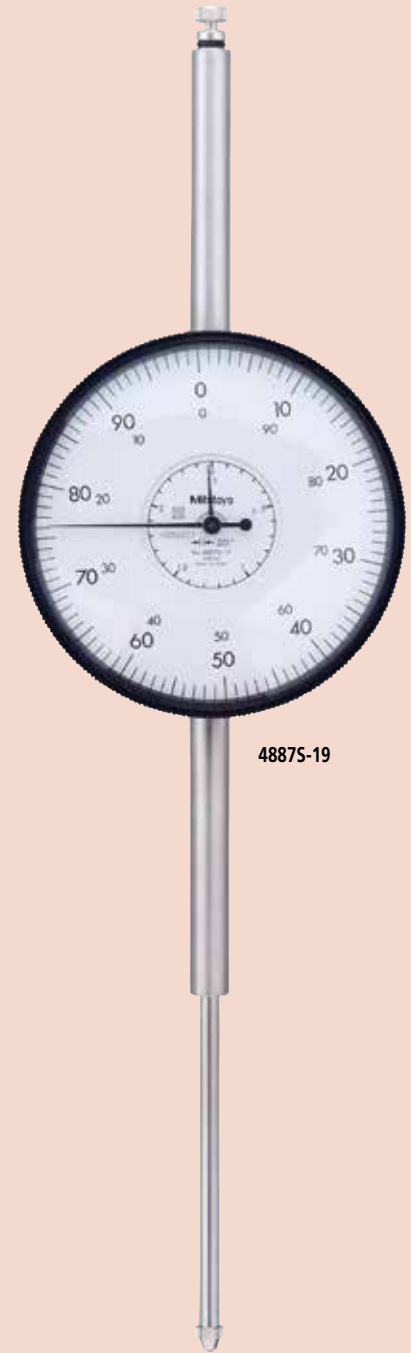
# Dial Indicators

## SERIES 4 — Large Dial Face

- Dial gages with a large-diameter (92mm / 3.62") graduation face for easy reading.
- All types come standard with limit pins and an outer frame clamp.



4046S



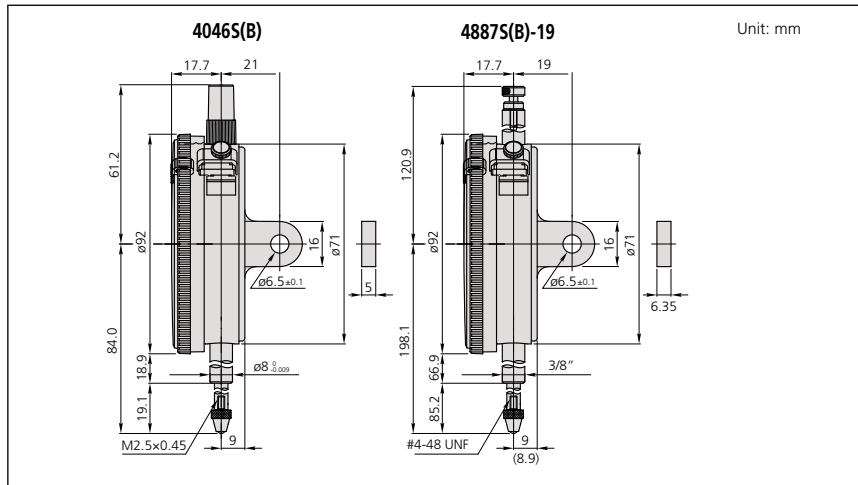
4887S-19

## SPECIFICATIONS

| Inch       |       | Stem 3/8" DIA. #4-48 UNF Thread |              |                 |                  | ANSI/AGD type |                  |                 |  |
|------------|-------|---------------------------------|--------------|-----------------|------------------|---------------|------------------|-----------------|--|
| Graduation | Range | Range /rev                      | Dial reading | Order No.       |                  | Accuracy      |                  | Measuring Force |  |
|            |       |                                 |              | W/ lug          | Flat-back        | First 2.5 Rev | Overall accuracy |                 |  |
| .001"      | 3"    | .1"                             | ±0-100       | <b>4887S-19</b> | <b>4887SB-19</b> | ±.001"        | ±.005"           | 3.0N or less    |  |

| Metric     |       | Stem ø 8mm M2.5x0.45 Thread |              |              |               | ISO/JIS type  |                  |                 |  |
|------------|-------|-----------------------------|--------------|--------------|---------------|---------------|------------------|-----------------|--|
| Graduation | Range | Range /rev                  | Dial reading | Order No.    |               | Accuracy      |                  | Measuring Force |  |
|            |       |                             |              | W/ lug       | Flat-back     | First 2.5 Rev | Overall accuracy |                 |  |
| 0.01mm     | 10mm  | 1mm                         | 0-100        | <b>4046S</b> | <b>4046SB</b> | ± 0.01mm      | ± 0.015mm        | 1.4N or less    |  |

## DIMENSIONS



## Optional Accessories

- : Backs (See page F-33.)
- : Contact points (See page F-34.)

# Back Plunger Dial Indicators

## SERIES 1 and 2



Mitutoyo's back-plunger dial indicators are built with the measuring spindles on the back of the units. This type of indicator offers the same precision and durability as all other Mitutoyo dial indicators, and operates effectively with optional holding bars.

- Back-plunger dial gages are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in small spaces where the graduations of standard dial gages are difficult to see.
- Model No. 1960T, which uses Mitutoyo's proprietary shock-proofing mechanism, has excellent durability and shock resistance.



One revolution type



Shockproof type



Jeweled bearing type

### Optional Accessories

- 136567:** Holding bar (ø6mm, L=81mm)  
**136568:** Holding bar (ø8mm, L=81mm)  
**124625:** Holding bar (.25" DIA, L=3.19")

—: Backs (See page F-31.)

—: Contact points (See page F-34.)

### SPECIFICATIONS

**Inch** Series 1 Stem 3/8" dia., #4-48 UNF Thread ANSI/AGD type

| Graduation | Range | Range / Rev | Dial reading | Order No.    | Accuracy | Measuring Force |   |   |   |
|------------|-------|-------------|--------------|--------------|----------|-----------------|---|---|---|
| .001"      | .04"  | .05"*       | 20-0-20      | <b>1961T</b> | ±.001"   | 0.4 - 1.4N      | ✓ | ✓ |   |
| .001"      | .2"   | .05"        | 0-50         | <b>1166T</b> | ±.001"   | 0.4 - 1.4N      |   |   |   |
| .001"      | .2"   | .05"        | 0-25-0       | <b>1167T</b> | ±.001"   | 0.4 - 1.4N      |   |   |   |
| .001"      | .2"   | .05"        | 50-0         | <b>1168T</b> | ±.001"   | 0.4 - 1.4N      |   |   | ✓ |

\*Full stroke

**Metric** Series 1 Stem ø8mm, M2.5x0.45 Thread ISO/JIS type

| Graduation | Range | Range / Rev | Dial reading | Order No.    | Accuracy | Measuring Force |   |   |   | Remarks |
|------------|-------|-------------|--------------|--------------|----------|-----------------|---|---|---|---------|
| 0.01mm     | 1mm   | 1.27mm*     | 50-0-50      | <b>1960T</b> | ±0.014mm | 0.4 - 1.4N      | ✓ | ✓ |   | —       |
| 0.01mm     | 5mm   | 1mm         | 0-100        | <b>1160T</b> | ±0.016mm | 0.4 - 1.4N      |   |   |   | —       |
| 0.01mm     | 5mm   | 1mm         | 100-0        | <b>1162T</b> | ±0.016mm | 0.4 - 1.4N      |   |   | ✓ | —       |

\*Full stroke

**Inch** Series 2 Stem 3/8" dia., #4-48 UNF Thread ANSI/AGD type

| Graduation | Range | Range/full stroke | Dial reading | Order No.       | Accuracy | Measuring Force |   |   |   |
|------------|-------|-------------------|--------------|-----------------|----------|-----------------|---|---|---|
| .0001"     | .008" | .01"              | 4-0-4        | <b>2991T-10</b> | ±.0002"  | 0.4 - 1.5N      | ✓ | ✓ | ✓ |
| .0005"     | .04"  | .05"              | 20-0-20      | <b>2961T</b>    | ±.0005"  | 0.4 - 1.4N      | ✓ | ✓ |   |

**Metric** Series 2 Stem ø8mm, M2.5x0.45 Thread ISO/JIS type

| Graduation | Range | Range/full stroke | Dial reading | Order No.       | Accuracy | Measuring Force |   |   |   |
|------------|-------|-------------------|--------------|-----------------|----------|-----------------|---|---|---|
| 0.001mm    | 0.1mm | 0.14mm            | 50-0-50      | <b>2990T-10</b> | ±0.005mm | 0.4 - 1.5N      | ✓ | ✓ | ✓ |
| 0.01mm     | 1mm   | 1.27mm            | 50-0-50      | <b>2960T</b>    | ±0.014mm | 0.4 - 1.4N      | ✓ | ✓ |   |

# Back Plunger Dial Indicators

SERIES 1 and 2



2960T

Balanced scale



Graduation: 0.01mm,  
Measuring range: 1mm

2960T

- One revolution
- Shockproof
- Back plunger



2990T-10

Balanced scale

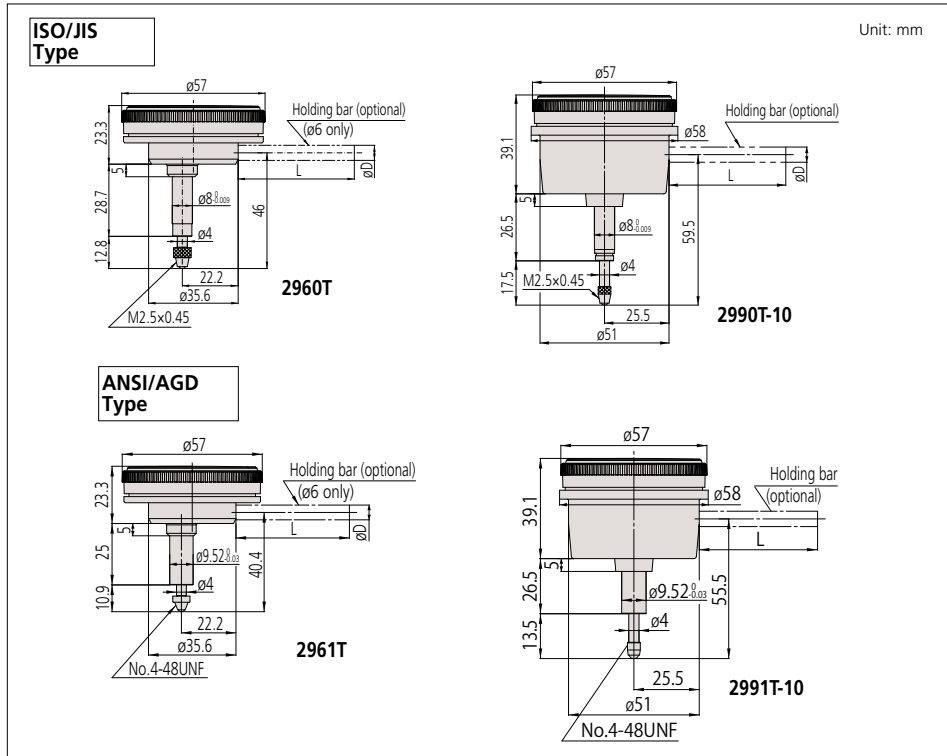


Graduation: 0.01mm,  
Measuring range: 1mm

2990T-10

- One revolution
- Shockproof
- Back plunger
- Jeweled bearing

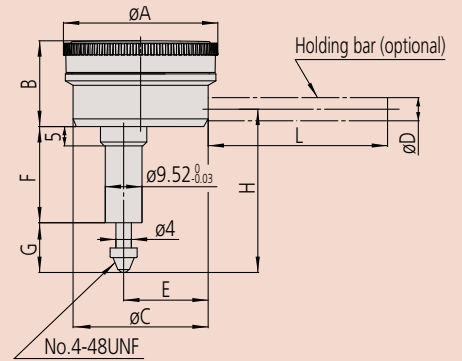
## DIMENSIONS



## DIMENSIONS

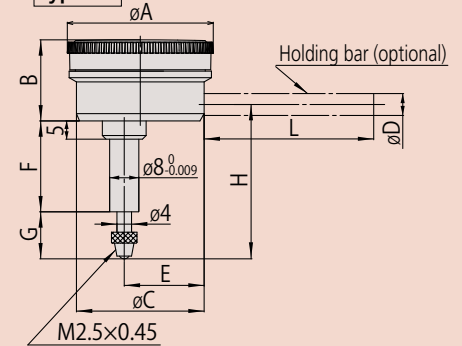
**ANSI/AGD Type**

Unit: mm



| Order No. | A  | B    | C    | E    | F  | G    | H  |
|-----------|----|------|------|------|----|------|----|
| 1166T     | 40 | 22.1 | 35.6 | 22.2 | 25 | 10.9 | 42 |
| 1167T     | 40 | 22.1 | 35.6 | 22.2 | 25 | 10.9 | 42 |
| 1168T     | 40 | 22.1 | 35.6 | 22.2 | 25 | 10.9 | 42 |
| 1961T     | 40 | 22.1 | 35.6 | 22.2 | 25 | 10.9 | 40 |

**ISO/JIS Type**



| Order No. | A  | B    | C    | E    | F    | G    | H    |
|-----------|----|------|------|------|------|------|------|
| 1160T     | 40 | 22.1 | 35.6 | 22.2 | 25   | 13.8 | 43.3 |
| 1162T     | 40 | 22.1 | 35.6 | 22.2 | 25   | 13.8 | 43.3 |
| 1960T     | 40 | 22.1 | 35.6 | 22.2 | 28.7 | 12.8 | 46   |

Note 1: Refer to pages F-34 to F-35 for contact point details.  
Note 2: Dimensions of the inch (ANSI/AGD Type) dial indicator partly differ from those of the metric (ISO/JIS Type) indicator.

Note 3: Inch (ANSI/AGD Type) dial indicators are provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

## Holding bar (optional)

| Order No. | øD      | L    |
|-----------|---------|------|
| 21AAA166  | ø6mm    | 42mm |
| 136567    | ø6mm    | 81mm |
| 124625    | ø6.35mm | 81mm |
| 21AAA167  | ø6.35mm | 42mm |
| 21AAA168  | ø8mm    | 42mm |
| 136568    | ø8mm    | 81mm |

\* øD and L: detail shown in drawing below.

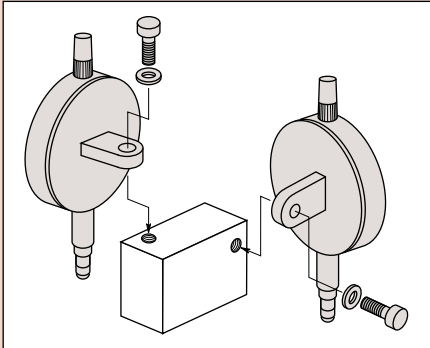


# Backs

## Optional Accessory for Digimatic and Dial Indicators

There are two ways to support Digimatic and dial indicators--by either holding the stem or the lug on the back of the indicator. The back of the indicator may need to be replaced for special applications. A variety of backs are available for Mitutoyo Digimatic and dial indicators.

### Application



### ID-S (543-6xx only)\*

- 02ACB420:** Lug-on-center back for ISO/JIS type
- 02ACB430:** Lug-on-center back for AGD type
- 02ACB440:** Flat back
- 02ACB610:** Back with post
- 02ACB620:** Adjustable back for AGD type
- 02ACB630:** Adjustable back (ISO/JIS type)
- 02ACB640:** Back with offset lug
- 02ACB650:** Magnetic back
- 02ACB660:** Back with screw mount for AGD type
- 02ACB670:** Back with screw mount (ISO/JIS type)
- 02ACB680:** Back with adjustable bracket

\*Includes the required adapter.



### SPECIFICATIONS

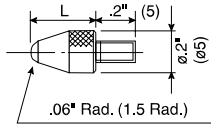
| Description                  |          | Order No.  |  |   |  |
|------------------------------|----------|--|--|---|--|
|                              |          | Series 0<br>(ø31mm)<br>1003<br>(ø36mm)   | Series 1<br>(ø41mm)  | Series 2<br>ID-C (all types),<br>ID-F, ID-H<br>ID-S (excludes 543-6xx)<br>(Ø57mm)                         | Series 3, 4<br>(ø77, 91mm)                             |
| Flat Back                    | Unit: mm | <b>191559:</b><br>a=1.0<br><b>137906:</b><br>for 1003<br>a=1.0                             | <b>101211:</b> a=2.2<br><b>136872:</b> for water-<br>proof type<br><b>191559:</b> for 1911,<br>1913-10 | <b>101039:</b> a=2.5<br><b>21AZB231:</b> for<br>waterproof of S<br>type                                   | <b>100836:</b> a=3.0                                   |
| Lug-on-Center Back           | Unit: mm | <b>190561:</b><br>Metric type<br><b>190139:</b><br>Inch type<br><b>137905:</b><br>for 1003 | <b>101210:</b> metric type<br><b>101307:</b> inch type<br><b>190561:</b> for 1911,<br>1913-10          | <b>101040:</b> metric type<br><b>101306:</b> inch type<br><b>21AZB230:</b> for<br>waterproof of S<br>type | <b>100691:</b> metric type<br><b>100797:</b> inch type |
| Magnetic Back                | Unit: mm | —  | <b>Special order</b>   | <b>900928</b>   | <b>900929</b>  |
| Back with Offset Lug         | Unit: mm | —  | <b>Special order</b>   | <b>101167</b>   | <b>100837</b>  |
| Back with Post               | Unit: mm | —  | <b>193172</b>  | <b>101169</b>   | <b>100839</b>  |
| Back with Screw Mount        | Unit: mm | —  | <b>193173:</b> M6x1,<br><b>193174:</b> #1/4-28UNF,   | <b>136023:</b> M6x1<br><b>101170:</b> #1/4-28UNF  | <b>136024:</b> M6x1<br><b>100840:</b> #1/4-28UNF       |
| Adjustable Back              | Unit: mm | —  | <b>136025:</b> M6x1<br><b>129721:</b> #1/4-20UNC   | <b>136026:</b> M6x1<br><b>101168:</b> #1/4-20UNC  | <b>136027:</b> M6x1<br><b>100838:</b> #1/4-20UNC       |
| Back with Adjustable Bracket | Unit: mm | —  | —  | <b>129902:</b><br>Dovetail<br>Rack Back<br><b>901964:</b><br>Dovetail bracket<br>for rack back            | —  |

( ) : ANSI / AGD Type

# Contact Points

Optional Accessories for Digimatic and Dial Indicators and Linear Gages

## ø.118" (ø3mm) Ball point



4-48UNF

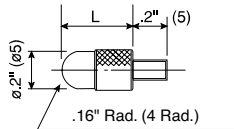
| L    | Carbide   | Sapphire | Ruby   | Plastic |
|------|-----------|----------|--------|---------|
| .25" | 21BZB005* | —        | —      | —       |
| .28" | —         | —        | —      | 902018  |
| .3"  | 131262    | 131263   | 131264 | —       |
| .6"  | 131265    | 131266   | 131267 | —       |
| 1"   | 131268    | 131269   | 131270 | —       |

M2.5 x 0.45mm

| L     | Carbide | Sapphire | Ruby   | Plastic |
|-------|---------|----------|--------|---------|
| 7.3mm | 901312* | —        | —      | 901994  |
| 8mm   | 120045  | 120046   | 120047 | —       |
| 15mm  | 120049  | 120050   | 120051 | —       |
| 25mm  | 120053  | 120054   | 120055 | —       |

\*Furnished with standard metric dial indicators.

## Shell point



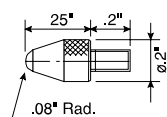
4-48UNF

| L              | Order No. |
|----------------|-----------|
| 3/32" (.094")  | 193697    |
| 5/32" (.156")  | 101184    |
| 1/4" (.25")    | 21AAA031  |
| 3/8" (.375")   | 21AAA032  |
| 1/2" (.5")     | 101185    |
| 5/8" (.625")   | 21AAA033  |
| 3/4" (.75")    | 101186    |
| 7/8" (.875")   | 21AAA034  |
| 1"             | 101187    |
| 1 1/4" (1.25") | 21AAA035  |
| 1 1/2" (1.5")  | 21AAA036  |
| 1 3/4" (1.75") | 21AAA037  |
| 2"             | 21AAA038  |
| 2 1/4" (2.25") | 21AAA039  |
| 2 1/2" (2.5")  | 21AAA040  |
| 2 3/4" (2.75") | 21AAA041  |
| 3"             | 21AAA042  |

M2.5 x 0.45mm

| L    | Order No. |
|------|-----------|
| 5mm  | 101386    |
| 10mm | 101118    |
| 15mm | 137393    |
| 20mm | 101387    |
| 25mm | 101388    |
| 30mm | 21AAA254  |

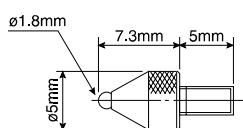
## ø.16 Ball Point



4-48UNF

| Order No. |
|-----------|
| 21BZB005  |

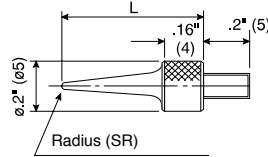
## ø1.8mm Ball Point



M2.5 x 0.45mm

| Order No. |
|-----------|
| 101122    |

## Needle point



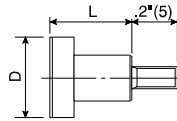
4-48UNF

| L      | Order No. | SR    |
|--------|-----------|-------|
| .6"    | 21AAA030  | .016" |
| 1"     | 21AAA046  | .016" |
| 1 1/2" | 21AAA047  | .016" |
| 2"     | 21AAA048  | .016" |

M2.5 x 0.45mm

| L    | Order No. | SR  |
|------|-----------|-----|
| 15mm | 101121    | 0.4 |
| 17mm | 137413    | 0.2 |

## Flat point



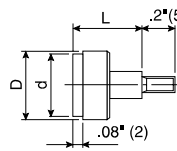
4-48UNF

| D     | L    | Order No. |
|-------|------|-----------|
| ø1/2" | 3/8" | 101188    |
| ø3/8" | 3/8" | 101189    |

M2.5 x 0.45mm

| D     | L    | Order No. |
|-------|------|-----------|
| ø10mm | 10mm | 101117    |

## Flat-point, Carbide tip



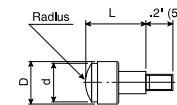
4-48UNF

| D     | d     | L   | Order No. |
|-------|-------|-----|-----------|
| ø.2"  | ø.17" | .2" | 131259    |
| ø.27" | ø.25" | .4" | 131260    |
| ø.41" | ø.37" | .4" | 131261    |

M2.5 x 0.45mm

| D       | d      | L    | Order No. |
|---------|--------|------|-----------|
| ø5.2mm  | ø4.3mm | 5mm  | 120041    |
| ø7mm    | ø6.5mm | 10mm | 120042    |
| ø10.5mm | ø9.5mm | 10mm | 120043    |

## Spherical-point, Carbide tip



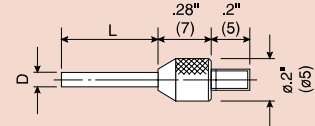
4-48UNF

| D     | d     | Radius | L   | Order No. |
|-------|-------|--------|-----|-----------|
| ø.2"  | ø.17" | .2"    | .2" | 131273    |
| ø.27" | ø.16" | .16"   | .4" | 131274    |
| ø.41" | ø.37" | .4"    | .4" | 131275    |

M2.5 x 0.45mm

| D       | d      | Radius | L    | Order No. |
|---------|--------|--------|------|-----------|
| ø5.2mm  | ø4.3mm | 5mm    | 5mm  | 120058    |
| ø7mm    | ø6.5mm | 7mm    | 10mm | 120059    |
| ø10.5mm | ø9.5mm | 10mm   | 10mm | 120060    |

## Needle point, Carbide tipped



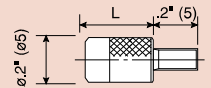
4-48UNF

| D      | L    | Order No. |
|--------|------|-----------|
| ø.018" | .12" | 131281    |
| ø.04"  | .12" | 131280    |
| ø.06"  | .5"  | 131279    |
| ø.078" | .04" | 131271    |

M2.5 x 0.45mm

| D       | L     | Order No. |
|---------|-------|-----------|
| ø0.45mm | 2.5mm | 120066    |
| ø1mm    | 2.5mm | 120065    |
| ø1.5mm  | 13mm  | 120064    |
| ø2mm    | 1mm   | 120056    |
| ø2mm    | 8mm   | 137257    |

## ø.2" (ø5mm) Flat point



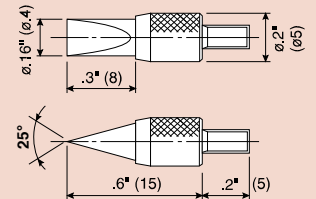
4-48UNF

| L     | Order No. |
|-------|-----------|
| 5/16" | 133017    |
| 1/2"  | 21AAA043  |
| 3/4"  | 21AAA044  |
| 1"    | 21AAA045  |

M2.5 x 0.45mm

| L   | Order No. |
|-----|-----------|
| 8mm | 131365    |

## Knife-edge point, Carbide tipped



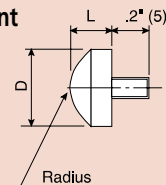
4-48UNF

| Order No. |
|-----------|
| 131282    |

M2.5 x 0.45mm

| Order No. |
|-----------|
| 120067    |

## Spherical point



4-48UNF

| D      | L       | Radius | Order No. |
|--------|---------|--------|-----------|
| ø.5"   | .125"   | .28"   | 101205    |
| ø.375" | .09375" | .35"   | 101204    |

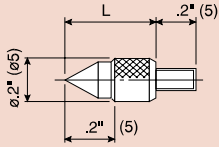
M2.5 x 0.45mm

| D     | L   | Radius | Order No. |
|-------|-----|--------|-----------|
| ø10mm | 5mm | 7mm    | 101119    |

# Contact Points

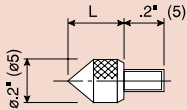
Optional Accessories for Digimatic and Dial Indicators and Linear Gages

## 60° Conical point



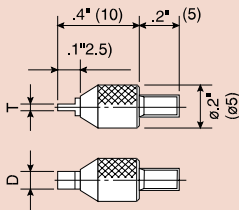
| 4-48UNF |           | M2.5 x 0.45mm |           |
|---------|-----------|---------------|-----------|
| L       | Order No. | L             | Order No. |
| 1/2"    | 101190    | 10mm          | 101120    |

## 90° Conical point



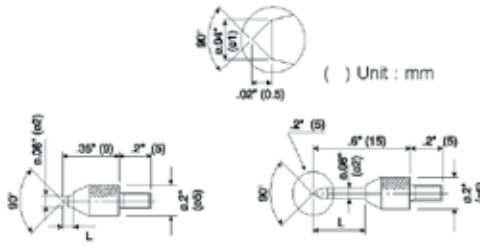
| 4-48UNF |           | M2.5 x 0.45mm |           |
|---------|-----------|---------------|-----------|
| L       | Order No. | L             | Order No. |
| 1/4"    | 101191    | 5mm           | 101385    |

## Blade point, Carbide tip



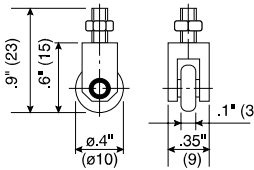
| 4-48UNF |       |           | M2.5 x 0.45mm |       |           |
|---------|-------|-----------|---------------|-------|-----------|
| D       | T     | Order No. | D             | T     | Order No. |
| .08"    | .016" | 131276    | 2mm           | 0.4mm | 120061    |
| .08"    | .024" | 131277    | 2mm           | 0.6mm | 120062    |
| .16"    | .04"  | 131278    | 4mm           | 1mm   | 120063    |

## 90° Conical point, Carbide tipped



| 4-48UNF |           | 4-48UNF |           | M2.5 x 0.45mm |           | M2.5 x 0.45mm |           |
|---------|-----------|---------|-----------|---------------|-----------|---------------|-----------|
| L       | Order No. | L       | Order No. | L             | Order No. | L             | Order No. |
| .08"    | 131272    | .3"     | 131283    | 2mm           | 120057    | 8mm           | 120068    |

## Roller Point



| 4-48UNF   |           | M2.5 x 0.45mm |           |
|-----------|-----------|---------------|-----------|
| Order No. | Order No. | Order No.     | Order No. |
| 901991    | 901954    | 901991        | 901954    |

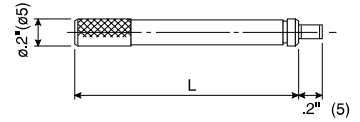
## Interchangeable Contact Point Set (M2.5x0.45)

Set Order No. 7822



| Individual No. | Description        |
|----------------|--------------------|
| 131365         | Flat Point (ø5mm)  |
| 101117         | Flat Point (ø10mm) |
| 101121         | Needle Point       |
| 101119         | Spherical Point    |
| 101118         | Shell Type Point   |
| 101387         | Shell Type Point   |

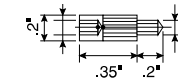
## Extension Rod



| 4-48UNF |           | M2.5 x 0.45mm |           |
|---------|-----------|---------------|-----------|
| L       | Order No. | L             | Order No. |
| 1/2"    | 139167    | 10mm          | 303611    |
| 1"      | 301655    | 15mm          | 21AAA259A |
| 2"      | 301657    | 20mm          | 303612    |
| 4"      | 301659    | 25mm          | 21AAA259B |
|         |           | 30mm          | 303613    |
|         |           | 35mm          | 21AAA259C |
|         |           | 40mm          | 21AAA259D |
|         |           | 45mm          | 21AAA259E |
|         |           | 50mm          | 21AAA259F |
|         |           | 55mm          | 21AAA259G |
|         |           | 60mm          | 304146    |
|         |           | 65mm          | 21AAA259H |
|         |           | 70mm          | 21AAA259J |
|         |           | 75mm          | 21AAA259L |
|         |           | 80mm          | 21AAA259M |
|         |           | 90mm          | 304147    |
|         |           | 100mm         | 303614    |

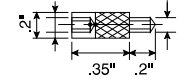
## Point Conversion

M2.5 x 0.45mm 4-48 UNFI



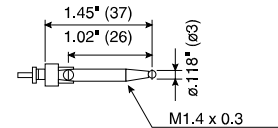
| Order No. |
|-----------|
| 21AAA011  |

4-48 UNFI M2.5 x 0.45mm



| Order No. |
|-----------|
| 21AAA012  |

## Lever Point



| 4-48UNF   |           | M2.5 x 0.45mm |           |
|-----------|-----------|---------------|-----------|
| Order No. | Order No. | Order No.     | Order No. |
| 900393    | 900393    | 900391        | 900391    |

# Spindle Lifting Lever and Cable

## Optional Accessories for Digimatic and Dial Indicators

### Spindle Lifting Lever

- 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.

Applicable S-Type Thickness and Depth Gages

| Order No. | Description                  |
|-----------|------------------------------|
| 21AZB149  | Depth gages up to 12.7mm/.5" |
| 21AZB150  | Depth gages up to 25mm/1"    |
| 21AZB151  | S-Type thickness gage        |



Dove Tail Type Lever Assembly

| Order No. | Lever up to .5" / 12.7mm | Screw  | Screw Thread |
|-----------|--------------------------|--------|--------------|
| 21EZA198  | 21AZB149                 | 101171 | M2.5         |
| 21EZA199  | 21AZB149                 | 101047 | 4/48 UNF     |



ANSI Screw **101047**  
JIS Screw **101171**

### Spindle Lifting Cable

- 901975**: with auto-stop function
  - 540774**: without auto-stop function
  - 971753**: With release-speed control
- Lifting range: 1" / 25.4mm  
Cable length: 300mm



### Spindle Lifting Pick

- 137693**
- Applicable spindle diameter; 4.8mm



Use for Series 1 Dial Indicators (up 5mm / .25")

| Set Order No. | Lever  | Screw  | Screw Thread |
|---------------|--------|--------|--------------|
| 21BZA610      | 900527 | 101047 | 4-48 UNF     |
| 21BZA205      | 900527 | 101171 | M2.5 x 0.45  |



Use for Series 2 Dial Indicators (up to 10mm/.4")

| Set Order No. | Lever  | Screw  | Screw Thread |
|---------------|--------|--------|--------------|
| 902794        | 900525 | 101047 | 4-48 UNF     |
| 902011        | 900525 | 101171 | M2.5 x 0.45  |



Use for Series 2 Dial Indicators (up to 10mm/.4") and 1 Group S-Type

| Set Order No. | Lever    | Screw  | Screw Thread |
|---------------|----------|--------|--------------|
| 21BZA613      | 21BZA612 | 101047 | 4-48 UNF     |
| 902100        | 21BZA612 | 101171 | M2.5 x 0.45  |



Use for Series 2 Dial Indicators (up to 20mm/.8") and Series 3 and 4 Dial Indicators (up to 10mm/.4")

| Set Order No. | Lever  | Screw  | Screw Thread |
|---------------|--------|--------|--------------|
| 903425        | 903307 | 192753 | 4-48 UNF     |
| 903424        | 903307 | 192686 | M2.5 x 0.45  |

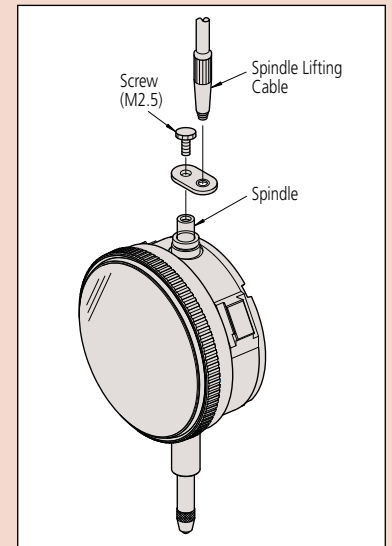
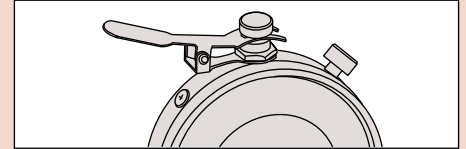
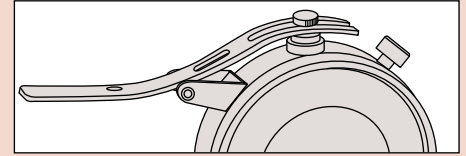


### Spindle Lifting Knob

| Set Order No. | Range        |
|---------------|--------------|
| 21EZA197      | For 1" range |
| 21EZA200      | For 2" range |



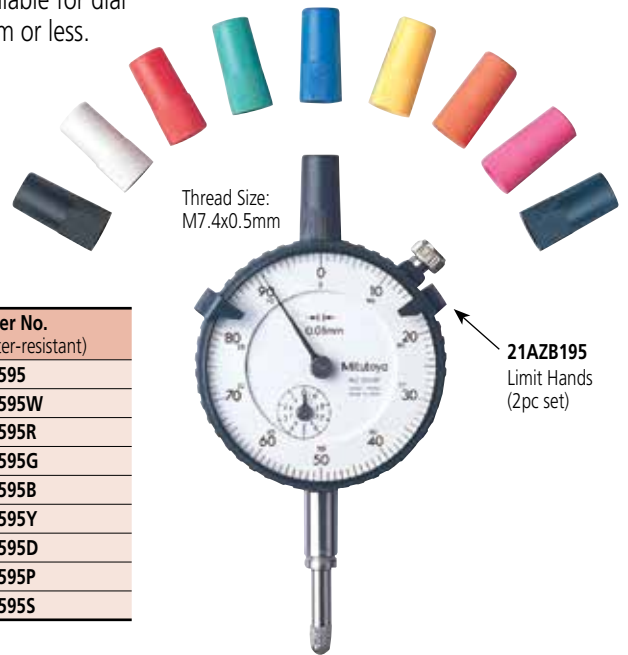
### Application



# Color Spindle Caps

## Optional Accessories for Digimatic and Dial Indicators

8 colors of spindle caps are available for dial indicators with a range of 10mm or less.



### SPECIFICATIONS

| Color     | Order No. (normal) | Order No. (water-resistant) |
|-----------|--------------------|-----------------------------|
| Black     | 193051             | 193595                      |
| White     | 193051W            | 193595W                     |
| Red       | 193051R            | 193595R                     |
| Green     | 193051G            | 193595G                     |
| Blue      | 193051B            | 193595B                     |
| Yellow    | 193051Y            | 193595Y                     |
| Orange    | 193051D            | 193595D                     |
| Pink      | 193051P            | 193595P                     |
| Dark blue | 193051S            | 193595S                     |

# Limit Stickers

## Optional Accessories for Digimatic and Dial Indicators

### FEATURES

- Stuck on the dial face or crystal of a Series 2 dial indicator (55.6mm or 57mm bezel dia.) to indicate tolerance limits.



136420: Red (10-sheet/set)



136421: Green (10-sheet/set)



136422: Yellow (10-sheet/set)

# Dial Indicator Repair Tool Kit

## Optional Accessories for Digimatic and Dial Indicators

Mitutoyo offers a tool set designed to let you perform simple repairs to your Mitutoyo dial indicator, as well as a device that lets you reset the indicator crystals.



### SPECIFICATIONS

| Order No. | Description                    |
|-----------|--------------------------------|
| 7823EU    | Dial indicator repair tool kit |

### Order No. 7823U

#### Set Configuration

- (1) 901173: Screwdriver (Phillips)
- (2) 901174: Screwdriver (Phillips/flat blade)
- (3) 129729: Tweezers
- (4) 901175: Pin-vise
- (5) 901176: Brush
- (6) 21JAA314: Stick
- (7) 901177: Brush
- (8) 901178: Hammer
- (9) 129730: Spindle rest
- (10) 129731: Pin rest
- (11) 901179: Nippers
- (12) 901180: Pliers
- (13) 126628: Hand remover (main unit)
- 126630: Interchangeable Pin, 0.8mm DIA.
- 126630B: Interchangeable Pin, 0.5mm DIA.
- 126630C: Interchangeable Pin, 1.6mm DIA.
- 100699: Nut
- (14) 129732: Pin remover
- (15) 129733: Punch
- (16) 129734: Bearing adjuster
- (17) 129735: Pinion rest
- (18) 129736: Reamer  $\varnothing 1$
- 193702: Reamer  $\varnothing 0.6$
- 21JAA273: Reamer  $\varnothing 0.5$
- (19) 901182: Case

# Dial Crystal Setter

## Optional Accessories for Dial Indicators

### FEATURES

- Used for fitting a crystal on dial indicators, dial test indicators and dial calipers.

### SPECIFICATIONS

| Order No. | Description                   |
|-----------|-------------------------------|
| 7000      | Dial indicator crystal setter |



With 8 sizes of crystal setting pads

# Dial Test Indicators

## SERIES 513

### FEATURES

- One piece movement for high-impact resistance and durability
- Contact point length is printed on dial face to avoid accuracy issues
- Scratch and smudge-resistant, anti-glare crystal for easy-to-read dial
- Newly designed contact point holder prevents backlash
- Includes NIST-traceable Certificate of Inspection - bidirectional
- Limit hands (optional) can be attached to the bezel, allowing easy identification of the upper and lower limits of tolerance.
- A  $\varnothing 8\text{mm}$  ( $\varnothing 0.315$  in) plain stem (21CAB104) for the Metric models or a  $\varnothing 9.52\text{mm}$  ( $\varnothing 3/8$  in) plain stem (21CAB105) for the Inch models that attaches to any dovetail on the frame is supplied as a standard accessory. Other sizes are available as optional accessories:
  - $\varnothing 4\text{mm}$  ( $\varnothing 0.157$  in) stem: **21CAB106**
  - $\varnothing 6\text{mm}$  ( $\varnothing 0.236$  in) stem: **21CAB103**
- Optional ruby tip has wear-resistance several times greater than a carbide tip and, since it is nonconductive, it can be used safely on an electrical discharge machine.
- Using universal fonts, changing dial face color and reviewing the relationship between pointer and scale marks have drastically improved readability.
- The O-ring seal on the bezel provides smooth rotation and prevents dust and oil from penetrating the dial face.
- Bonding the bezel and crystal eliminates a gap for cutting fluid or oil to penetrate the dial face.
- A flange prevents the bezel from unintentionally being removed during handling.
- Four models are available, each with a different orientation of the dial to allow the best visibility in any situation.
  - Standard - dial is on top of the frame.
  - Vertical: dial is on the end of the frame.
  - Standard ( $20^\circ$  tilted face): dial is on top of the frame but tilted  $20^\circ$ .
  - Horizontal: dial is on the side of the frame.
- The conventional method of mounting the stylus pivot bearing screw in the frame is prone to loosen with prolonged use. A unique sub-plate structure has been incorporated in all models to eliminate this issue.

Contact point length is printed on dial face to avoid accuracy issues



Scratch and smudge-resistant, anti-glare crystal for easy-to-read dial



Conventional

New

Newly designed contact point holder prevents backlash



Includes NIST-traceable Certificate of Inspection - bidirectional



One piece movement for high-impact resistance and durability



Four models are available:



Standard

Vertical

Standard  
( $20^\circ$  Tilted face)

Parallel



Impact-resistant bezel

# Dial Test Indicators

## SERIES 513 — Horizontal Type

### FEATURES

- Performs easy and accurate measurement of narrow or recessed areas, plus inside and outside diameters that dial indicators cannot access.
- No-clutch structure for automatic reversal of measuring direction.
- One-piece bezel and crystal design with O-ring provide resistance to water and dust.
- The glare-free flat crystal face has a scratch-resistant coating.
- High sensitivity and quick response because of jeweled bearings.
- Standard carbide contact point provide.



513-424-10E



513-414-10E

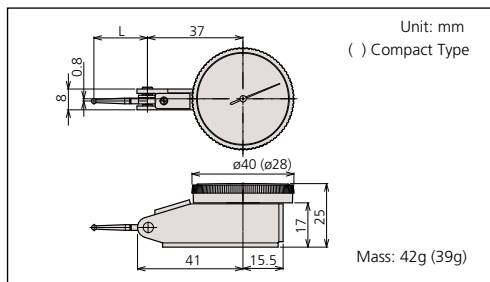


513-404-10E



513-402-10E

### DIMENSIONS AND MASS



### Optional Accessories

- : Swivel clamp
- : Holding bar
- : Stem
- : Contact points

### Special Set: No. 513-908-10E (mm)

- 513-404-10E: Dial test indicator
- 7014-10E: Mini magnetic stand

### No. 513-907-10E (inch)

- 513-402-10E: Dial test indicator
- 7014E-10: Mini magnetic stand



### Description of Icon

| Icon | Description                        |
|------|------------------------------------|
|      | With revolution counter            |
|      | Long contact point                 |
|      | Jeweled bearing                    |
|      | Double scale spacing, easy to read |
|      | Compact                            |
|      | Dustproof                          |
|      | Anti-magnetic                      |



## Set Configuration: Test Indicators

Inch

**Full set**

Contact point, .039" DIA. carbide  
 Contact point, .118" DIA. carbide  
 Stem, .157" DIA. (21CAB106)

Swivel clamp (900322, for .157" DIA., 3/8" DIA., dovetail)  
 Inch holding bar (L: 4") (900306)

**Basic set**

Contact point, .079" DIA. (Carbide)  
 Indicator  
 Knurled clamp ring  
 Stem, 3/8" DIA. (Set No. 21CZB130)

Metric

**Full set**

Swivel clamp (900321, for ø4mm, ø8mm, dovetail)  
 Metric holding bar (L: 100mm) (900209)

**Plus set**

Contact point, ø1mm carbide  
 Contact point, ø3mm carbide  
 Stem, ø4mm (21CAB106)

**Basic set**

Contact point, ø2mm (Carbide)  
 Indicator  
 Knurled clamp ring  
 Stem, ø8mm (Set No. 21CZB129)



Anti-magnet type



Double scale spacing type



Long contact point type



Jeweled bearing type



Compact type



With revolution counter type



## SPECIFICATIONS

Inch

| Graduation | Order No.    |             | Range | Accuracy | Dial reading | Measuring force | L (mm) |   |   |   |   |   |   |   |
|------------|--------------|-------------|-------|----------|--------------|-----------------|--------|---|---|---|---|---|---|---|
|            | Basic set    | Full set    |       |          |              |                 |        |   |   |   |   |   | — | — |
| .00005"    | 513-407-10E  | 513-407-10T | .008" | ±.0001"  | 0-4-0        | 0.3N or less    | 19     | ✓ | — | ✓ | — | — | — | — |
| .0005"     | 513-402-10E  | 513-402-10T | .03"  | ±.0005"  | 0-15-0       | 0.3N or less    | 19.9   | ✓ | — | ✓ | — | — | — | — |
| .0005"     | 513-472-10E* |             | .03"  | ±.0005"  | 0-15-0       | 0.3N or less    | 19.9   | ✓ | — | ✓ | — | — | — | — |
| .0005"     | 513-412-10E  | 513-412-10T | .03"  | ±.0005"  | 0-15-0       | 0.2N or less    | 33.9   | ✓ | ✓ | ✓ | — | — | — | — |
| .0005"     | 513-479-10E* |             | .03"  | ±.0005"  | 0-15-0       | 0.2N or less    | 33.9   | ✓ | ✓ | ✓ | — | — | — | — |
| .0005"     | 513-462-10E  |             | .03"  | ±.0005"  | 0-15-0       | 0.3N or less    | 19.9   | ✓ | — | ✓ | ✓ | — | — | — |
| .0001"     | 513-403-10E  | 513-403-10T | .008" | ±.0001"  | 0-4-0        | 0.3N or less    | 19     | ✓ | — | ✓ | — | — | — | — |
| .0001"     | 513-473-10E* |             | .008" | ±.0001"  | 0-4-0        | 0.3N or less    | 19     | ✓ | — | ✓ | — | — | — | — |
| .0001"     | 513-463-10E  |             | .008" | ±.0001"  | 0-4-0        | 0.3N or less    | 15     | ✓ | — | ✓ | ✓ | — | — | — |

\*Provided with a ø2mm ruby contact point as a substitute for ø2mm carbide contact point.

Metric

| Graduation | Order No.    |             | Range  | Accuracy | Dial reading | Measuring force | L (mm) |   |   |   |   |   |   |   |   |
|------------|--------------|-------------|--------|----------|--------------|-----------------|--------|---|---|---|---|---|---|---|---|
|            | Basic set    | Full set    |        |          |              |                 |        |   |   |   |   |   |   | — | — |
| 0.01mm     | 513-424-10E  | 513-424-10T | 0.5mm  | 5µm      | 0-25-0       | 0.3N or less    | 22.3   | ✓ | ✓ | — | ✓ | — | — | — | — |
| 0.01mm     | 513-414-10E  | 513-414-10T | 0.5mm  | 10µm     | 0-25-0       | 0.2N or less    | 36.8   | ✓ | ✓ | ✓ | ✓ | — | — | — | — |
| 0.01mm     | 513-466-10E  | -           | 0.5mm  | 5µm      | 0-25-0       | 0.3N or less    | 22.3   | ✓ | ✓ | — | ✓ | ✓ | — | — | — |
| 0.01mm     | 513-478-10E* | -           | 0.5mm  | 5µm      | 0-25-0       | 0.3N or less    | 22.3   | ✓ | — | — | ✓ | — | — | — | — |
| 0.01mm     | 513-404-10E  | 513-404-10T | 0.8mm  | 8µm      | 0-40-0       | 0.3N or less    | 20.9   | ✓ | — | — | ✓ | — | — | — | — |
| 0.01mm     | 513-474-10E* | -           | 0.8mm  | 8µm      | 0-40-0       | 0.3N or less    | 20.9   | ✓ | — | — | ✓ | — | — | — | — |
| 0.01mm     | 513-464-10E  | -           | 0.8mm  | 8µm      | 0-40-0       | 0.3N or less    | 20.9   | ✓ | — | — | ✓ | ✓ | — | — | — |
| 0.01mm     | 513-415-10E  | 513-415-10T | 1mm    | 10µm     | 0-50-0       | 0.2N or less    | 44.5   | ✓ | — | ✓ | ✓ | — | — | — | — |
| 0.01mm     | 513-477-10E* | -           | 1mm    | 10µm     | 0-50-0       | 0.2N or less    | 44.5   | ✓ | — | ✓ | ✓ | — | — | — | — |
| 0.01mm     | 513-426-10E  | -           | 1.5mm  | 16µm     | 0-25-0       | 0.4N or less    | 22.3   | ✓ | ✓ | — | ✓ | — | — | ✓ | — |
| 0.002mm    | 513-405-10E  | 513-405-10T | 0.2mm  | 4µm      | 0-100-0      | 0.3N or less    | 14.7   | ✓ | — | — | ✓ | — | — | — | — |
| 0.002mm    | 513-465-10E  | -           | 0.2mm  | 4µm      | 0-100-0      | 0.3N or less    | 14.7   | ✓ | — | — | ✓ | ✓ | — | — | — |
| 0.002mm    | 513-475-10H* | -           | 0.2mm  | 4µm      | 0-100-0      | 0.3N or Less    | 18.7   | ✓ | — | — | ✓ | — | — | — | — |
| 0.002mm    | 513-425-10E  | -           | 0.6mm  | 7µm      | 0-100-0      | 0.4N or less    | 14.7   | ✓ | — | — | ✓ | — | — | ✓ | — |
| 0.001mm    | 513-401-10E  | -           | 0.14mm | 4µm      | 0-70-0       | 0.3N or less    | 12.8   | ✓ | — | — | ✓ | — | — | — | — |
| 0.001mm    | 513-471-10E* | -           | 0.14mm | 4µm      | 0-70-0       | 0.3N or less    | 12.8   | ✓ | — | — | ✓ | — | — | — | — |

\*Provided with a ø2mm ruby contact point as a substitute for ø2mm carbide contact point.

Metric/inch

| Graduation      | Order No.   |             | Range         | Accuracy | Dial reading   | Measuring force | L (mm) |   |   |   |   |   |   |   |
|-----------------|-------------|-------------|---------------|----------|----------------|-----------------|--------|---|---|---|---|---|---|---|
|                 | Basic set   | Full set    |               |          |                |                 |        |   |   | — | — | — | — |   |
| 0.002mm, .0001" | 513-409-10E | 513-409-10T | 0.2mm, .0075" | 3µm      | 0-10-0, 0-38-0 | 0.3N or less    | 14.7   | ✓ | ✓ | — | — | — | — | — |

Inch/Metric

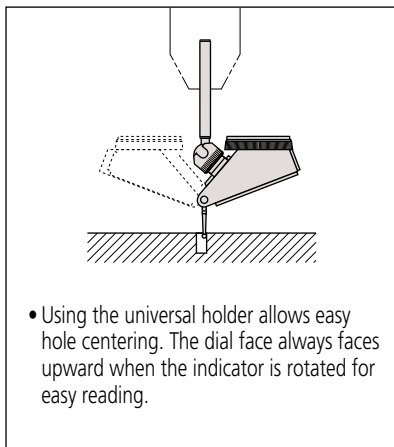
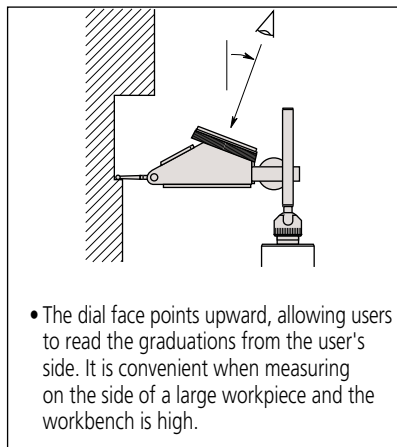
| Graduation     | Order No.   |             | Range       | Accuracy | Dial reading   | Measuring force | L (mm) |   |   |   |   |   |   |   |
|----------------|-------------|-------------|-------------|----------|----------------|-----------------|--------|---|---|---|---|---|---|---|
|                | Basic set   | Full set    |             |          |                |                 |        |   |   | — | — | — | — |   |
| .0005", 0.01mm | 513-406-10E | 513-406-10T | .03", 0.7mm | ±.0005"  | 0-15-0, 0-35-0 | 0.3N or less    | 19.9   | ✓ | ✓ | — | — | — | — | — |

# Dial Test Indicators

## SERIES 513 — Horizontal (20° Tilted Face), Vertical and Parallel

### FEATURES

- Specially designed for easy viewing of measurements.



513-444-10E



513-445-10E



513-454-10E  
513-484-10E



513-455-10E



513-452-10E



513-482-10A



513-444-10E



513-455-10E



513-484-10E



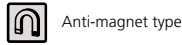
513-442-10A



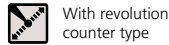
513-446-10A

### Optional Accessories

- : Swivel clamp
- : Holding bar
- : Stem
- : Contact points



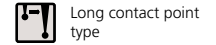
Anti-magnet type



With revolution counter type



Jeweled bearing type



Long contact point type

## Set Configuration: Test Indicators

Inch

**Full set**

Contact point, .039" DIA. carbide  
Contact point, .118" DIA. carbide  
Stem, .157" DIA. (21CAB106)

Swivel clamp (900322, for .157" DIA., 3/8" DIA., dovetail)  
Inch holding bar (L: 4") (900306)

**Basic set**

Contact point, .079" DIA. (Carbide)  
Indicator  
Knurled clamp ring  
Stem, 3/8" DIA. (Set No. 21CZB130)

Metric

**Full set**

Swivel clamp (900321, for ø4mm, ø8mm, dovetail)  
Metric holding bar (L: 100mm) (900209)

Contact point, ø1mm carbide  
Contact point, ø3mm carbide  
Stem, ø4mm (21CAB106)

**Plus set**

Contact point, ø2mm (Carbide)  
Indicator  
Knurled clamp ring  
Stem, ø8mm (Set No. 21CZB129)

## SPECIFICATIONS

**Metric** Horizontal (20° tilted face) type

| Graduation | Order No.   |             | Range | Accuracy | Dial reading | Measuring force | Mass (g) | L (mm) |                                     |                                     |                                     |
|------------|-------------|-------------|-------|----------|--------------|-----------------|----------|--------|-------------------------------------|-------------------------------------|-------------------------------------|
|            | Basic set   | Full set    |       |          |              |                 |          |        |                                     |                                     |                                     |
| 0.01mm     | 513-444-10E | 513-444-10T | 1.6mm | 10µm     | 0-40-0       | 0.3N or less    | 48       | 20.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 0.002mm    | 513-445-10E | 513-445-10T | 0.4mm | 5µm      | 0-100-0      | 0.3N or less    | 48       | 14.7   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

**Inch** Horizontal (20° tilted face) type

| Graduation | Order No.   |             | Range | Accuracy | Dial reading | Measuring force | Mass (g) | L (mm) |                                     |                                     |                                     |                          | Remarks    |
|------------|-------------|-------------|-------|----------|--------------|-----------------|----------|--------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|------------|
|            | Basic set   | Full set    |       |          |              |                 |          |        |                                     |                                     |                                     |                          |            |
| .0005"     | 513-442-10A | 513-442-10T | .06"  | ±.0005"  | 0-15-0       | 0.3N or less    | 48       | 19.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | —          |
| .0005"     | 513-442-16A | 513-442-16T | .06"  | ±.0005"  | 0-15-0       | 0.3N or less    | 48       | 19.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Black dial |
| .0005"     | 513-446-10A | 513-446-10T | .06"  | ±.0005"  | 0-15-0       | 0.2N or less    | 48       | 33.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | —          |
| .0005"     | 513-446-16A | 513-446-16T | .06"  | ±.0005"  | 0-15-0       | 0.2N or less    | 48       | 33.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Black dial |
| .0001"     | 513-443-10A | 513-443-10T | .016" | ±.0002"  | 0-4-0        | 0.3N or less    | 48       | 15     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | —          |
| .0001"     | 513-443-16A | 513-443-16T | .016" | ±.0002"  | 0-4-0        | 0.3N or less    | 48       | 15     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Black dial |

**Metric** Vertical type

| Graduation | Order No.   |             | Range | Accuracy | Dial reading | Measuring force | Mass (g) | L (mm) |                                     |                                     |
|------------|-------------|-------------|-------|----------|--------------|-----------------|----------|--------|-------------------------------------|-------------------------------------|
|            | Basic set   | Full set    |       |          |              |                 |          |        |                                     |                                     |
| 0.01mm     | 513-454-10E | 513-454-10T | 0.8mm | 8µm      | 0-40-0       | 0.3N or less    | 50       | 20.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 0.002mm    | 513-455-10E | 513-455-10T | 0.2mm | 3µm      | 0-100-0      | 0.3N or less    | 50       | 14.7   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

**Inch** Vertical type

| Graduation | Order No.   |             | Range | Accuracy | Dial reading | Measuring force | Mass (g) | L (mm) |                                     |                                     |
|------------|-------------|-------------|-------|----------|--------------|-----------------|----------|--------|-------------------------------------|-------------------------------------|
|            | Basic set   | Full set    |       |          |              |                 |          |        |                                     |                                     |
| .0005"     | 513-452-10E | 513-452-10T | .03"  | ±.0005"  | 0-15-0       | 0.3N or less    | 50       | 19.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| .0001"     | 513-453-10E | 513-453-10T | .008" | ±.0001"  | 0-4-0        | 0.3N or less    | 50       | 19     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

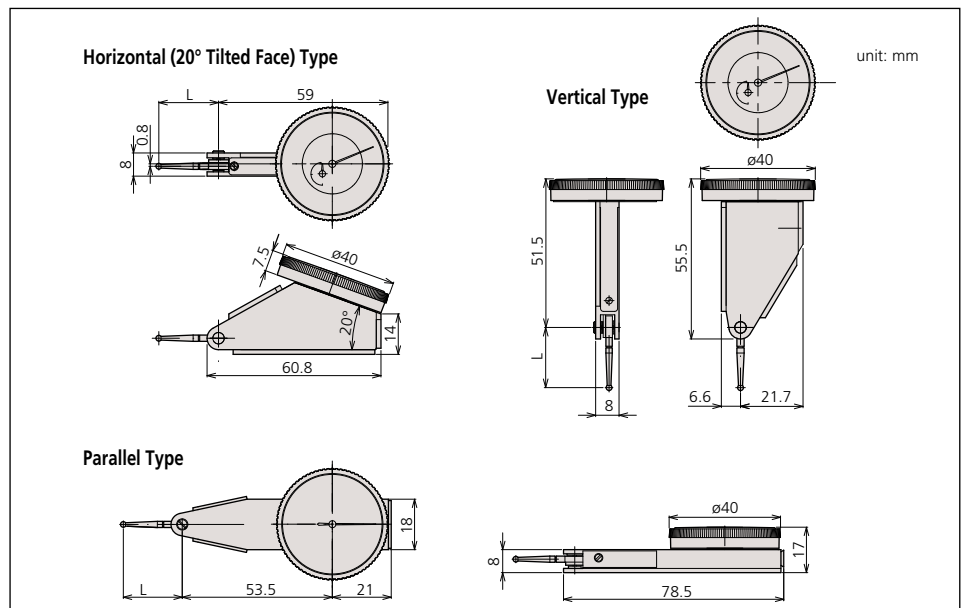
**Metric** Parallel type

| Graduation | Order No.   |             | Range | Accuracy | Dial reading | Measuring force | Mass (g) | L (mm) |                                     |                                     |
|------------|-------------|-------------|-------|----------|--------------|-----------------|----------|--------|-------------------------------------|-------------------------------------|
|            | Basic set   | Full set    |       |          |              |                 |          |        |                                     |                                     |
| 0.01mm     | 513-484-10E | 513-484-10T | 0.8mm | 8µm      | 0-40-0       | 0.3N or less    | 68       | 20.9   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

**Inch** Parallel type

| Graduation | Order No.   |             | Range | Accuracy | Dial reading | Measuring force | Mass (g) | L (mm) |                                     |                                     |
|------------|-------------|-------------|-------|----------|--------------|-----------------|----------|--------|-------------------------------------|-------------------------------------|
|            | Basic set   | Full set    |       |          |              |                 |          |        |                                     |                                     |
| .0005"     | 513-482-10A | 513-482-10T | .03"  | ±.0005"  | 0-15-0       | 0.3N or less    | 68       | 20     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

## DIMENSIONS

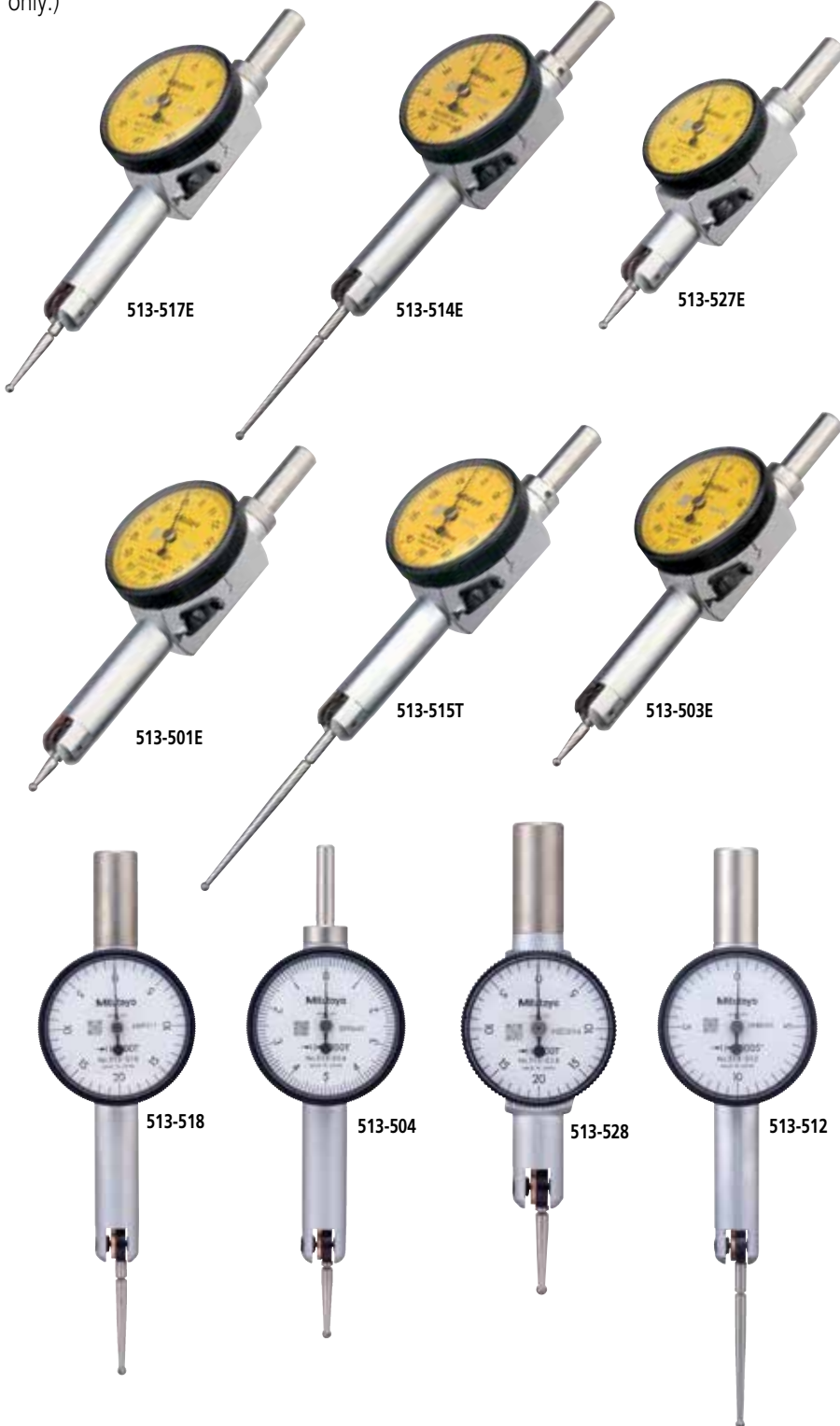


# Pocket Dial Test Indicators

## SERIES 513

### FEATURES

- Jeweled bearings ensure high sensitivity and accuracy.
- Reversible measuring direction.
- Two holding bars are supplied. (Full sets only.)
- Fully adjustable bezel/dial face.
- Contact point is adjustable within 220°.
- Bezel is sealed with an O-ring to keep out water / oil.



513-514E



513-517E  
513-527E



513-515T



513-503E



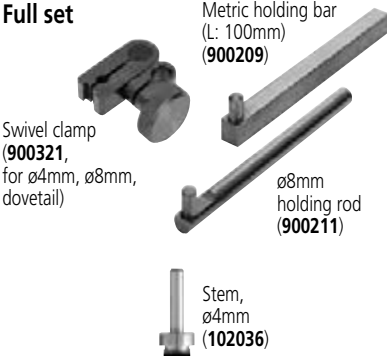
513-501E

### Optional Accessories

- : Swivel clamp
- : Holding bar
- : Stem
- : Contact points

## Set Configuration: Metric

**Full set**



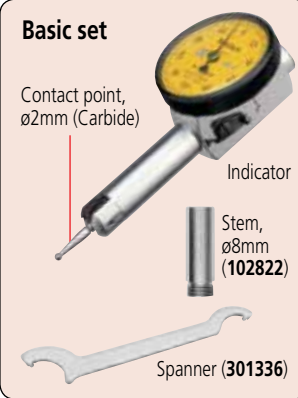
Swivel clamp (900321, for ø4mm, ø8mm, dovetail)

Metric holding bar (L: 100mm) (900209)

ø8mm holding rod (900211)

Stem, ø4mm (102036)

**Basic set**



Contact point, ø2mm (Carbide)

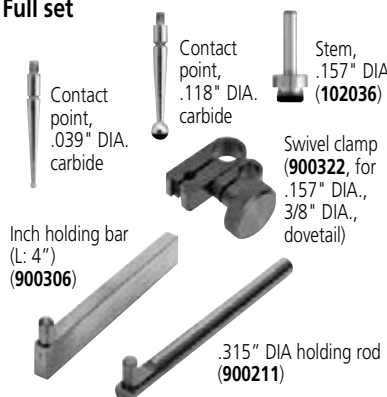
Indicator

Stem, ø8mm (102822)

Spanner (301336)

## Set Configuration: Inch

**Full set**



Contact point, .039" DIA. carbide

Contact point, .118" DIA. carbide

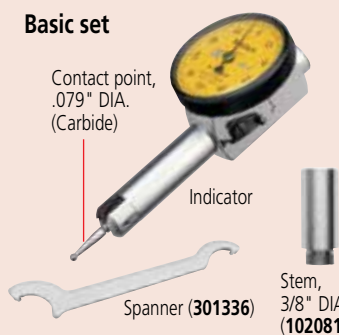
Stem, .157" DIA. (102036)

Swivel clamp (900322, for .157" DIA., 3/8" DIA., dovetail)

Inch holding bar (L: 4") (900306)

.315" DIA holding rod (900211)

**Basic set**

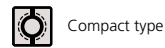
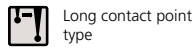


Contact point, .079" DIA. (Carbide)

Indicator

Stem, 3/8" DIA. (102081)

Spanner (301336)



## SPECIFICATIONS

### Metric

| Graduation | Order No. |          | Range  | Accuracy | Dial reading | Measuring force | L (mm) |   |   |   |
|------------|-----------|----------|--------|----------|--------------|-----------------|--------|---|---|---|
|            | Basic set | Full set |        |          |              |                 |        |   |   |   |
| 0.01mm     | 513-514E  | 513-514T | 0.5mm  | 10µm     | 0-25-0       | 0.3N or less    | 36.8   | ✓ | ✓ | — |
| 0.01mm     | 513-517E  | 513-517T | 0.8mm  | 8µm      | 0-40-0       | 0.3N or less    | 20.9   | — | ✓ | — |
| 0.01mm     | 513-527E  | 513-527T | 0.8mm  | 8µm      | 0-40-0       | 0.3N or less    | 14.7   | — | ✓ | ✓ |
| 0.01mm     | —         | 513-515T | 1mm    | 10µm     | 0-50-0       | 0.3N or less    | 44.5   | ✓ | ✓ | — |
| 0.002mm    | 513-503E  | 513-503T | 0.2mm  | 3µm      | 0-100-0      | 0.3N or less    | 14.7   | — | ✓ | — |
| 0.001mm    | 513-501E  | 513-501T | 0.14mm | 3µm      | 0-70-0       | 0.4N or less    | 12     | — | ✓ | — |

### Inch

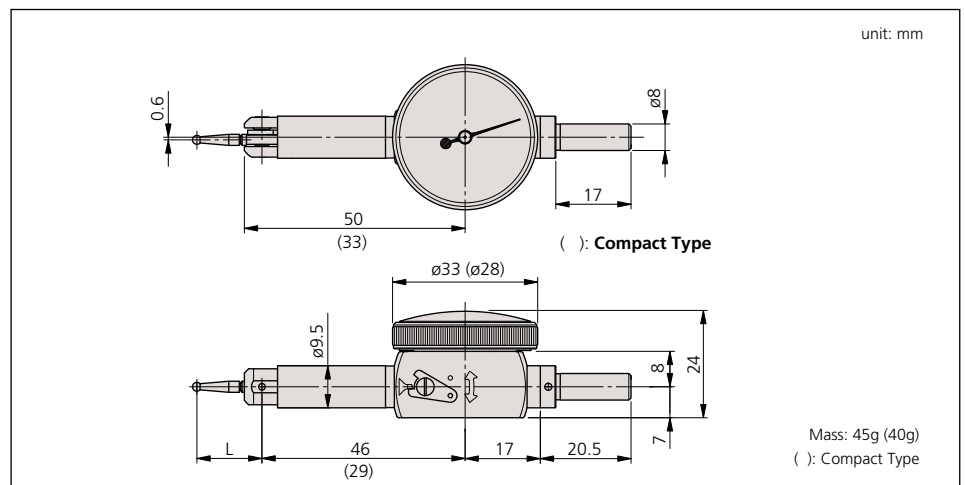
| Graduation | Order No. |          | Range | Accuracy | Dial reading | Measuring force | L (mm) |   |   |   |
|------------|-----------|----------|-------|----------|--------------|-----------------|--------|---|---|---|
|            | Basic set | Full set |       |          |              |                 |        |   |   |   |
| .001"      | 513-518   | 513-518T | .04"  | ±.001"   | 0-20-0       | 0.3N or less    | 26.5   | — | ✓ | — |
| .001"      | 513-528   | 513-528T | .04"  | ±.001"   | 0-20-0       | 0.3N or less    | 18.7   | — | ✓ | ✓ |
| .0005"     | 513-512   | 513-512T | .02"  | ±.0005"  | 0-10-0       | 0.3N or less    | 37.4   | ✓ | ✓ | — |
| .0001"     | 513-504   | 513-504T | .01"  | ±.0002"  | 0-5-0        | 0.3N or less    | 18.7   | — | ✓ | — |

## Optional Contact Points

### Pocket Type

| Order No.         | 1mm    | 2mm    | 3mm    | 0.5mm  | 0.7mm  |
|-------------------|--------|--------|--------|--------|--------|
| 513-501E          | 136756 | 136104 | 136758 | —      | —      |
| 513-503E 513-527E | 103017 | 103010 | 103018 | 190547 | 190548 |
| 513-504 513-528   | 131314 | 103011 | 131315 | —      | —      |
| 513-512           | 131316 | 131324 | 131317 | —      | —      |
| 513-514E          | 137746 | 129949 | 137747 | —      | —      |
| 513-515T          | 136235 | 136013 | 136236 | 190656 | 190655 |
| 513-517E          | 103013 | 103006 | 103014 | 190549 | 190550 |
| 513-518           | 103008 | 103007 | 103009 | —      | —      |

## DIMENSIONS AND MASS

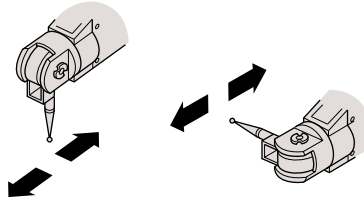


# Dial Test Indicators

## SERIES 513 — Universal Type

### FEATURES

- Universal application for all directions. Not only the direction of the measuring point, but also the direction of measurement itself can be adjusted 360 degrees without moving the indicator.



513-304GE

### SPECIFICATIONS



Jeweled bearing type

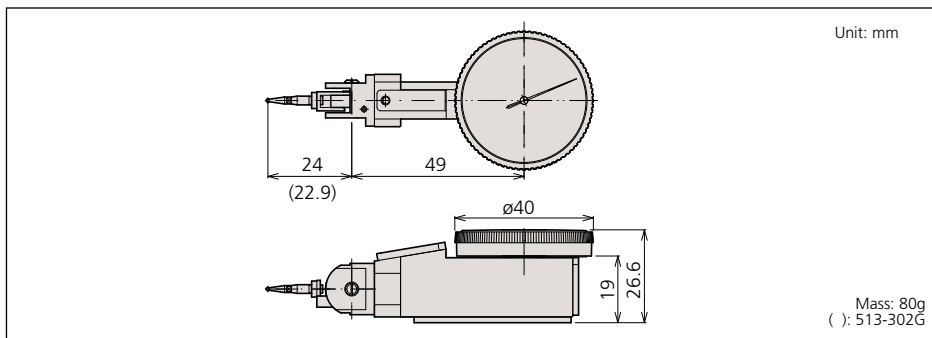
#### Metric

| Graduation | Order No. |           | Range | Accuracy | Dial reading | Measuring force |   |
|------------|-----------|-----------|-------|----------|--------------|-----------------|---|
|            | Basic set | Full set  |       |          |              |                 |   |
| 0.01mm     | 513-304GE | 513-304GT | 0.8mm | 8µm      | 0-40-0       | 0.3N or less    | ✓ |

#### Inch

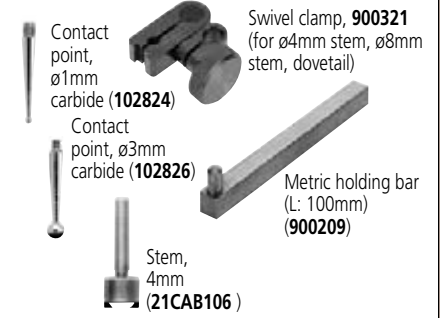
| Graduation | Order No. |           | Range | Accuracy | Dial reading | Measuring force |   |
|------------|-----------|-----------|-------|----------|--------------|-----------------|---|
|            | Basic set | Full set  |       |          |              |                 |   |
| .0005"     | 513-302G  | 513-302GT | .03"  | ±.0005"  | 0-15-0       | 0.3N or less    | ✓ |

### DIMENSIONS AND MASS

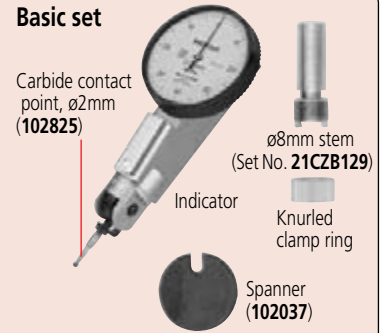


### Set Configuration: Metric

#### Full set

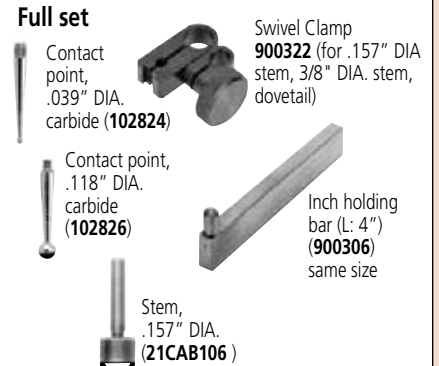


#### Basic set

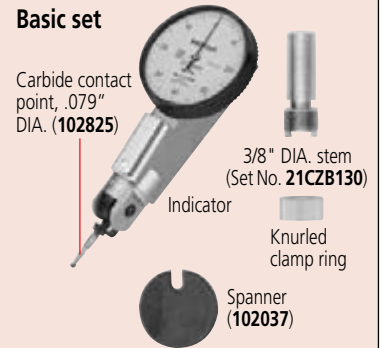


### Set Configuration: Inch

#### Full set



#### Basic set

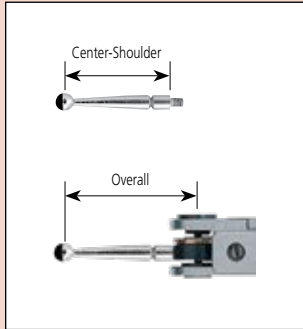


### Optional Accessories

- : Swivel clamp
- : Holding bar
- : Stem

# Contact Points and Clamp Holders

## Optional Accessories for Dial Test Indicator



| Inch            |         |          |      |        |        |        |           |   |                            |  |  |
|-----------------|---------|----------|------|--------|--------|--------|-----------|---|----------------------------|--|--|
| Length (mm)     |         | Part No. |      |        |        |        |           | Test Indicator Code No.                   |                            |  |  |
| Center-Shoulder | Overall | ø0.5     | ø0.7 | ø1     | ø2     | ø3     | Ruby ø2mm |   |                            |  |  |
| 11.5            | 15.0    | —        | —    | 136076 | 136075 | 136077 | 21CZA213  | 513-403-10E<br>513-453-10E                | 513-443-10A<br>513-463-10E | 513-473-10E <sup>1,3</sup><br>513-443-16A                |  |
| 16.4            | 19.9    | —        | —    | 133196 | 133195 | 133197 | 21CZA204  | 513-401-10E<br>513-406-10E<br>513-452-10E | 513-442-10A<br>513-462-10E | 513-472-10E <sup>1,3</sup><br>513-442-16A<br>513-482-10A |  |
| 30.4            | 33.9    | —        | —    | 136291 | 136290 | 136292 | 21CZA214  | 513-412-10E<br>513-446-16A                | 513-446-10A                |  |  |
| 15.2            | 18.7    | —        | —    | 131314 | 103011 | 131315 | —         | 513-504 <sup>1</sup>                      | 513-528 <sup>1</sup>       |  |  |
| 23.0            | 26.5    | —        | —    | 103008 | 103007 | 103009 | —         | 513-518 <sup>1</sup>                      |                            |  |  |
| 33.9            | 37.4    | —        | —    | 131316 | 131324 | 131317 | —         | 513-512 <sup>1</sup>                      |                            |  |  |

| Metric      |      |          |        |          |          |          |          |   |   |   |  |
|-------------|------|----------|--------|----------|----------|----------|----------|---|---|---|--|
| Length (mm) |      | Part No. |        |          |          |          |          |   |   |   |  |
| 9.4         | 12.9 | —        | —      | 21CZA044 | 21CZA036 | 21CZA045 | 21CZA212 | 513-401-10E                               | 513-471-10E                               |   |  |
| 11.2        | 14.7 | 190547   | 190548 | 103017   | 103010   | 103018   | 21CZA209 | 513-405-10E<br>513-503E<br>513-527E       | 513-425-10E<br>513-455-10E<br>513-455-10E | 513-445-10E                               |  |
| 17.4        | 20.9 | 190549   | 190550 | 103013   | 103006   | 103014   | 21CZA201 | 513-404-10E<br>513-464-10E<br>513-484-10E | 513-444-10E<br>513-517E <sup>1</sup>      | 513-454-10E<br>513-474-10E <sup>1,3</sup> |  |
| 18.7        | 22.2 | 190654   | 190653 | 137558   | 137557   | 137559   | 21CZA210 | 513-424-10E<br>513-478-10H <sup>3</sup>   | 513-426-10E                               | 513-466-10E                               |  |
| 41.0        | 44.5 | 190656   | 190655 | 136235   | 136013   | 136236   | 21CZA211 | 513-415-10E                               | 513-515T <sup>1</sup>                     |   |  |
| 33.3        | 36.8 | —        | —      | 137746   | 129949   | 137747   | —        | 513-414-10E                               | 513-514E <sup>1</sup>                     |   |  |
| 8.6         | 12.0 | —        | —      | 136756   | 136104   | 136758   | —        | 513-501E <sup>1</sup>                     |   |   |  |
| 6.5         | 24.0 | —        | —      | 102824   | 102825   | 102826   | —        | 513-304GE <sup>2</sup>                    | 513-302G <sup>2</sup>                     |   |  |

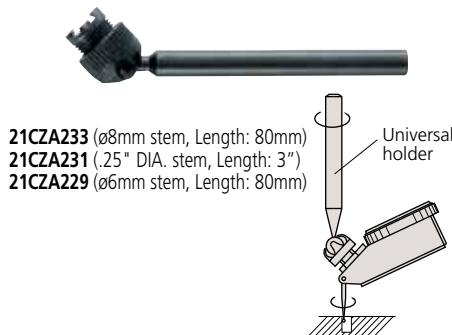
\*1 Denotes Pocket Indicators  
\*2 Denotes Universal Indicator  
\*3 Indicator Ships with Ruby Contact

### Holding Bars (with 6mm mounting pin)



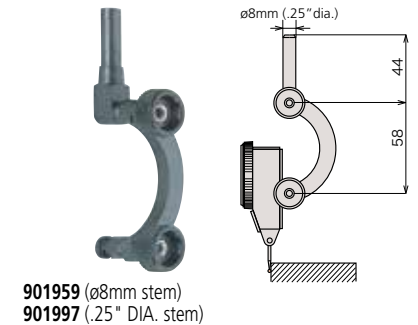
### Universal Holder

- Allows the indicator to be set at a desired position.



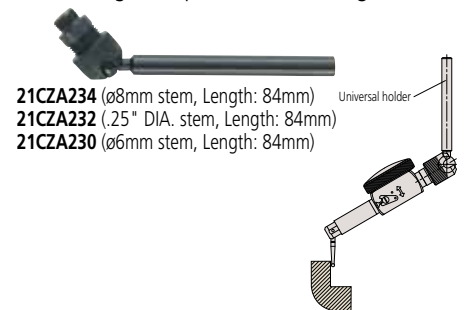
### Centering Holder

- Allows large diameter cylinders or holes to be centered.



### Universal Holder (pocket type)

- Since the Dial Test Indicator can be swiveled to a desired angle, the holder is useful for centering workpieces and installing workpieces on a milling machine.



# i-Checker

## SERIES 170 – Inspection Instrument for Dial Indicator

The i-Checker is specially designed to calibrate dial indicators, dial test indicators, and other electronic comparison gage heads with a stroke of up to 100mm (4").

- $\pm(0.1+0.4L/100)$   $\mu\text{m}$  indication accuracy.
- Directly inspects an indicator with a stroke of up to 100mm (4"). The dial test indicator, bore gage and lever-type inductive head can be inspected with optional accessories.

- Adjustment of the measurement position is easily accomplished due to semi-automatic measurement and fully automatic measurement functions.
- Creates and prints out a simple inspection certificate.
- Saves inspection results as a CSV file for analysis by software.

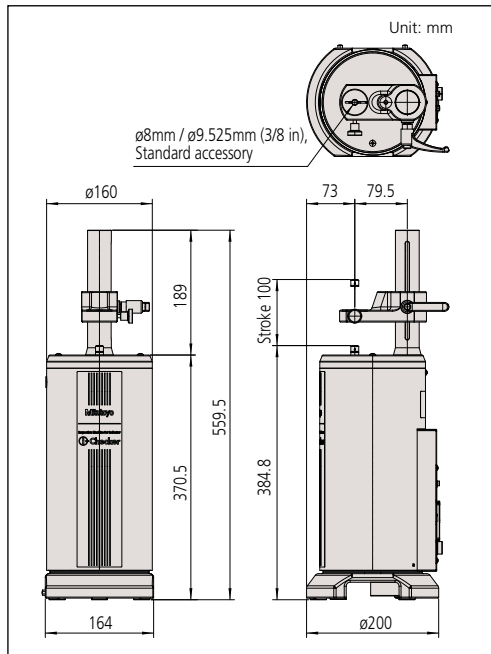


## SPECIFICATIONS

| Order No. | Remarks                              |
|-----------|--------------------------------------|
| 64PKA148  | comes with both 8mm and 3/8" bushing |

Recommended PC Part No. **64PKA149E**

## DIMENSIONS



## Applicable Indicators

- Dial indicator
  - Hicator
  - Digimatic indicator\*\*\*
  - Test indicator\*
  - Bore gage\*\*
  - Linear gage
- \* Requires optional test indicator attachment set.  
 \*\* Contact the nearest Mitutoyo sales office for testable indicators.  
 \*\*\* Requires optional SPC cable for fully automatic measurement.



Using test indicator attachment set (02ASK000)



## Technical Data

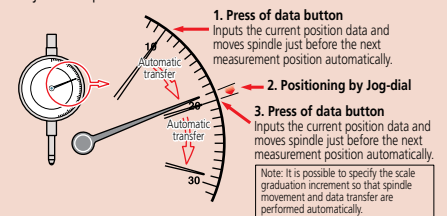
Measuring Range: 100mm / 4"  
 Resolution: 0.01  $\mu\text{m}$  / 0.4  $\mu\text{m}$   
 Accuracy:  $\pm(0.1+0.4L/100)$   $\mu\text{m}$  in vertical position  
 $\pm(0.15+0.6L/100)$   $\mu\text{m}$  in lateral position  
 L = measuring length (mm)  
 Drive method: Motor direct drive  
 Measuring Unit: "STVC-4Z" linear encoder  
 Thermal Expansion coefficient: 0.4 ppm /  $^{\circ}\text{C}$   
 Measurement method: Semi / Full automatic\*  
 Dimensions: 116 x 205.5 x 559.5mm (W x D x H)  
 Operating temperature range:  $20^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$   
 Power supply: 100 – 240VAC  $\pm 10\%$ , 50/60 Hz  
 Mass: 20kg / 44.1lbs

\* Automatic measurement requires the indicator's connection cable. Additionally, some form of indicator, along with a connecting machine (the optional accessory for indicator as a Digimatic power-supply unit on EF counter), will be needed.

## Functions

### Semi-automatic inspection of analog indicator

The pointer of the analog indicator is positioned just before the measuring point automatically via Mitutoyo's Semi-automatic Measurement function. After that, inspection begins simply by adjusting the pointer position with the jog-dial. Because of this function, measurement time is reduced and user fatigue is practically eliminated. Additionally all functions necessary for inspection are combined in the control box so that the operator need not rely on excessive eye movement to adjust the pointer.



### Fully automatic inspection of digital indicator

The Automatic Measurement function, in tandem with a digital indicator, makes the spindle move so that measurement data is acquired automatically. Therefore, manual adjustment to the measurement position is unnecessary and the efficiency of every inspection is enhanced.

### Create and printout a simplified inspection certificate

Create, edit and print your own inspection certificate. Data can be saved as a CSV file.

## Optional Accessories

- 02ASK000: Test indicator attachment set ( $\varnothing 6\text{mm}$  stem)
- 02ASK180: Test indicator attachment set ( $\varnothing 8\text{mm}$  stem)
- 02ASK370: Test indicator holder ( $\varnothing 6\text{mm}$  stem)
- 02ASK380: Test indicator holder ( $\varnothing 8\text{mm}$  stem)
- 02ASU162: CG accessory set (type C) for bore gages\*
- 21CZB128:  $\varnothing 6\text{mm}$  dovetail grooved stem
- 21CZB129:  $\varnothing 8\text{mm}$  dovetail grooved stem
- 02ASK040: Stem bush  $\varnothing 6\text{mm}$
- 02ASJ856: Stem bush  $\varnothing 8\text{mm}$
- 02ASK150: Stem bush  $\varnothing 8\text{mm}$ , short
- 02ASL150: Stem bush  $\varnothing 10$ , short
- 02ASK050: Bush  $\varnothing 9.5$  (Requires 02ASK070)
- 02ASK060: Stem bush  $\varnothing 12\text{mm}$
- 02ASK070: Stem bush  $\varnothing 15\text{mm}$
- 02ASK080: Stem bush  $\varnothing 20\text{mm}$
- 02ASK710: Stem bush  $\varnothing 28\text{mm}$
- 02ASK090: Stem bush 3/8"
- 02ASK130: Stem bush case
- 02ASK730: Reflector
- 937179T: Foot switch

\* Not compatible with IC1000 models





### Optional Accessory

**12AKK824:** Stand for bore gage inspection



# UDT-2 Dial Gage Testers

## SERIES 170

The UDT-2 Dial Gage Tester consists of a specially designed 0-1" / 0-25mm micrometer head, with a large disc, and rigid holding fixtures. Gage tester to calibrate measuring accuracy of dial indicators, dial test indicators and dial bore gage.

### FEATURES

- Clamping stem diameter—  
170-102-10: 6mm and 8mm,  
170-101-10: .25" and .375"
- With the optional stand (**12AAK824**), inspection of dial bore gages becomes possible.

### SPECIFICATIONS

| Metric   |                   |            |          |
|----------|-------------------|------------|----------|
| Range    | Order No.         | Graduation | Accuracy |
| 0 - 25mm | <b>170-102-10</b> | 0.001mm    | ±1µm     |



170-102-10

| Inch   |                   |            |          |
|--------|-------------------|------------|----------|
| Range  | Order No.         | Graduation | Accuracy |
| 0 - 1" | <b>170-101-10</b> | .0001"     | ±.0001"  |

# Calibration Testers

## SERIES 521

The Calibration Tester is specially designed to calibrate measuring accuracy of short-range dial indicators, dial test indicators, and other electronic comparison gage heads.

### FEATURES

- Universal bracket accepts any dial indicator, dial test indicator, and lever head of Mu-Checker without any additional accessory.
- Clamping capacity: ø4mm - ø10mm / .157"-.394" dia.
- Dual color-indexed directional graduations to facilitate measurements.



Calibrating test indicator



521-103

### SPECIFICATIONS

| Metric  |                |            |          |
|---------|----------------|------------|----------|
| Range   | Order No.      | Graduation | Accuracy |
| 0 - 1mm | <b>521-103</b> | 0.0002mm   | ±0.2µm   |
| 0 - 5mm | <b>521-105</b> | 0.0002mm   | ±0.8µm   |

| Inch     |                |            |          |
|----------|----------------|------------|----------|
| Range    | Order No.      | Graduation | Accuracy |
| 0 - .05" | <b>521-104</b> | .00001"    | ±.00001" |
| 0 - .2"  | <b>521-106</b> | .00001"    | ±.00003" |

# Thickness Gages

## SERIES 547, 7

Thickness Gages offer a quick and efficient means of inspection with a convenient grip handle, thumb trigger and spring-loaded spindle. The various models cover a range of applications.

### FEATURES

- Wide range of applications with various types of measuring faces (on the spindle and anvil).

### Flat-Anvil Type

#### Standard Type / Digital



#### Deep-Throat Type / Digital



#### Deep-Throat Type / Dial

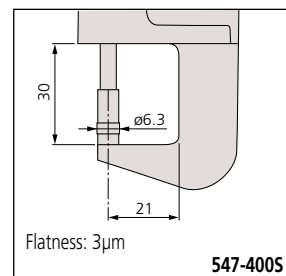


#### High-Accuracy Type / Digital



- Digital models incorporate Mitutoyo's popular ID-C and ID-S Series Digimatic Indicators to provide error-free LCD readings, as well as data output for SPC analysis.
- **547-4005** is ideally suited for measuring thicknesses of paper, film, wire, sheet metal and similar materials.

### DIMENSIONS



### Technical Data

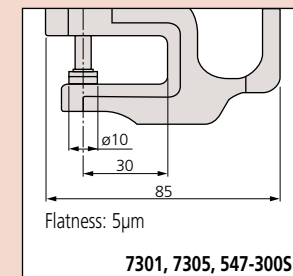
#### Function of Digital Models

- IDS Types
- ON/OFF
  - Inch / mm Conversion
  - Origin
  - ±Direction Changeover
  - SPC Output
  - Battery Life: 20,000 hrs
  - Power Supply: Silver Oxide Cell (SR-44 1pc.)

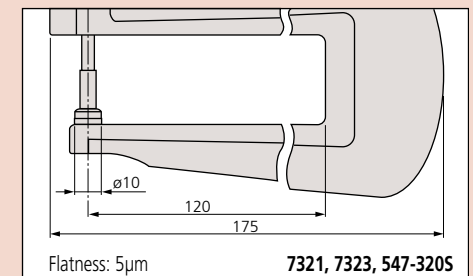
#### IDC Types

- ON/OFF
- Inch / mm Conversion
- Zero / ABS
- ±Direction Changeover
- SPC Output
- Battery Life: 5,000 hrs
- Power Supply: Silver Oxide Cell (SR-44 1pc.)
- Preset
- Provides go/no-go judgment
- Face Rotates 330°

### DIMENSIONS



Unit: mm



# Thickness Gages

## SERIES 547, 7

### Optional Accessories

- 905338:** SPC cable (40" / 1m) for digital type  
**905409:** SPC cable (80" / 2m) for digital type  
**902794:** Spindle lifting lever for IDS digimatic type (stroke .5" / 12.7mm)

### Standard Accessories

- 21AZB149:** Spindle lifting lever for digimatic and dial thickness gage (stroke .5" / 12.7mm)  
**21AZB150:** Spindle lifting lever for dial indicator (stroke 1" / 25.4mm)

### Flat Anvil

#### SPECIFICATIONS

| Inch/Metric         |                 | Digital Type   |          |                 |               |                        |
|---------------------|-----------------|----------------|----------|-----------------|---------------|------------------------|
| Range               | Order No.       | Resolution     | Accuracy | Measuring Force | Indicator     | Spindle/Anvil Material |
| 0 - .47" / 0 - 12mm | <b>547-500S</b> | .0005"/0.01mm  | ±.001"   | 1.5N or less    | Digimatic IDS | Ceramic                |
| 0 - .47" / 0 - 12mm | <b>547-520S</b> | .0005"/0.01mm  | ±.001"   | 1.5N or less    | Digimatic IDS | Ceramic                |
| 0 - .47" / 0 - 12mm | <b>547-526S</b> | .0001"/0.001mm | ±.0002"  | 1.5N or less    | Digimatic IDS | Ceramic                |
| 0 - .4" / 0 - 10mm  | <b>547-300S</b> | .0005"/0.01mm  | ±.001"   | 1.5N or less    | Digimatic IDC | Ceramic                |
| 0 - .4" / 0 - 10mm  | <b>547-320S</b> | .0005"/0.01mm  | ±.001"   | 1.5N or less    | Digimatic IDC | Ceramic                |
| 0 - .47" / 0 - 12mm | <b>547-400S</b> | .0005"/0.001mm | ±.00015" | 3.5N or less    | Digimatic IDC | Carbide                |

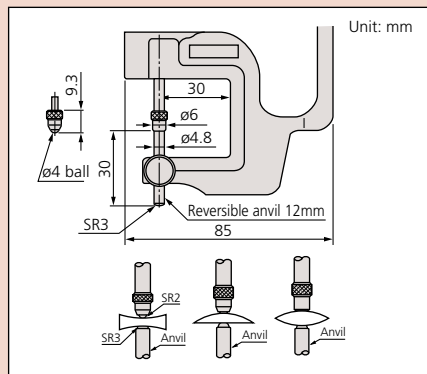
#### Inch Dial Type

| Range    | Order No.    | Graduation | Accuracy | Measuring Force | Remarks                                  |
|----------|--------------|------------|----------|-----------------|--|
| 0 - .05" | <b>7326S</b> | .0001"     | ±.0002"  | 1.4N or less    | Fine dial reading, ceramic spindle/anvil |
| 0 - .5"  | <b>7300S</b> | .001"      | ±.001"   | 1.4N or less    | Standard, ceramic spindle/anvil          |
| 0 - 1"   | <b>7304S</b> | .001"      | ±.002"   | 2.0N or less    | Standard, ceramic spindle/anvil          |
| 0 - 1"   | <b>7322S</b> | .001"      | ±.002"   | 2.0N or less    | Deep throat, ceramic spindle/anvil       |

#### Metric Dial Type

| Range    | Order No.   | Graduation | Accuracy | Measuring Force | Remarks                                  |
|----------|-------------|------------|----------|-----------------|--|
| 0 - 1mm  | <b>7327</b> | 0.001mm    | ±5µm     | 1.4N or less    | Fine dial reading, ceramic spindle/anvil |
| 0 - 10mm | <b>7301</b> | 0.01mm     | ±15µm    | 1.4N or less    | Standard, ceramic spindle/anvil          |
| 0 - 20mm | <b>7305</b> | 0.01mm     | ±20µm    | 2.0N or less    | Standard, ceramic spindle/anvil          |
| 0 - 10mm | <b>7321</b> | 0.01mm     | ±15µm    | 1.4N or less    | Deep throat, ceramic spindle/anvil       |
| 0 - 20mm | <b>7323</b> | 0.01mm     | ±22µm    | 2.0N or less    | Deep throat, ceramic spindle/anvil       |

### DIMENSIONS



### Lens thickness measurement (reverse anvil)



#### SPECIFICATIONS

| Inch/Metric         |                 | Digital Type  |          |                 |               |  |
|---------------------|-----------------|---------------|----------|-----------------|---------------|--|
| Range               | Order No.       | Resolution    | Accuracy | Measuring Force | Indicator     |  |
| 0 - .47" / 0 - 12mm | <b>547-512S</b> | .0005"/0.01mm | ±.001"   | 1.5N or less    | Digimatic IDS |  |
| 0 - .4" / 0 - 10mm  | <b>547-312S</b> | .0005"/0.01mm | ±.001"   | 1.5N or less    | Digimatic IDC |  |

#### Inch Dial Type

| Range   | Order No.    | Graduation | Accuracy | Measuring Force | Remarks        |
|---------|--------------|------------|----------|-----------------|----------------|
| 0 - .5" | <b>7312S</b> | .001"      | ±.001"   | 1.4N or less    | Lens thickness |

#### Metric Dial Type

| Range    | Order No.   | Graduation | Accuracy | Measuring Force | Remarks        |
|----------|-------------|------------|----------|-----------------|----------------|
| 0 - 10mm | <b>7313</b> | 0.01mm     | ±15µm    | 1.4N or less    | Lens thickness |

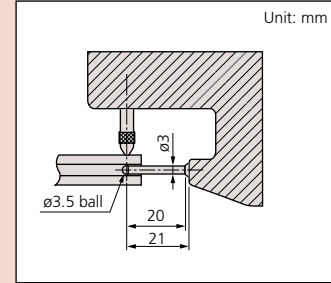
# Thickness Gages

## SERIES 547, 7

### Tube thickness measurement



### DIMENSIONS



### SPECIFICATIONS

| Inch/Metric         |           | Digital Type  |          |                 |               |
|---------------------|-----------|---------------|----------|-----------------|---------------|
| Range               | Order No. | Resolution    | Accuracy | Measuring Force | Indicator     |
| 0 - .47" / 0 - 12mm | 547-561S  | .0005"/0.01mm | ±.001"   | 1.5N or less    | Digimatic IDS |
| 0 - .4" / 0 - 12mm  | 547-361S  | .0005"/0.01mm | ±.001"   | 1.5N or less    | Digimatic IDC |

| Inch    |           | Dial Type  |          |                 |                |
|---------|-----------|------------|----------|-----------------|----------------|
| Range   | Order No. | Graduation | Accuracy | Measuring Force | Remarks        |
| 0 - .5" | 7361S     | .001"      | ±.001"   | 1.4N or less    | Tube thickness |

| Metric   |           | Dial Type  |          |                 |                |
|----------|-----------|------------|----------|-----------------|----------------|
| Range    | Order No. | Graduation | Accuracy | Measuring Force | Remarks        |
| 0 - 10mm | 7360      | 0.01mm     | ±15µm    | 1.4N or less    | Tube thickness |

### Optional Accessories

- 905338: SPC cable (40" / 1m) for digital type
- 905409: SPC cable (80" / 2m) for digital type
- 902794: Spindle lifting lever for IDS digimatic type (stroke .5" / 12.7mm)

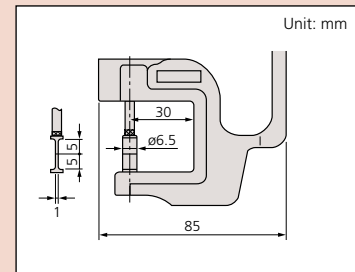
### Standard Accessories

- 21AZB149: Spindle lifting lever for digimatic and dial thickness gage (stroke .5" / 12.7mm)
- 21AZB150: Spindle lifting lever for dial indicator (stroke 1" / 25.4mm)

### Groove thickness measurement (Blade anvil)



### DIMENSIONS



### SPECIFICATIONS

| Inch/Metric         |           | Digital Type  |          |                 |               |
|---------------------|-----------|---------------|----------|-----------------|---------------|
| Range               | Order No. | Resolution    | Accuracy | Measuring Force | Indicator     |
| 0 - .47" / 0 - 12mm | 547-516S  | .0005"/0.01mm | ±.001"   | 1.5N or less    | Digimatic IDS |
| 0 - .47" / 0 - 10mm | 547-316S  | .0005"/0.01mm | ±.001"   | 1.5N or less    | Digimatic IDC |

| Inch    |           | Dial Type  |          |                 |                  |
|---------|-----------|------------|----------|-----------------|------------------|
| Range   | Order No. | Graduation | Accuracy | Measuring Force | Remarks          |
| 0 - .5" | 7316S     | .001"      | ±.001"   | 1.4N or less    | Groove thickness |

| Metric   |           | Dial Type  |          |                 |                  |
|----------|-----------|------------|----------|-----------------|------------------|
| Range    | Order No. | Graduation | Accuracy | Measuring Force | Remarks          |
| 0 - 10mm | 7315      | 0.01mm     | ±15µm    | 1.4N or less    | Groove thickness |