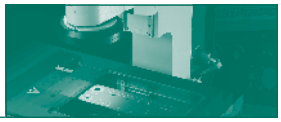
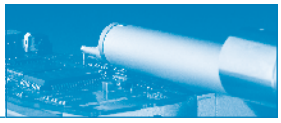
Mitutoyo

MEASURING INSTRUMENTS CATALOGUE

UK-2026

Mitutoyo

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B	Micrometers • Micrometer Heads	 B
C	Holtest • Inside Micrometers • Bore Gauges	 C
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E	Gauge Blocks • Reference Gauges	 E
F	Digimatic Indicators • Dial Indicators • Dial Test Indicators • Instruments & Stands	 F
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Mitutoyo

Traceability of Mitutoyo Standards

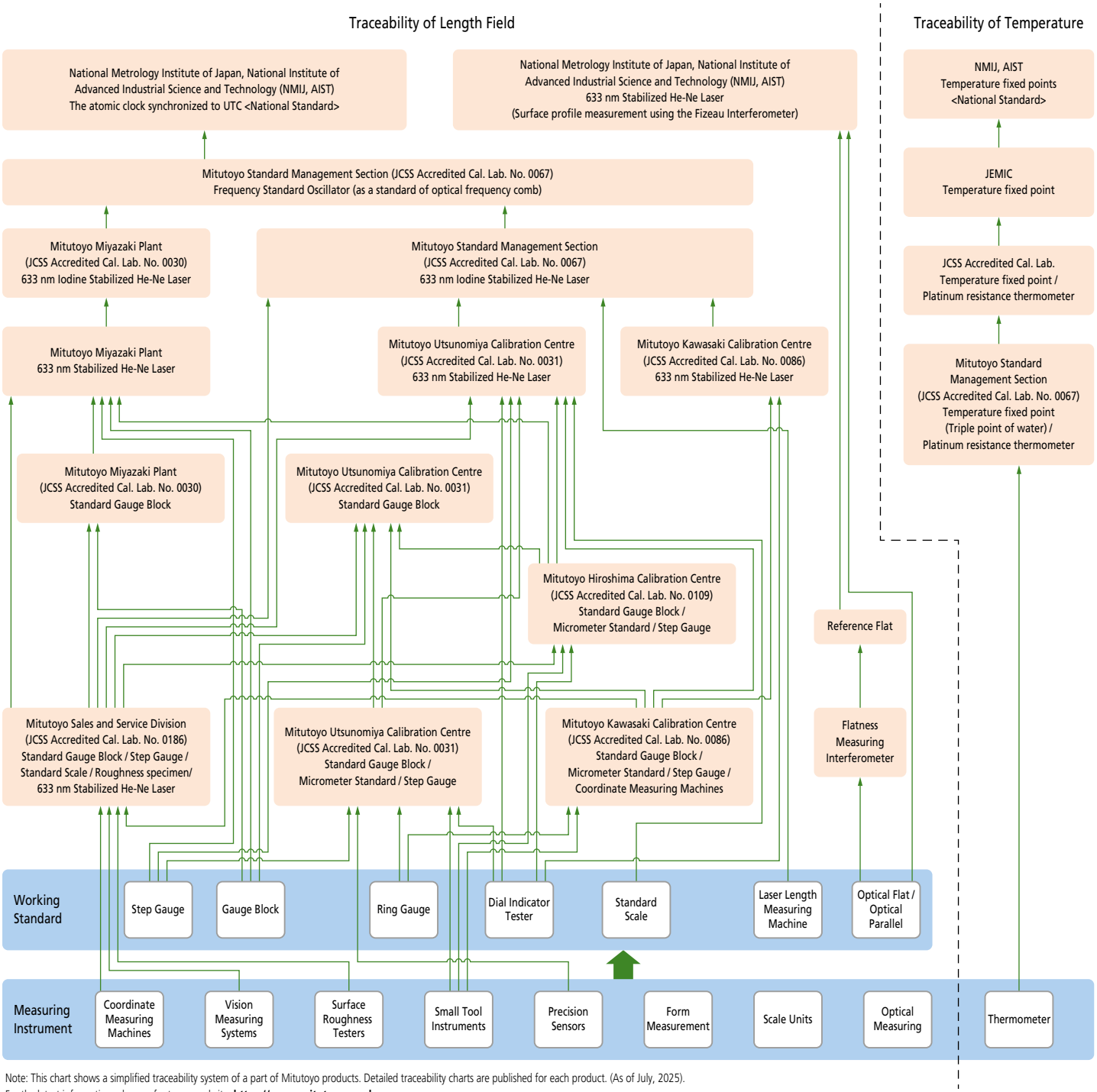
Traceability System

Mitutoyo ensures and maintains traceability of various types of precision measuring instruments by holding standards of length and other physical quantities that are directly traceable to the national standards for use in calibrating the working standards used for the calibration of measuring instrument products supplied to industry. Furthermore, Mitutoyo offers a temperature calibration service which is indispensable for high-accuracy length measurement.

The Mitutoyo traceability system with the optical frequency comb at the top level, ensuring performance equivalent to that of the Japan's national standard, and the calibration technology supporting this system are the basis of highly accurate and reliable products offered to customers.



Certificate of JCSS accredited laboratory (Mitutoyo Standard Management Section).



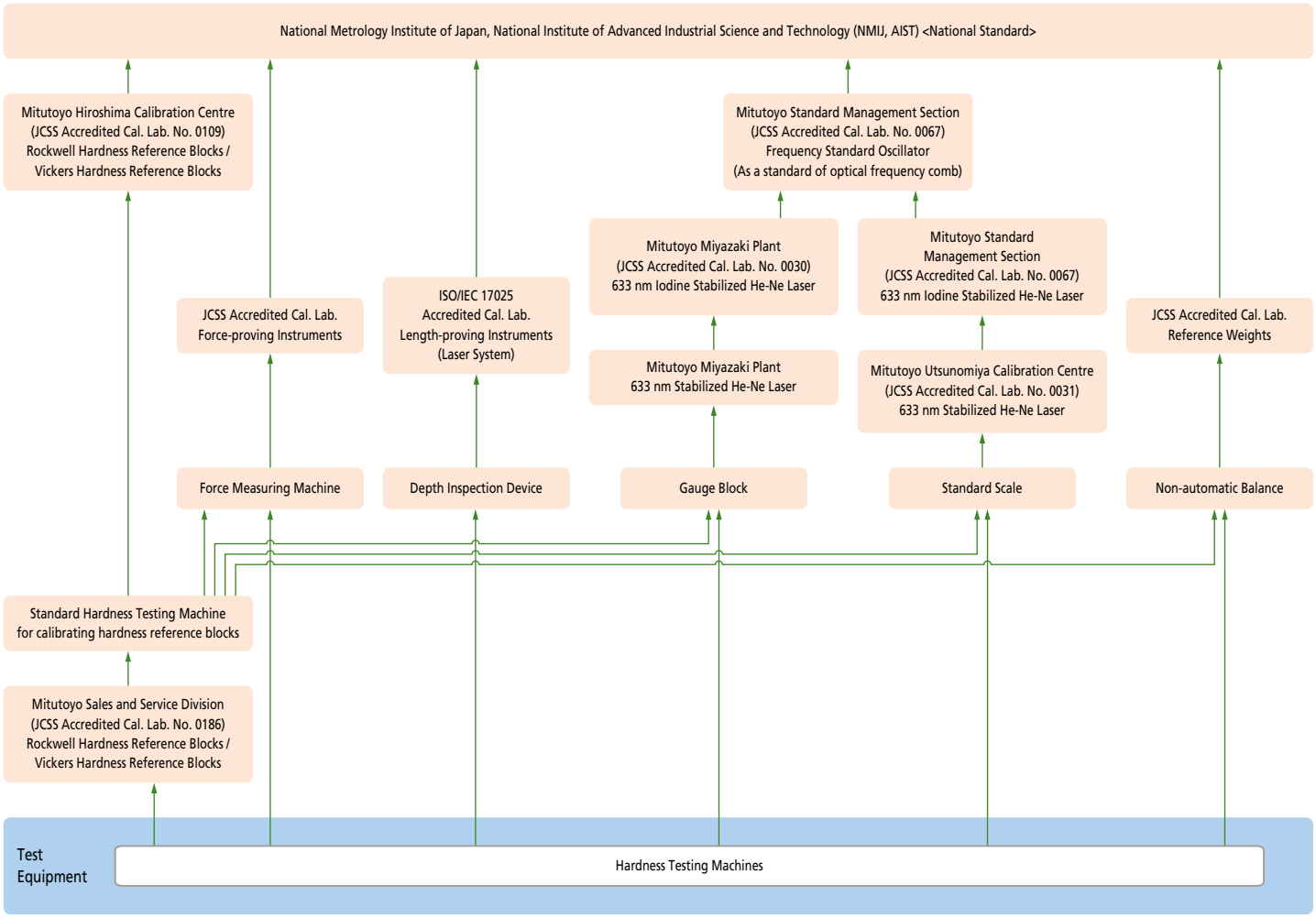
Note: This chart shows a simplified traceability system of a part of Mitutoyo products. Detailed traceability charts are published for each product. (As of July, 2025).
For the latest information, please refer to our website **https://www.mitutoyo.co.uk**







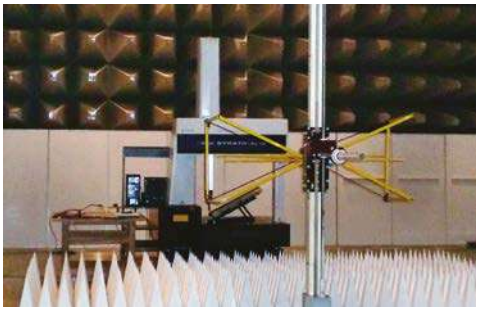
Traceability of Hardness Field



Note: This chart shows a simplified traceability system of a part of Mitutoyo products. Detailed traceability charts are published for each product. (As of July, 2025).
For the latest information, please refer to our website **https://www.mitutoyo.co.uk**

Response to Safety and Environmental Protection Regulations

To deliver safe and reliable products to our customers, Mitutoyo evaluates its products to ensure that they adhere to applicable product safety and environmental standards, including CE marking.





Conformity evaluation for CE marking (EMC Directives)

Major applicable Directives relating to Mitutoyo products

Applicable Directives	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 1000 V or DC voltage of 75 to 1500 V.
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. Restricted substances and maximum concentration values tolerated by weight: · Lead (0.1%) · Cadmium (0.01%) · Mercury (0.1%) · Hexavalent chromium (0.1%) · Polybrominated biphenyls (PBB) (0.1%) · Polybrominated diphenyl ethers (PBDE) (0.1%) · Bis (2-ethylhexyl) phthalate (DEHP) (0.1%) · Butyl benzyl phthalate (BBP) (0.1%) · Dibutyl phthalate (DBP) (0.1%) · Diisobutyl phthalate (DIBP) (0.1%) Note: Our products fall under Cat.9 "Monitoring and control instruments including industrial monitoring and control instruments".

Precautions to be taken when handling button cells

⚠WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

- KEEP batteries OUT OF REACH OF CHILDREN, ingestion can cause DEATH or serious injury. Seek immediate medical attention if you suspect that a battery is swallowed or inserted inside any part of the body.
- Do not dismantle, heat or throw the battery in a fire.
- If alkaline solution leaks from the battery and contacts your skin or clothes, immediately wash the affected area with water. IF IN EYES, immediately rinse eyes cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing and summon immediate assistance from a doctor. Do not solder directly to a battery.
- Ensure batteries are inserted without coming into contact with metal parts of equipment.
- In case of disposal, insulate (+) and (-) terminals of a battery by applying an insulating material.

⚠CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

- Do not try to charge the battery as it is not chargeable. Install the battery with correct polarity. Failure to do so can cause battery leakage or burst resulting in damage to the instrument or personal injury.

NOTICE	Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

- Do not use new and used batteries together. Do not use different types of batteries together.
- Do not use nor leave batteries in direct sunlight nor in locations subject to high temperature or humidity.
- Avoid letting batteries contact water.
- Remove batteries from equipment that will not be used for a prolonged period.

Follow the regulations of each country when disposing of batteries.

CE Marking

CE marking indicates that a product complies with the essential requirements of the relevant European health, safety and environmental protection legislation.

UKCA Marking

UKCA marking indicates that the products conform to the applicable requirements for products sold in Great Britain.

Response to WEEE Directive

The WEEE Directive*[1] 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. To differentiate between equipment waste and household waste, a crossed-out wheeled-bin symbol is marked on a product.

*[1] WEEE Directive: Directive 2012/19/EU of the European Parliament and of the Council on waste electrical and electronic equipment.

Response to REACH Regulation

REACH Regulation*[2] is a regulation governing registration, evaluation, authorization and restriction of chemical substances in Europe, and all products such as substances, mixtures and moulded 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 (Candidate List of substances of very high concern for Authorization (CLS)) 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 Restricted Use of Hazardous Substances in Electrical and Electronic Product (China RoHS 2)

We set the environmental protection use period regulated by China RoHS 2 per product and label with the marks shown on the right, together with a list of the contained substances.

"Environmental Protection Use Period" mark*[3]

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

Meaning of Symbols

Logo	Short	Description
ABSOLUTE	ABSOLUTE linear encoder	Electronic measuring scale that provides a direct readout of ABSOLUTE linear position. No Initialization required after switching on.
DIGIMATIC	Mitutoyo's data transmission standard	Mitutoyo's original Digimatic Interface enables fast and reliable transfer of measurement data to external systems such as PCs, printers and Mitutoyo counter units.
DIGIMATIC S1	Bidirectional communication system for handheld measuring devices	Mitutoyo's original bidirectional serial communication system which enables e.g. to perform parameter setting from a PC as well as sending measurement data to a PC.
d2	Generic term for Mitutoyo Digimatic output	d2 is the generic name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.
COOLANT PROOF™	Universal term for Mitutoyo Digimatic small tools	These small tool instruments are not only resistant to dust and water ingress (rated to IP65 or better), but also to deterioration of materials due to contact with the cutting oil or coolant fluids in normal use. Note: Some types of aggressive cutting oil or coolant may degrade the sealing materials over time
IP65	Harsh environment protection level	Protection class IP65 offers protection against water jets and dust ingress (dustproof).
IP66	Harsh environment protection level	Protection class IP66 offers protection against powerful water jets and dust ingress (dustproof).
IP67	Harsh environment protection level	Protection class IP67 offers full dust and waterproofness (30 minutes, 1 m deep).
G	Harsh environment protection level	Oil proof – protection against entry of oil droplets or splashes from all directions.
U-WAVE	Wireless data transmission system	U-WAVE is Mitutoyo's proprietary wireless data transmission system which is superior to Bluetooth® in both reliability and range. It is based on IEEE802.15.4 signals in the 2.4 GHz band.
U-WAVE fit	Transmitter system for U-WAVE and Bluetooth®	With functions and performance inherited from U-WAVE-T, the compact and thinner design provides better fitting to an instrument and improved operability, which enables further improvement of efficiency. U-WAVE fit transmitters are available in a Bluetooth® version.
MeasurLink ENABLED Data Management Software by Mitutoyo	SPC software system	MeasurLink® is a measurement data management (SPC) software system based on databases (SQL server).
SMS Smart Measuring System	Smart Measuring System	An online system to monitor the operational and mechanical statuses of measuring machines. This allows you to grasp the state of a process flow from the operational status of measuring machines within a production process.
TÜVRheinland CERTIFIED	Independent confirmation of compliance	IP65, IP66 and IP67 protection level ratings for applicable Mitutoyo products have been independently confirmed by the German accreditation organization, TÜV Rheinland.
Mitutoyo guarantees the product quality. PROPRIETARY INSPECTION CERTIFICATE Mitutoyo guarantees the product quality.	Measuring instruments shipped with inspection certificate	Mitutoyo guarantees product quality as a leading precision measuring instrument manufacturer and ships measuring instruments with an inspection certificate that includes inspection data so that customers can use them with confidence. Mitutoyo also calibrates the purchased measuring instrument and issues, for a fee, a calibration certificate that proves traceability to the relevant standard. Note: For the meaning of the inspection mark shown at left, refer to the detailed description of each product.

DATA MANAGEMENT





MeasurLink® 10 Software



U-WAVE Wireless Communication System

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Bluetooth U-WAVE*fit* Wireless Communication System	A-17
U-WAVE*fit* Wireless Communication System	A-19
U-WAVE-T Wireless Communication System	A-21
U-WAVE-T Connecting Cables	A-22
Digimatic Input Tools	A-23
Digimatic Multiplexers	A-24
EC Counter (Digimatic Display Unit)	A-25
DP-1VA LOGGER Digimatic Mini-Processor	A-26

Data Management

Example of Data Management System Design

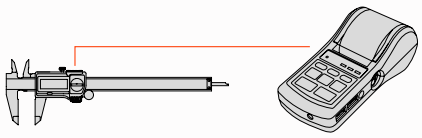
A typical example of a system for recording and analysing measurement results from various Mitutoyo measuring instruments for quality assurance purposes.

A

Implementation Step 1

Recording measurement results

Eliminate handwriting



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

DP-1VA LOGGER see page **A-26**

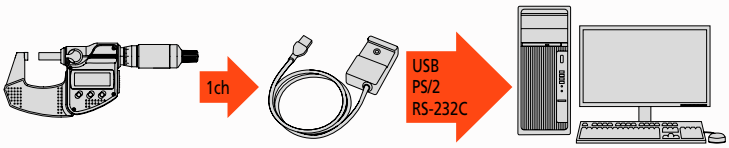
Direct data input to a PC

Connecting-cable-integrated USB-ITN.



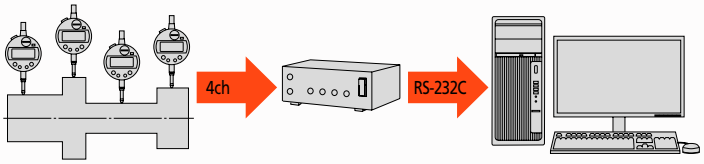
USB Input Tool Series see page **A-15**

A choice of two models with different output specifications IT-012U/IT-005D/IT-007R.



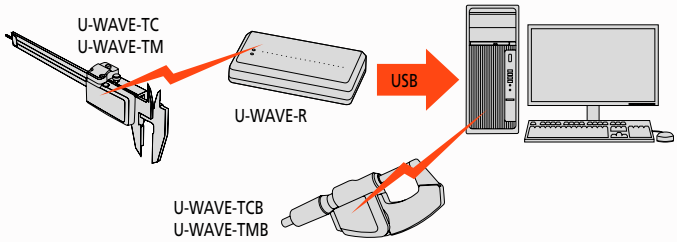
Input Tool Series see page **A-23**

Connectable to an RS-232C interface PC via a 4-channel multiplexer.



Multiplexers see page **A-24**

Wireless data input to a PC

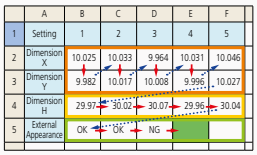


U-WAVE see page **A-17**

Implementation Step 2

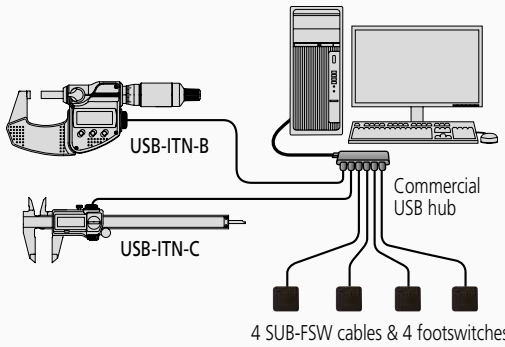
Software dedicated to inspection and quality control

Inspection certificate creation



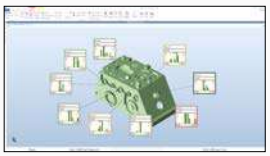
	A	B	C	D	E	F
1	Setting	1	2	3	4	5
2	Dimension X	10.025	10.033	9.964	10.031	10.046
3	Dimension Y	9.982	10.017	10.008	9.996	10.027
4	Dimension H	29.97	30.02	30.07	29.96	30.04
5	External Appearance	OK	OK	NG		

Measurement data from calipers and micrometers are imported into an Excel spreadsheet.

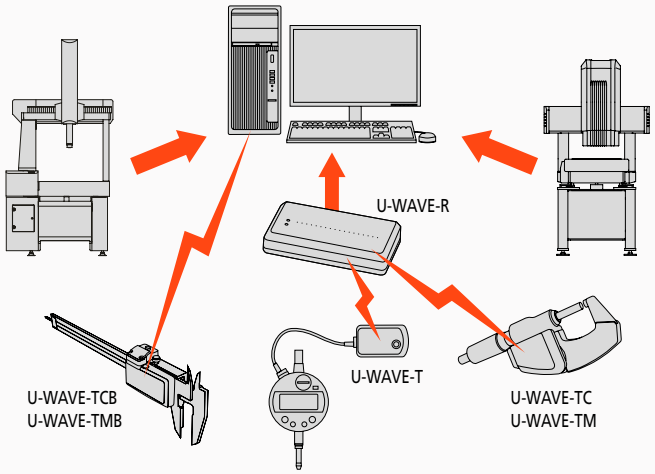


USB-ITPAK see page **A-12**

Statistical Process Control



GO/NO-GO judgement, process capability and control charts are displayed in real time.



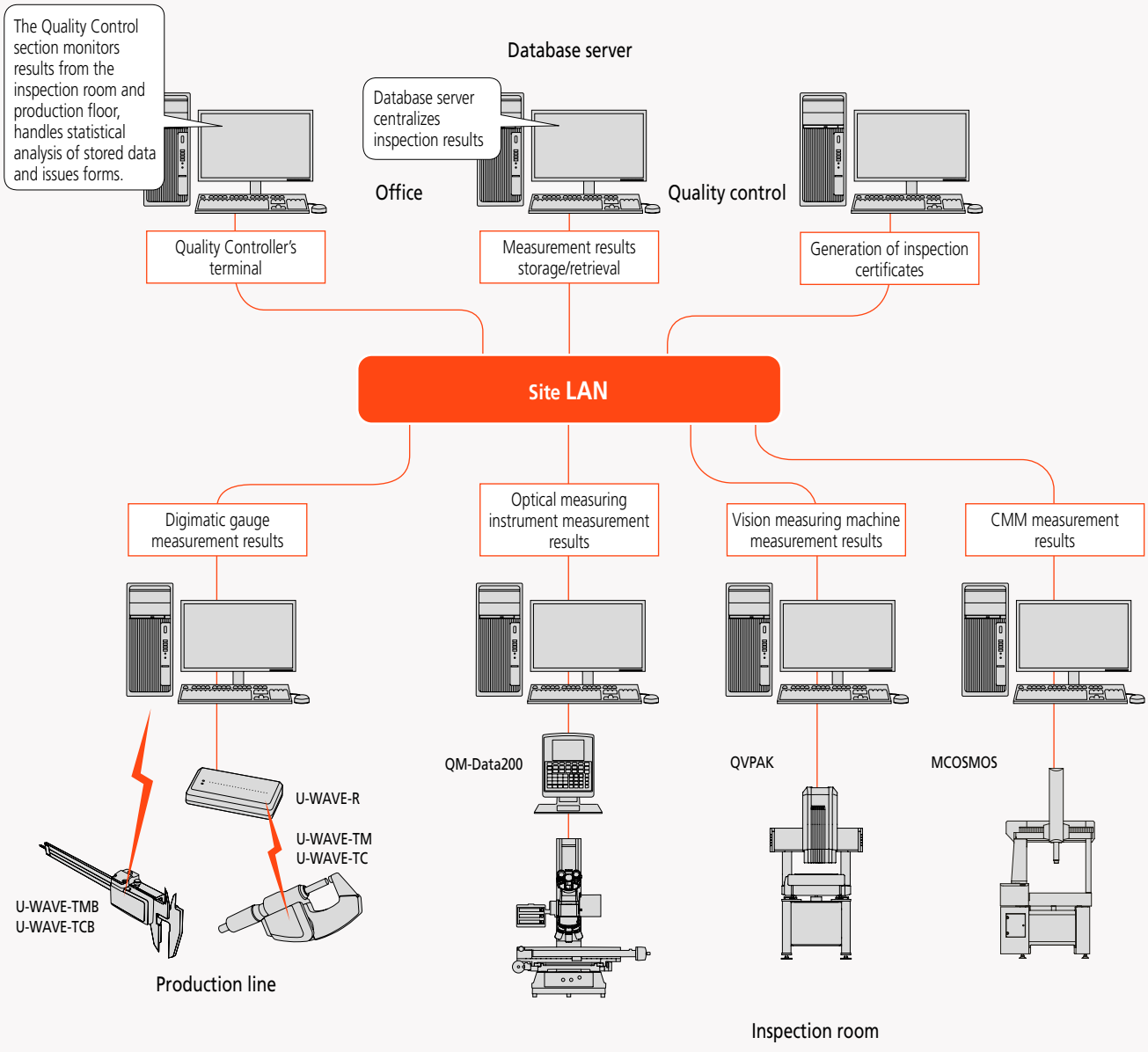
MeasurLink® see page **A-05**

Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Implementation Step 3

Creating a quality control network covering a wide area on site

Unify management of the quality control function using the network



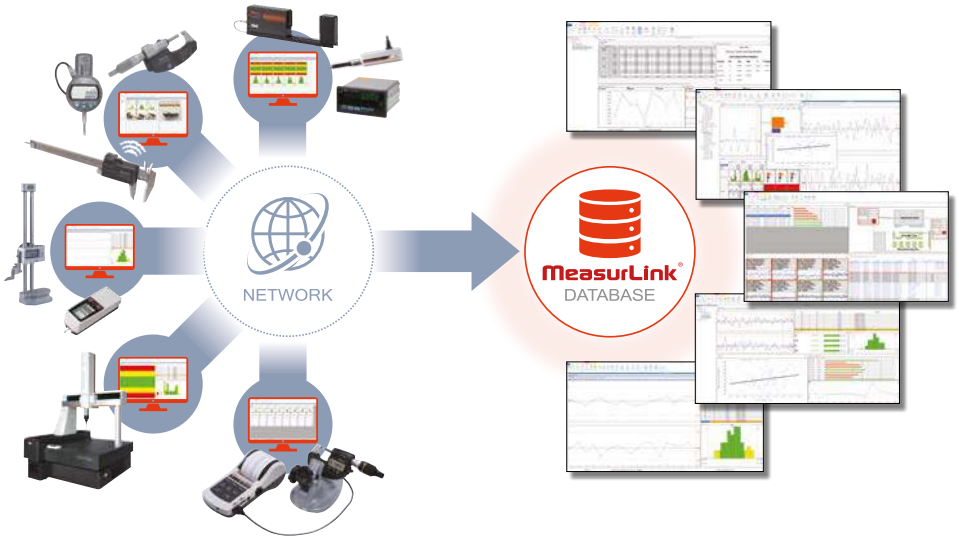
MeasurLink® see page **A-05**

Data Management

MeasurLink® 10 Software

Mitutoyo has been developing MeasurLink® and serving manufacturing quality programs for almost 30 years. It represents the design input of industry experts and thousands of manufacturers across the globe. It is quality management, inspection and analysis software built on a technology platform for the most robust performance and reliability.

MeasurLink® can serve the smallest shop to the largest multi-national enterprise with the most ease of use and power available in SPC software today. It is designed with Industry 4.0 and Smart Factory in mind and provides the scalability, extensibility and interoperability needed in today's factory.



Scalable Data Acquisition, Management & Analysis

MeasurLink® is Mitutoyo's Data Collection and Real-Time SPC software. It is used in all industries to collect and analyze data to improve the manufacturing process. MeasurLink® supports Real-Time data collection with live SPC charts to alert operators, and additional alerts, analysis tools, and reports for Quality Control and Operations.

Assemble a software package from any of the MeasurLink® modules to satisfy your organization's specific needs.

- **Real-Time Professional**
  Allows data collection from each tool and instrument while allowing real-time display of statistical processing data such as control charts, histograms and process capability indices. Additionally supports filter, Import Templates and DDE DAQ Sources.
- **Real-Time Professional 3D**
  Additionally supports view of the workpiece using 3D CAD data. (HOOPS).
- **Process Analyzer**
  A powerful supervisory tool for viewing, analyzing and reporting on all data collected at any Real-Time station on the network. Additional charting options and management friendly reports provide insight on the manufacturing process.
- **Process Manager**
  Enables centralized monitoring of information from all MeasurLink® data collection terminals networked together on the shop floor.
- **Report Scheduler**
  Automatically outputs reports created by Real-Time or Process Analyzer on a user defined schedule.
- **Gage Management**
  Plans and implements a complete calibration schedule and incorporates a powerful retrieval function in addition to recording and managing the operational state of gauges.
- **Gage R&R**
  Is an evaluation and analysis software compliant with MSA required in ISO/TS 16949.

Technical Data

Database Management System (DBMS) Requirements

MeasurLink® 10 ships with Microsoft SQL Server Express Edition 2019. This edition can be used to support a standalone or multi-machine workgroup installation. We recommend 5 licenses or fewer when using SQL Server Express).

MeasurLink® supports the following Microsoft SQL Server versions:

- Microsoft® SQL Server 2022 Standard Edition.
- Microsoft® SQL Server 2022 Enterprise Edition.
- Microsoft® SQL Server 2019 Standard Edition.
- Microsoft® SQL Server 2019 Enterprise Edition.
- Microsoft® SQL Server 2017 Standard Edition
- Microsoft® SQL Server 2017 Enterprise Edition.
- Microsoft® SQL Server 2016 Standard Edition.
- Microsoft® SQL Server 2016 Enterprise Edition.

Operating System Requirements

All MeasurLink® 10 products are supported on the following Microsoft® Windows Operating System versions:

- All Windows® 10 versions (not including Mobile and IoT versions).
- All Windows® 11 versions (not including IoT versions).
- 64-bit operating systems required.

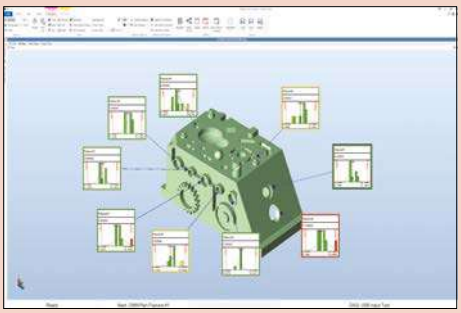
MeasurLink® 10 is not supported under Windows® 7 or 8/8.1 or any previous operating systems.

Hardware Requirements

These requirements are the minimum for the Windows OS and may not provide optimum performance. In general, the more powerful the PC, the faster the response times.

- 1 gigahertz (GHz) or faster processor.
- 8 gigabytes (GB) RAM.
- 20 GB available hard disk space.
- DirectX 9 graphics device with WDDM 1.0 or higher driver.
- DVD-ROM drive (optional) or available USB-A port for software installation.







Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances.
Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Data Management

MeasurLink® 10 Software

Features & Benefits

User Friendly
Click a gauge 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.

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

Comprehensive SPC
Easy-to-use Control Charts, Histograms, Capability, Detailed statistics, Assignable Causes, Corrective Actions, and Traceability all make this software *best in class*.

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

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

Revision History
Track specification adjustments and preserve historical data.

Data Acquisition and Input
Collects data from digital micrometers, calipers, indicators, bore gauges, etc. Keyboard entry is a snap. Collect data for one or a million parts. Begin collecting data in 60 seconds with a *Quick Run* by defining features, tolerances and input method. Flexible data input. Collect data by feature, by part or randomly. Guided sequencing minimizes inspection errors.

Mixed and Attribute 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.) Mix your dimensions and nonconformances in the same Inspection Routine. Track defects and defectives along with your dimensional data. Collect data from visual inspections (burrs, cracks, dents, missing holes, etc.) to determine the fitness of a part. Track failures using a GO/±NG 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 of them, too.

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

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.

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

Corrective 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.

Forced Assignable Cause
Force assignable cause tags on Inspector during collection if process is out of control.

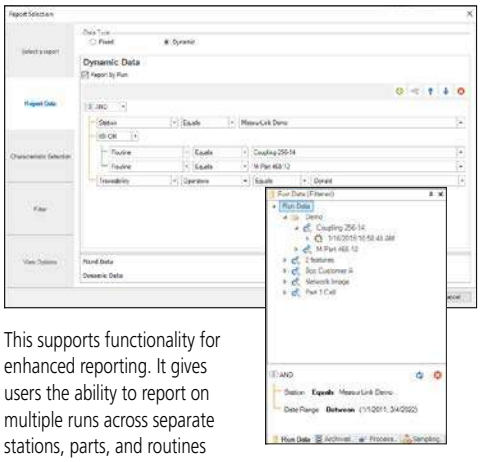
New Functions

AS9102 First Article Inspection



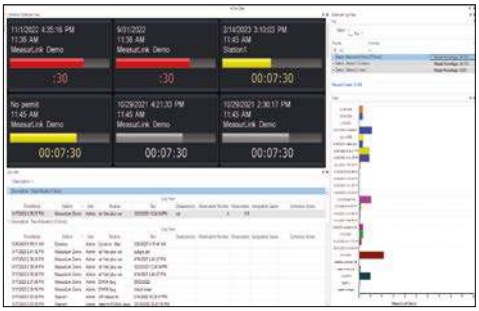
First article inspection view in Real-Time or Process Analyzer provides a clear and concise approach for completing FAI reports that align with the AS9102 requirements. This feature includes forms 1, 2, and 3 with options to export to Excel or PDF and allows users to search first article inspection information and production data in one location.

Dynamic Run Selection



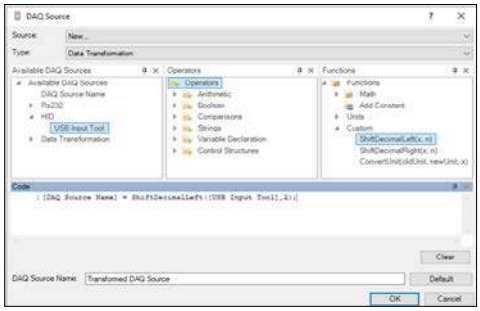
This supports functionality for enhanced reporting. It gives users the ability to report on multiple runs across separate stations, parts, and routines based on filter criteria. Output all runs matching filter criteria to a single report, or an individual report for each run.

Missed Inspection View and Metrics



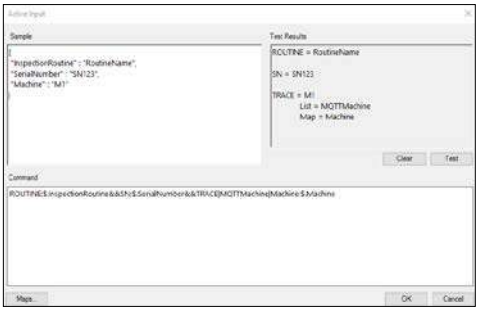
View metrics based on run, routine, station, and time for missed data collections using Process Manager.

Data Transformation



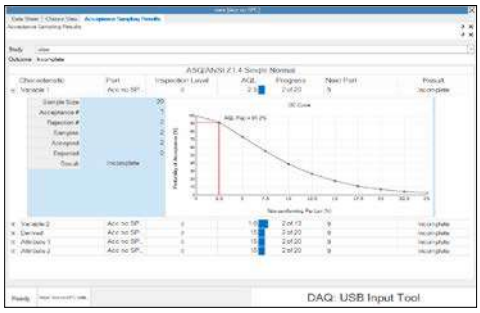
Transform data from measurement sources before storing and displaying results. This function can convert units and shift decimal points to make data collection even easier.

MQTT JSON Device



Supports machine-to-machine communication protocol for industrial automation. Similar to RS-232 devices, the measurement, traceability and serial number can be collected.

Acceptance Sampling



MeasurLink®'s Acceptance Sampling feature calculates the correct number of samples to take and will reject or accept lots based on C=0 or ANSI Z1.4 standards. Display OC Curves for risk evaluation. Export to Excel or PDF.

A

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Data Management

MeasurLink® 10 Real-Time Professional Edition



MeasurLink® 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).

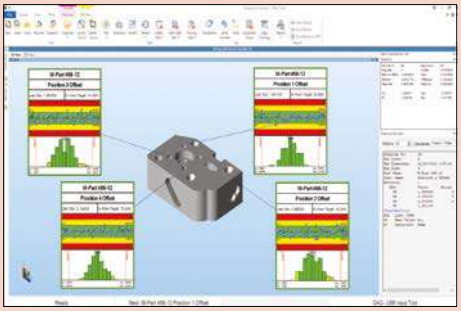
In addition to all of the features supported by MeasurLink® Real-Time Standard Edition, this application also supports data filters. Full reporting functionality with templates is also provided. Supported data sources include keyboard, RS232 and USB devices, native Mitutoyo integration (DDE) ASCII, and QMD (xml-based) file import. MeasurLink® also supports the Quality Information Framework (QIF) through the import of QIF Plans and Results and the export of QIF Results and Statistics.

- 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.
- Import Data
  When set up as a data source, import templates are readily available to the operator, or periodic imports can be executed.
- Data Filter
  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.
- Data Transfer
  Collect data into MeasurLink® from Mitutoyo capital equipment running Mitutoyo Software that is MeasurLink® enabled. This provides a tighter and more robust interface than importing data from files.

Specifications

Code No.	Description
64AAB837R	MeasurLink® 10 Real-Time Professional Edition

MeasurLink® 10 Real-Time Professional 3D Edition



MeasurLink® Real-Time Professional 3D Edition is designed for customers who wish to collect data using the Hoops 3D graphics view, in addition to all features offered by MeasurLink® 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 include keyboard, RS232, and USB devices, native Mitutoyo integration (DDE) ASCII and QMD (xml-based) file import.

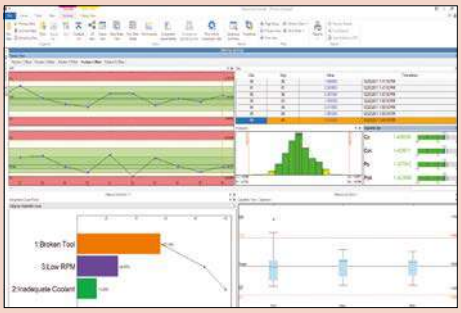
- 3D View
  True three-dimensional model support with Hoops streaming files (.HSF). Export your part's model from Catia, Solidworks or other CAD software and place callouts in the 3D space.
- Flexible Callout Design
  Callouts provide part acceptability at a glance. You can design them the same way as 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

Code No.	Description
64AAB838R	MeasurLink® 10 Real-Time Professional 3D Edition

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Data Management



MeasurLink® 10 Process Analyzer Professional Edition

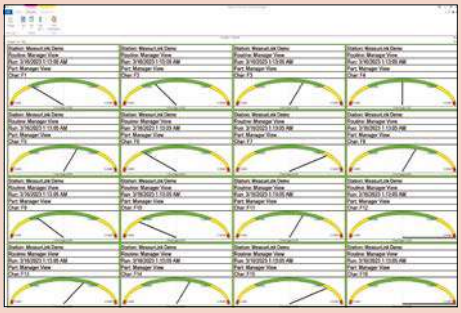
Analyze data collected on all networked Real-Time stations in one place to identify problem areas, take corrective action, and improve the quality of your product. Inspection data can be merged, filtered, charted and printed to identify long term trends and identify root causes for process improvement.

Process Analyzer Professional Edition is designed for viewing and manipulation of Real-Time data in a networked environment. It enables Quality Engineering to slice and dice data in meaningful ways that contribute to quality control initiatives.

- Review Inspection Data
  Analyze inspection data, view notes and traceability. Open data from different runs to compare the data and process behaviour.
- Crystal Reports and Custom Reporting
  Create your own customized Crystal Reports for use with Part or Run data. Build report templates with company logos and free form text. Select and position chart types to customer specification.
- Advanced Filter
  Easily filter for runs that meet your criteria. Choose your date range, Stations, Routines, failed data test, Traceability/Assignable Cause, Serial Number, note and more.
- Merge Data
  Combine lot based or just-in-time collected data to get a bigger picture of process variation and production quality. One option available for merging is to align data by serial number.

Specifications

Code No.	Description
64AAB839R	MeasurLink® 10 Process Analyzer Professional Edition



MeasurLink® 10 Process Manager Professional Edition

Monitor data as it is collected in Real-Time. Process Manager provides managers with the perfect tool to organize and maintain a shop-wide quality program at a glance. Display snapshot windows of characteristics that are currently being collected in MeasurLink® Real-Time. The data can be sorted by inspection station, capability or timestamp.

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 grid. The user can select the type of events to be monitored e.g. failed out of tolerance test.
- Plant View
  Allows users the highest level view of their shop floor processes. Callouts have a meaningful border colour related to tests for capability that have been enabled in each routine's properties. Add image of your floor plan.
- Group and Search and Sort Data
  View data by part, routine, station. Apply saved filters to data so you monitor only the data that you are responsible for. Supervisor can easily monitor the three stations in their cell.
- 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.

Specifications

Code No.	Description
64AAB840R	MeasurLink® 10 Process Manager Standard Edition

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Data Management

MeasurLink® 10 Gage R&R Standard Edition



MeasurLink® Gage R&R is a collection of techniques whose purpose is to measure the capability of a measurement system for a measurement task.

Gage R&R results provide information about a measurement system's reproducibility, repeatability, location or stability. Graphical tools allow for isolation of gauging problems including inconsistencies in technique between operators or inspectors.

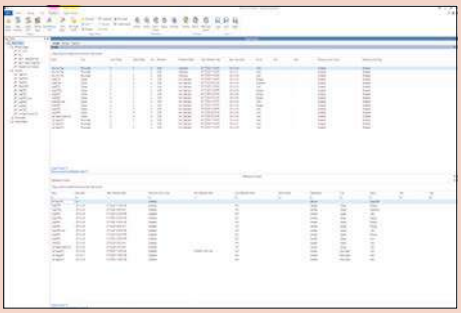
A

- Study Wizard
  User-guided study setup defines the study that needs to be performed in order to determine the measurement system's capabilities. All elements required for the selected study to be completed are captured before the study is created, and the user is prompted to provide any missing information before beginning the study.
- Direct Data Input
  Data for the study can be collected directly from a gauge connected to the system or transferred from Mitutoyo Coordinate Measuring Machines or Vision and Form Measuring Systems via native integration (DDE). Users can also key in their data.
- Organization
  All studies in the database are visible and can be organised using various criteria.
- Randomized Collection Sequence
  As recommended by the academic community, the collection sequence can be automatically randomized.

Specifications

Code No.	Description
64AAB841R	MeasurLink® 10 Gage R&R Standard Edition

MeasurLink® 10 Gage Management Edition





Gage Management provides a method for maintaining, organizing and managing information about gauges.

Information such as measurement specifications, calibration recall dates, Gage R&R dates and general event history is provided in an intuitive user interface with complete reporting abilities. Calibration procedure setup is easy and flexible.

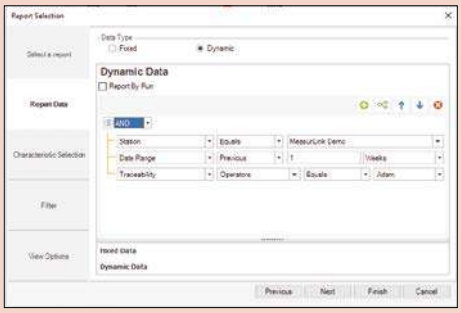
- Gauge Inventory
  Establish calibration standard and gauge inventory. Build metrology asset database. Includes vendor, tolerance, range, owner, serial number, model number, etc.
- Calibration Procedures
  Generate calibration procedures with environmental conditions, instructions, gauge block sequencing, etc.
- Calibration Recall Reports
  View calibration due date or overdue report to collect gauges. Can be filtered based on various criteria.
- R&R Recall Reports
  View Gage R&R due date or overdue report to collect gauges. Can be filtered based on various criteria.

Specifications

Code No.	Description
64AAB842R	MeasurLink® 10 Gage Management Edition

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Data Management



MeasurLink® 10 Report Scheduler

Report Scheduler is a tool that provides automated report distribution. A great time-saver for engineers, create reporting tasks that will run on a given schedule.

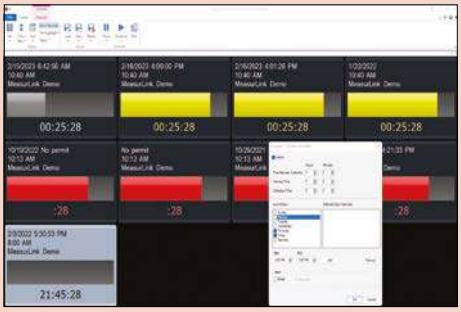
The dynamic data reporting offers advanced filtering that can report on all data collected during a specified date range. A user can select which part numbers or batches they would like to report on before the measurement data exists. When the filter criteria is satisfied, users can receive a report with their analysis automatically, drastically saving them time from manually searching for and analyzing data.

For example, a user can schedule a report to run each weekend so Monday morning there will be a report on all runs added the previous week.

- Ability to report on multiple runs across separate stations, parts, and routines based on filter criteria.
- Assign Reporting Schedule.
- Choose Report Destination.
- Supports Crystal Reports and MeasurLink® Reports.

Specifications

Code No.	Description
64AAB853R	MeasurLink® 10 Report Scheduler



MeasurLink® 10 Collection Scheduler

Keep critical measurements on track with MeasurLink® Collection Scheduler. Designed for customers that manufacture and measure on a timed measurement schedule, Collection Scheduler works in conjunction with any Real-Time edition to alert operators when the next measurement is due with a colourful Andon display and timer. The perfect tool to keep measurements on-time for operators running multiple machines or jobs, the Collection Scheduler timer will reset as soon as measurements have been taken in Real-Time.

Supervisors can receive email alerts when measurements miss their assigned schedule or simply keep an eye on the entire shop-floor schedule using Process Manager's new Collection Scheduler view.

- Colourful Andon Display
  Run tiles turn red or yellow if schedules are due or about to be due to help operators easily recognize when measurements need to occur.
- Customized Schedules
  Set schedules for each day or shift to suit organizational needs.
- Auto-Switch Between Modules
  Select the run due for measurement and automatically launch it in Real-Time. Suspend the run and automatically return to Collection Scheduler for easy operation.
- Customizable Layout
  Set the size and layout of the run tiles to make easy identification when managing multiple runs.

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Mitutoyo

Data Management

MeasurLink® 10 Defect Analytics for Power BI

Unlock advanced data insights from your existing MeasurLink® data. With Power BI, these insights become interactive, visual, and easily shareable across your organization, transforming complex data into meaningful narratives.

Customizable dashboards offer a real-time overview of your operations, enabling you to quickly identify trends, pinpoint issues, and make data-backed decisions faster than ever before.

You can leverage the integrated system's full capabilities on any device, providing unprecedented flexibility and responsiveness. Imagine the benefits this powerful synergy could bring to your organization – increased operational efficiency, improved product quality, and enhanced competitive advantage.





Quality Dashboard Benefits

- Identify locations of quality problems in a manufacturing plant.
- Identify parts with quality problems.
- Identify characteristics with quality problems.
- Inspection count activity.
- Defect count and percentages.
- Identify time series of quality improvement:
  – month over month
  – week over week
  – day over day

Power BI Defect Analysis

- Microsoft Power BI report..
- Data model from MeasurLink DB.
- Visuals for inspection count and defects.
- Multi-page.
- Summary and overview.
- Time over time.
- Drill through ability.
- Filters (dimensions) for:
  – station
  – part
  – routine
  – characteristic
  – date range

MeasurLink Data Model

- Star schema built around Inspection Run Data.
- Characteristic Tolerance and Actual used for determining defects.
- DAX expressions used to preprocess extracted data..
- Data model intended to be refreshed periodically (e.g., daily) – scheduled in Power BI service.
- Web publishing and viewing requires Microsoft Power BI subscription (not provided with purchase of report).

Specifications

Code No.	Description
64AAB857R	MeasurLink® Power BI Report

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Data Management

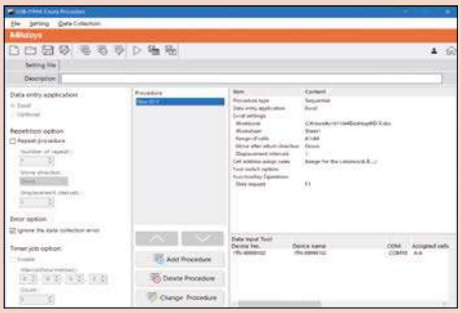
USB-ITPAK V3.0 Measurement Data Collection Software

- USB-ITPAK is a setting and data collection program for collecting data from measuring instruments with Digimatic output for entry to Microsoft® Excel®. A free version with basic features is available for download from our website. Purchasing the licensing dongle opens up all the features of USB-ITPAK.
- A USB Direct Input Tool, U-WAVE Wireless communication system and USB Footswitch adapter can be used to send the data to a Microsoft® Excel® worksheet.
- For instruments accepting the S1 type cable two way communication is possible. This allows for remote zeroing and presetting of the gauge.

Technical Data

Supported communication standard:	Digimatic d1/d2, Digimatic S1
OS compatibility:	Windows® 10 Pro/Enterprise (64-bit only)
Functions:	Sequential measurement, batch measurement, individual measurement, simple measurement, measuring instrument setting*, measurement history*, device information*, data input into Microsoft® Excel® (2010 or later), text data input using a virtual keyboard

* For instruments using the S1 type connection.

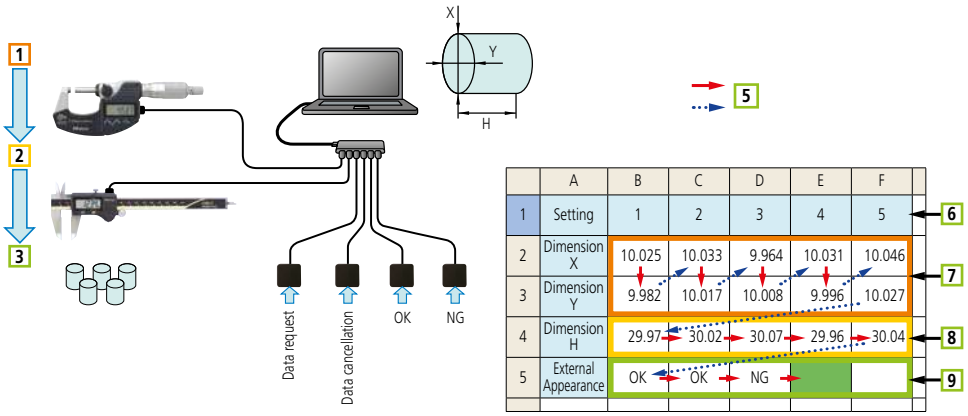




USB licensing dongle

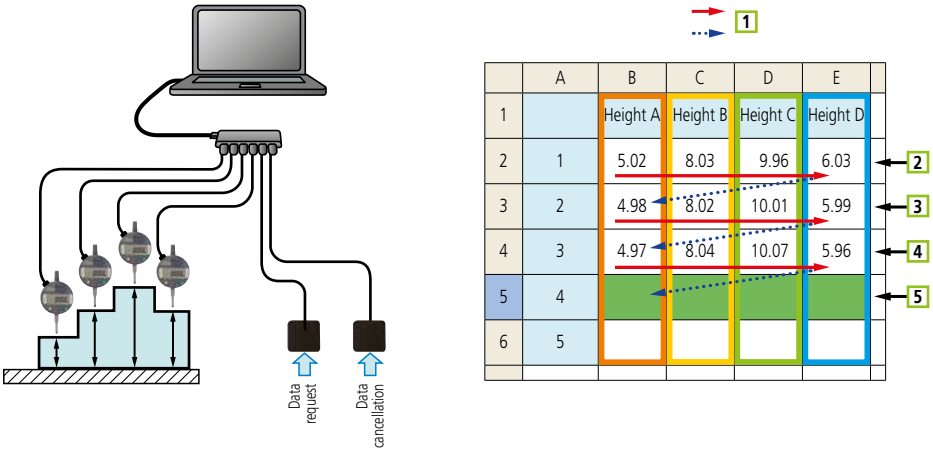
Specifications

Code No.	Description	Price
06AGR543	Dongle license for USB ITPAK V3 (D/L software from Mitutoyo)	£301.00



Sequential Measurement

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



Simultaneous Measurement

1: Measurement direction; **2**: First measurement: press footswitch once = 4 complete data batches; **3**: Second measurement: press footswitch once = 4 complete data batches; **4**: Third measurement: press footswitch once = 4 complete data batches; **5**: Is waiting for the next batch measurement

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Mitutoyo

Data Management

Digimatic Signal Cables

- These cables are used to connect Mitutoyo measuring instruments that feature a Digimatic interface.
- Mitutoyo's Digimatic interface not only allows connection of numerous additional devices such as printers, counters and the like, but also enables connection of one or more Digimatic measuring instruments to a PC by using a Mitutoyo transmitter, RS-232C input tool, multiplexer, USB input tool or USB input tool direct.
- Contact Mitutoyo's Sales Desk for more information.



05CZA662



06AGL011



06AGL021

Technical Data

Digimatic measuring instruments require one of the following for initiating data transmission:

1. Footswitch
2. Data pushbutton on the instrument (if present)
3. Data request from the PC
4. Signal cables with data pushbutton (if connectable to the measuring instrument)

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Digimatic Signal Cables

Type


Type A.


Type B.


Type C.


Type CR.


Type D.


Type E.


Type F.


Type G.


Type H.


Type I.


Type J.

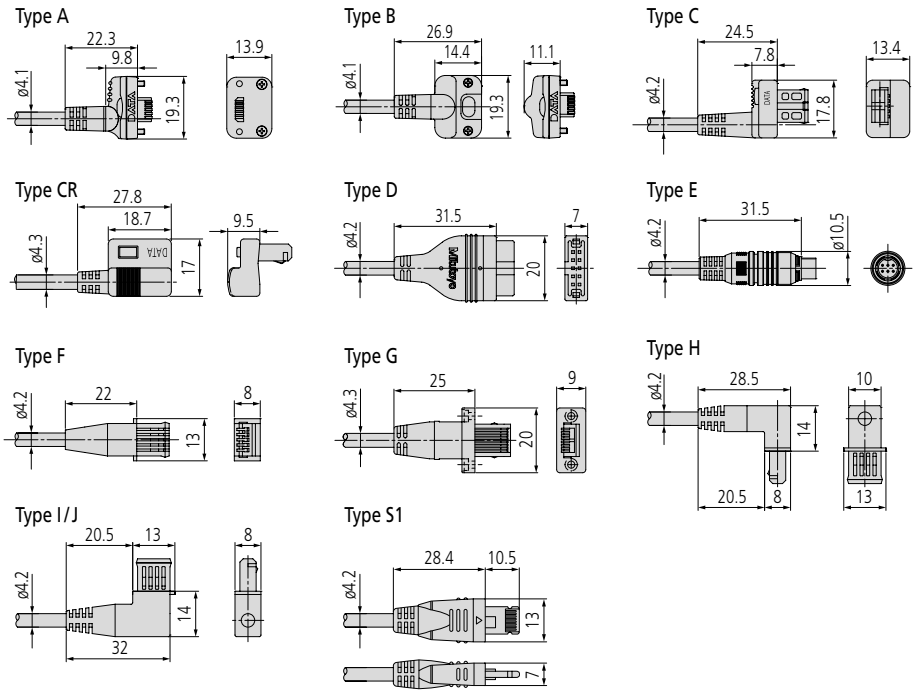

Type S1

Specifications

Code No.	Type	Water/dust -proof	Description	Length	Price
05CZA624	A	✓	Digimatic Signal Cable straight with data pushbutton and screws e.g. for IP67 ABSOLUTE Digimatic Caliper	1 m	£85.60
05CZA625				2 m	£104.00
05CZA662	B	✓	Digimatic Signal Cable rear mounting with data pushbutton e.g. for IP65 Digimatic Micrometer	1 m	£85.60
05CZA663				2 m	£104.00
959149	C	—	Digimatic Signal Cable straight with data pushbutton e.g. for Standard ABSOLUTE Digimatic Caliper	1 m	£44.10
959150				2 m	£50.30
04AZB512	CR	—	Digimatic Signal Cable L-type with data pushbutton e.g. for Digimatic Interchangeable Anvil Micrometer	1 m	£83.00
04AZB513				2 m	£88.60
936937	D	—	Digimatic Signal Cable with identical connectors on both ends e.g. for ID-H Digimatic Indicator	1 m	£42.00
965014				2 m	£61.60
937387	E	—	Digimatic Signal Cable round 6 pin e.g. for ABSOLUTE Digimatic Micrometers	1 m	£48.40
965013				2 m	£61.60
905338	F	—	Digimatic Signal Cable straight e.g. for ID-C Indicator	1 m	£42.00
905409				2 m	£47.10
21EAA194	G	✓	Digimatic Signal Cable straight e.g. for ID-N Indicator	1 m	£58.60
21EAA190				2 m	£66.00
21EAA210			Digimatic Signal Cable straight with zero-setting terminal e.g. for ID-N Indicator	1 m	£153.00
21EAA211				2 m	£170.00
905689	H	—	Digimatic Signal Cable rear mounting e.g. for ID-C Indicator	1 m	£42.00
905690				2 m	£57.80
905691	I	—	Digimatic Signal Cable right side e.g. for ID-C Indicator	1 m	£42.00
905692				2 m	£57.80
905693	J	—	Digimatic Signal Cable left side e.g. for ID-C Indicator	1 m	£42.00
905694				2 m	£57.80
06AGL011	S1	✓	Digimatic Cable for S1 equipped devices	1 m	£47.60
06AGL021				2 m	£51.20

Dimensions

Unit: mm



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Data Management

USB Input Tool Direct (Digimatic USB Cable)

- This input tool allows you to directly connect Digimatic measuring devices to a USB interface, without needing additional software.
- Measurement data is converted into keyboard codes, enabling interaction with any program working with keyboard entries.
- You can also connect to a USB with fixed COM assignment in Microsoft® Windows® as channel identification (VCP).
- The USB-ITPAK software lets you easily create Microsoft® Excel® worksheets.
- Multi-channel input for measurement values, Microsoft® Excel®.
- Cables can be cascaded via a standard USB hub.



06AGQ001F

Technical Data

Output:	USB (HID/VCP)
OS compatibility:	Windows® 7/8/10 (32-bit, 64-bit)
Max. connectable devices:	20 devices

Optional Accessories

Code No.	Description	Price
937179T	Footswitch	**£57.90**
06ADV384	Footswitch adapter	**£134.00**
06AGR543	Dongle license for USB ITPAK V3 (D/L software from Mitutoyo)	**£301.00**

Advantages of the Digimatic USB Connections

Application	Situation	Software USB-ITPAK	Data format	Remarks
Arbitrary software which expects a keyboard code	Only a USB Input tools signal cable required	Software is not needed.	Measured value as keyboard format (HID = Human Interface Device)	Footswitch cannot be connected
Commercial statistics software, such as Mitutoyo's MeasurLink®	A USB input tools signal cable and the software USB ITPAK are required	For each measuring instrument (cable) a fixed assigned virtual COM-Port is generated once; afterwards Software USB ITPAK becomes inactive.	MUX-10 Specification (e.g. 01A+138.626) with fixed COM assignment as channel identification	—
Arbitrary software, which expects a keyboard code, e.g. Word, txt-format	—	- Connected measuring instruments and footswitches are selected and assigned. - Terminator is determined. - Procedure is registered as a part program	Transmission of a measured value in text format (VCP = as virtual COM port)	—
Microsoft® Excel®	—	- Connected measuring instruments and footswitches are selected and assigned. - Performs organization of the Microsoft® Excel®-table, i.e. the transferred measured values are written into the predefined cells	Measuring report Microsoft® Excel®-format and character sequence of max. 31 characters (e.g. text input)	—

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Data Management

USB Input Tool Direct (Digimatic USB Cable)

Type


Type A.


Type B.


Type C.


Type D.


Type E.


Type F.


Type G.

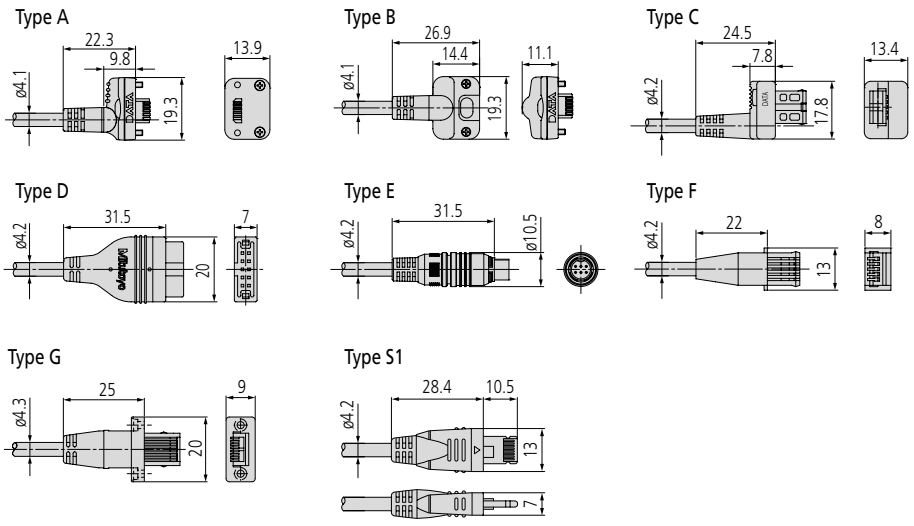

Type S1

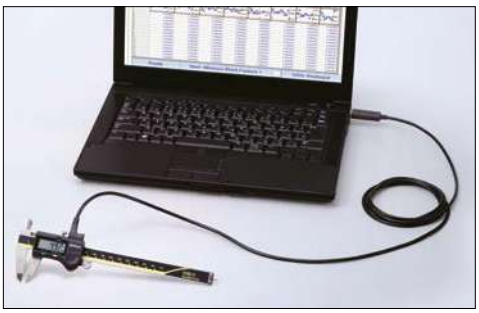
Specifications

Code No.	Type	Water/dust -proof	Description	Price
06AFM380A	A	✓	USB Input Tool Direct Cable straight with data pushbutton (2 m) e.g. for IP67 ABSOLUTE Digimatic Caliper	**£158.00**
06AFM380B	B	✓	USB Input Tool Direct Cable rear mounting with data pushbutton (2 m) e.g. for IP65 Digimatic Micrometer	**£158.00**
06AFM380C	C	—	USB Input Tool Direct Cable straight with data pushbutton (2 m) e.g. for Standard ABSOLUTE Digimatic Caliper	**£143.00**
06AFM380D	D	—	USB Input Tool Direct Cable plain (2 m) e.g. for ID-H Indicator	**£143.00**
06AFM380E	E	—	USB Input Tool Direct Cable round (2 m) e.g. for Quick Micrometer	**£143.00**
06AFM380F	F	—	USB Input Tool Direct Cable straight (2 m) e.g. for ID-C Indicator	**£143.00**
06AFM380G	G	✓	USB Input Tool Direct Cable ID-N/ID-B (2 m)	**£143.00**
06AGQ001F	S1	✓	USB Input Tool Direct Cable straight (1 m)	**£132.00**

Dimensions

Unit: mm





ABSOLUTE Digimatic Caliper connected to a PC with a **06AFM380C** cable.

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Mitutoyo

Data Management

Bluetooth U-WAVE *fit* Wireless Communication System

- With functions and performance inherited from U-WAVE-T, the compact and thinner design provides better fitting to an instrument and improved operability, which enables further improvement of efficiency.
- Bluetooth® communication allows for wireless transmission of measurement data from digimatic micrometers and calipers to PCs, smartphones, tablets and other such terminals if they are equipped with Bluetooth® wireless technology.
- Bluetooth® communication not only allows cost reduction, as it does not require the conventional dedicated receiver unit (U-WAVE-R), but it also improves operability.
- **U-WAVEPAK-BM** (free), the measurement support application software for smartphones is available for download from app stores (Google Play®, Apple Store®).
- **U-WAVEPAK-BW** (free), the communication software for transferring measurement data to optional computer software (**USB-ITPAK**, **MeasurLink®**) is available for download from our company's website.
- Data can be input by single button operation. Since there is no need for manual input misinput does not occur. Efficiency is greatly improved!
- 16 metre communication distance (line of sight).
- Data transfer is confirmed by the transmitter through a buzzer or LED.
- An IP67-rated transmitter is available.









Measurement Navigation Application Mitutoyo U-WAVE Navi

- Wireless communication with Mitutoyo Bluetooth® U-WAVE responds to a wide range of measurement needs of users implementing data management.
- A new application tool to further widen the appeal of Mitutoyo Bluetooth® U-WAVE is now available. It allows for entering measurement locations, measuring methods, precautions, etc. to work procedures.
- By allowing the insertion of image files into procedures, it enables anyone to measure in the same way and correctly.
- Since it also allows for entering the inspectors' names, it can be used to keep records of "when, where, who" performed the measurement.
- Workpiece information, procedures, as well as measurement results can be managed on the application.
- It can also output data in CSV format.
- **Mitutoyo U-WAVE Navi** is available for free download from Google Play®.

Software Specifications

Software	Mitutoyo U-WAVE Navi	U-WAVEPAK-BM
Purpose	Using the application, create a measurement procedure, display and navigate the measurement, and manage the measurement results	Measure a workpiece continuously to perform a simple trend management
Possible actions (functions)	Create/perform a measurement procedure (including GO/NG judgement), navigate a measurement procedure, manage/transfer a measurement procedure, display a list of measurement results, transfer a measurement result	Judgement, data logging, graphical display of measurement result, display the histogram of measurement results, transfer a measurement result (log data)
Compatible OS	Android 7.0 or later (iOS not supported)	Android 7.0 or later / iOS 10.0 or later

Technical Data

Wireless communication protocol:	IEEE 802.15.4
Modulation method:	DS-SS (Direct Sequence Spread Spectrum)
Communication	
Distance:	Approx. 20 m line of sight
Speed:	250 kbps
Frequency:	2.4 GHz (ISM: universal frequency band)
User band:	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz)

Consumable Spare

Code No.	Description	Price
05SAA217	Lithium battery CR-2032	£4.80



U-WAVE-TMB transmitter fitted to a Digimatic micrometer.



U-WAVE-TCB transmitter fitted to a Digimatic caliper.



U-WAVE-TMB transmitter fitted to a ID-C NX Digimatic indicator.

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Data Management

Bluetooth U-WAVE *fit* Wireless Communication System



264-627 transmitter with **02AZF310** connecting unit



264-625 transmitter with **02AZF300** connecting unit

Compatibility of Measuring Tool and Unit

Digimatic gauge	Type	U-WAVE *fit* Bluetooth Connecting unit	U-WAVE *fit* Bluetooth Transmitter	Assembled appearance
Micrometer	Standard	**02AZF310**	**U-WAVE-TMB** (buzzer type) **264-627**	
	Water/dust -proof		**U-WAVE-TMB** (IP67 type) **264-626**	
QuantuMike	Standard	**02AZF960**	**U-WAVE-TMB** (buzzer type) **264-627**	
	Water/dust -proof		**U-WAVE-TMB** (IP67 type) **264-626**	
Caliper	Standard	**02AZF300**	**U-WAVE-TCB** (buzzer type) **264-625**	
	Water/dust -proof	**02AZF310**	**U-WAVE-TCB** (IP67 type) **264-624**	
ID-C NX indicator (12.7 mm model only)	Standard	**02AZF700**	**U-WAVE-TMB** (buzzer type) **264-627**	
	Water/dust -proof		**U-WAVE-TMB** (IP67 type) **264-626**	

Specifications for U-WAVE *fit* Transmitter

Code No.	**264-624**	**264-625**	**264-626**	**264-627**
Protection rating	IP67	—	IP67	—
Compatible measuring tool	IP67 caliper*1	Standard caliper*1	IP65 micrometer, ID-C NX indicator*2	Standard micrometer, ID-C NX indicator*2
Data reception indication	LED	LED and buzzer	LED	LED and buzzer
Power supply	Battery CR2032			
Battery life	Approx. 400,000 transmissions			
Dimensions (W x D x H)	41.9 x 12.9 x 38.8 mm		56 x 11.45 x 30.4 mm	
Mass	18 g			
Price	**£242.00**	**£242.00**	**£242.00**	**£242.00**

*1 Compatible measuring ranges 0-150 mm, 0-200 mm, 0-300 mm.
*1 Compatible with 12.7 mm model only.

Specifications for U-WAVE *fit* Connection Unit

Code No.	**02AZF300**	**02AZF310**	**02AZF700**	**02AZF960**
Protection rating	—	IP67	—	IP67
Compatible transmitter	264-625	264-624/626/627	264-626/627	264-626/627
Mass	6 g		10 g	6 g
Price	**£77.30**	**£77.30**	**£77.30**	**£50.40**

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Data Management

U-WAVE *fit* Wireless Communication System

- With functions and performance inherited from U-WAVE-T, the compact and thinner design provides better fitting to an instrument and improved operability, which enables further improvement of efficiency.
- At the press of a button or footswitch this wireless communication system transfers data directly from a Digimatic measuring instrument to a PC, thus avoiding the need for long cable runs.
- 20 metre communication distance (line of sight).
- Allows easy data export straight to Microsoft® Excel® or other applications, using the bundled data interface software.
- Data transfer is confirmed by the transmitter through a buzzer or LED.
- An IP67-rated transmitter (without buzzer) is available.
- Up to 400,000 data transmissions with a single battery.
- Mitutoyo's optional USB-ITPAK V2.1 software supports U-WAVE. Writing measurement data for each connected instrument into separate predefined cell ranges within Excel® is now possible. It is also possible to set up timed data collection for connected gauges.

U-WAVE *fit* d2

U-WAVE-TM



U-WAVE-TC



02AZF310



02AZF700

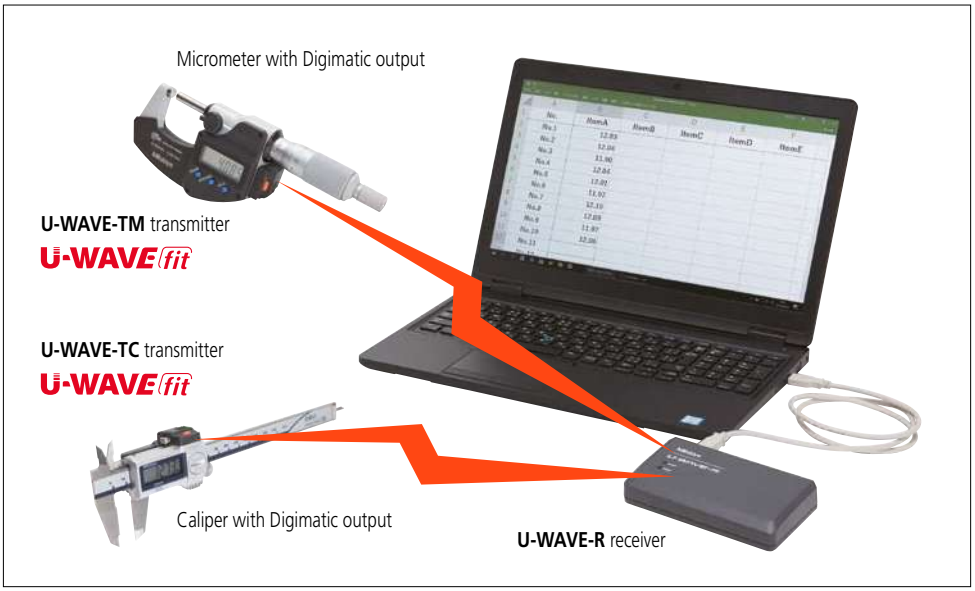


02AZF300



02AZF960





Technical Data

Wireless communication protocol:	IEEE 802.15.4
Modulation method:	DS-SS (Direct Sequence Spread Spectrum)
Communication	
Distance:	Approx. 20 m line of sight
Speed:	250 kbps
Frequency:	2.4 GHz (ISM: universal frequency band)
User band:	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz)

Consumable Spare

Code No.	Description	Price
05SAA217	Lithium battery CR-2032	£4.80



U-WAVE-TM transmitter fitted to a Digimatic micrometer.



U-WAVE-TC transmitter fitted to a Digimatic caliper.



U-WAVE-TM transmitter fitted to a ID-C NX Digimatic indicator.

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Data Management

U-WAVE *fit* Wireless Communication System

Compatibility of Measuring Tool and Unit

Digimatic gauge	Type	U-WAVE *fit* Connecting unit	U-WAVE *fit* Transmitter	Assembled appearance (front/back)
Micrometer	Standard	**02AZF310**	**U-WAVE-TM** (buzzer type) **264-623**	
	Water/dust -proof		**U-WAVE-TM** (IP67 type) **264-622**	
QuantuMike	Standard	**02AZF960**	**U-WAVE-TM** (buzzer type) **264-623**	
	Water/dust -proof		**U-WAVE-TM** (IP67 type) **264-622**	
Caliper	Standard	**02AZF300**	**U-WAVE-TC** (buzzer type) **264-621**	
	Water/dust -proof	**02AZF310**	**U-WAVE-TC** (IP67 type) **264-620**	
ID-C NX Indicator (12.7 mm model only)	Standard	**02AZF700**	**U-WAVE-TM** (buzzer type) **264-623**	
	Water/dust -proof		**U-WAVE-TM** (IP67 type) **264-622**	

Specifications for U-WAVE *fit* Transmitter

Code No.	**264-620**	**264-621**	**264-622**	**264-623**
Protection rating	IP67	—	IP67	—
Compatible measuring tool	IP67 caliper*[1]	Standard caliper*[1]	IP65 micrometer, ID-C NX indicator*[2]	Standard micrometer, ID-C NX indicator*[2]
Data reception indication	LED	LED and buzzer	LED	LED and buzzer
Power supply	Battery CR2032			
Battery life	Approx. 400,000 transmissions			
Dimensions (W x D x H)	41.9 x 12.9 x 38.8 mm		56 x 11.45 x 30.4 mm	
Mass	18 g			
Price	**£242.00**	**£242.00**	**£242.00**	**£242.00**

*[1] Compatible measuring ranges 0-150 mm, 0-200 mm, 0-300 mm.
*[1] Compatible with 12.7 mm model only.

Specifications for U-WAVE *fit* Connection Unit

Code No.	**02AZF300**	**02AZF310**	**02AZF700**	**02AZF960**
Protection rating	—	IP67	—	IP67
Compatible transmitter	264-621	264-620/622/623	264-622/623	264-622/623
Mass	6 g		10 g	6 g
Price	**£77.30**	**£77.30**	**£77.30**	**£50.40**

Specifications for U-WAVE-R Receiver

Code No.	**02AZD810D**
Items included	U-WAVE-R + software
Software	U-WAVEPAK
Number of U-WAVE-R units that can be connected to a PC	Up to 16
Number of U-WAVE *fit* units that can be connected	Up to 100
USB cable length	1 m
Power supply	USB bus power system
Dimensions (W x D x H)	140 x 80 x 31.6 mm
Mass	130 g
Price	**£401.00**

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Data Management

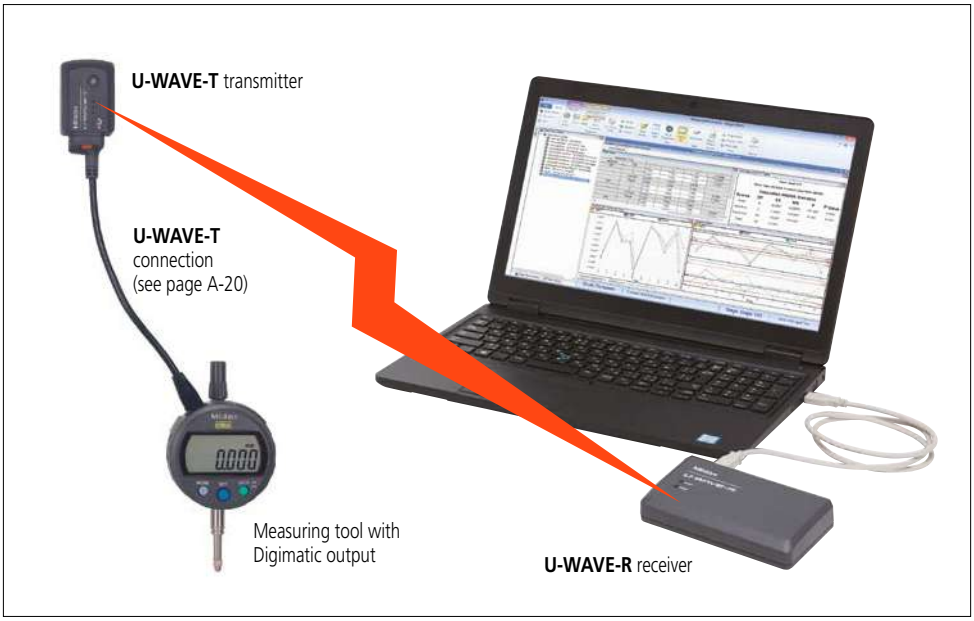
U-WAVE-T Wireless Communication System

- This wireless communication system transfers data directly from a Digimatic measuring instrument to a PC, thus avoiding the need for long cable runs.
- 20 metre communication distance (line of sight).
- Allows easy data export straight to Microsoft® Excel® or other applications, using the bundled data interface software.
- Data transfer is confirmed by the transmitter through a buzzer or LED.
- An IP67-rated transmitter is available.
- Up to 400,000 data transmissions with a single battery.

U-WAVE d2



U-WAVE-T



Specifications for U-WAVE-T Transmitter

Code No.	02AZD730G	02AZD880G
Protection rating	IP67	—
Data reception indication	LED	LED and buzzer
Power supply	Battery CR2032	
Battery life	400,000 transmissions	
Dimensions (W x D x H)	44 x 29.6 x 18.5 mm	
Mass	23 g	
U-WAVE cable included*	✓	✓
Price	**£242.00**	**£242.00**

* Required cable type needs to be specified at time of purchase.

Specifications for U-WAVE-R Receiver

Code No.	02AZD810D
Items included	U-WAVE-R + software
Software	U-WAVEPAK
Number of U-WAVE-R units that can be connected to a PC	Up to 16
Number of U-WAVE-T units that can be connected	Up to 100
USB cable length	1 m
Power supply	USB bus power system
Dimensions (W x D x H)	140 x 80 x 31.6 mm
Mass	130 g
Price	**£401.00**

Technical Data

Wireless communication protocol:	IEEE 802.15.4
Modulation method:	DS-SS (Direct Sequence Spread Spectrum)
Communication	
Distance:	Approx. 20 m line of sight
Speed:	250 kbps
Frequency:	2.4 GHz (ISM: universal frequency band)
User band:	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz)
OS compatibility:	Windows® 7/8/10 (32-bit, 64-bit)

Standard Accessory for U-WAVE-T

Supplied with a U-WAVE connection (required type needs to be specified at time of purchase).

Optional Accessories

Code No.	Description	Price
937179T	Footswitch	**£57.90**
02AZE200	Holder for U-WAVE-T. Contents: support plate, fixing pads, screws	**£26.70**







Consumable Spare

Code No.	Description	Price
05SAA217	Lithium battery CR-2032	**£4.80**

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Data Management

U-WAVE-T Connecting Cables

- This is a short cable that connects a measuring tool to its U-WAVE-T unit. Choose the appropriate cable for your measuring tool from the eight types below, A to S1.



Digimatic Indicator ID-C NX with **02AZG011** cable.



QM-Height Gauge with **02AZD790D** cable.



ABSOLUTE Digimatic Indicator ID-N with **02AZD790G** cable.



Digimatic Micrometer Head with **02AZD790C** cable.



ABSOLUTE Digimatic Indicator ID-CX with **02AZD790F** cable (footswitch optional accessory).

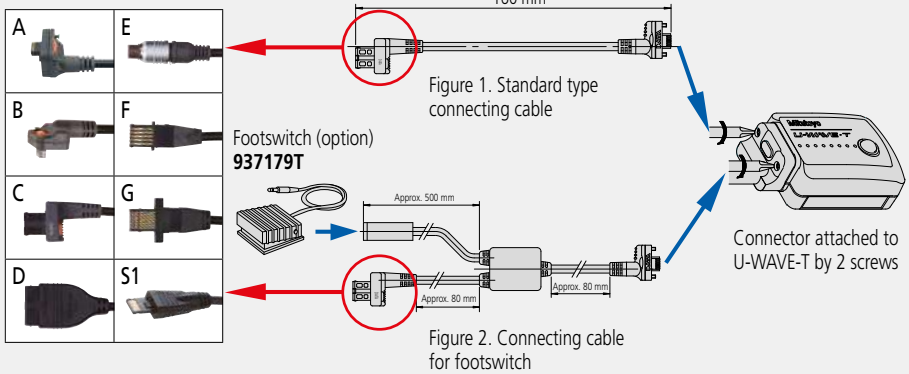


02AZG011

Specifications

Code No.	Type	Water/dust -proof	Description	Price
Without footswitch connection				
02AZD790A	A	✓	Data cable, straight with pushbutton	**£77.30**
02AZD790B	B	✓	Data cable, rear mounting with pushbutton	**£77.30**
02AZD790C	C	—	Data cable, straight with pushbutton	**£77.30**
02AZD790D	D	—	Data cable, plain	**£77.30**
02AZD790E	E	—	Data cable, round	**£77.30**
02AZD790F	F	—	Data cable, straight	**£77.30**
02AZD790G	G	✓	Data cable, straight	**£77.30**
02AZG011	S1	—	Data cable, straight with pushbutton	**£89.00**
With footswitch connection				
02AZE140A	A	✓	Data cable, straight with pushbutton	**£179.00**
02AZE140B	B	✓	Data cable, rear mounting with pushbutton	**£179.00**
02AZE140C	C	—	Data cable, straight with pushbutton	**£160.00**
02AZE140D	D	—	Data cable, plain	**£160.00**
02AZE140E	E	—	Data cable, round	**£160.00**
02AZE140F	F	—	Data cable, straight	**£160.00**
02AZE140G	G	✓	Data cable, straight	**£160.00**
02AZG021	S1	—	Data cable, straight with pushbutton	**£203.00**

7 types of connector



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Mitutoyo

Data Management

SERIES 264 – Digimatic Input Tools

- An input tool is an interface enabling you to easily input measurement data from a Mitutoyo gauge, equipped with the Digimatic output feature, to your PC. USB and RS-232C compatible types are available.
- This USB input tool is a keyboard Interface for transmitting data from measuring instruments equipped with Digimatic interfaces to a PC. Measurement data is converted into keyboard codes, allowing easy transfer to any program working with keyboard entries, regardless of the operating system. The USB and data conversation interfaces also allow you to directly input measurement data into a spreadsheet.
- The RS-232C communication type IT-007R allows serial communication control with a PC (data request command from PC).

d2



264-020



264-007

Technical Data

Cable length: 0.9 m
Dimensions (W x D x H): 72 x 44 x 23.5 mm
OS compatibility: Windows® 7/8/10 (32-bit, 64-bit)

Optional Accessory

Code No.	Description	Price
937179T	Footswitch	£57.90





Specifications

Code No.	Data input	Data output	Output decimal mark	Footswitch connector	Power supply	Price
264-020	1 x Digimatic	USB keyboard signal (HID)	Point	Yes	5V from USB cable	£273.00
264-007		RS-232C			12V from PC bus	£397.00

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Data Management

SERIES 264 – Digimatic Multiplexers

- Digimatic Multiplexers are used to concentrate streams of measurement data from several instruments into a single stream feeding into a dedicated processor or PC for storage and processing.
- Models are available for handling 4 or 8 inputs (it is possible to obtain more inputs by linking multiple units together).
- Supplied with RS-232C and USB cables.

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

Optional Accessory

Code No.	Description	Price
937179T	Footswitch	£57.90





64AAB639UK





64AAB640UK

Specifications

Code No.	Type	Data output	Number of input channels	Price
64AAB637UK	MIG-1USB	USB	1	£412.00
64AAB638UK	MIG-2USB	RS-232C and USB	2	£694.00
64AAB639UK	MIG-4USB		4	£1,020.00
64AAB640UK	MIG-8USB		8	£1,510.00

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Data Management

SERIES 542 – EC Counter, Low-Cost Modular Display Unit

- A Display Unit of the single-function type for connection to Digimatic measuring instruments.
- Employs DIN size (96 x 48 mm) panel-mount configuration to facilitate system integration.
- Able to produce tolerance judgement and Digimatic measurement data output.

A



542-007E



Technical Data

Functions:	Preset, GO/±NG judgement
Output (selectable)	
Tolerance judgement:	-NG, OK, +NG (open collector)
Data:	Digimatic code
External control signal input:	Preset, data hold
Power supply:	Via AC adapter

Optional Accessories

Code No.	Description	Price
214938	DC plug PJ-2	**£6.10**
C162-155	I/O cable	**£57.50**

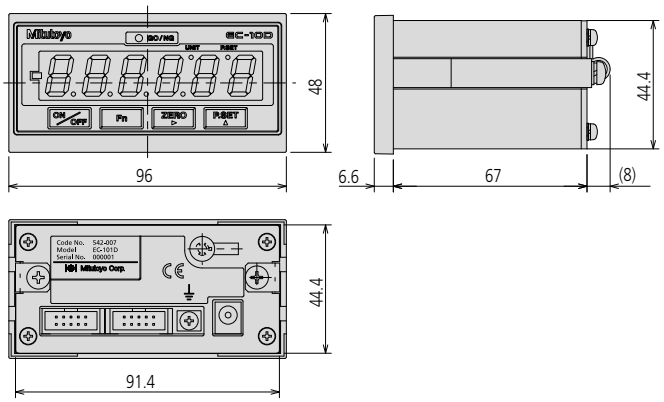


Specifications

Code No.	542-007E
Applicable input	Digimatic code (SPC)
Number of gauge inputs	1
Resolution	0.01, 0.001 mm (automatically set depending on the gauge)
Display	6-digit and a negative [-] sign LED (amber, green, red)
Price	**£347.00**

Dimensions

Unit: mm



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Data Management

SERIES 264 – DP-1VA LOGGER Digimatic Mini-Processor

- In addition to the conventional (DP-1VR) printing and statistical calculation functions, data logging and USB output functions are added and enhanced.
- Mitutoyo's DP-1VA LOGGER is so compact it fits right in your palm. But with this powerful little device you can print data from calipers, micrometers and any other measuring devices equipped with a Digimatic port, and even perform statistical evaluations.
- The versatile DP1-VA LOGGER printer not only prints measurement data but performs a variety of statistical analyses, draws histograms and D-charts and also performs complex operations on X-bar R control charts.
- The data logger function allows storage of up to 1,000 pieces of data in memory and batch transfer of stored data to an Excel-format inspection certificate, etc., by connecting to a PC via a USB cable.
- Easy printing function. The print speed is excellent from a one-touch start and with the built-in thermal printer there's almost no noise.
- The thermosensitive paper has outstanding durability and chemical resistance for long-term storage and excellent readability due to large character print.
- Clock function for loading measurement data.
- Processing capacity for up to 9,999 data groups.

DIGIMATIC d2



264-505E

Technical Data

Printing paper:	48 m per roll
Capacity:	ca. 6,500 lines for large characters, 12,000 lines for normal characters
Printable data:	Measurement data, GO/±NG judgement, number of data, maximum/minimum value, range, average, standard deviation, number of defective, fraction defective, process capability index, histogram, D-chart, control chart generation for Xd-bar and control limit data, date and time
Power:	AC adapter, Battery LR6 x 4 (alkaline), NiMH (rechargeable, battery is not charged in the device)

Optional Accessories

Code No.	Description	Price
937179T	Footswitch	£57.90
965516	GO/±NG cable	£97.60
09EAA084	RS-232C signal cable 1 m (9 pin) for connecting DP-1VA to a PC	£259.00

Consumable Spare

Code No.	Description	Price
09EAA069D	Printer paper (1 roll)	£7.20





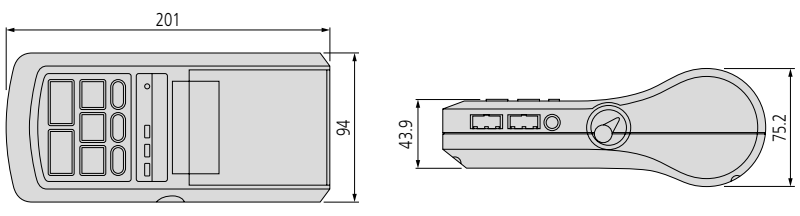


Specifications

Code No.		264-505E
Printer type		Thermal line printer
Printing method		384 dot (8 dot / mm)
Print speed		6.5 mm/s (using AC adapter)
Processing capacity	Modes 1/2/3	9,999 data subgroups
	Mode 0	100,000 data subgroups
Output function		RS-232C or GO/±NG judgement
Input timer		0.25 s; 1 s; 5 s; 30 s; 1 min; 30 min; 60 min (0.25 s only statistical function)
Mass		390g
Price		**£503.00**

Dimensions

Unit: mm



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Mitutoyo

MICROMETERS
MICROMETER HEADS



Micrometers



Micrometer Heads



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Micrometers

SERIES 293 – ABSOLUTE Digimatic High-Accuracy Micrometer

- A world-leading 0.1 µm resolution makes this micrometer ideal for customers who need to make highly accurate measurements with a hand-held tool.
- The High-Accuracy Digimatic Micrometer utilizes Mitutoyo's innovative 0.1 µm resolution ABS (absolute) rotary sensor* and high-accuracy screw machining technology to reduce the instrumental error to ±0.5 µm, delivering higher accuracy without sacrificing operability.
- A highly rigid frame and high-performance constant-force mechanism* enable more stable measurement, while the clicks emitted while the workpiece is being measured assure the operator that measurement is proceeding normally.
- Transfer of body heat to the instrument is reduced by a (removable) heat shield, minimizing error caused by thermal expansion of the frame when performing handheld measurements.
- The ABS sensor also eliminates the need to perform origin setting each time the power is turned on, letting you start measuring straight away. With no possibility of overspeed errors, this micrometer also delivers a higher level of reliability.
- A range of features enables flexible measurement, including switchable resolution (0.0001/0.0005 mm), function lock and preset.

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

ABSOLUTE DIGIMATIC d2 U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



293-130-20

Specifications

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Measuring surface	Mass	Price
293-130-20	0 - 1" (0 - 25.4 mm)	.000005" / .00002" (0.0001 / 0.0005 mm) switchable	±.00002" (±0.5 µm)	ø3.2 mm	400 g	**£1,950.00**

Technical Data

Measuring force:	7 to 9 N
Power supply:	Button type lithium battery CR2032 (**05SAA217**), 1 pc
Battery life:	Approx. two years when used under normal conditions

Functions

Preset (ABS measurement system):
The measurement origin can be preset to any value within the display range for convenience in measuring.

Zero-setting (INC measurement system):
The display can be zeroed at any position of the spindle, making comparison measurement easier. Returning to the absolute-measurement mode is easily accomplished.

Hold:
Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility when the instrument must be moved away from the workpiece before the reading can be recorded.

Resolution switching:
The resolution of the display can be switched. If 0.1 µm measurement is not required, the resolution can be switched to 0.5 µm.

Function lock:
Functions such as preset or zero-set can be locked to avoid inadvertently changing the origin position.

On/off:
The power can be turned off after measurement is complete. Even after the power is turned off, the origin or last zero-set position remains in the memory.

Auto power off:
Even if the power is left on, the power turns off automatically if the micrometer is not used within a 20-minute period.

Measurement data output:
Measurement data can be output, allowing easy incorporation of this instrument into a statistical process control or measurement system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.



Function lock (circled red).

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Micrometers

SERIES 293 – ABSOLUTE Digimatic High-Accuracy Micrometer

Standard Accessories

Code No.	Description
04AAB969B	Heat shield
04AAB985	Screwdriver
05SAA217	CR2032 lithium battery
200877	Spanner
—	Lens paper (for the display)
—	Inspection certificate



Heat shield (Patent pending in Japan, the United States of America, the European Union, and China).



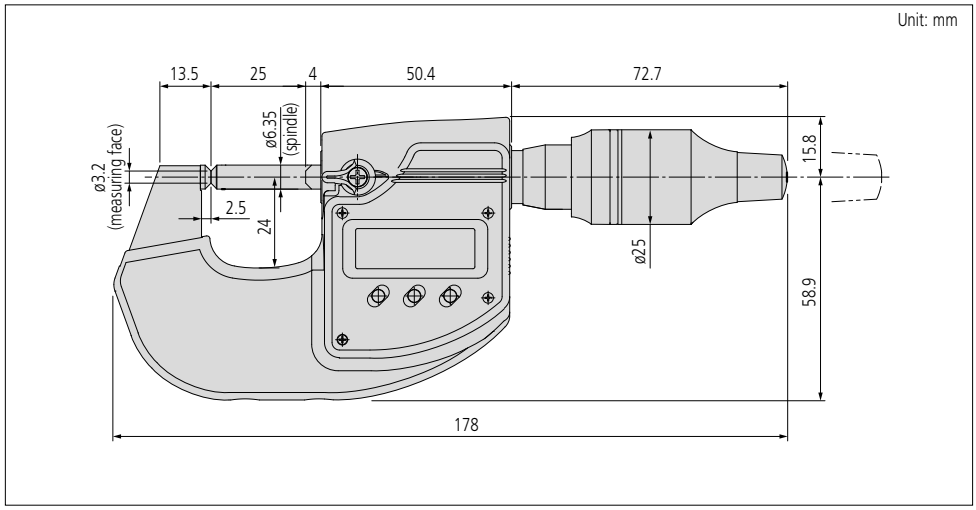
With heat shield attached.

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*	**£242.00**
02AZD790B	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*	**£242.00**
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£179.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

*U-WAVE-R Receiver required.

Dimensions







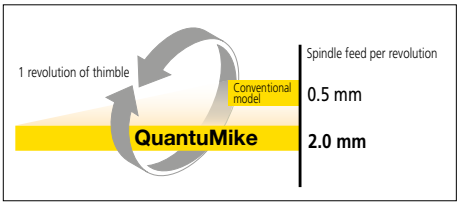


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Micrometers

SERIES 293 – QuantuMike Fast Action Waterproof Digimatic Micrometer

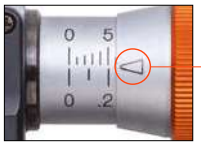
- Advanced pioneering technology has created the next generation of micrometer, the most revolutionary advance in micrometer technology since James Watt invented the instrument.
- Faster measurement is achieved by using a coarser thread which feeds the spindle by 2 mm per revolution of the thimble. This increase in thread lead has been made possible thanks to new high precision thread-cutting and testing techniques.



- QuantuMike is equipped with a function lock feature to prevent the origin point being moved by mistake during measurement.



- A graduated scale is provided on the sleeve for use with a reference mark on the thimble so that every millimetre displacement can be checked to provide extra confidence.



- Data output allows easy incorporation of this instrument into a statistical process control or measurement system.
- There is a choice of convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals for direct input to cells in off-the-shelf spreadsheet software such as Excel.
- Excellent resistance against oil, water and dust (IP65 protection level) enables this product to be used in machining situations that include splashing coolant fluid.
- Measuring faces: carbide.

DIGIMATIC S1 COOLANT PROOF™ IP65 U-WAVE fit

MeasurLink ENABLED
Data Management Software by Mitutoyo



293-180-40

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Flatness	Parallelism	Price
293-180-40	0-1" (0-25.4 mm)	.00005" (0.001 mm)	±.00005" (±1 µm)	.000012" (0.3 µm)	.00004" (1 µm)	£366.00
293-181-40	1-2" (25.4-50.8 mm)					£389.00
293-182-40	2-3" (50.8-76.2 mm)				.00008" (2 µm)	£438.00
293-183-40	3-4" (76.2-101.6 mm)		±.0001" (±2 µm)			£498.00



293-183-40

Technical Data

Dust/Water protection level:	IP65 (IEC60529)*
Measuring force:	7 to 12 N
Length standard:	Electromagnetic rotary sensor
Battery life:	Approx. 2 years under normal use
Standard accessories:	Setting standard 1 pc (except for 0-1" models) Button type lithium battery CR2032 (**05SAA217**), 1 pc Spanner (**301336**), 1 pc

* Anti-corrosion treatment is required after use.

Functions

Origin point setting (ABS measurement system):
The measurement origin can be preset to any value within the display range for convenience in measuring.

Zero setting (INC measurement system):
The display can be zeroed at any position of the spindle, making comparison measurement easier. Returning to the absolute-measurement mode is easily accomplished.

Hold:
The hold function freezes the current value on the display, making it useful for performing measurements in locations where the display is difficult to see. Also, when the hold function is released, the measurement value from the most recently set zero set position or origin point position is displayed.

Calibration schedule alert function:
Supports proper management of the Digimatic gauge.

Approach speed warning function:
Reduces variation in measurement values and improves reliability of measurements.

Tolerance judgement function:
You can judge pass/failure at a glance, which is effective even when handling numerous workpieces.

Calculation function (Ax + B):
Enables calculation and direct reading of correction values for a processing machine, thereby improving the efficiency of processing work.

Key operation lock feature:
Locks the ORIGIN (origin point setting) and ZERO (zero setting) functions to prevent the origin point from being accidentally changed.

Auto power ON/OFF:
The reading on the LCD disappears if the micrometer is left idle for approx. 20 minutes, but the origin point (preset value) for absolute length measurement is retained. Turning the spindle again will restore the reading on the LCD.

Key customization function:
Helps to easily recall frequently used functions for improved work efficiency.

Measurement data output function (Digimatic S1):
Bidirectional communication allows setting changes and information management to be easily performed from a PC.

Error message:
In the event of an overflow on the LCD or a computing error, an error message appears on the LCD, and the measuring function stops. This prevents continuation of measurement with an erroneous display. Also, when the battery voltage drops to a certain level the battery depletion indicator appears well before the micrometer becomes unusable.

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Micrometers

SERIES 293 – QuantuMike Fast Action Waterproof Digimatic Micrometer

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*[1]	£242.00
264-623	U-WAVE-TM transmitter*[1]	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF960	U-WAVE-TM/TMB connection unit	£50.40
06AGL111	SPC data cable with pushbutton (1 m)	£93.60
06AGL121	SPC data cable with pushbutton (2 m)	£98.80
06AGQ001A	USB input tool direct USB-ITN-SA (2 m)	£100.00

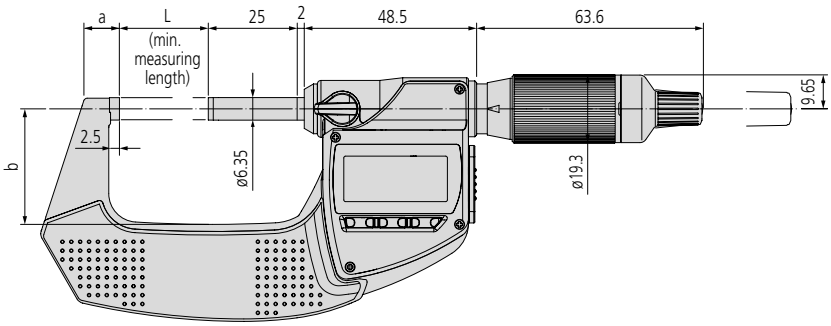
*[1] U-WAVE-R Receiver required.





Dimensions

Unit: mm



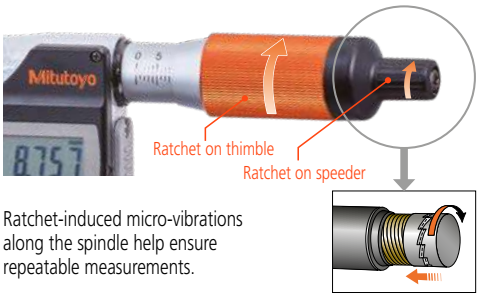
Range	L	a	b
0-1"	0	9	25
1-2"	25.4	9.8	32.5
2-3"	50.8	12.6	47
3-4"	76.2	14	60

Patented ratchet thimble mechanism*[2]

The patented ratchet thimble mechanism helps ensure repeatable results by transmitting micro-vibrations along the spindle to the contact face to provide a constant measuring force and encourage good contact with the workpiece. The ratchet works from the thimble as well as the speeder so it is always easy to use – even when making measurements one handed. The sound of the ratchet provides the user with a sense of confidence and the speeder enables the rapid spindle feed needed when measuring widely different dimensions.

*[2] Patent registered (Japan, USA, China, Germany, UK and France).





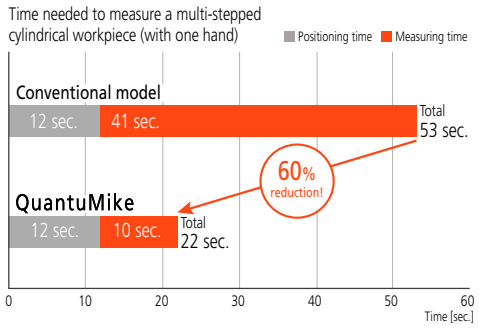
Ratchet-induced micro-vibrations along the spindle help ensure repeatable measurements.

Measuring time on a multi-stepped workpiece with one hand

Thanks to the quick movement, positioning times are reduced by around 75%*[2] resulting in a reduction in measuring cycle times of about 60%*[3] compared with a conventional micrometer.

*[3] According to Mitutoyo's comparison test data for measuring time on typical workpieces.











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Mitutoyo

Micrometers

SERIES 293 – IP65 Digimatic Micrometer

- Based on new waterproof structural technology, this micrometer provides IP65 protection levels, enabling use in environments that include cutting oil or coolant.*1
- ±1 µm instrumental error (75 mm/3" or less measuring range models).
- Measuring data output function is available with a water-resistant data cable to maintain the IP65 protection level.
- Oil-resistant materials are used in all plastic components.
- Auto power ON/OFF function.
- Further-Increased operability thanks to easy-to-read LCD with 30% more character area.
- Models equipped with a Digimatic output port can form part of a statistical process control or networked measurement system.
- Interface Input Tools are available that enable the conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software such as Excel.
- Two types of constant-force devices are available: Ratchet Stop and Ratchet Thimble.
- Measuring faces: carbide.

*1 Anti-corrosion treatment is required after use.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



293-230-30



293-334-30



Technical Data

Flatness:	.000012" / 0.3 µm
Dust/water protection level:	IP65 (IEC60529) *2
Measuring force:	5 to 10 N
Battery life:	Approx. 1.2 years under normal use
Standard accessories:	Setting standard, 1 pc (except for 0 - 25 mm (0 - 1") models) Button type silver oxide battery (SR44, **938882**), 1 pc Spanner (**301336**), 1 pc

*2 Anti-corrosion treatment is required after use.

Functions

Origin point setting (ABS measurement system):
Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:
Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility where the instrument must be moved away from the workpiece before the reading can be recorded.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Function lock*3:
This function allows the ORIGIN (origin point setting) function and the ZERO (zero-setting) function to be locked to prevent these points being reset accidentally.

*3 All-digit preset type only.



293-354-30

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Micrometers

SERIES 293 – IP65 Digimatic Micrometer

Set Specifications

Metric

Code No.	Range	Price
293-962-30	0 - 75 mm (3 pcs./set)	£954.00
293-963-30	0 - 100 mm (4 pcs./set)	£1,220.00
293-966-30	0 - 50 mm (2 pcs./set)	£732.00

Inch/Metric

Code No.	Range	Price
293-960-30	0 - 3" (3 pcs./set)	£994.00
293-961-30	0 - 4" (4 pcs./set)	£1,370.00

Optional Accessories*1

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*2	£242.00
264-623	U-WAVE-TM transmitter*2	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

*1 Only for models with data output function.
*2 U-WAVE-R Receiver required.



Range	L	a	b	c
0 - 1"	0	2.8	9	25
1 - 2"	25.4	2.8	9.8	32
2 - 3"	50.8	2.8	12.6	47
3 - 4"	76.2	2.8	14	60
4 - 5"	101.6	5.3	16.7	76
5 - 6"	127.0	5.7	18.8	90
6 - 7"	152.4	6.1	19.1	102
7 - 8"	177.8	6.3	18.2	115
8 - 9"	203.2	6.7	16.8	127
9 - 10"	228.6	5.5	18	139
10 - 11"	254.0	6.5	18	152
11 - 12"	279.4	6.5	18	166

Specifications

Metric

Code No.	Range	Resolution	Max. permissible error /MPE	Parallelism	Constant-force device	Mass	Price
With SPC data output							
293-230-30	0 - 25 mm	0.001 mm	±1 µm	1 µm	Ratchet stop	270 g	£305.00
293-231-30	25 - 50 mm					330 g	£325.00
293-232-30	50 - 75 mm			2 µm		470 g	£370.00
293-233-30	75 - 100 mm		±2 µm			625 g	£400.00

Inch/Metric

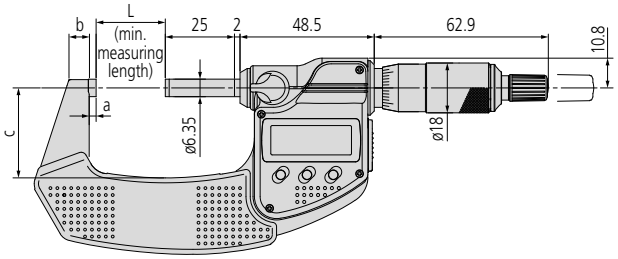
Code No.	Range	Resolution	Max. permissible error /MPE	Parallelism	Constant-force device	Mass	Price
With SPC data output							
293-330-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.00005" (±1 µm)	.00004" (1 µm)	Ratchet stop	270 g	£305.00
293-331-30	1 - 2" (25.4 - 50.8 mm)					330 g	£325.00
293-332-30	2 - 3" (50.8 - 76.2 mm)			.00008" (2 µm)		470 g	£370.00
293-333-30	3 - 4" (76.2 - 101.6 mm)		±.0001" (±2 µm)			625 g	£400.00
293-350-30	4 - 5" (101.6 - 127.0 mm)	.0001" (0.001 mm)		.00012" (3 µm)		600 g	£610.00
293-351-30	5 - 6" (127.0 - 152.4 mm)					740 g	£617.00
293-352-30	6 - 7" (152.4 - 177.8 mm)		±.00015" (±3 µm)			800 g	£631.00
293-353-30	7 - 8" (177.8 - 203.2 mm)			.00016" (4 µm)		970 g	£646.00
293-354-30	8 - 9" (203.2 - 228.6 mm)					1100 g	£660.00
293-355-30	9 - 10" (228.6 - 254.0 mm)		±.0002" (±4 µm)			1270 g	£674.00
293-356-30	10 - 11" (254.0 - 279.4 mm)					1340 g	£690.00
293-357-30	11 - 12" (279.4 - 304.8 mm)			.0002" (5 µm)		1540 g	£735.00
293-334-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.00005" (±1 µm)	.00004" (1 µm)	Ratchet thimble	275 g	£305.00
293-335-30	0 - 1" (0 - 25.4 mm)				Friction thimble	275 g	£322.00
293-336-30	1 - 2" (25.4 - 50.8 mm)					335 g	£366.00
Without SPC data output							
293-340-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.00005" (±1 µm)	.00004" (1 µm)	Ratchet stop	270 g	£231.00
293-341-30	1 - 2" (25.4 - 50.8 mm)					330 g	£289.00
293-342-30	2 - 3" (50.8 - 76.2 mm)			.00008" (2 µm)		470 g	£338.00
293-343-30	3 - 4" (76.2 - 101.6 mm)		±.0001" (±2 µm)			625 g	£381.00
293-344-30	0 - 1" (0 - 25.4 mm)		±.00005" (±1 µm)	.00004" (1 µm)	Ratchet thimble	275 g	£243.00
293-345-30	1 - 2" (25.4 - 50.8 mm)					335 g	£289.00
293-346-30	2 - 3" (50.8 - 76.2 mm)			.00008" (2 µm)		475 g	£338.00
293-347-30	3 - 4" (76.2 - 101.6 mm)		±.0001" (±2 µm)			639 g	£381.00
293-348-30	0 - 1" (0 - 25.4 mm)		±.00005" (±1 µm)	.00004" (1 µm)	Friction thimble	275 g	£245.00

Note: All-Digit preset type – models over 125 mm (5") measuring range.

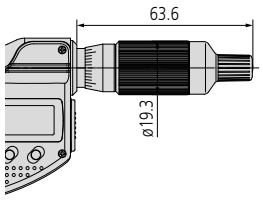
Dimensions

Unit: mm

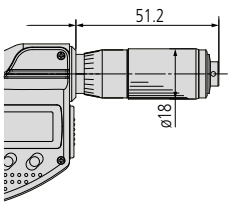
Ratchet stop type up to 100 mm maximum measuring range



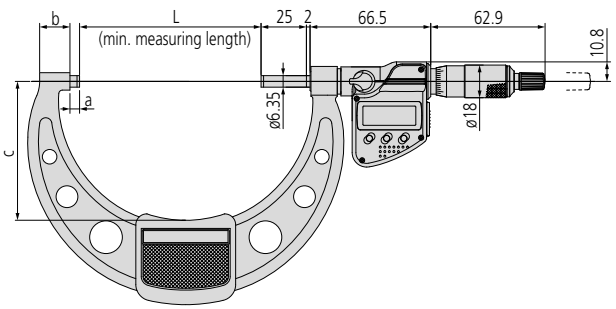
Ratchet thimble type



Friction thimble type



Ratchet stop type over 100 mm maximum measuring range



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Micrometers

SERIES 293 – Digimatic Micrometer

- Easily integrated into a statistical process control or networked measurement system.
- Constant-force device: ratchet stop.
- Interface Input Tools are available that enable the conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software such as Excel.
- Measuring faces: carbide.

DIGIMATIC U-WAVE MeasurLink ENABLED
Data Management Software by Mitutoyo

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293-782

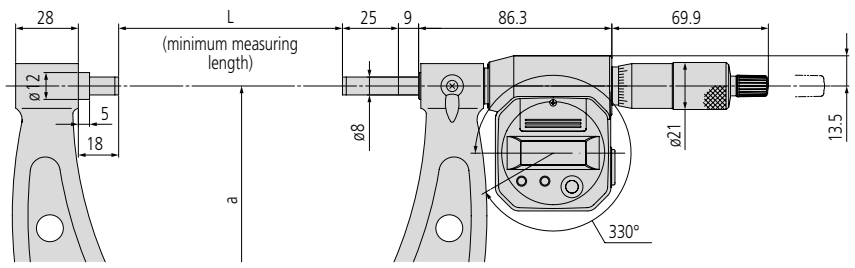
Specifications

Inch/Metric

Code No.	Range	Max. permissible error J_{MPE}	Flatness	Parallelism	Price
293-782	12 - 13" (304.8 - 330.2 mm)	±.0003" (±6 µm)	.000024" (0.6 µm)	.0002" (5 µm)	£878.00
293-783	13 - 14" (330.2 - 355.6 mm)				£881.00
293-784	14 - 15" (355.6 - 381.0 mm)				£902.00
293-785	15 - 16" (381.0 - 406.4 mm)	±.00035" (±7 µm)		.00024" (6 µm)	£912.00
293-786	16 - 17" (406.4 - 431.8 mm)				£924.00
293-787	17 - 18" (431.8 - 457.2 mm)				£945.00
293-788	18 - 19" (457.2 - 482.6 mm)	±.0004" (±8 µm)			£959.00
293-789	19 - 20" (482.6 - 508.0 mm)			.00028" (7 µm)	£967.00

Dimensions

Unit: mm



Range	L	a
12 - 13"	304.8	187
13 - 14"	330.2	199
14 - 15"	355.6	212
15 - 16"	381.0	224

Range	L	a
16 - 17"	406.4	236
17 - 18"	431.8	248
18 - 19"	457.2	261
19 - 20"	482.6	273

Technical Data

Resolution:	.0001" (0.001 mm)
Measuring force:	10 to 15 N
Battery:	SR44 (2 pcs) **938882**
Battery life:	Approx. 1.8 years under normal use

Functions

Origin point setting (ABS measurement system):
Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:
Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility where the instrument must be moved away from the workpiece before the reading can be recorded.

Function lock:
This function allows the ORIGIN (origin point setting) function and the ZERO (zero-setting) function to be locked to prevent these points being reset accidentally.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

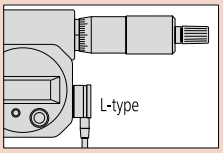
Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

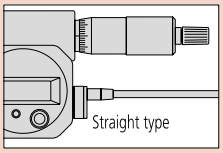
Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

Code No.	Description	Price
959149	SPC data cable with pushbutton*2 (1 m)	£44.10
959150	SPC data cable with pushbutton*2 (2 m)	£50.30
02AZD730G	U-WAVE-T IP67 transmitter*3	£242.00
02AZD790C	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*3	£242.00
02AZE140C	U-WAVE-T data cable (for footswitch)	£160.00
02AZE200	U-WAVE-T mounting plate	£26.70
04AZB512	SPC data cable L-type with pushbutton (1 m)	£83.00
04AZB513	SPC data cable L-type with pushbutton (2 m)	£88.60
06AFM380C	USB input tool direct USB-ITN-C (2 m)	£143.00

*2 May interfere with operating the thimble.
*3 U-WAVE-R Receiver required.





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Micrometers

SERIES 293 – Digital Micrometer

- Simple design, such as not incorporating data output, achieves low cost.
- Provided only with an origin-set button for easy origin setting.
- Increased operability thanks to easy-to-read LCD with 30% more character display area than previous model.
- Equipped with Ratchet Stop for constant measuring force.
- Measuring faces: carbide.

Technical Data

Measuring force:	5 to 10 N
Battery:	SR44 (1 pc) **938882**
Battery life:	Approx. 2.4 years under normal use

Functions

Zero setting:
A brief press on the ORIGIN button sets display to zero at the current spindle position (zero-setting), which allows easy comparison measurement.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading is retained. Turning the spindle causes the reading to reappear.



293-821-30



293-832-30

Specifications

Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Constant-force device	Price
293-821-30	0 - 25 mm	0.001 mm	±2 µm	Ratchet stop	**£181.00**

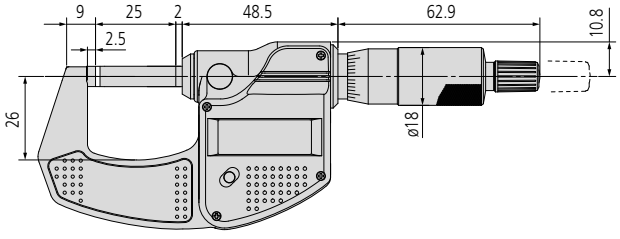
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Constant-force device	Price
293-831-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.0001" (±2 µm)	Ratchet stop	**£181.00**
293-832-30				Friction thimble	**£195.00**

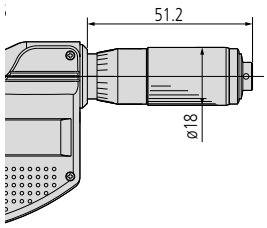
Dimensions

Unit: mm

Ratchet stop type



Friction thimble type



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Micrometers

SERIES 293 – ABSOLUTE Digimatic Quickmike Micrometer

- The Quickmike provides a speedy spindle feed of 10 mm per thimble rotation, which enables widely differently sized features to be measured quickly.
- Set the origin only once. The absolute linear scale maintains the origin throughout the life of the battery, meaning no more zero setting (presetting) or overspeed error.
- Measuring faces: carbide.
- Supplied with a Ratchet Thimble for constant measuring force.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP65 U-WAVE

MeasurLink® ENABLED Data Management Software by Mitutoyo



293-676-20

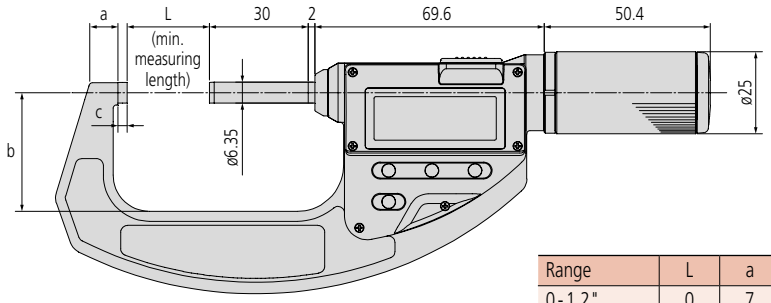
Specifications

Inch/Metric

Code No.	Range	Max. permissible error J_{MPE}	Flatness	Parallelism	Mass	Price
293-676-20	0-1.2" (0-30.48 mm)	±.0001" (±2 µm)	±.000012" 0.3 µm)	.00008" (2 µm)	275 g	£532.00
293-677-20	1-2.2" (25.4-55.8 mm)				340 g	£582.00
293-678-20	2-3.2" (50.8-81.28 mm)	±.00015" (±3 µm)			480 g	£588.00
293-679-20	3-4.2" (76.2-106.68 mm)			.00012" (3 µm)	585 g	£614.00

Dimensions

Unit: mm



Range	L	a	b	c
0-1.2"	0	7	25	2
1-2.2"	25.4	8.5	36	2.8
2-3.2"	50.8	10.3	47	
3-4.2"	76.2	10.7	60	

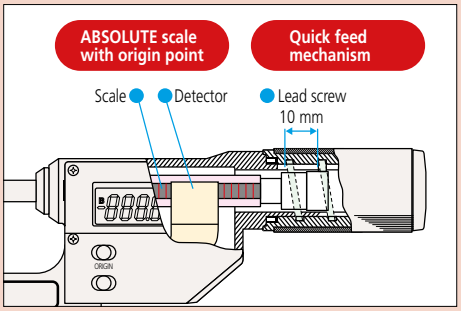
Technical Data

Resolution:	.00005" (0.001 mm)
Accuracy:	Refer to the list of specifications
Measuring force:	5 to 15 N
Battery:	SR44 (1 pc) **938882**
Battery life:	Approx. 3 years under normal use
Max. response speed:	Without limit

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
02AZE200	U-WAVE-T mounting plate	£26.70
05CZA662	SPC data cable (1 m)	£85.60
05CZA663	SPC data cable (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

*U-WAVE-R Receiver required.



Non-rotating spindle

The non-rotating spindle enables even inexperienced operators to perform measurements repeatably and accurately.



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Micrometers

SERIES 227 – ABSOLUTE Digimatic Adjustable Measuring Force Micrometer

- Digimatic micrometer dedicated to applications requiring a constant/low measuring force such as measuring wire, paper, and plastic/rubber parts.
- Ratchet mechanism in the thimble applies constant force to workpiece.
- Measuring force is adjustable (in steps) to suit various kinds of workpiece.
- High-accuracy measurement can be performed even by unskilled operators due to the repeatability of the automatically applied measuring force.
- Compact and easy to handle.
- Non-rotating spindle.
- Measuring faces: carbide.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



227-211-20

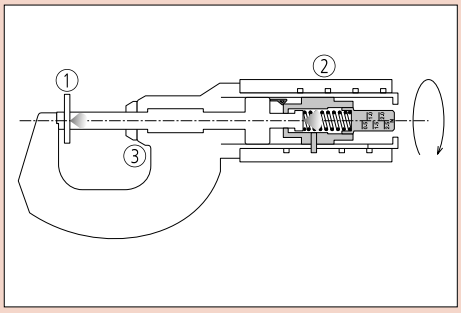
Technical Data

Flatness: .000012" (0.3 µm)
Parallelism: .00008" (2 µm)
Measurement posture: Horizontal orientation only (recommended spindle inclination: within ±3°)
Battery: SR44 (1 pc), **938882**
Battery life: Approx. 3 years under normal use (1 year for **227-213/16/17-20**)

Functions

Adjustable measuring force mechanism, hold, origin point setting, ABS measurement system, low voltage alarm, data output, presetting (**227-213/16/17-20**).

Operation

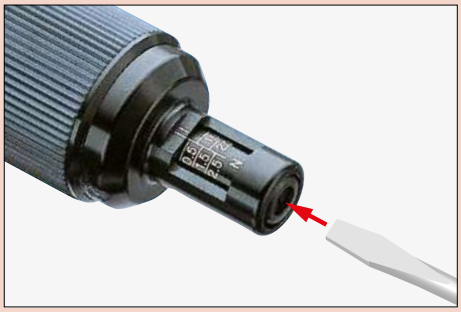


① Measuring force is generated by the action of trapping a workpiece between the spindle face and the anvil.
② The constant-force unit applies the specified measuring force.
③ When the preset measuring force is reached, the value on the LCD is automatically held and the hold symbol appears. (To cancel the hold, reverse the thimble more than 1/10 revolution and press the hold button.)

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*1	**£242.00**
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*1	**£242.00**
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£179.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
05CZA662	SPC data cable (1 m)	**£85.60**
05CZA663	SPC data cable (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

*1 U-WAVE-R Receiver required.



Adjustable measuring force
To preset the measuring force, adjust the measuring force setting scale on the thimble with the screwdriver supplied.

Specifications

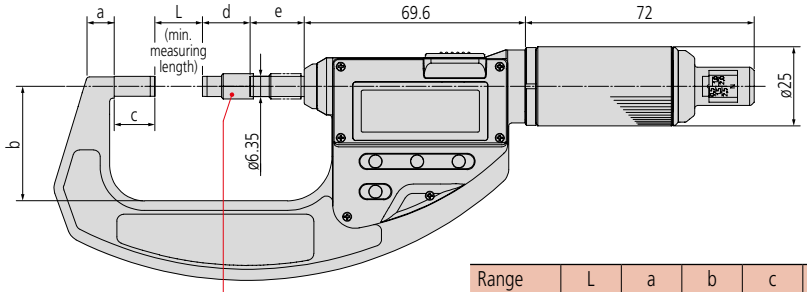
Inch/Metric

Code No.	227-211-20	227-213-20	227-215-20	227-216-20	227-217-20
Range	0 - .6" (0 - 15.24 mm)	.6 - 1.2" (15.24 - 30.48 mm)	0 - .4" (0 - 10.16 mm)	.4 - .8" (10.16 - 20.32 mm)	.8 - 1.2" (20.32 - 30.48 mm)
Measuring force range	0.5 - 2.5 N		2 - 10 N		
Resolution	.00005" (0.001 mm)				
Maximum permissible error J_{MPE}	±.0001" (±2 µm)				
Measuring force	0.5, 1.0, 1.5, 2.0, 2.5 N		2, 4, 6, 8, 10 N		
Accuracy of the selected measuring force*2	± (0.1 + the selected measuring force/10) N		± (0.4 + the selected measuring force/10) N		
Repeatability of measuring force*2	Within 0.1 N		Within 0.4 N		
Mass	300 g	380 g	345 g	425 g	415 g
Price	**£976.00**	**£1,040.00**	**£1,030.00**	**£1,100.00**	**£1,150.00**

*2 These values are guaranteed when used in a horizontal orientation (within ±3 degrees).

Dimensions

Unit: mm



Range	L	a	b	c	d	e
0 - .6"	0	7	25	2	15	17
0 - .4"					10	22
.6 - 1.2"	15.24	8.5	36	12.8	15	17
.4 - .8"	10.16			17.8	10	22
.8 - 1.2"	20.32			7.8		

B

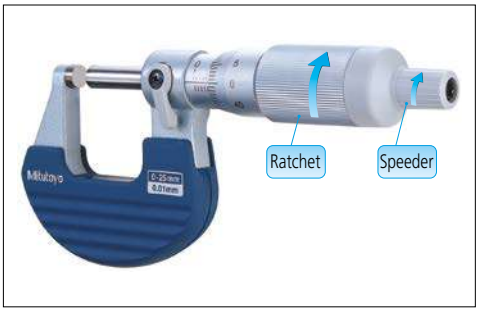
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Mitutoyo

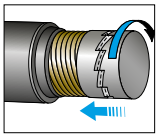
Micrometers

SERIES 102 – Ratchet Thimble Micrometer

- More accurate in one-handed operation: inexperienced operators measure significantly more accurately with this micrometer.
- Heat-insulated frame.
- Ratchet function works both from the thimble and the speeder.



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



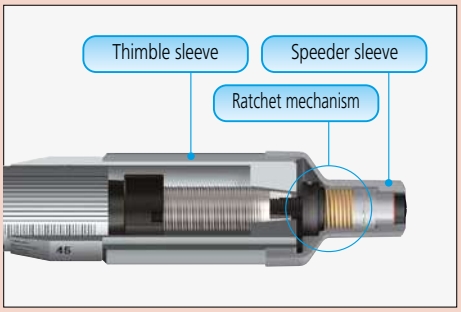
- Clearly audible ratchet operation for reassurance that measurement is being performed at constant, preset force.
- The speeder is always available for quick rotation of spindle.
- A simple mechanism, which requires neither parts maintenance nor special technique, is employed in the constant-force device.
- Measuring faces: carbide.



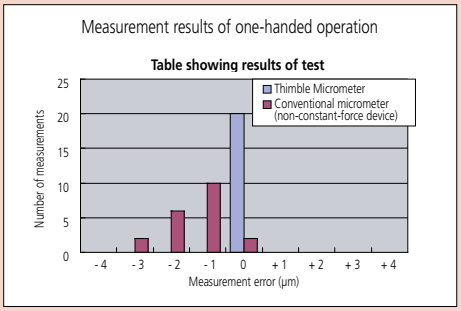
102-701

Technical Data

Flatness:	0.6 µm / .000024"
Parallelism:	2 µm / .00008"
Measuring force:	5-10 N



Internal structure.



Greatly improved accuracy and repeatability
A beginner performed a test by measuring a workpiece 20 times using a conventional micrometer and a Ratchet Thimble Micrometer.

Specifications

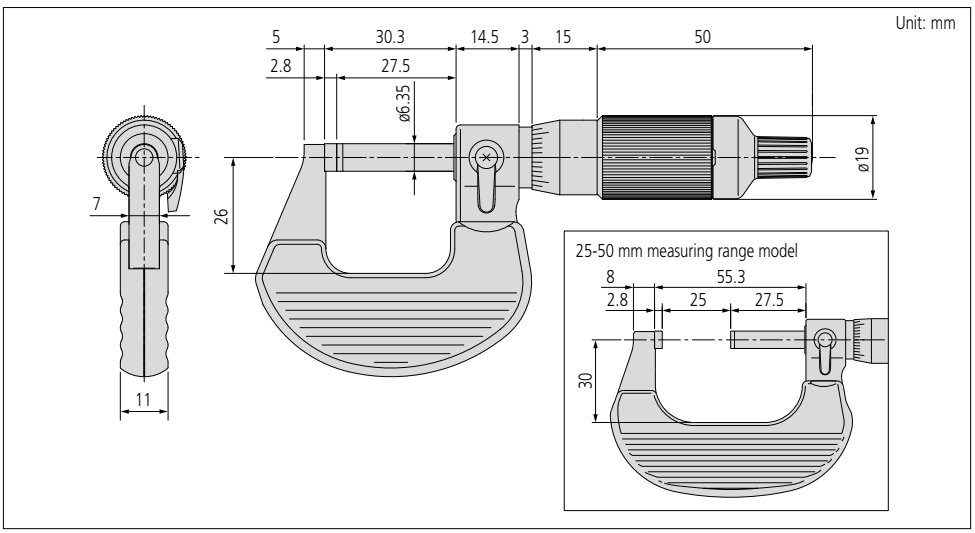
Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Mass	Price
102-701	0 - 25 mm	0.01 mm	±2 µm	180 g	£79.10
102-707		0.001 mm			£88.10
102-702	25 - 50 mm	0.01 mm		270 g	£90.40
102-708		0.001 mm			£128.00

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Mass	Price
102-717	0 - 1"	.0001"	±.0001"	180 g	£88.10
102-718	1 - 2"			270 g	£128.00

Dimensions









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Internal structure.





Micrometers

SERIES 102 – Economy Micrometer

- Cut-away frame (behind anvil) for measuring in hard-to-reach places.
- Heat-insulated frame.
- Measuring faces: carbide.



102-301

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Flatness	Parallelism	Constant-force device	Price
102-301	0 - 25 mm	0.01 mm	±2 µm	0.6 µm	2 µm	Ratchet stop	**£79.10**
102-311		0.001 mm	±1 µm	0.3 µm	1 µm		**£145.00**
102-302	25 - 50 mm	0.01 mm	±2 µm	0.6 µm	2 µm		**£90.40**
102-312		0.001 mm	±1 µm	0.3 µm	1 µm		**£155.00**
102-303	50 - 75 mm	0.01 mm	±2 µm	0.6 µm	2 µm		**£119.00**
102-304	75 - 100 mm		±3 µm		3 µm		**£134.00**

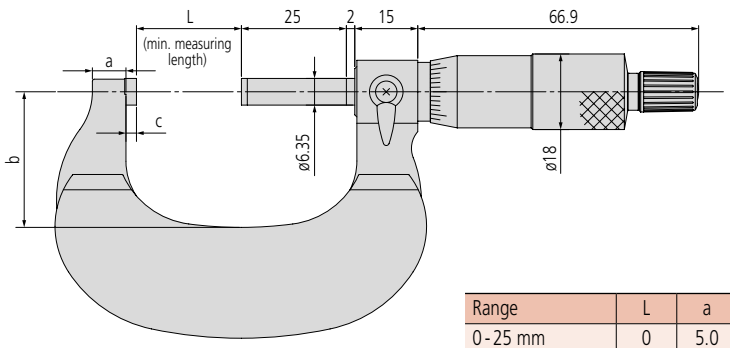
Set Specifications

Metric

Code No.	Range	Models included	Price
102-911-40	0 - 100 mm (4 pcs./set)	**102-301**, **102-302**, **102-303**, **102-304**, 3 micrometer setting standards	**£389.00**

Dimensions

Unit: mm



Range	L	a	b	c
0 - 25 mm	0	5.0	26	2.5
25 - 50 mm	25	7.8	32	
50 - 75 mm	50	10.6	45	
75 - 100 mm	75	11.0	58	

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Micrometers

SERIES 103 – Economy Micrometer

- Baked-enamel-finished frame.
- Equipped with Ratchet Stop for constant measuring force.
- Measuring faces: carbide.
- Setting standard included on models measuring above 25 mm/1" maximum measuring range.



103-137

Technical Data

Flatness: 0.6 µm/.000024" for models up to 300 mm /12", 1 µm /00004" for models over 300 mm/12"



B

Specifications

Metric

Code No.	Range (mm)	Graduation	Max. permissible error J_{MPE}	Parallelism	Price
With ratchet stop					
103-137	0 - 25	0.01 mm	±2 µm	2 µm	£59.20
103-129		0.001 mm			£68.20
103-138	25 - 50	0.01 mm			£79.50
103-130		0.001 mm			£88.10
103-139-10	50 - 75	0.01 mm			£106.00
103-140-10	75 - 100		±3 µm	3 µm	£119.00
103-141-10	100 - 125				£132.00
103-142-10	125 - 150				£146.00
103-143-10	150 - 175		±4 µm		£159.00
103-144-10	175 - 200			4 µm	£182.00
103-145-10	200 - 225				£196.00
103-146-10	225 - 250		±5 µm		£224.00
103-147-10	250 - 275				£237.00
103-148-10	275 - 300			5 µm	£248.00
103-149	300 - 325		±6 µm		£298.00
103-150	325 - 350				£322.00
103-151	350 - 375				£347.00
103-152	375 - 400		±7 µm	6 µm	£384.00
103-153	400 - 425				£431.00
103-154	425 - 450				£446.00
103-155	450 - 475		±8 µm		£483.00
103-156	475 - 500			7 µm	£519.00
103-157	500 - 525				£568.00
103-158	525 - 550		±9 µm		£606.00
103-159	550 - 575				£631.00
103-160	575 - 600			8 µm	£656.00
103-161	600 - 625		±10 µm		£762.00
103-162	625 - 650				£791.00
103-163	650 - 675				£836.00
103-164	675 - 700		±11 µm	9 µm	£865.00
103-165	700 - 725				£896.00
103-166	725 - 750				£908.00
103-167	750 - 775		±12 µm		£996.00
103-168	775 - 800			10 µm	£1,030.00
103-169	800 - 825				£1,080.00
103-170	825 - 850		±13 µm		£1,120.00
103-171	850 - 875				£1,160.00
103-172	875 - 900			11 µm	£1,190.00
103-173	900 - 925		±14 µm		£1,230.00
103-174	925 - 950				£1,280.00
103-175	950 - 975				£1,340.00
103-176	975 - 1000		±15 µm	12 µm	£1,370.00

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Parallelism	Price
With ratchet stop					
103-177	0 - 1"	.001"	±.0001"	0.00008"	£59.20
103-131		.0001"			£68.20
103-178	1 - 2"	.001"			£79.50
103-132		.0001"			£88.10
103-179	2 - 3"	.001"			£106.00
103-180	3 - 4"		±.00015"	0.00012"	£119.00
103-181	4 - 5"				£132.00
103-182	5 - 6"				£146.00
103-183	6 - 7"		±.0002"		£159.00
103-184	7 - 8"			0.00016"	£182.00
103-185	8 - 9"				£196.00
103-186	9 - 10"		±.00025"		£224.00
103-187	10 - 11"				£237.00
103-188	11 - 12"			0.0002"	£248.00
103-189	12 - 13"		±.0003"		£298.00
103-190	13 - 14"				£322.00
103-191	14 - 15"				£347.00
103-192	15 - 16"		±.00035"	0.00024"	£384.00
103-193	16 - 17"				£431.00
103-194	17 - 18"				£446.00
103-195	18 - 19"		±.0004"		£483.00
103-196	19 - 20"			0.00028"	£519.00
103-197	20 - 21"				£568.00
103-198	21 - 22"		±.00045"		£606.00
103-199	22 - 23"				£631.00
103-200	23 - 24"			0.00032"	£656.00
103-201	24 - 25"		±.0005"		£762.00
103-202	25 - 26"				£791.00
103-203	26 - 27"				£836.00
103-204	27 - 28"		±.00055"	0.00036"	£865.00
103-205	28 - 29"				£896.00
103-206	29 - 30"				£908.00
103-207	30 - 31"		±.0006"		£957.00
103-208	31 - 32"			0.0004"	£1,030.00
103-209	32 - 33"				£1,060.00
103-210	33 - 34"		±.00065"		£1,080.00
103-211	34 - 35"				£1,130.00
103-212	35 - 36"			0.00044"	£1,150.00
103-213	36 - 37"		±.0007"		£1,180.00
103-214	37 - 38"				£1,190.00
103-215	38 - 39"				£1,230.00
103-216	39 - 40"		±.00075"	0.00048"	£1,270.00
With friction thimble					
103-135	0 - 1"	.001"*1	±.0001"	0.00008"	£79.00
103-136	1 - 2"				£115.00

*1 .0001 reading is obtained with vernier.

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Micrometers

SERIES 103 – Economy Micrometer



103-904-10



103-905-10

Set Specifications

Metric

Code No.	Range	Models included	Price
103-927-10	0 - 75 mm (3 pcs./set)	**103-137**, **103-138**, **103-139-10**, 2 micrometer setting standards	**£301.00**
103-913-50	0 - 150 mm (6 pcs./set)	**103-137**, **103-138**, **103-139-10**, **103-140-10**, **103-141-10**, **103-142-10**, 5 micrometer setting standards	**£683.00**
103-915-10	150 - 300 mm (6 pcs./set)	**103-143-10**, **103-144-10**, **103-145-10**, **103-146-10**, **103-147-10**, **103-148-10**, 6 micrometer setting standards	**£1,460.00**
103-914-50	0 - 300 mm (12 pcs./set)	All micrometers in **103-913-50** and **103-915-10** in one set, 11 micrometer setting standards	**£2,050.00**

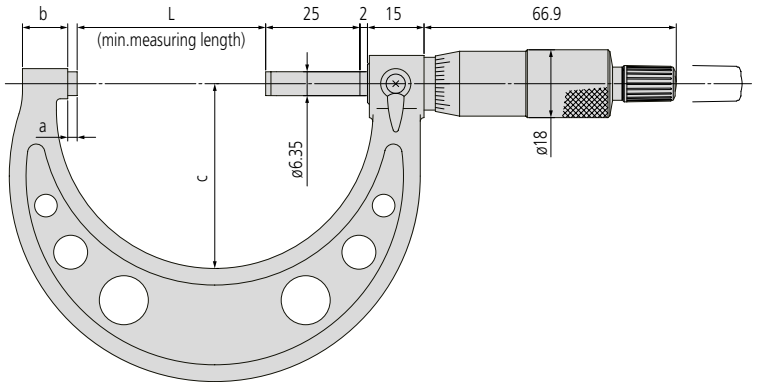
Inch

Code No.	Range	Models included	Price
103-929	0 - 3" (3 pcs./set)	**103-177**, **103-178**, **103-179**, 2 micrometer setting standards	**£301.00**
103-904-10	0 - 6" (6 pcs./set)	**103-177**, **103-178**, **103-179**, **103-180**, **103-181**, **103-182**, 5 micrometer setting standards	**£546.00**
103-906	6 - 12" (6 pcs./set)	**103-183**, **103-184**, **103-185**, **103-186**, **103-187**, **103-188**, 6 micrometer setting standards	**£1,460.00**
103-905-10	0 - 12" (12 pcs./set)	All micrometers in **103-904-10** and **103-906** in one set, 11 micrometer setting standards	**£2,050.00**

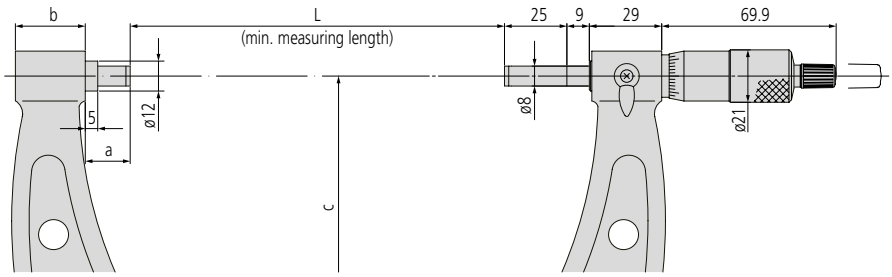
Dimensions

Unit: mm

Models up to 300 mm maximum measuring range



Models over 300 mm measuring range



Range	L	a	b	c
0 - 25 mm	0	2.5	9	28
25 - 50 mm	25		10	38
50 - 75 mm	50		12	49
75 - 100 mm	75		14	60
100 - 125 mm	100	5.3	16.7	79
125 - 150 mm	125	5.7	18.8	94
150 - 175 mm	150	6.1	19.1	106
175 - 200 mm	175	6.3	18.2	118
200 - 225 mm	200	6.7	16.8	130
225 - 250 mm	225	5.5	18	143
250 - 275 mm	250	6.5		156
275 - 300 mm	275			169
300 - 325 mm	300	18	28	187
325 - 350 mm	325			199
350 - 375 mm	350			212
375 - 400 mm	375			224
400 - 425 mm	400			236
425 - 450 mm	425			248
450 - 475 mm	450			261
475 - 500 mm	475			273
500 - 525 mm	500	40		307
525 - 550 mm	525	15		
550 - 575 mm	550	40		332
575 - 600 mm	575	15		
600 - 625 mm	600	40		355
625 - 650 mm	625	15		
650 - 675 mm	650	40		382
675 - 700 mm	675	15		
700 - 725 mm	700	40		405
725 - 750 mm	725	15		
750 - 775 mm	750	40		430
775 - 800 mm	775	15		
800 - 825 mm	800	40		455
825 - 850 mm	825	15		
850 - 875 mm	850	40		480
875 - 900 mm	875	15		
900 - 925 mm	900	40		505
925 - 950 mm	925	15		
950 - 975 mm	950	40		530
975 - 1000 mm	975	15		

B

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Mitutoyo

Micrometers

SERIES 193 – Mechanical Counter Micrometer

- Mechanical digit counter with 0.01 mm or .001" resolution for quick and error-free reading.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.



193-111

Technical Data

Counter reading: 0.01 mm or .001"
Flatness: 0.6 µm (.000024")
Parallelism
Range 0 - 75 mm: 2 µm
Range 75 - 100 mm: 3 µm



Specifications

Metric

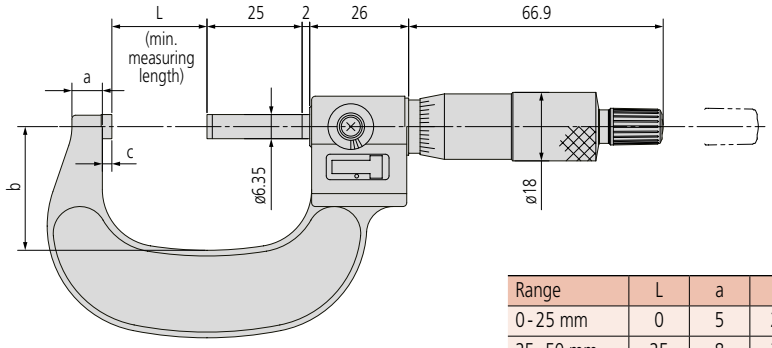
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Price
With ratchet stop				
193-101	0 - 25 mm	0.01 mm	±2 µm	**£170.00**
193-111		0.001 mm		**£189.00**
193-102	25 - 50 mm	0.01 mm		**£205.00**
193-112		0.001 mm		**£219.00**
193-103	50 - 75 mm	0.01 mm		**£230.00**
193-113		0.001 mm		**£236.00**
193-104	75 - 100 mm	0.01 mm	±3 µm	**£231.00**
193-114		0.001 mm		**£255.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Price
With friction thimble				
193-211	0 - 1"	.0001"	±.0001"	**£189.00**
193-212	1 - 2"			**£219.00**
With ratchet stop				
193-213	2 - 3"	.0001"	±.0001"	**£236.00**
193-214	3 - 4"		±.00015"	**£255.00**

Dimensions

Unit: mm



Range	L	a	b	c
0 - 25 mm	0	5	26	2.5
25 - 50 mm	25	8	32	2.0
50 - 75 mm	50	9	45	
75 - 100 mm	75		57	

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Micrometers

SERIES 406 – Digimatic Non-Rotating Spindle Micrometer

- Non-rotating spindle.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



406-352-30

B

Technical Data

Battery: SR44 (1 pc) **938882**

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.



Specifications

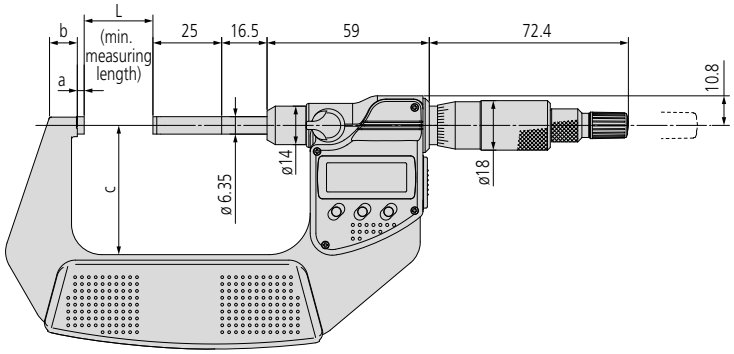
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Flatness	Parallelism	Price
406-350-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.00015" (±3 µm)	.000012" (0.3 µm)	.00012" (3 µm)	£810.00
406-351-30	1 - 2" (25.4 - 50.8 mm)					£852.00
406-352-30	2 - 3" (50.8 - 76.2 mm)					£914.00
406-353-30	3 - 4" (76.2 - 101.6 mm)		±.0002" (±4 µm)		.00016" (4 µm)	£956.00

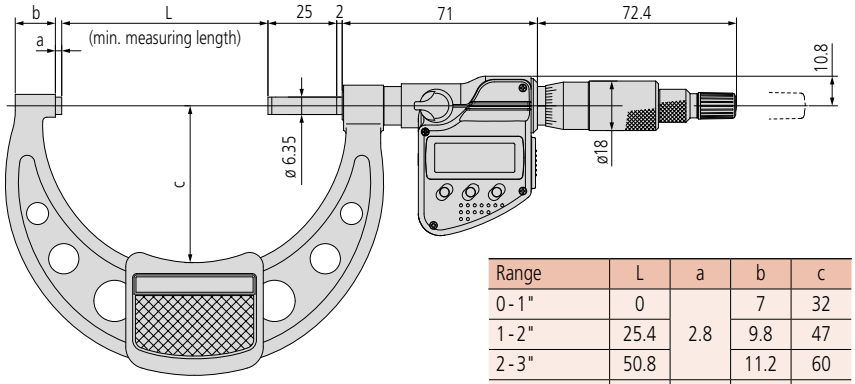
Dimensions

Unit: mm

Models up to 3" maximum measuring range



3 - 4" measuring range model



Range	L	a	b	c
0 - 1"	0	2.8	7	32
1 - 2"	25.4		9.8	47
2 - 3"	50.8		11.2	60
3 - 4"	76.2	2.3	14.6	57

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Mitutoyo

Micrometers

SERIES 340 – Digimatic Interchangeable Anvil Micrometer

- Wide measuring range with interchangeable anvils.
- Measuring face of the spindle is carbide tipped (standard model).
- IP65 water/dust protection.*1
- Equipped with Ratchet Stop for constant measuring force.

*1 Only models with a maximum measuring range up to 300 mm.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



340-351-30

DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



340-722

Specifications

Inch/Metric

Code No.	Range	Resolution	Interchangeable anvils	Setting standards	Micrometer head stroke	Price
IP65 rated						
340-351-30	0 - 6" (0 - 152.4 mm)	00005" (0.001 mm)	6 pcs.	5 pcs.	1" (25 mm)	**£853.00**
340-352-30	6 - 12" (152.4 - 304.8 mm)	.0001" (0.001 mm)		6 pcs.		**£1,110.00**
Unrated						
340-720	12 - 18" (304.8 - 457.2 mm)	.0001" (0.001 mm)	6 pcs.	6 pcs.	1" (25 mm)	**£1,430.00**
340-721	18 - 24" (457.2 - 609.6 mm)					**£1,580.00**
340-722	24 - 30" (609.6 - 762.0 mm)					**£1,770.00**
340-723	30 - 36" (762.0 - 914.4 mm)					**£1,890.00**

Technical Data

Flatness: .000024" (0.6 µm) for models up to 12", .00004" (1.0 µm) for models over 12"

Parallelism

Range

0 - 75 mm: 2 µm

75 - 150 mm: 3 µm

150 - 1000 mm: (2+R/100) µm*2

Spindle feed error: 3 µm / 0.00015"

Battery: SR44 (1 pc), **938882**

*2 R = max. range (mm), (fraction rounded up).

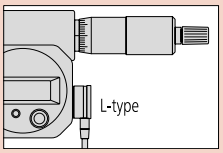
Dimensions

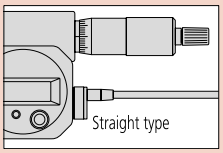
See page B-21

Optional Accessories

Code No.	Description	Price
For 340-351-30/340-352-30 only		
264-622	U-WAVE-TM IP67 transmitter*3	**£242.00**
264-623	U-WAVE-TM transmitter*3	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**
For 340-720/21/22/23 only		
02AZD730G	U-WAVE-T IP67 transmitter*3	**£242.00**
02AZD790C	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*3	**£242.00**
02AZE140C	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£160.00**
04AZB512	SPC data cable L-type with pushbutton (1 m)	**£83.00**
04AZB513	SPC data cable L-type with pushbutton (2 m)	**£88.60**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**
959149	SPC data cable with pushbutton (1 m)*4	**£44.10**
959150	SPC data cable with pushbutton (2 m)*4	**£50.30**

*3 U-WAVE-R Receiver required.
*4 May interfere with operating the thimble.







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Micrometers

SERIES 104 – Interchangeable Anvil Micrometer

- Wide measuring range with interchangeable anvils.
- Measuring face of the spindle is carbide tipped (standard model).
- Equipped with Ratchet Stop for constant measuring force.

Technical Data

Flatness: 0.6 µm (.000024") for models up to 300 mm (12"), 1.0 µm (.00004") for models over 300 mm (12")

Parallelism

Range

0 - 75 mm: 2 µm

75 - 150 mm: 3 µm

150 - 1000 mm: (2+R/100) µm*

Spindle feed error: 3 µm/0.00015"

Battery: SR44 (1 pc), **938882**

*R = max. range (mm), (fraction rounded up).

Dimensions

See page B-21



104-136A

Specifications

Metric

Code No.	Range	Graduation	Interchangeable anvils	Setting standard	Micrometer head stroke	Price
104-139A	0 - 100 mm	0.01 mm	4 pcs.	3 pcs.	25 mm	**£310.00**
104-135A	0 - 150 mm		6 pcs.	5 pcs.		**£456.00**
104-161A	50 - 150 mm		4 pcs.	4 pcs.		**£458.00**
104-140A	100 - 200 mm					**£411.00**
104-136A	150 - 300 mm		6 pcs.	6 pcs.		**£606.00**
104-141A	200 - 300 mm		4 pcs.	4 pcs.		**£498.00**
104-142A	300 - 400 mm					**£620.00**
104-143A	400 - 500 mm					**£720.00**
104-144A	500 - 600 mm					**£976.00**
104-145A	600 - 700 mm					**£1,100.00**
104-146A	700 - 800 mm					**£1,230.00**
104-147A	800 - 900 mm					**£1,450.00**
104-148A	900 - 1000 mm					**£1,660.00**

Inch

Code No.	Range	Graduation	Interchangeable anvils	Setting standard	Micrometer head stroke	Price
104-149	0 - 4"	.001"	4 pcs.	3 pcs.	1"	**£310.00**
104-137	0 - 6"		6 pcs.	5 pcs.		**£456.00**
104-162	2 - 6"		4 pcs.	4 pcs.		**£458.00**
104-150	4 - 8"					**£411.00**
104-138	6 - 12"		6 pcs.	6 pcs.		**£606.00**
104-151	8 - 12"		4 pcs.	4 pcs.		**£498.00**
104-152	12 - 16"					**£620.00**
104-201	12 - 18"		6 pcs.	6 pcs.		**£825.00**
104-153	16 - 20"		4 pcs.	4 pcs.		**£720.00**
104-202	18 - 24"		6 pcs.	6 pcs.		**£982.00**
104-154	20 - 24"		4 pcs.	4 pcs.		**£976.00**
104-155	24 - 28"					**£1,100.00**
104-203	24 - 30"		6 pcs.	6 pcs.		**£1,100.00**
104-156	28 - 32"		4 pcs.	4 pcs.		**£1,230.00**
104-204	30 - 36"		6 pcs.	6 pcs.		**£1,390.00**
104-157	32 - 36"		4 pcs.	4 pcs.		**£1,450.00**
104-158	36 - 40"					**£1,660.00**
104-205	36 - 42"		6 pcs.	6 pcs.		**£1,730.00**

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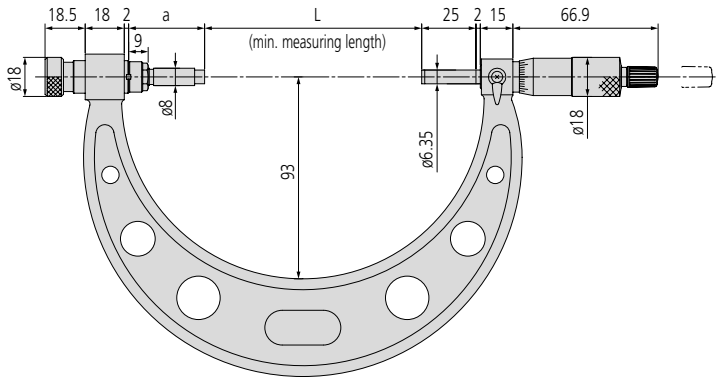
Micrometers

SERIES 340, 104 – Interchangeable Anvil Micrometer

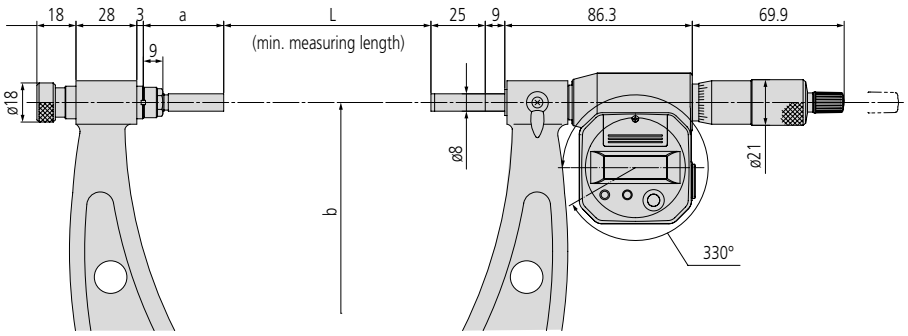
Dimensions

Unit: mm

104-135A



Models from 400 to 1000 mm measuring range



Interchangeable anvils

		L : range (mm)					
Range	0 to 150 mm models	0 - 25	25 - 50	50 - 75	75 - 100	100 - 125	125 - 150
	150 to 300 mm models	150 - 175	175 - 200	200 - 225	225 - 250	250 - 275	275 - 300
Code No.		**303950**	**303951**	**303952**	**303953**	**303954**	**303955**
a: overall length (mm)		135	110	85	60	35	10
Interchangeable anvil		M1	M2	M3	M4	M5	M6

		L : range (mm)				b
Range	300 to 400 mm models	300 - 325	325 - 350	350 - 375	375 - 400	224
	400 to 500 mm models	400 - 425	425 - 450	450 - 475	475 - 500	273
	500 to 600 mm models	500 - 525	525 - 550	550 - 575	575 - 600	332
	600 to 700 mm models	600 - 625	625 - 650	650 - 675	675 - 700	382
	700 to 800 mm models	700 - 725	725 - 750	750 - 775	775 - 800	430
	800 to 900 mm models	800 - 825	825 - 850	850 - 875	875 - 900	480
	900 to 1000 mm models	900 - 925	925 - 950	950 - 975	975 - 1000	530
Code No.		**304001**	**304002**	**304003**	**304004**	
a: overall length (mm)		87	62	37	12	
Interchangeable anvil		M3	M4	M5	M6	

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Micrometers

SERIES 105 – Anvil Extension Collar Micrometer

- Wide measuring range with anvil extension collars.
- 50 mm spindle stroke.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.

Technical Data

Flatness:	1.3 µm
Setting standard:	2 pcs.
Spindle feed error:	6 µm

Anvil Extension Collar



Measuring range 700 to 750 mm with **105-105**.



Measuring range 750 to 800 mm with **105-105**.



105-105

Specifications

Metric

Code No.	Range	Graduation	Extension collars	Parallelism	Price
105-103	500 - 600 mm	0.01 mm	1 pc (50 mm)	8 µm	**£1,220.00**
105-104	600 - 700 mm			9 µm	**£1,280.00**
105-105	700 - 800 mm			10 µm	**£1,350.00**
105-106	800 - 900 mm			11 µm	**£1,480.00**
105-107	900 - 1000 mm			12 µm	**£1,710.00**

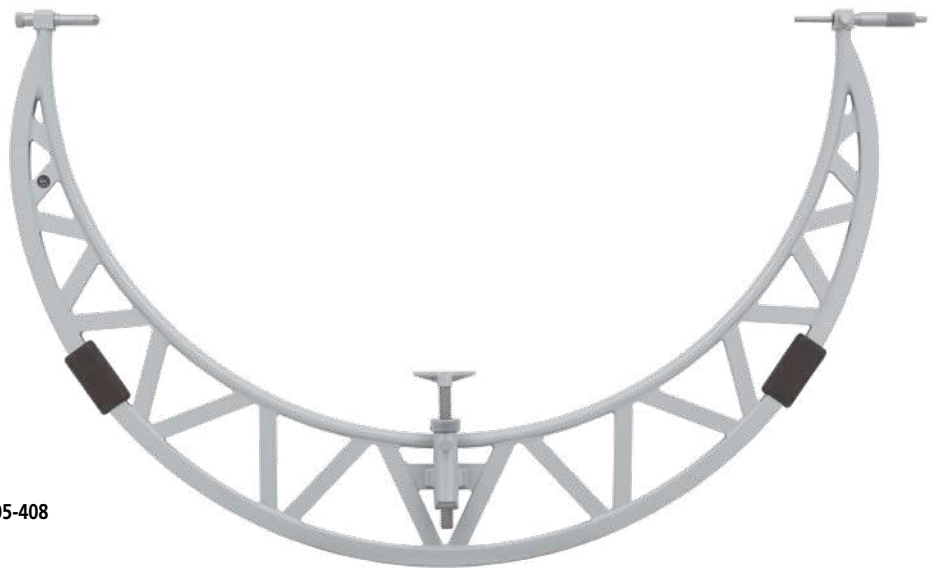
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Mitutoyo

Micrometers

SERIES 105 – Anvil Extension Collar Micrometer

- Wide measuring range with anvil extension collars.
- 50 mm/2" spindle stroke.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.



105-408

Technical Data

Flatness:	1.3 µm/.000052"
Setting standard:	2 pcs. for 100 mm span and inch models, 4 pcs. for 200 mm span models
Spindle feed error:	6 µm

Specifications

Metric

Code No.	Range	Graduation	Extension collars	Parallelism	Price
100 mm span models					
105-408	1000 - 1100 mm	0.01 mm	1 pc (50 mm)	13 µm	**£2,790.00**
105-409	1100 - 1200 mm			14 µm	**£2,830.00**
105-410	1200 - 1300 mm			15 µm	**£2,900.00**
105-411	1300 - 1400 mm			16 µm	**£2,980.00**
105-412	1400 - 1500 mm			17 µm	**£3,040.00**
105-413	1500 - 1600 mm			18 µm	**£3,470.00**
105-414	1600 - 1700 mm			19 µm	**£3,680.00**
105-415	1700 - 1800 mm			20 µm	**£3,990.00**
105-416	1800 - 1900 mm			21 µm	**£4,390.00**
105-417	1900 - 2000 mm			22 µm	**£4,780.00**
200 mm span models					
105-418	1000 - 1200 mm	0.01 mm	2 pcs (50 mm, 100 mm)	14 µm	**£3,090.00**
105-419	1200 - 1400 mm			16 µm	**£3,820.00**
105-420	1400 - 1600 mm			18 µm	**£4,590.00**
105-421	1600 - 1800 mm			20 µm	**£5,250.00**
105-422	1800 - 2000 mm			22 µm	**£6,040.00**

Inch

Code No.	Range	Graduation	Extension collars	Parallelism	Price
105-428	40 - 44"	.001"	1 pc (2")	.00052"	**£2,790.00**
105-429	44 - 48"			.00056"	**£2,830.00**
105-430	48 - 52"			.0006"	**£2,900.00**
105-431	52 - 56"			.00063"	**£2,980.00**
105-432	56 - 60"			.00067"	**£3,040.00**
105-433	60 - 64"			.00071"	**£3,470.00**
105-434	64 - 68"			.00075"	**£3,680.00**
105-435	68 - 72"			.00079"	**£3,990.00**
105-436	72 - 76"			.00083"	**£4,390.00**
105-437	76 - 80"			.00087"	**£4,780.00**

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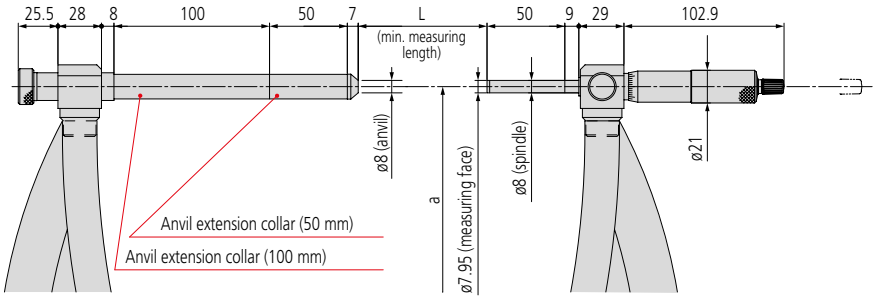
Micrometers

SERIES 105 – Anvil Extension Collar Micrometer

Dimensions

Unit: mm

Over 1200 mm up to 2000 mm maximum measuring range



Range	L	a
1000 - 1200 mm	1000	500 - 600
1200 - 1400 mm	1200	600 - 700
1400 - 1600 mm	1400	700 - 800
1600 - 1800 mm	1600	800 - 900
1800 - 2000 mm	1800	900 - 1000







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Mitutoyo

Micrometers

SERIES 343 – Digimatic Caliper Anvil Micrometer

- Effective for measuring workpiece features where access is difficult.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



343-350-30

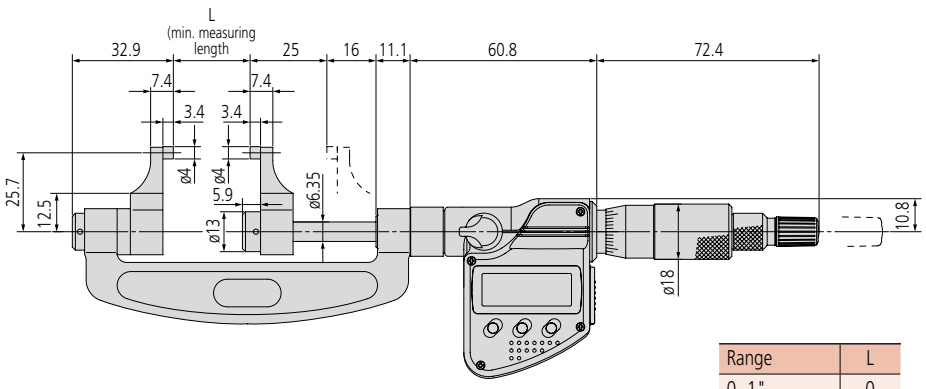
Specifications

Inch/Metric

Code No.	Range	Max. permissible error J_{MPE}	Parallelism	Price
343-350-30	0-1" (0-25.4 mm)	±.00025" (±5 µm)	.00012"	**£717.00**
343-351-30	1-2" (25.4-50.8 mm)	±.0003" (±6 µm)		**£754.00**
343-352-30	2-3" (50.8-76.2 mm)	±.00035" (±7 µm)	.00016"	**£789.00**
343-353-30	3-4" (76.2-101.6 mm)	±.0004" (±8 µm)		**£836.00**

Dimensions

Unit: mm



Range	L
0-1"	0
1-2"	25.4
2-3"	50.8
3-4"	76.2

Technical Data

Flatness:	.000012" (0.3 µm)
Resolution:	.00005" (0.001 mm)
Battery:	SR44 (2 pcs) **938882**

Functions

Origin point setting (ABS measurement system):
Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:
Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility where the instrument must be moved away from the workpiece before the reading can be recorded.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

*U-WAVE-R Receiver required.



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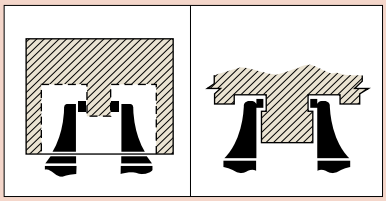
Micrometers

SERIES 143 – Caliper Anvil Micrometer

- Effective for measuring workpiece features where access is difficult.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.

Technical Data

Flatness: 0.3 µm / .000012"





143-101

B

Specifications

Metric

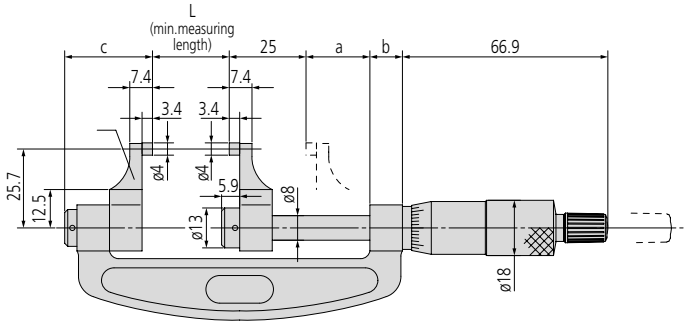
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Parallelism	Price
143-101	0 - 25 mm	0.01 mm	±5 µm	3 µm	**£312.00**
143-102	25 - 50 mm		±6 µm		**£334.00**
143-103	50 - 75 mm		±7 µm	4 µm	**£340.00**
143-104	75 - 100 mm		±8 µm		**£355.00**
143-105	100 - 125 mm		±9 µm		**£413.00**
143-106	125 - 150 mm			5 µm	**£455.00**
143-107	150 - 175 mm		±10 µm		**£484.00**
143-108	175 - 200 mm				**£523.00**
143-109	200 - 225 mm		±11 µm	6 µm	**£536.00**
143-110	225 - 250 mm				**£551.00**
143-111	250 - 275 mm		±12 µm		**£610.00**
143-112	275 - 300 mm			7 µm	**£649.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Parallelism	Price
143-121	0 - 1"	.001"	±.00025"	.00012"	**£312.00**
143-122	1 - 2"		±.0002"		**£334.00**
143-123	2 - 3"		±.00035"		**£340.00**

Dimensions

Unit: mm



Range	L	a	b	c
0 - 25 mm	0	20.3	11.1	28.6
25 - 50 mm	25			
50 - 75 mm	50			
75 - 100 mm	75			
100 - 125 mm	100			
125 - 150 mm	125			

Range	L	a	b	c
150 - 175 mm	150	20.3	11.1	28.6
175 - 200 mm	175			
200 - 225 mm	200	16.3	15.0	32.5
225 - 250 mm	225			
250 - 275 mm	250			
275 - 300 mm	275			

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Micrometers

SERIES 125 – Screw Thread Micrometer

- Fixed anvil type to suit 60° threads.
- Directly indicates screw pitch diameter (no need for calculation).
- Equipped with Ratchet Stop for constant measuring force.



125-103



Technical Data

Spindle feed error: 3 µm

Optional Accessories

Setting standards refer to page B-64.

Specifications

Metric

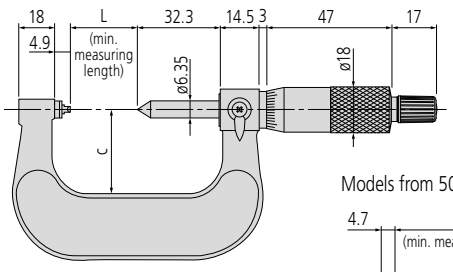
Code No.	Thread to be measured (Metric/Unified)	Range	Graduation	Price
125-101	0.4-0.5 mm/64-48 TPI	0-25 mm	0.01 mm	**£204.00**
125-102	0.6-0.9 mm/44-28 TPI			**£204.00**
125-103	1-1.75 mm/24-14 TPI			**£204.00**
125-104	2-3 mm/13-9 TPI			**£204.00**
125-105	3.5-5 mm/8-5 TPI			**£204.00**
125-106	0.4-0.5 mm/64-48 TPI	25-50 mm		**£283.00**
125-107	0.6-0.9 mm/44-28 TPI			**£283.00**
125-108	1-1.75 mm/24-14 TPI			**£283.00**
125-109	2-3 mm/13-9 TPI			**£283.00**
125-110	3.5-5 mm/8-5 TPI			**£283.00**
125-111	0.6-0.9 mm/44-28 TPI	50-75 mm		**£320.00**
125-112	1-1.75 mm/24-14 TPI			**£320.00**
125-113	2-3 mm/13-9 TPI			**£320.00**
125-114	3.5-5 mm/8-5 TPI			**£320.00**
125-115	5.5-7 mm/4.5-3.5 TPI			**£320.00**
125-116	0.6-0.9 mm/44-28 TPI	75-100 mm		**£338.00**
125-117	1-1.75 mm/24-14 TPI			**£338.00**
125-118	2-3 mm/13-9 TPI			**£338.00**
125-119	3.5-5 mm/8-5 TPI			**£338.00**
125-120	5.5-7 mm/4.5-3.5 TPI			**£338.00**

Note: A setting standard is supplied with each model (except for 0-25 mm measuring range). The setting standard is for metric threads (unified) 60°.

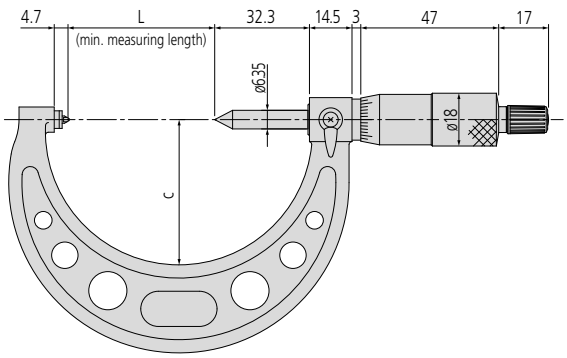
Dimensions

Unit: mm

Models up to 50 mm maximum measuring range



Models from 50 to 100 mm maximum measuring range



Range	L	c
0-25 mm	0	25
25-50 mm	25	32
50-75 mm	50	49
75-100 mm	75	63

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Micrometers

SERIES 326 – Digimatic Interchangeable Anvil Screw Thread Micrometer

- Anvils and spindle tips are interchangeable in matching pairs to enable measurement of Metric/Unified or Whitworth threads.
- Direct reading of screw pitch diameter (no need for calculation).
- Equipped with Ratchet Stop for constant measuring force.
- Interchangeable anvils/spindle tips are optional.

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326-351-30



Interchangeable anvils / spindle tips (optional).

Technical Data

Spindle feed error: .00015" (3 µm)
Battery: SR44 (2 pcs) **938882**

Functions

Origin point setting (ABS measurement system):
Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:
Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility where the instrument must be moved away from the workpiece before the reading can be recorded.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

Interchangeable anvil/spindle tip sets refer to page B-29.
Setting standards refer to page B-62.

*U-WAVE-R Receiver required.



Specifications

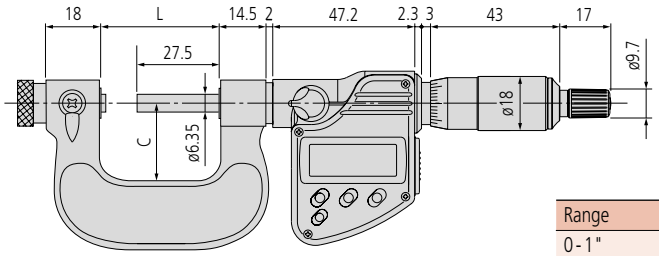
Inch/Metric

Code No.	Range	Resolution	Price
326-351-30	0-1" (0-25.4 mm)	.00005" (0.001 mm)	£710.00
326-352-30	1-2" (25.4-50.8 mm)		£778.00
326-353-30	2-3" (50.8-76.2 mm)		£815.00
326-354-30	3-4" (76.2-101.6 mm)		£847.00

Note: A matching setting standard is supplied with each model (except for 0-25 mm measuring range). The setting standard is for metric threads (unified) 60°.

Dimensions

Unit: mm



Range	L	c
0-1"	39.5	25
1-2"	64.5	32
2-3"	90	45
3-4"	115.6	65

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Micrometers

SERIES 126 – Interchangeable Anvil Screw Thread Micrometer

- Anvils and spindle tips are interchangeable in matching pairs to enable measurement of Metric/Unified or Whitworth threads.
- Direct reading of screw pitch diameter (no need for calculation).
- Equipped with Ratchet Stop for constant measuring force.
- Interchangeable anvils/spindle tips are optional.

B



126-125

Specifications

Metric

Code No.	Range	Graduation	Price
126-125	0 - 25 mm	0.01 mm	£280.00
126-126	25 - 50 mm		£352.00
126-127	50 - 75 mm		£362.00
126-128	75 - 100 mm		£375.00
126-129	100 - 125 mm		£434.00
126-130	125 - 150 mm		£516.00
126-131	150 - 175 mm		£629.00
126-132	175 - 200 mm		£728.00
126-133	200 - 225 mm		£764.00
126-134	225 - 250 mm		£768.00
126-135	250 - 275 mm		£902.00
126-136	275 - 300 mm		£921.00

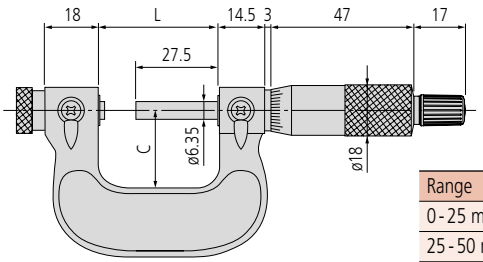
Inch

Code No.	Range	Graduation	Price
126-137	0 - 1"	.001"	£280.00
126-138	1 - 2"		£352.00
126-139	2 - 3"		£362.00
126-140	3 - 4"		£375.00
126-141	4 - 5"		£434.00
126-142	5 - 6"		£516.00
126-143	6 - 7"		£629.00

Note: A matching setting standard is supplied with each model (except for 0 - 25 mm measuring range). The standard is for metric threads (unified) 60°.

Dimensions

Unit: mm



Range	L	c
0 - 25 mm	39.5	25
25 - 50 mm	64.5	32
50 - 75 mm	90	45
75 - 100 mm	115.6	65
100 - 125 mm	140.6	79
125 - 150 mm	165.6	93

Range	L	c
150 - 175 mm	190.5	105
175 - 200 mm	215.5	120
200 - 225 mm	240.5	130
225 - 250 mm	265.5	147
250 - 275 mm	290.5	165
275 - 300 mm	315.5	171

Technical Data

Spindle feed error: 3 µm/.00015"

Optional Accessories

Interchangeable anvils/spindle tips



For Metric/Unified threads (pair)

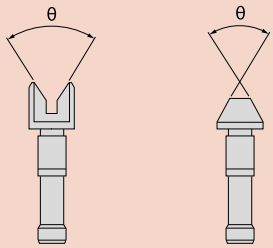
Code No.	Metric	UNF	Price
126-801	0.4 - 0.5 mm	64 - 48	£59.60
126-802	0.6 - 0.9 mm	44 - 28	£59.60
126-803	1 - 1.75 mm	24 - 14	£59.60
126-804	2 - 3 mm	13 - 9	£59.60
126-805	3.5 - 5 mm	8 - 5	£59.60
126-806	5.5 - 7 mm	4.5 - 3.5	£59.60

For Whitworth threads (pair)

Code No.	TPI	Price
126-811	60 - 48	£59.60
126-812	48 - 40	£59.60
126-813	40 - 32	£59.60
126-814	32 - 24	£59.60
126-815	24 - 18	£59.60
126-816	18 - 14	£59.60
126-817	14 - 10	£59.60
126-818	10 - 7	£59.60
126-819	7 - 4.5	£59.60
126-820	4.5 - 3.5	£59.60

Sets

Code No.	Description	Price
126-800	Consists of **126-801** to **126-806**	£399.00
126-810	Consists of **126-811** to **126-820**	£658.00



Allowable error in the vee/cone angles

Type	Metric (Unified)	Whitworth	Half-angle error
Pitch (mm), Nominal designation of threads per inch		W1	±30'
	M1 (U1)	W2	±30'
		W3	±20'
	M2 (U2)	W4	±20'
		W5	±15'
	M3 (U3)	W6	±15'
	M4 (U4)	W7	±10'
		W8	±10'
	M5 (U5)	W9	±10'
	M6 (U6)	W10	±10'

Setting standards refer to page B-62.

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Micrometers

SERIES 313 – Three-Wire Units

- Enables measurement of the pitch diameter (effective diameter) of screw threads with a standard micrometer using the *three-wire method*.

Technical Data

Roundness:	0.5 µm or less
Cylindricity:	1 µm or less
Hardness:	63 to 66 HRC
Max. permissible error J MPE:	±2 µm





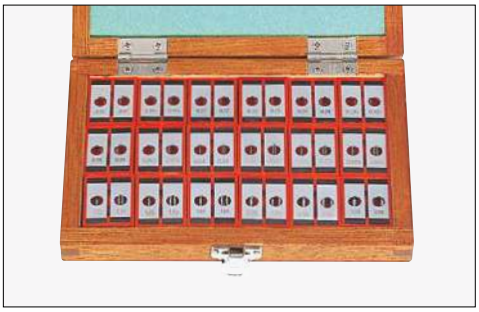
952141

B

Specifications

Code No.	No. of units in set	Wire diameter range (mm)	Support spindle (mm)	Price
Three-wire unit set				
313-101	18	0.170 - 3.200	ø6.35	**£3,610.00**

Code No.	Wire diameter (mm)	Thread type			Price
		Metric (mm)	Unified (threads per inch)	Whitworth (threads per inch)	
One pair, support spindle ø6.35 mm (ø.25")					
952131	0.170	0.2, 0.25, 0.3	80	—	**£205.00**
952132	0.195	0.35	72	—	**£205.00**
952133	0.220	0.4	64	—	**£205.00**
952134	0.250	0.45	56	60	**£205.00**
952135	0.290	0.5	48	48	**£205.00**
952136	0.335	0.6	44, 40	40	**£205.00**
952137	0.390	0.7	36	36	**£205.00**
952138	0.455	0.75, 0.8	32	32	**£205.00**
952139	0.530	0.9	28	28, 26	**£205.00**
952140	0.620	1.0	24	24, 22	**£205.00**
952141	0.725	1.25	20	20, 19, 18	**£205.00**
952142	0.895	1.5	18, 16	16	**£205.00**
952143	1.100	1.75, 2.0	14, 13, 12	14, 12	**£205.00**
952144	1.350	2.5	11, 10	11, 10	**£205.00**
952145	1.650	3.0	9, 8	9, 8	**£205.00**
952146	2.050	3.5	7	7	**£205.00**
952147	2.550	4, 4.5	6	6	**£205.00**
952148	3.200	5, 5.5, 6	5, 4.5	5, 4.5	**£205.00**



313-101

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Micrometers

SERIES 169 – Paper Thickness Micrometer



- Ideal where a greater contact area is advantageous such as when measuring soft and thin workpieces such as paper, felt, rubber, cardboard, fabrics and similar materials.
- Non-rotating spindle ensures no twisting action is applied to the material being measured.
- Equipped with Ratchet Stop for constant measuring force (8 ± 0.8 N).



169-103-10

Specifications

Metric

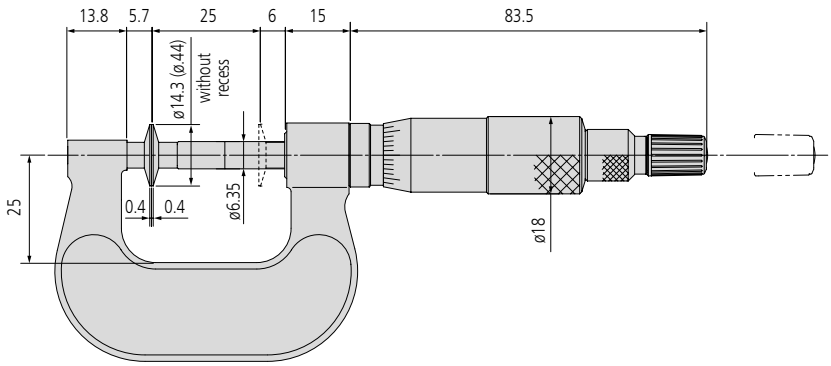
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Flatness	Parallelism	Price
169-101-10	0 - 25 mm	0.01 mm	±4 µm	1 µm	3 µm	**£252.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Flatness	Parallelism	Price
169-103-10	0 - 1"	.001"	±.0002"	.00004"	.00015"	**£252.00**

Dimensions

Unit: mm (inch)



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Micrometers

SERIES 323 – Digimatic Disc Micrometer

- Can be used for making root tangent measurements on spur gears and helical gears.
- Equipped with Ratchet Stop for constant measuring force.
- Supplied with a setting standard (except for 0-25 mm/0-1" measuring range).

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink® ENABLED Data Management Software by Mitutoyo



323-350-30

Technical Data

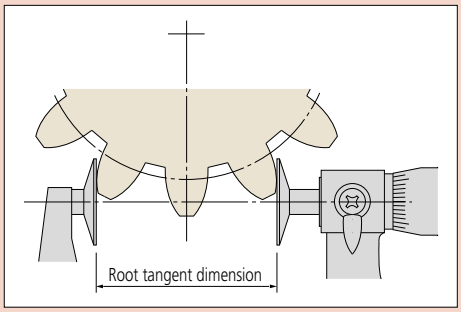
Flatness: .00004" (1 µm)
Parallelism: .0002" (4 µm) for models up to 2",
.0003" (6 µm) for models up to 4"
Battery: SR44 (2 pcs) **938882**

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.





Root tangent measurement.

Specifications

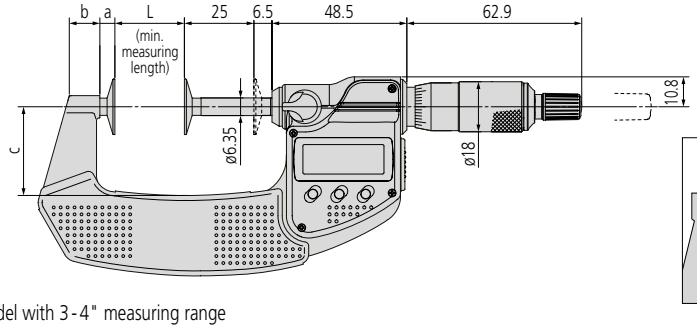
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Anvil	Measurable module	Price
323-350-30	0-1" (0-25.4 mm)	.00005" (0.001 mm)	±.0002" (± 4 µm)	ø.787" (ø20 mm)	0.5-6	£606.00
323-351-30	1-2" (25.4-50.8 mm)					£667.00
323-352-30	2-3" (50.8-76.2 mm)		±.0003" (± 6 µm)			£705.00
323-353-30	3-4" (76.2-101.6 mm)					£803.00

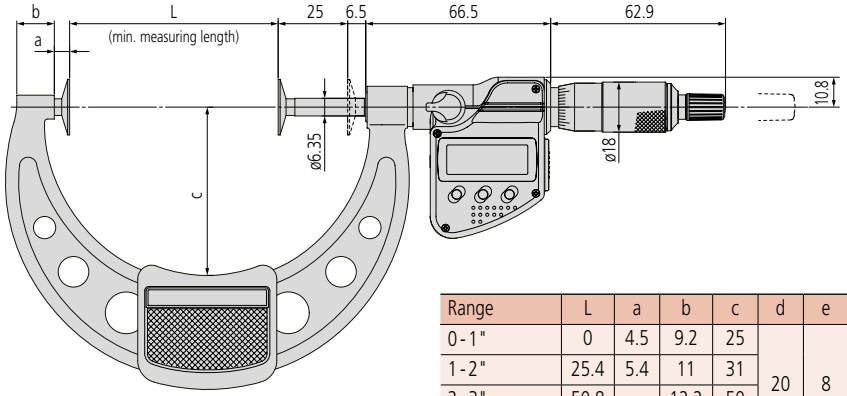
Dimensions

Unit: mm

Models up to 3" maximum measuring range



Model with 3-4" measuring range



Range	L	a	b	c	d	e	t
0-1"	0	4.5	9.2	25	20	8	0.7
1-2"	25.4	5.4	11	31			
2-3"	50.8	5.5	12.2	50			
3-4"	76.2		14	60			

Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances.
Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Micrometers

SERIES 123 – Disc Micrometer

- Can be used for making root tangent measurements on spur gears and helical gears.
- Equipped with Ratchet Stop for constant measuring force.
- Supplied with a setting standard (except for 0-25 mm/0-1" measuring range).

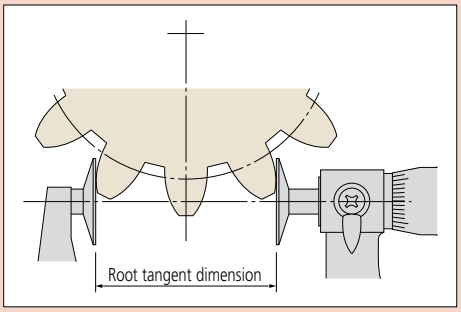


123-101

Technical Data

Flatness:	1 µm/.00004" for models up to 100 mm /4", 1.6 µm/.000063" for models over 100 mm/4"
Parallelism:	4 µm/.0002" for models up to 50 mm/2", 6 µm/.0003" for models up to 100 mm/4"

* R = max. range (mm).
Note: Fractions rounded up.



Root tangent (En).

Specifications

Metric

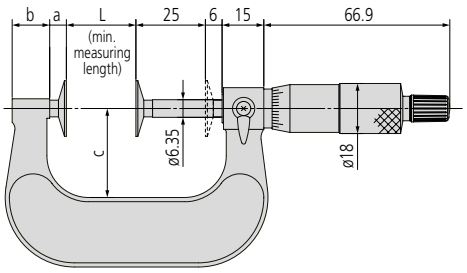
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Anvil	Measurable module	Price
123-101	0-25 mm	0.01 mm	±4 µm	ø20 mm	0.5-6	**£244.00**
123-102	25-50 mm					**£276.00**
123-103	50-75 mm		±6 µm			**£302.00**
123-104	75-100 mm					**£318.00**
123-105	100-125 mm		±7 µm	ø30 mm	0.7-11	**£310.00**
123-106	125-150 mm					**£328.00**
123-107	150-175 mm		±8 µm			**£334.00**
123-108	175-200 mm					**£346.00**
123-109	200-225 mm					**£351.00**
123-110	225-250 mm		±9 µm			**£371.00**
123-111	250-275 mm					**£399.00**
123-112	275-300 mm					**£421.00**

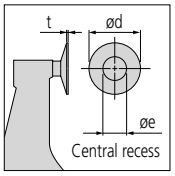
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Anvil	Measurable module	Price
123-125	0-1"	.001"	±.0002"	ø.787"	0.5-6	**£244.00**
123-126	1-2"					**£276.00**
123-127	2-3"		±.0003"			**£302.00**
123-128	3-4"					**£318.00**

Dimensions

Unit: mm





Range	L	a	b	c	d	e	t
0-25 mm	0	6	14	25	20	8	0.7
25-50 mm	25			32			
50-75 mm	50	5.5	11	49			
75-100 mm	75			63			

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Micrometers

SERIES 324 – Digimatic Interchangeable Anvil Gear Tooth Micrometer

- Intended for making *over-pin diameter* measurements on gears using precision ball anvils/spindle tips.
- Interchangeable steel (or carbide) ball anvils/spindle tips for various gear modules (0.5 - 5.25) are optional (see page B-36 for details).
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



324-351-30

Technical Data

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

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

Interchangeable anvil/spindle tip sets refer to page B-35.

* U-WAVE-R Receiver required.



Specifications

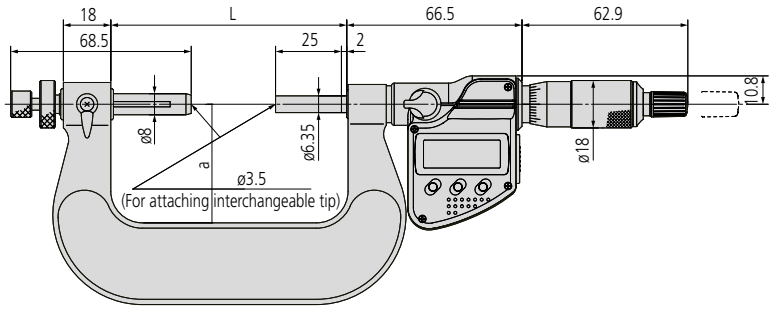
Inch/Metric

Code No.	Range	Resolution	Spindle feed error	Price
324-351-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	0.00015" (3 µm)	£730.00
324-352-30	1 - 2" (25.4 - 50.8 mm)			£777.00
324-353-30	2 - 3" (50.8 - 76.2 mm)			£821.00
324-354-30	3 - 4" (76.2 - 101.6 mm)			£876.00

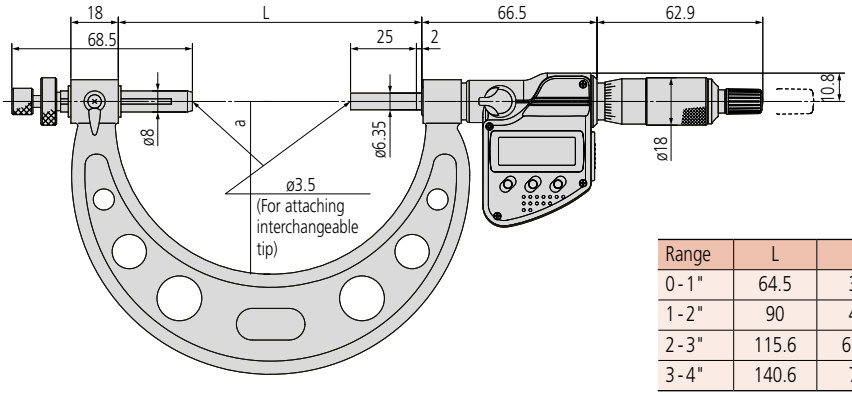
Dimensions

Unit: mm

Models up to 2" maximum measuring range



Models with a maximum measuring range over 2"



Range	L	a
0 - 1"	64.5	32
1 - 2"	90	45
2 - 3"	115.6	65.5
3 - 4"	140.6	79

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Micrometers

SERIES 124 – Interchangeable Anvil Gear Tooth Micrometer

- Intended for making *over-pin diameter* measurements on gears using precision ball anvils/spindle tips.
- Interchangeable steel (or carbide) ball anvils/spindle tips for various gear modules (0.5 - 5.25) are optional.
- Equipped with Ratchet Stop for constant measuring force.



124-173

Specifications

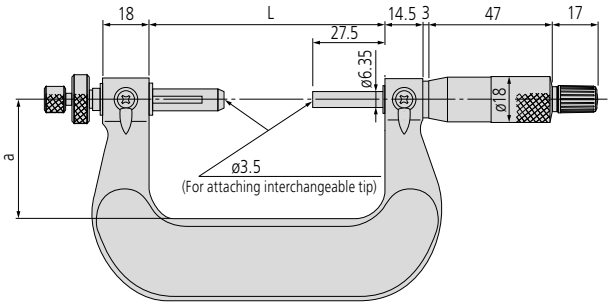
Metric

Code No.	Range	Graduation	Spindle feed error	Price
124-173	0 - 25 mm	0.01 mm	3 µm	£335.00
124-174	25 - 50 mm			£360.00
124-175	50 - 75 mm			£384.00
124-176	75 - 100 mm			£397.00
124-177	100 - 125 mm			£421.00
124-178	125 - 150 mm			£446.00
124-179	150 - 175 mm			£544.00
124-180	175 - 200 mm			£582.00
124-181	200 - 225 mm			£631.00
124-182	225 - 250 mm			£692.00
124-183	250 - 275 mm			£730.00
124-195	275 - 300 mm			£791.00

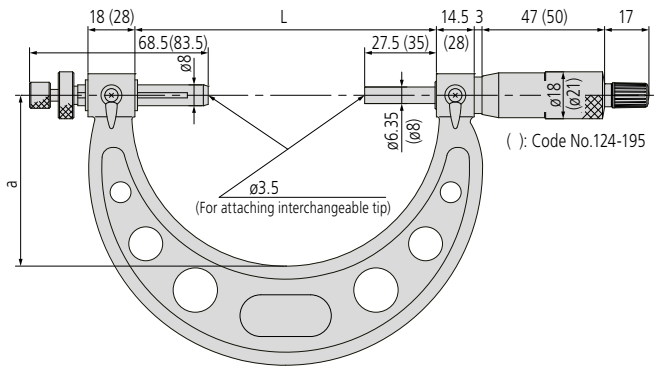
Dimensions

Unit: mm

Models with a maximum measuring range up to 50 mm



Models with a maximum measuring range 75 - 300 mm



Range	L	a
0 - 25 mm	64.5	32
25 - 50 mm	90	45
50 - 75 mm	115.6	65
75 - 100 mm	140.6	79
100 - 125 mm	165.6	93
125 - 150 mm	190.5	105
150 - 175 mm	215.5	120
175 - 200 mm	240.5	130
200 - 225 mm	265.5	147
225 - 250 mm	290.5	165
250 - 275 mm	315.5	171
275 - 300 mm	353	187

Interchangeable Anvils / Spindle Tips

Code No.	Diameter* (mm)	Gear module	Dia. pitch	Price
124-801	ø0.8	0.5 - 0.55	50	£119.00
124-802	ø1.0	0.6 - 0.65	45	£119.00
124-803	ø1.191 ($^{3}/_{64}$")	0.7 - 0.8	35 - 30	£119.00
124-821	ø1.5	0.9 - 1	28 - 26	£119.00
124-804	ø1.588 ($^{1}/_{16}$")	0.9 - 1	28 - 26	£119.00
124-805	ø2.0	1.25	22	£119.00
124-806	ø2.381 ($^{3}/_{32}$")	1.5	17	£119.00
124-822	ø2.5	1.5	17	£119.00
124-807	ø3.0	1.75	15	£119.00
124-808	ø3.175 ($^{1}/_{8}$")	—	14	£119.00
124-823	ø3.5	2	13	£119.00
124-809	ø3.969 ($^{5}/_{32}$")	2	13	£119.00
124-810	ø4.0	2.25	11	£119.00
124-824	ø4.5	2.5	10	£119.00
124-811	ø4.763 ($^{3}/_{16}$")	2.5	10	£119.00
124-812	ø5.0	2.75	9	£119.00
124-813	ø5.556 ($^{7}/_{32}$")	3.0 - 3.25	8	£119.00
124-814	ø6.0	3.5	7	£119.00
124-815	ø6.35 ($^{1}/_{4}$")	3.75	7	£119.00
124-816	ø7.0	4.0	6.5	£119.00
124-817	ø7.144 ($^{9}/_{32}$")	4.25	6	£119.00
124-818	ø7.938 ($^{5}/_{16}$")	4.5	5.5	£119.00
124-819	ø8.0	4.75	5.5	£119.00
124-820	ø8.731 ($^{11}/_{32}$")	0.5 - 5.25	5	£119.00

* ø2 mm or less/carbide-tipped type.

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Micrometers

SERIES 369 – Digimatic Non-Rotating Spindle Disc Micrometer

- Can be used for making root tangent measurements on spur gears and helical gears.
- Measurable range of gear pitch: 0.5 to 6 module.
- Equipped with Ratchet Stop for constant measuring force.
- Supplied with a setting standard (except for 0 - 25 mm/0 - 1" measuring range).

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



369-350-30

Technical Data

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

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

* U-WAVE-R Receiver required.



Specifications

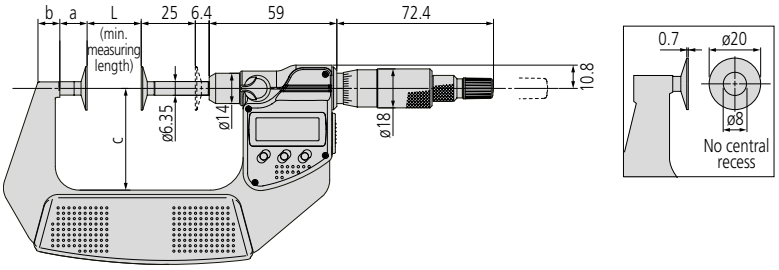
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Anvil	Flatness	Parallelism	Price
369-350-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.0002" (±4 µm)	ø20	.00004" (1 µm)	.0002" (4 µm)	**£778.00**
369-351-30	1 - 2" (25.4 - 50.8 mm)						**£881.00**
369-352-30	2 - 3" (50.8 - 76.2 mm)		±.0003" (±6 µm)			.0003" (6 µm)	**£922.00**
369-353-30	3 - 4" (76.2 - 101.6 mm)						**£952.00**

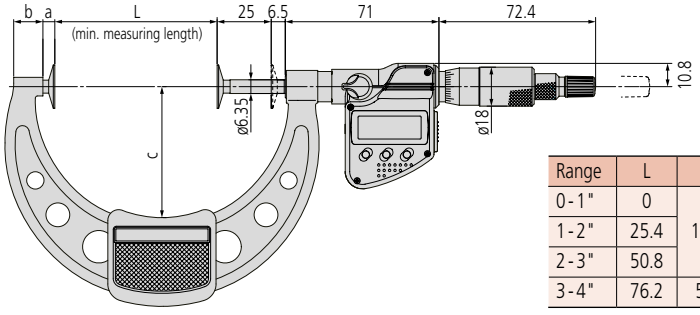
Dimensions

Unit: mm

Models up to 3" maximum measuring range



Model with 3 - 4" measuring range



Range	L	a	b	c
0 - 1"	0	12.9	7	32
1 - 2"	25.4		9.8	47
2 - 3"	50.8		11.2	60
3 - 4"	76.2	5.5	13.5	

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Mitutoyo

Micrometers

SERIES 169 – Non-Rotating Spindle Disc Micrometer

- Can be used for making root tangent measurements on spur gears and helical gears.
- Measurable range of gear pitch: 0.5 to 6 module.
- Equipped with Ratchet Stop for constant measuring force.
- Supplied with a setting standard (except for 0-25 mm/0-1" measuring range).



169-203-10



169-205-10

B

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Anvil	Flatness	Parallelism	Price
169-201-10	0-25 mm	0.01 mm	±4 µm	ø20	1 µm	4 µm	**£266.00**
169-202-10	25-50 mm						**£301.00**
169-205-10	50-75 mm		±6 µm			6 µm	**£325.00**
169-207-10	75-100 mm						**£353.00**

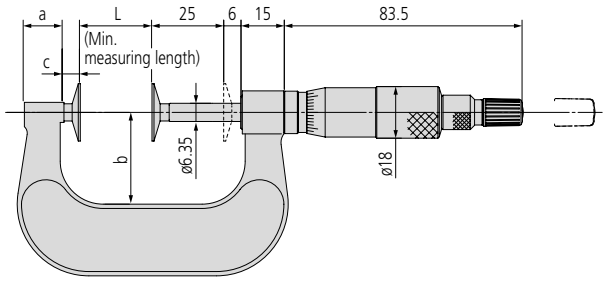
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Anvil	Flatness	Parallelism	Price
169-203-10	0-1"	.001"	±.0002"	ø20	.00004"	.00016"	**£266.00**
169-204-10	1-2"						**£301.00**
169-206-10	2-3"		±.0003"			.00024"	**£325.00**
169-208-10	3-4"						**£292.00**

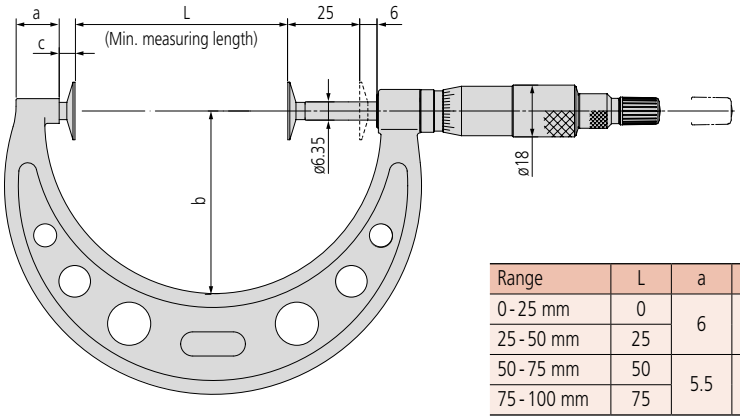
Dimensions

Unit: mm

Models up to 50 mm maximum measuring range



Models over 50 mm maximum measuring range



Range	L	a	b	c
0-25 mm	0	6	13.5	25
25-50 mm	25			32
50-75 mm	50	5.5	13	49
75-100 mm	75			63

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Micrometers

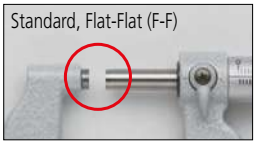
SERIES 389 – Digimatic Sheet Metal Micrometer

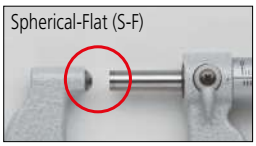
- The large throat depth makes this micrometer ideal for measuring the thickness of sheet metal at a considerable distance from the edge.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.
- Profile of measuring faces: Flat-Flat, Spherical-Flat and Spherical-Spherical.

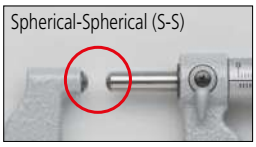
DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



389-351-30







Technical Data

Flatness:	.000024" (0.6 µm) for models up to 6" (150 mm) throat, .00004" (1.0 µm) for models with 12" (300 mm) throat
Parallelism:	.00012" (3 µm)
Battery:	SR44 (1 pc), **938882** (2 pcs: **389-714**)

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*[1]	**£242.00**
264-623	U-WAVE-TM transmitter*[1]	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

*[1] U-WAVE-R Receiver required.



Specifications

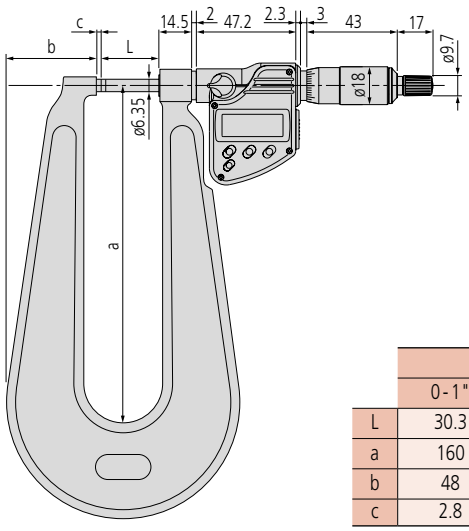
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Throat depth*[2]	Measuring surfaces	Price
389-351-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.0002" (±4 µm)	6" (150 mm)	F-F	**£600.00**
389-361-30					S-F	**£600.00**
389-371-30					S-S	**£681.00**
389-352-30	1 - 2" (25.4 - 50.8 mm)		±.0002" (±4 µm)	6" (150 mm)	F-F	**£705.00**
389-362-30					S-F	**£752.00**
389-372-30					S-S	**£752.00**

*[2] Models with a 300 mm (12") throat are equipped with a stand for convenience of measurement in the horizontal orientation.

Dimensions

Unit: mm



	Range	
	0 - 1"	1 - 2"
L	30.3	55.3
a	160	165
b	48	45
c	2.8	2.5

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Mitutoyo

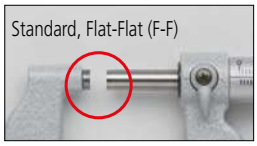
Micrometers

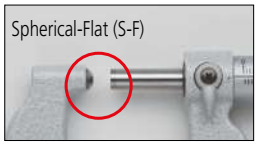
SERIES 118 – Sheet Metal Micrometer

- The large throat depth makes this micrometer ideal for measuring the thickness of sheet metal at a considerable distance from the edge.
- Measuring faces: carbide.
- Profile of measuring faces: Flat-Flat, Spherical-Flat and Spherical-Spherical.
- Equipped with Ratchet Stop for constant measuring force.



118-102







Technical Data

Flatness:	0.6 µm/.000024" for models up to 150 mm/6" throat, 1.0 µm/.00004" for models with 300 mm/12" throat
Parallelism:	3 µm/.00012"

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Throat depth*	Measuring surfaces	Price
118-101	0 - 25 mm	0.01 mm	±4 µm	100 mm	F-F	**£187.00**
118-102				150 mm		**£196.00**
118-114					S-F	**£242.00**
118-118					S-S	**£252.00**
118-103			±5 µm	300 mm	F-F	**£360.00**
118-110	25 - 50 mm		±4 µm	150 mm		**£252.00**
118-126					S-S	**£269.00**

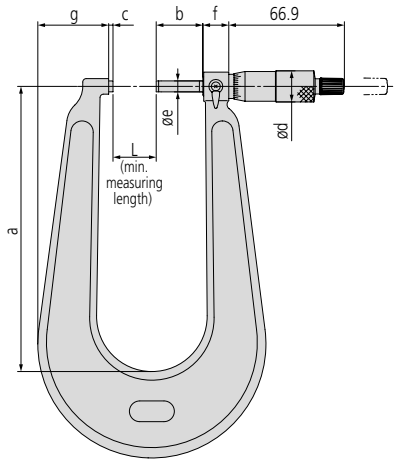
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Throat depth*	Measuring surfaces	Price
118-129	0 - 1"	.0001"	±.0002"	6"	F-F	**£196.00**
118-116					S-F	**£242.00**
118-120					S-S	**£252.00**
118-107		.001"	±.00025"	12"	F-F	**£322.00**
118-112	1 - 2"		±.0002"	6"		**£252.00**

* Models with a 300 mm (12") throat are equipped with a stand for convenience of measurement in the horizontal orientation.

Dimensions

Unit: mm



Code No.	L	a	b	c	d	e	f	g
118-101	0	110	27.5	2.8	18	6.35	14.5	39
118-102		160						48
118-114								
118-118								
118-103		330	35	3.5	21	8	28	84
118-110	25	165	27.5	2.5	18	6.35	14.5	45

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Micrometers

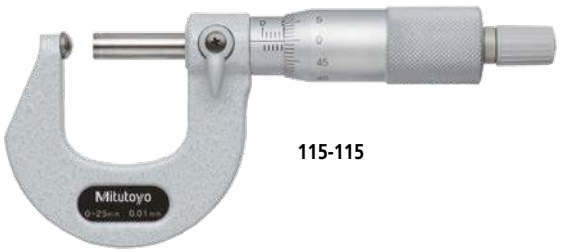
SERIES 395,115 – Tube Micrometers

- Designed to measure workpieces with concave-convex surfaces such as the wall thickness of tubes and pipes.
- Measuring faces: carbide (**115-101**: only the spindle is carbide tipped).
- 395 series: IP65 digital spherical-flat anvil type micrometer.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



395-351-30



115-115

Technical Data

Flatness: .000024" / 0.6 µm:115 series
.000012" (0.3 µm): 395 series
Battery: SR44 (1 pc), **938882**: 395 series

Optional Accessories (for 395 series only)

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

* U-WAVE-R Receiver required.



Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	D	Price
Digimatic					
395-351-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.0001" (±2 µm)	ø.59" (ø15 mm)	**£499.00**
395-352-30	1 - 2" (25.4 - 50.8 mm)				**£543.00**
395-353-30	2 - 3" (50.8 - 76.2 mm)			ø.75" (ø19 mm)	**£603.00**
395-354-30	3 - 4" (76.2 - 101.6 mm)		±.00015" (±3 µm)		**£581.00**

Metric

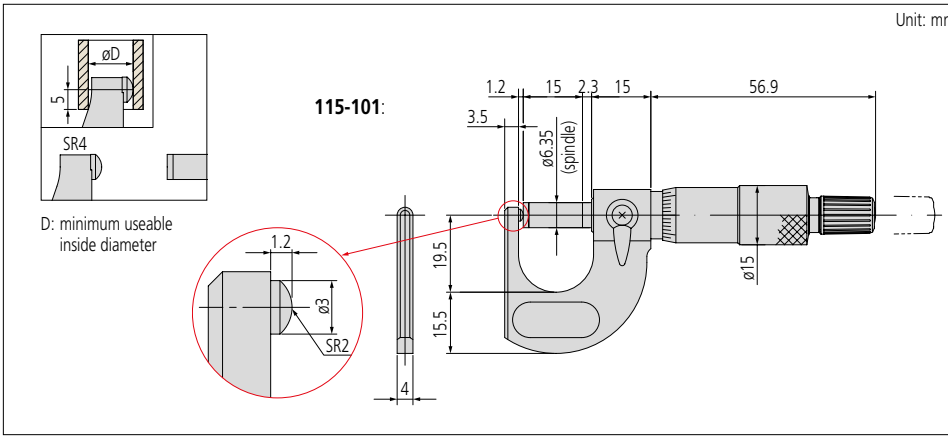
Code No.	Range	Graduation	Max. permissible error J_{MPE}	D	Price
115-101	0 - 15 mm	0.01 mm	±3 µm	ø5.5 mm	**£187.00**
115-115	0 - 25 mm			ø10 mm	**£118.00**
115-116	25 - 50 mm			ø11 mm	**£120.00**
115-117	50 - 75 mm			ø17 mm	**£122.00**
115-118	75 - 100 mm		±4 µm	ø18 mm	**£146.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	D	Price
115-153	0 - 1"	.0001"	±.00015"	ø.40"	**£118.00**

Dimensions

Unit: mm



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Mitutoyo

Micrometers

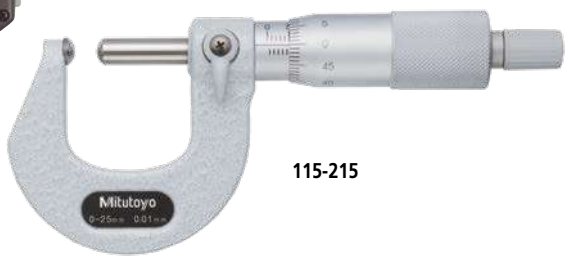
SERIES 395,115 – Spherical Anvil and Spindle Tube Micrometers

- Designed to measure workpieces with concave-concave surfaces such as the race-wall thickness of anti-friction bearings.
- Measuring faces: carbide (**115-201**: only the spindle is carbide tipped).
- 395 series: Digimatic type IP65 rated with spherical anvil and spindle.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



395-371-30



115-215

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	D	Price
Digimatic					
395-371-30	0 - 1" (0 - 25.4 mm)	.00005" (0.001 mm)	±.0001" (±2 µm)	ø.59" (ø15 mm)	**£499.00**
395-372-30	1 - 2" (25.4 - 50.8 mm)				**£543.00**
395-373-30	2 - 3" (50.8 - 76.2 mm)			ø.75" (ø19 mm)	**£603.00**
395-374-30	3 - 4" (76.2 - 101.6 mm)		±.00015" (±3 µm)	ø.79" (ø20 mm)	**£631.00**

Metric

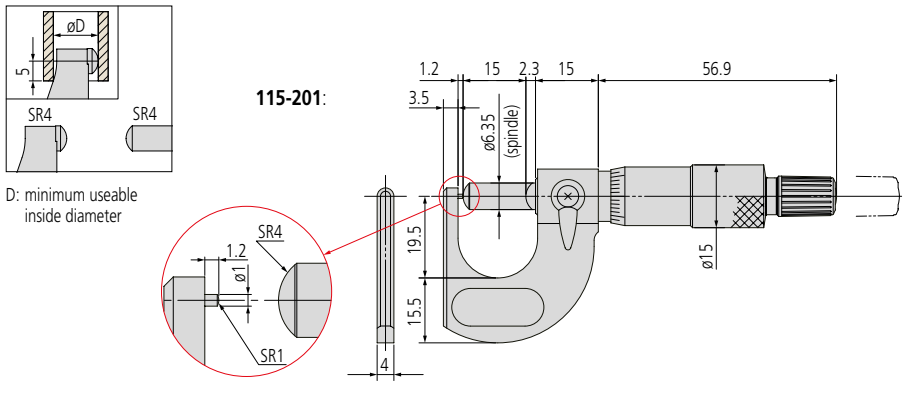
Code No.	Range	Graduation	Max. permissible error J_{MPE}	D	Price
115-201	0 - 15 mm	0.01 mm	±3 µm	ø5.5 mm	**£153.00**
115-215	0 - 25 mm			ø10 mm	**£138.00**
115-216	25 - 50 mm			ø11 mm	**£150.00**
115-217	50 - 75 mm			ø17 mm	**£163.00**
115-218	75 - 100 mm		±4 µm	ø18 mm	**£174.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	D	Price
115-253	0 - 1"	.0001"	±.00015"	ø.40"	**£138.00**
115-242	1 - 2"	.001"		ø.44"	**£150.00**
115-243	2 - 3"			ø.67"	**£163.00**

Dimensions

Unit: mm



Technical Data

Battery: SR44 (1 pc), **938882**: 395 series

Optional Accessories (for 395 series only)

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

* U-WAVE-R Receiver required.



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Micrometers

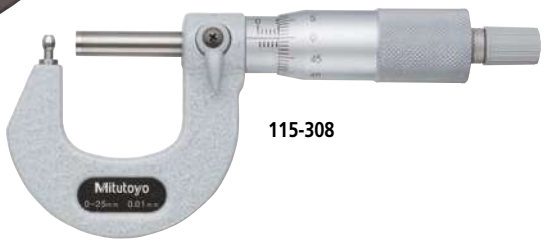
SERIES 395,115 – Cylindrical/Spherical Anvil Tube Micrometers

- Spindle face: carbide.
- 395 series: Digimatic type IP65 rated with a choice of spherical or cylindrical anvils.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



395-363-30



115-308

Technical Data

Battery: SR44 (1 pc), **938882**: 395 series

Optional Accessories (for 395 series only)

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

* U-WAVE-R Receiver required.





BMB1



BMB2



BMB3



BMB4

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Type	Price
Digimatic					
395-362-30	0-1" (0-25.4 mm)	.00005" (0.001 mm)	±.00015" (±3 µm)	BMB2	**£486.00**
395-363-30				BMB3	**£558.00**
395-364-30				BMB4	**£558.00**

Metric

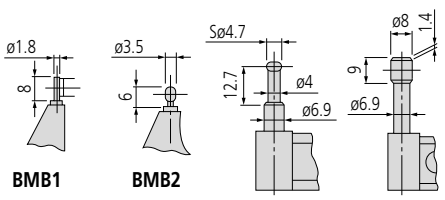
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Type	Price
115-302	0-25 mm	0.01 mm	±3 µm	BMB1	**£122.00**
115-308				BMB2	**£142.00**
115-303	25-50 mm			BMB1	**£134.00**
115-315	0-25 mm			BMB3	**£163.00**
115-316				BMB4	**£163.00**

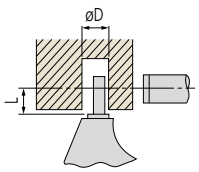
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Type	Price
115-305	0-1"	.001"	±.00015"	BMB1	**£122.00**
115-313		.0001"		BMB3	**£163.00**
115-314				BMB4	**£163.00**

Dimensions

Unit: mm





D: Minimum insertable inside diameter
L: Distance to spindle centre

Anvil	D	L
BMB1	2	4
BMB2	3.6	4
BMB3	4.8	12
BMB4	8.2	22

B

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Mitutoyo

Micrometers

SERIES 331 – Digimatic Spline Micrometer

- The anvil and spindle are of small diameter for measuring splined shafts, slots, and keyways.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



331-351-30

Technical Data

Flatness: .000012" (0.3 µm)
Resolution: .00005" (0.001 mm)
Battery: SR44 (1 pc), **938882**

Optional Accessories (for 331 series only)

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.



Specifications

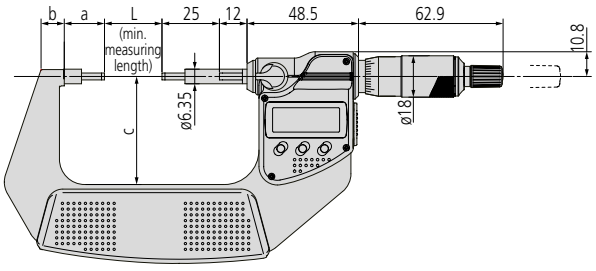
Inch/Metric

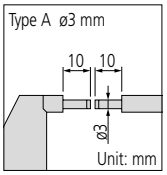
Code No.	Range	Parallelism	Max. permissible error J_{MPE}	Remarks	Price
331-351-30	0-1" (0-25.4 mm)	.00008" (2 µm)	±.0001" (±2 µm)	Type A	£557.00
331-352-30	1-2" (25.4-50.8 mm)				£642.00
331-353-30	2-3" (50.8-76.2 mm)				£667.00
331-354-30	3-4" (76.2-101.6 mm)	.00012" (3 µm)	±.00015" (±3 µm)		£766.00
331-361-30	0-1" (0-25.4 mm)	.00008" (2 µm)	±.0001" (±2 µm)	Type B	£631.00
331-362-30	1-2" (25.4-50.8 mm)				£704.00
331-363-30	2-3" (50.8-76.2 mm)				£748.00
331-364-30	3-4" (76.2-101.6 mm)	.00012" (3 µm)	±.00015" (±3 µm)		£777.00

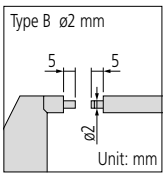
Dimensions

Unit: mm

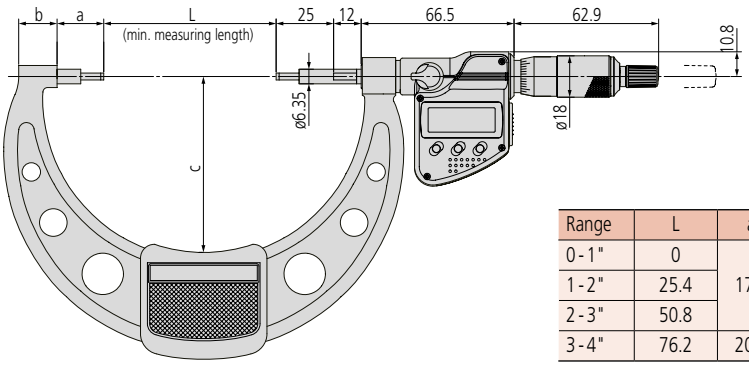
Models up to 3" maximum measuring range







Model with 3-4" measuring range



Range	L	a	b	c
0-1"	0	17.5	7.3	32.5
1-2"	25.4		10.1	47
2-3"	50.8		11.5	60
3-4"	76.2	20.3	16.7	76

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Micrometers

SERIES 111 – Spline Micrometer

Technical Data

Flatness: 0.3 µm / .000012"
Graduation: 0.01 mm / .0001"

- The anvil and spindle are of small diameter for measuring splined shafts, slots, and keyways.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.



111-115

B

Specifications

Metric

Code No.	Range	Max. permissible error J_{MPE}	Parallelism	Type	Price
111-215	0-25 mm	±3 µm	2 µm	B	**£193.00**
111-115	0-25 mm			A	**£184.00**
111-116	25-50 mm				**£212.00**
111-117	50-75 mm				**£237.00**
111-118	75-100 mm	±4 µm	3 µm		**£253.00**
111-119	100-125 mm				**£370.00**
111-120	125-150 mm				**£386.00**
111-121	150-175 mm	±5 µm			**£431.00**
111-122	175-200 mm		4 µm		**£458.00**
111-123	200-225 mm				**£499.00**
111-124	225-250 mm	±6 µm			**£519.00**
111-125	250-275 mm				**£544.00**
111-126	275-300 mm		5 µm		**£646.00**

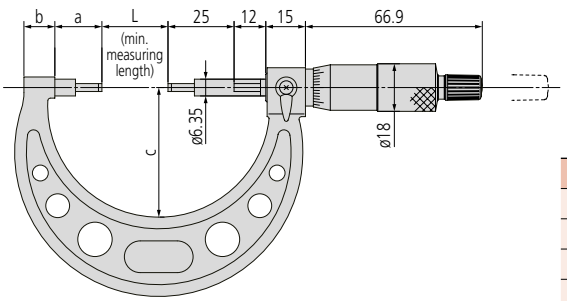
Inch

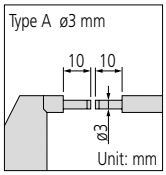
Code No.	Range	Max. permissible error J_{MPE}	Parallelism	Type	Price
111-166	0-1"	±.00015"	.00008"	A	**£184.00**

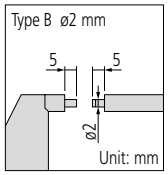
Dimensions

Unit: mm

Models up to 200 mm maximum measuring range







Range	L	a	b	c
0-25 mm	0	17.5	10	38
25-50 mm	25		12	49
50-75 mm	50		14	60
75-100 mm	75	20.3	17	79
100-125 mm	100	20.7	19	94
125-150 mm	125	21.1	20	106
150-175 mm	150	21.3	19	118
175-200 mm	175	21.7	18	130

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Micrometers

SERIES 342 – Digimatic Point Micrometer

- Pointed spindle and anvil for measuring the web thickness of drills, small grooves, keyways, and other hard-to-reach features.
- The measuring points (carbide tipped) have, approximately, a 0.3 mm radius.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



342-351-30

Specifications

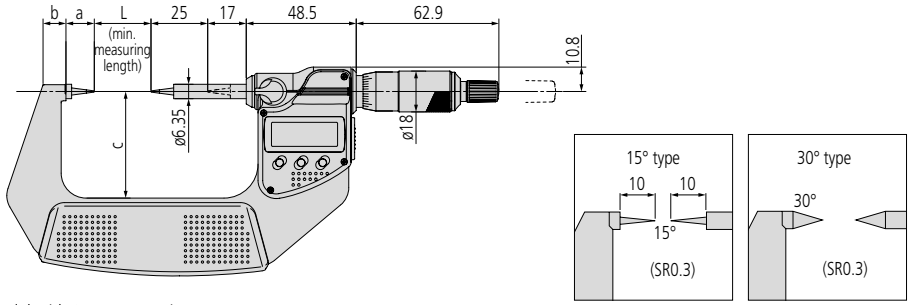
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Point	Price
342-351-30	0-1" (0-25.4 mm)	.00005" (0.001 mm)	±.0001" (±2 µm)	15°	£544.00
342-352-30	1-2" (25.4-50.8 mm)				£578.00
342-353-30	2-3" (50.8-76.2 mm)				£681.00
342-354-30	3-4" (76.2-101.6 mm)		±.00015" (±3 µm)		£750.00
342-361-30	0-1" (0-25.4 mm)		±.0001" (±2 µm)	30°	£544.00
342-362-30	1-2" (25.4-50.8 mm)				£656.00
342-363-30	2-3" (50.8-76.2 mm)				£681.00
342-364-30	3-4" (76.2-101.6 mm)		±.00015" (±3 µm)		£750.00

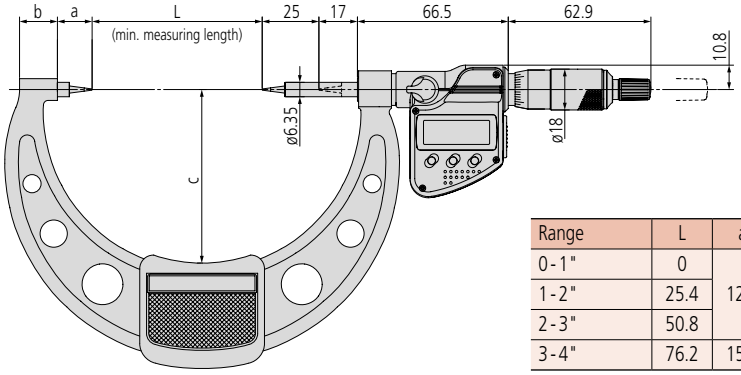
Dimensions

Unit: mm

Models up to 3" maximum measuring range



Model with 3-4" measuring range



Range	L	a	b	c
0-1"	0	12.5	7.3	32.5
1-2"	25.4		10.1	47
2-3"	50.8		11.5	60
3-4"	76.2	15.3	16.7	76

Technical Data

Battery: SR44 (1 pc), **938882**

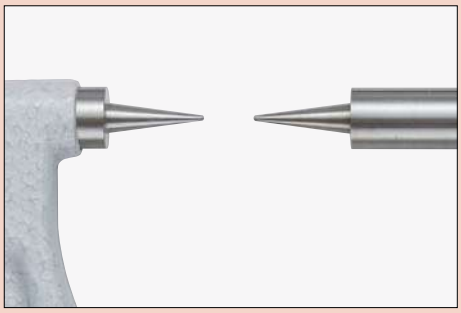
Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

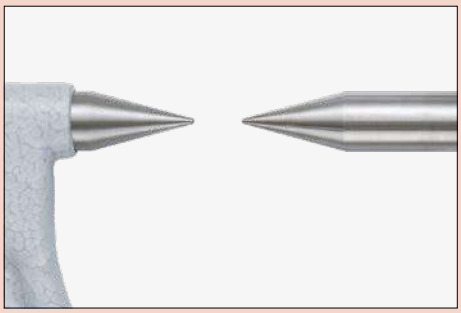
* U-WAVE-R Receiver required.



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15° angle type.



30° angle type.

Micrometers

SERIES 112 – Point Micrometer

- Pointed spindle and anvil for measuring the web thickness of drills, small grooves, keyways, and other hard-to-reach features.
- The measuring points (carbide tipped) have, approximately, a 0.3 mm radius.
- Equipped with Ratchet Stop for constant measuring force.



112-201

B

Specifications

Metric

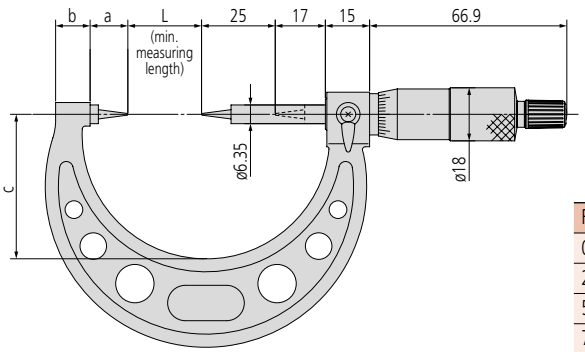
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Point	Price
112-153	0 - 25 mm	0.01 mm	±3 µm	15°	**£155.00**
112-154	25 - 50 mm				**£191.00**
112-155	50 - 75 mm				**£266.00**
112-156	75 - 100 mm		±4 µm		**£325.00**
112-201	0 - 25 mm		±3 µm	30°	**£156.00**
112-202	25 - 50 mm				**£218.00**
112-203	50 - 75 mm				**£266.00**
112-204	75 - 100 mm		±4 µm		**£285.00**
With carbide tip					
112-165	0 - 25 mm	0.01 mm	±3 µm	15°	**£268.00**
112-166	25 - 50 mm				**£305.00**
112-167	50 - 75 mm				**£325.00**
112-168	75 - 100 mm		±4 µm		**£427.00**
112-213	0 - 25 mm		±3 µm	30°	**£231.00**
112-214	25 - 50 mm				**£266.00**
112-215	50 - 75 mm				**£279.00**
112-216	75 - 100 mm		±4 µm		**£353.00**

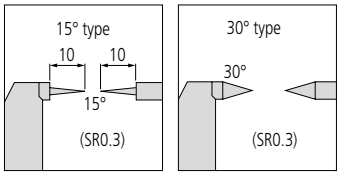
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Point	Price
112-177	0 - 1"	.001"	±.00015"	15°	**£155.00**
112-178	1 - 2"				**£191.00**
112-225	0 - 1"			30°	**£156.00**
112-226	1 - 2"				**£218.00**
With carbide tip					
112-189	0 - 1"	.001"	±.00015"	15°	**£289.00**
112-190	1 - 2"				**£305.00**
112-191	2 - 3"				**£368.00**
112-237	0 - 1"			30°	**£231.00**
112-238	1 - 2"				**£266.00**

Dimensions

Unit: mm





Range	L	a	b	c
0 - 25 mm	0	12.5	10	38
25 - 50 mm	25		12	49
50 - 75 mm	50		14	60
75 - 100 mm	75	15.3	17	79

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Mitutoyo

Micrometers

SERIES 314 – Digimatic V-Anvil Micrometer

- Measures the outside diameter of cutting tools (such as taps, reamers, end mills) which have three flutes.
- Can measure pitch diameter of screw threads.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo

B



314-351-30

Specifications

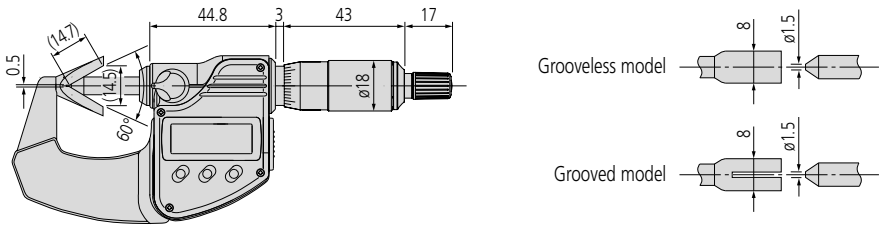
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Remarks	Anvil	Price
For 3-flute cutting tools						
314-351-30	.05 - .6" (1.27 - 15.24 mm)	.00005" (0.001 mm)	±.0002" (±4 µm)	Grooved	60°	**£788.00**
314-352-30	.4 - 1" (10.16 - 25.4 mm)					**£876.00**
314-353-30	1 - 1.6" (25.4 - 40.64 mm)		±.00025" (±5 µm)	—		**£938.00**
314-361-30	.05 - .6" (1.27 - 15.24 mm)		±.0002" (±4 µm)	—		**£788.00**
314-362-30	.4 - 1" (10.16 - 25.4 mm)			—		**£876.00**

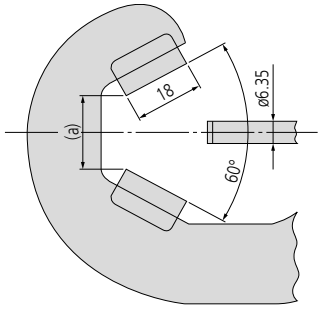
Dimensions

Unit: mm

314-351-30:



314-353-30:



Range	(a)
.4 - 1"	6.2
1 - 1.6"	19.14

Technical Data

Battery: SR44 (1 pc), **938882**

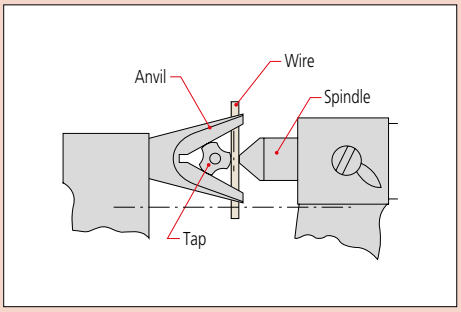
Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

Setting standards refer to page B-62.

* U-WAVE-R Receiver required.



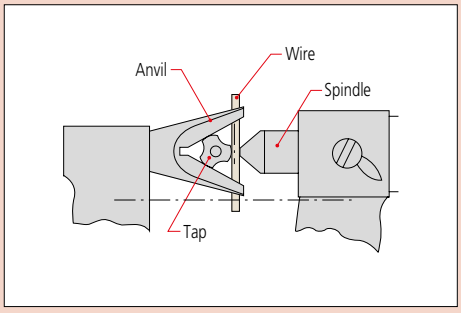


Pitch diameter measurement of tap by single-wire method.

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Optional Accessories

Setting standards refer to page B-62.



Pitch diameter measurement of tap by single-wire method.

Micrometers

SERIES 114 – Three-Flute V-Anvil Micrometer

- Measures the outside diameter of cutting tools (such as taps, reamers, end mills) which have three flutes.
- Can measure pitch diameter of screw threads.
- Equipped with Ratchet Stop for constant measuring force.



114-101



114-102

B

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Remarks	Anvil	Carbide tip	Price
114-204	2.3 - 25 mm	0.01 mm	±4 µm	—	60°	Anvil and spindle	**£372.00**
114-101	1 - 15 mm			Grooved		Spindle	**£397.00**
114-161				—			**£397.00**
114-102	10 - 25 mm			Grooved			**£407.00**
114-162				—			**£459.00**
114-103	25 - 40 mm		±5 µm				**£464.00**
114-104	40 - 55 mm		±6 µm				**£524.00**
114-105	55 - 70 mm						**£532.00**
114-106	70 - 85 mm		±7 µm				**£615.00**
114-107	85 - 100 mm						**£631.00**
114-108	100 - 115 mm		±8 µm				**£531.00**
114-109	115 - 130 mm		±9 µm				**£604.00**
114-110	130 - 145 mm						**£676.00**

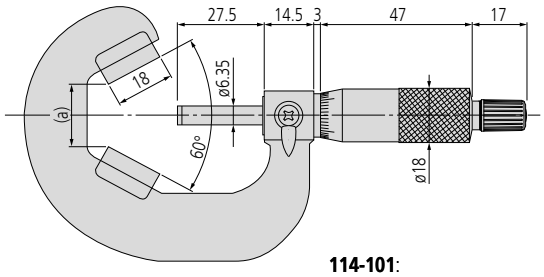
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Remarks	Anvil	Carbide tip	Price
114-163	.05 - .6"	.0001"	±.0002"	—	60°	Spindle	**£397.00**
114-113	1 - 1.6"		±.00025"	—			**£464.00**

Dimensions

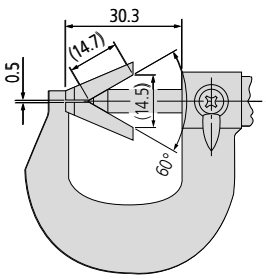
Unit: mm

114-103:

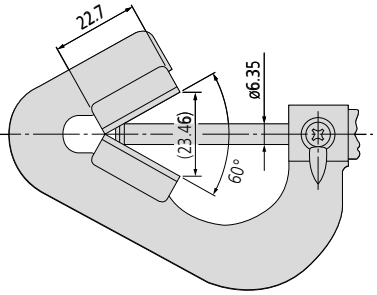


Range	(a)
For 3-flute cutting tools	
10 - 25 mm	6.2
25 - 40 mm	19.14
40 - 55 mm	32.13
55 - 70 mm	45.12
70 - 85 mm	58.11

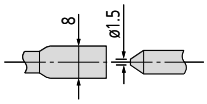
114-101:



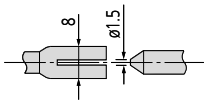
114-204:



Grooveless model



Grooved model



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Micrometers

SERIES 114 – Five-Flute V-Anvil Micrometer

- Measures the outside diameter of cutting tools (such as taps, reamers, end mills) which have five flutes.
- Can measure pitch diameter of screw threads.
- Equipped with Ratchet Stop for constant measuring force.



114-121

Optional Accessories

Setting standards refer to page B-62.

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Remarks	Anvil	Carbide tip	Price
114-137	2.3 - 25 mm	0.01 mm	±4 µm	—	108°	Anvil and spindle	**£464.00**
114-165	5 - 25 mm			—		Spindle	**£409.00**
114-121				w/groove			**£428.00**
114-122	25 - 45 mm		±5 µm	—			**£551.00**
114-123	45 - 65 mm		±6 µm	—			**£610.00**
114-124	65 - 85 mm		±7 µm	—			**£761.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Remarks	Anvil	Carbide tip	Price
114-135	.09 - 1"	.0001"	±.0002"	—	108°	Spindle	**£428.00**

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Micrometers

SERIES 422 – Digimatic Blade Micrometer

- The anvil and spindle are blade-shaped for measuring the groove diameter of shafts, keyways, and other hard-to-reach features.
- Equipped with Ratchet Stop for constant measuring force.
- Four types of blade shape are available (see diagrams below). Types C and D have carbide-tipped measuring faces.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



422-330-30

Technical Data

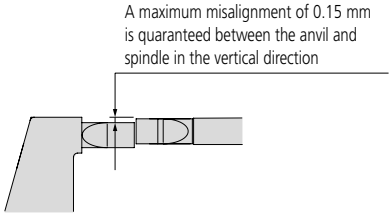
Parallelism: .00015" (3 µm) for models up to 3", .0002" (4 µm) for models over 3"
Battery: SR44 (1 pc) **938882**

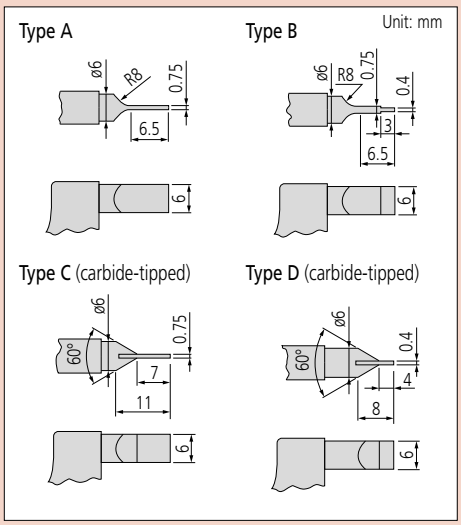
Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

* U-WAVE-R Receiver required.







Specifications

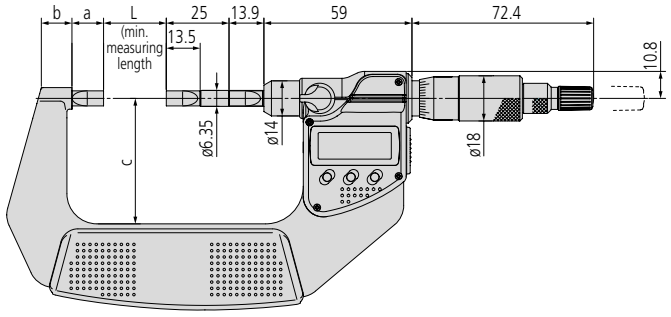
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Remarks	Price
422-330-30	0-1" (0-25.4 mm)	.00005" (0.001 mm)	±.00015" (±3 µm)	Type A	**£865.00**
422-331-30	1-2" (25.4-50.8 mm)				**£923.00**
422-332-30	2-3" (50.8-76.2 mm)				**£967.00**
422-333-30	3-4" (76.2-101.6 mm)		±.0002" (±4 µm)		**£996.00**
422-360-30	0-1" (0-25.4 mm)		±.00015" (±3 µm)	Type B	**£967.00**
422-370-30				Type C	**£973.00**
422-371-30				Type D	**£994.00**

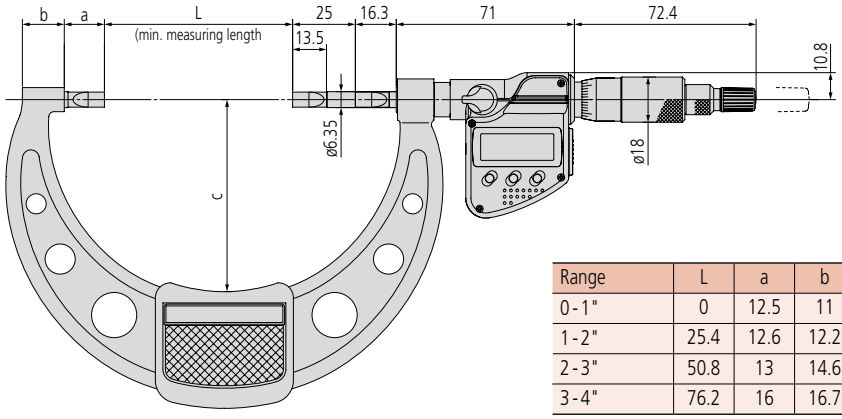
Dimensions

Unit: mm

Models up to 3" maximum measuring range



Model with 3-4" measuring range



Range	L	a	b	c
0-1"	0	12.5	11	31
1-2"	25.4	12.6	12.2	50
2-3"	50.8	13	14.6	57
3-4"	76.2	16	16.7	76

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Mitutoyo

Micrometers

SERIES 122 – Blade Micrometer

- The anvil and spindle are blade-shaped for measuring the groove diameter of shafts, keyways, and other hard-to-reach features.
- Equipped with Ratchet Stop for constant measuring force.
- Four types of blade shape are available (see diagrams below). Types C and D have carbide-tipped measuring faces.



122-101-10

B

Specifications

Metric

Code No.	Range	Max. permissible error J_{MPE}	Parallelism	Remarks	Price
122-101-10	0 - 25 mm	±3 µm	3 µm	Type A	**£236.00**
122-102-10	25 - 50 mm				**£248.00**
122-103-10	50 - 75 mm				**£290.00**
122-104-10	75 - 100 mm	±4 µm	4 µm		**£311.00**
122-105-10	100 - 125 mm		5 µm		**£397.00**
122-106-10	125 - 150 mm				**£434.00**
122-107-10	150 - 175 mm	±5 µm			**£471.00**
122-108-10	175 - 200 mm				**£519.00**
122-109-10	200 - 225 mm		6 µm		**£592.00**
122-110-10	225 - 250 mm	±6 µm			**£631.00**
122-115-10	250 - 275 mm				**£743.00**
122-116-10	275 - 300 mm				**£791.00**
122-111-10	0 - 25 mm	±3 µm	3 µm	Type B	**£253.00**
122-112-10	25 - 50 mm				**£259.00**
With carbide tip					
122-161-10	0 - 25 mm	±3 µm	3 µm	Type C	**£298.00**
122-162-10	25 - 50 mm				**£353.00**
122-141-10	0 - 25 mm			Type D	**£298.00**
122-142-10	25 - 50 mm				**£353.00**

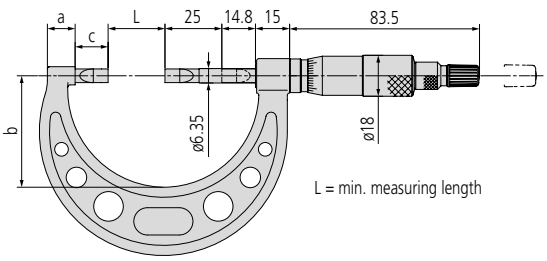
Inch

Code No.	Range	Max. permissible error J_{MPE}	Parallelism	Remarks	Price
122-125-10	0 - 1"	±.00015"	.00015"	Type A	**£236.00**
122-126-10	1 - 2"				**£273.00**
122-127-10	2 - 3"				**£290.00**
122-128-10	3 - 4"	±.0002"	.0002"		**£311.00**
122-135-10	0 - 1"	±.00015"	.00015"	Type B	**£253.00**
122-151-10				Type D	**£298.00**

Dimensions

Unit: mm

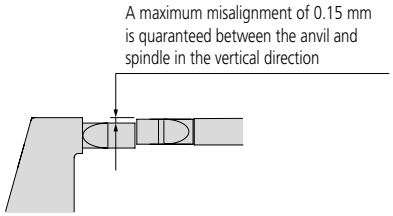
Range	L	a	b	c
0 - 25 mm	0	15	7.8	30
25 - 50 mm	25	14.5	12.2	49
50 - 75 mm	50		14.6	60
75 - 100 mm	75	17.5	16.7	79
100 - 125 mm	100	17.9	18.8	94
125 - 150 mm	125	18.3	19.1	106
150 - 175 mm	150	18.5	18.2	118
175 - 200 mm	175	18.9	16.8	130
200 - 225 mm	200	17.7	18	143
225 - 250 mm	225	18.7		156
250 - 275 mm	250			169
275 - 300 mm	275			181



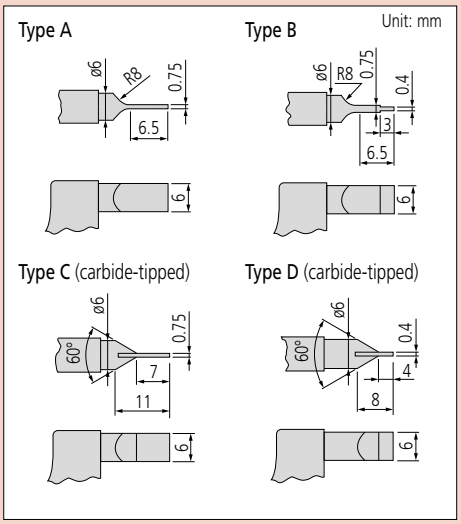
L = min. measuring length

Technical Data

Graduation: 0.01 mm / .0001"



Note: Applies to a measuring range of 0-25 mm





122-142-10

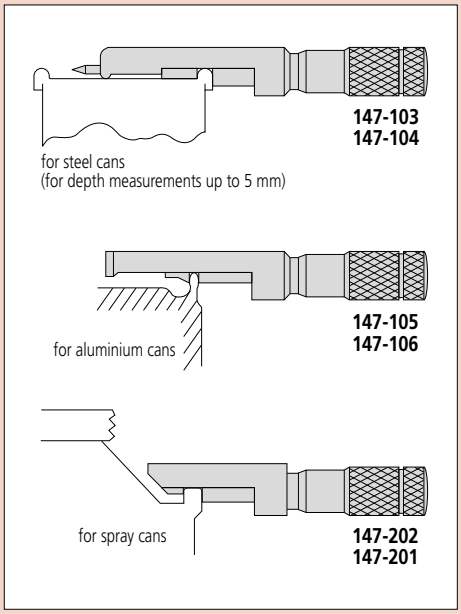
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Micrometers

SERIES 147 – Can Seam Micrometer

- Measures the width, height and depth of can seams.







147-103

B

Specifications

Metric

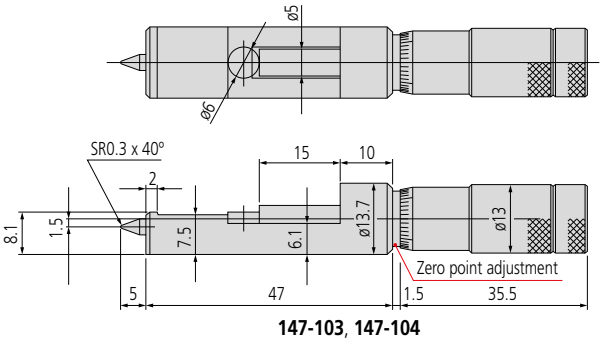
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Remarks	Price
147-103	0 - 13 mm	0.01 mm	±3 µm	For steel cans	**£178.00**
147-105				For aluminium cans	**£185.00**
147-202				For spray cans	**£168.00**

Inch

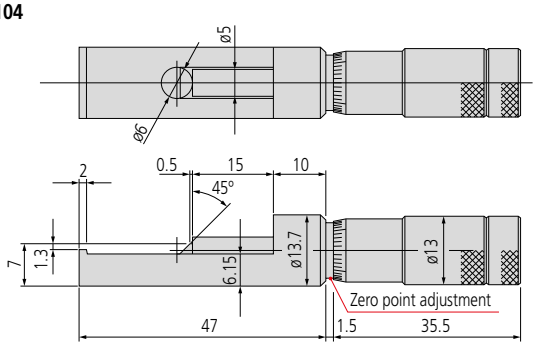
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Remarks	Price
147-104	0 - .5"	.001"	±.00015"	For steel cans	**£178.00**
147-106				For aluminium cans	**£185.00**
147-201				For spray cans	**£168.00**

Dimensions

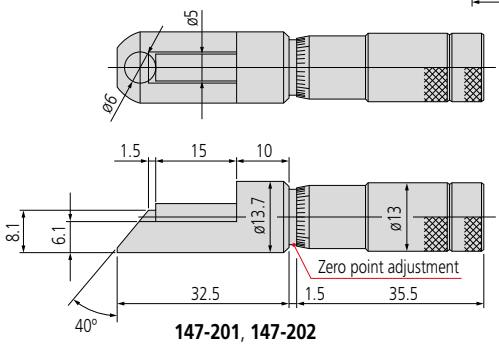
Unit: mm



147-103, **147-104**



147-105, **147-106**



147-201, **147-202**

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Micrometers

SERIES 147 – Hub Micrometer

- Measures hub thickness and shoulders inside a bore.
- Measuring faces: carbide.
- Equipped with Ratchet Stop for constant measuring force.



147-301

Technical Data

Flatness: 0.6 µm / .000024"



Specifications

Metric

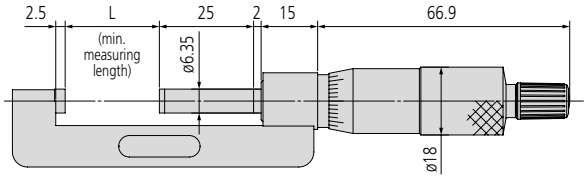
Code No.	Range	Graduation	Max. permissible error J_{MPE}	Parallelism	Price
147-301	0 - 25 mm	0.01 mm	±2 µm	3 µm	**£206.00**
147-302	25 - 50 mm				**£237.00**
147-303	50 - 75 mm				**£280.00**
147-304	75 - 100 mm		±3 µm		**£325.00**

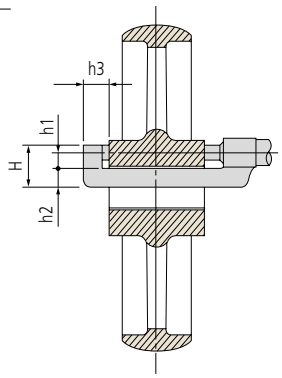
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Parallelism	Price
147-351	0 - 1"	.001"	±.0001"	.00012"	**£206.00**
147-352	1 - 2"				**£237.00**
147-353	2 - 3"				**£280.00**
147-354	3 - 4"		±.00015"		**£325.00**

Dimensions

Unit: mm





Range	H	h1	h2	h3	L
0 - 25 mm	17.5	6	8.5	13.5	0
25 - 50 mm	20.5	6.5	11	14	25
50 - 75 mm				13	50
75 - 100 mm					75

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Micrometers

SERIES 342, 112 – Crimp Height Micrometers

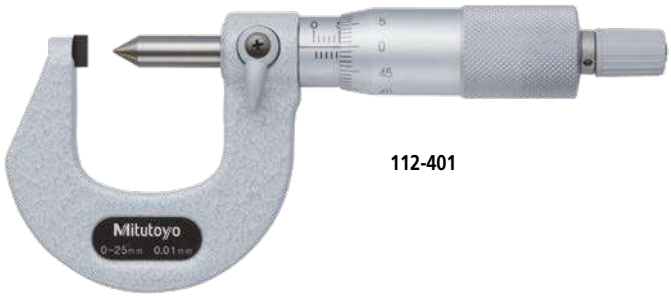
- Measures the height of crimp contacts.
- Equipped with Ratchet Stop for constant measuring force.
- 342 series: Digimatic type IP65 rated.

ABSOLUTE DIGIMATIC COOLANT PROOF IP65 U-WAVE fit

MeasurLink ENABLED Data Management Software by Mitutoyo



342-371-30



112-401

Technical Data

Battery: SR44 (1 pc), **938882**: 342 series

Optional Accessories (for 342 series only)

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.



Specifications

Inch/Metric

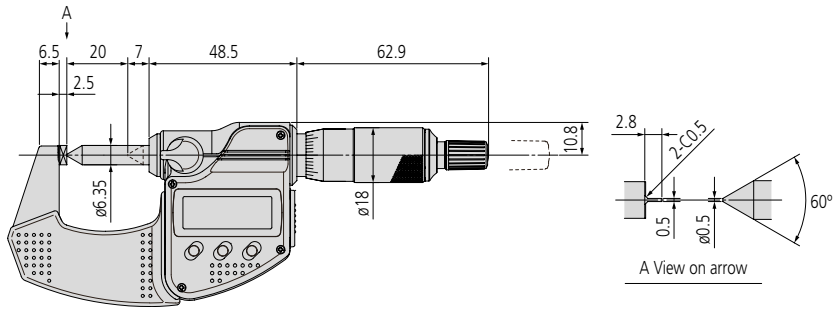
Code No.	Range	Resolution	Max. permissible error J_{MPE}	Price
342-371-30	0 - .8" (0 - 20.32 mm)	0.001 mm (.00005")	±3 µm (±.00015")	£580.00

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Price
112-401	0 - 25 mm	0.01 mm	±3 µm	£217.00

Dimensions

Unit: mm



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Mitutoyo

Micrometers

SERIES 317, 117 – Uni-Mike Interchangeable Anvil Micrometers

- Measures tubing thickness, shoulder-edge distance, rivet head height, etc., with interchangeable anvils (flat anvil, rod anvil, V-anvil).
- IP65 water/dust protection (317 series).

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo

B



317-351-30



117-101

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error /MPE	Parallelism	Price
Digimatic					
317-351-30	0-1" (0-25.4 mm)	0.001 mm (.00005")	±4 µm (±.0002")	.00012" (3 µm)	**£561.00**
317-352-30	1-2" (25.4-50.8 mm)				**£705.00**

Metric

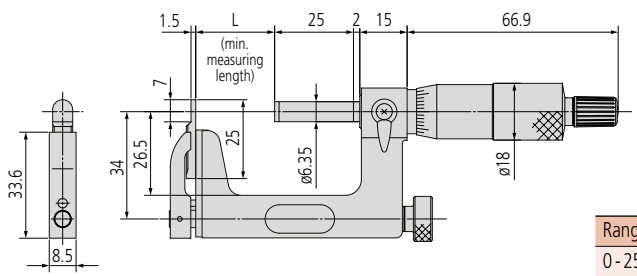
Code No.	Range	Graduation	Max. permissible error /MPE	Parallelism	Price
117-101	0-25 mm	0.01 mm	±4 µm	3 µm	**£212.00**
117-102	25-50 mm				**£273.00**

Inch

Code No.	Range	Graduation	Max. permissible error /MPE	Parallelism	Price
117-107	0-1"	.0001"	±.0002"	.00012"	**£212.00**
117-108	1-2"				**£273.00**

Dimensions

Unit: mm



Range	L
0-25 mm	0
25-50 mm	25

Technical Data

Flatness
- Spindle face: 0.6 µm
- Anvil face: 2 µm

Parallelism: 3 µm

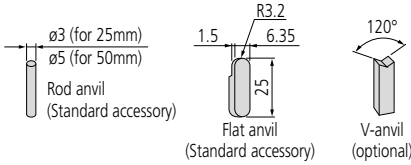
Battery: SR44 (1 pc), **938882**: 317 series

Optional Accessories

Code No.	Description	Price
201216	Flat anvil (standard accessory)	**£21.20**
201217	Rod anvil (standard accessory for 117-101)	**£2.00**
201379	Rod anvil (standard accessory for 117-102)	**£2.10**
201218	V-anvil	**£14.20**
950758	Base for 25 mm	**£81.50**
For 317 series only		
264-622	U-WAVE-TM IP67 transmitter*	**£242.00**
264-623	U-WAVE-TM transmitter*	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF310	U-WAVE-TM connection unit	**£77.30**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB input tool direct USB-ITN-B (2 m)	**£158.00**

* U-WAVE-R Receiver required.

Unit: mm







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Micrometers

SERIES 510 – Indicating Micrometer

- Suited to the measurement of low-volume manufactured parts.
- Easy to use when operating one-handed due to retractable anvil.
- In the 25 mm measuring range, models are available that offer left or right positioning of the anvil-retraction button.
- Water resistant to protection level IP54.
- Greatly improved accuracy: indication error and graduation of 1 µm.
- Hard-coated crystal: enhanced oil and scratch resistance.
- Indicator scale is large and easy-to-read.
- Easily set zero position and adjustable limit markers for GO/NO-GO testing.
- Measuring faces: carbide.

IP54



510-122

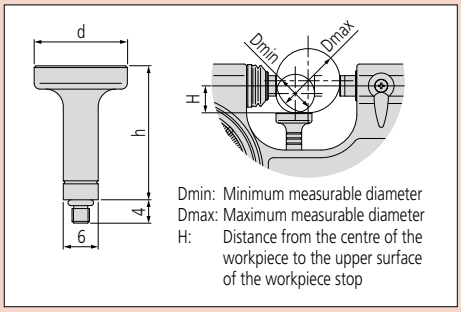
Technical Data

Flatness:	0.3 µm/.000012"
Parallelism:	0.6 µm/.000024" for models up to 50 mm/2", 1 µm/.00004" for models over 50 mm/2"
Accuracy:	±2 µm
Spindle feed error:	3 µm/.00015"
Repeatability:	0.4 µm/.00002"
Dial indication accuracy:	1 µm/.00005"

Workpiece Stop (optional)

Enables a more stable measurement. Three types with various heights (h) are available to suit workpieces of different sizes.

Code No.	Description	d	h	Price
04AZA124	Type A	ø16	23	£12.50
04AZA125	Type B	ø14	20.5	£12.50
04AZA126	Type C	ø14	15	£12.50



Dmin: Minimum measurable diameter
Dmax: Maximum measurable diameter
H: Distance from the centre of the workpiece to the upper surface of the workpiece stop

Description	Dmin	Dmax	H
Code No. 510-121 and **510-131**			
Type A	N/A	N/A	N/A
Type B	4 mm	16 mm	5.0 mm
Type C	15 mm	25 mm	10.5 mm
Code No. 510-122 and **510-132**			
Type A	25 mm	37 mm	15.5 mm
Type B	30 mm	42 mm	18.0 mm
Type C	41 mm	50 mm	23.5 mm
Code No. 510-123 and **510-133**			
Type A	50 mm	61 mm	27.5 mm
Type B	54 mm	66 mm	30.0 mm
Type C	65 mm	75 mm	35.5 mm
Code No. 510-124 and **510-134**			
Type A	75 mm	87 mm	40.5 mm
Type B	80 mm	92 mm	43.0 mm
Type C	91 mm	100 mm	48.2 mm



Specifications

Metric

Code No.	Range	Indicating range	Graduation	Dial graduation	Measuring force	Price
510-121	0-25 mm	±0.06 mm	0.001 mm	0.001 mm	5-10N	£769.00
510-122	25-50 mm					£863.00
510-123	50-75 mm					£998.00
510-124	75-100 mm					£1,120.00

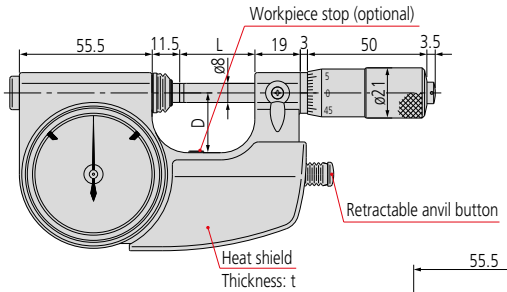
Inch

Code No.	Range	Indicating range	Graduation	Dial graduation	Measuring force	Price
510-131	0-1"	±.0023"	.0001"	.00005"	5-10N	£769.00
510-132	1-2"					£863.00
510-133	2-3"					£998.00
510-134	3-4"					£1,120.00

Dimensions

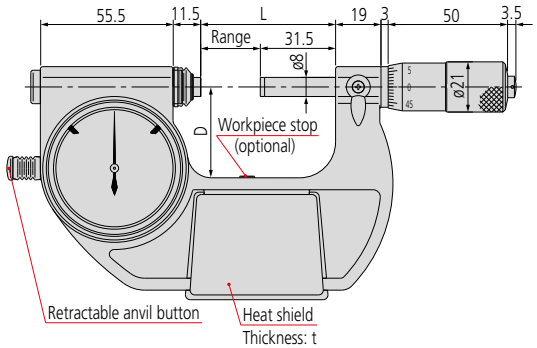
Unit: mm

25 mm maximum measuring range models
(anvil-retraction button on the right side)



Range	D	L	t
0-25 mm	25	31.5	16.4
25-50 mm	38	56.5	16
50-75 mm	50	81.5	16
75-100 mm	63	106.5	16

Models over 25 mm maximum measuring range (anvil-retraction button on the left side)



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Micrometers

SERIES 523 – Dial Snap Meter

- Suited to the measurement of mass produced parts.
- Designed for measurement using a stand to enable a more stable measurement.
- Greatly improved accuracy: indication error and graduation of 1 µm.
- Water resistant to protection level IP54.
- Indicator scale is large and easy-to-read.
- Hard-coated crystal: enhanced oil and scratch resistance.
- Easily settable adjustable limit markers for GO/NO-GO testing.
- Equipped with an elevating workpiece stop as standard.
- Measuring faces: carbide.

B

IP54



523-121

Technical Data

Indicator
- Indicating range: ±0.06 mm/±.0023"
- Repeatability of indication: 0.4 µm/.00002"
- Dial indication accuracy: 1 µm/.00005"

Flatness: 0.3 µm/.000012"



Specifications

Metric

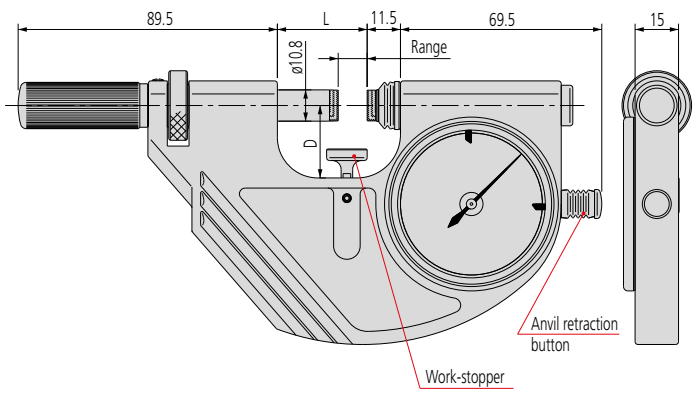
Code No.	Range	Parallelism	Dial graduation	Measuring force	Price
523-121	0-25 mm	0.6 µm	0.001 mm	5-10N	**£620.00**
523-122	25-50 mm				**£700.00**
523-123	50-75 mm	1.0 µm			**£764.00**
523-124	75-100 mm				**£846.00**

Inch

Code No.	Range	Parallelism	Dial graduation	Measuring force	Price
523-131	0-1"	.000024"	.00005"	5-10N	**£620.00**
523-132	1-2"				**£700.00**
523-133	2-3"	.00004"			**£764.00**
523-134	3-4"				**£846.00**

Dimensions

Unit: mm



Range	D	L
0-25 mm	25	31
25-50 mm	35	56
50-75 mm	47	81
75-100 mm	60	106

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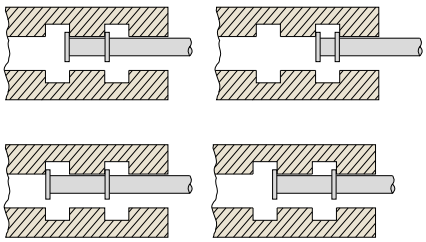
Micrometers

SERIES 146 – Non-Rotating Spindle Groove Micrometer

- Flanged spindle and anvil for measuring width and location of grooves inside bores and tubes.
- Dual scales for direct reading of inside and outside measurements.
- Two-directional ratchet stop.

Technical Data

Parallelism: 10 µm / .0004"





146-221



146-222

Specifications

Metric

Code No.	Range outside	Range inside	Graduation	Max. permissible error J_{MPE}	Flange	Price
146-221	0 - 25 mm	1.6 - 26.5 mm	0.01 mm	±10 µm	ø6.35 mm	**£432.00**
146-222					ø12.7 mm	**£486.00**
146-223	25 - 50 mm	26.5 - 51.5 mm				**£529.00**
146-224	50 - 75 mm	51.5 - 76.5 mm				**£543.00**
146-225	75 - 100 mm	76.5 - 101.5 mm				**£558.00**

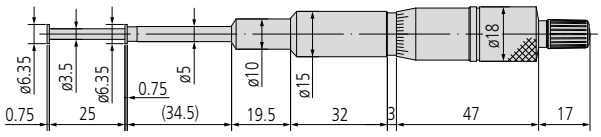
Inch

Code No.	Range outside	Range inside	Graduation	Max. permissible error J_{MPE}	Flange	Price
146-231	0 - 1"	.055 - 1.05"	.001"	±.0004"	ø.25"	**£432.00**
146-232					ø.5"	**£486.00**
146-233	1 - 2"	1.05 - 2.05"				**£529.00**
146-234	2 - 3"	2.05 - 3.05"				**£543.00**
146-235	3 - 4"	3.05 - 4.05"				**£558.00**

Dimensions

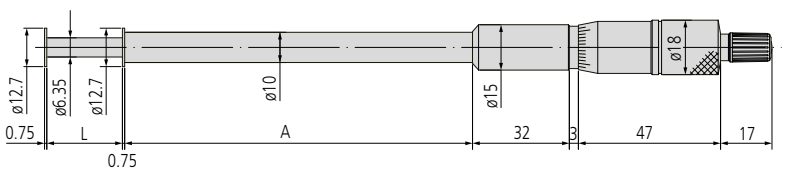
Unit: mm

146-221



L	A
25	115
50	90
75	65
100	40

146-222/23/24/25



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Mitutoyo

Micrometers

SERIES 700 – QUICKmini

- Lightweight and palm-sized.
- Highly suitable for quick dimensional inspection of small, thin and delicate objects.
- Functions: origin setting and zero-setting.

Application examples:

- Measurement of small objects: pearls, jewels, shims for engine tappets and screws.
- Measurement of thin objects: printing paper, polyethylene bags, sheet materials, foods including noodles, lenses for glasses, media substrates, foils, thin plates and medical products including filter cloths.
- Measurement of fine lines and bars: fishing lines, dental reamers, pasta, drills for PCBs and hard wiring.

B

700-118-30



Technical Data

Battery: SR44 (1 pc) **938882**





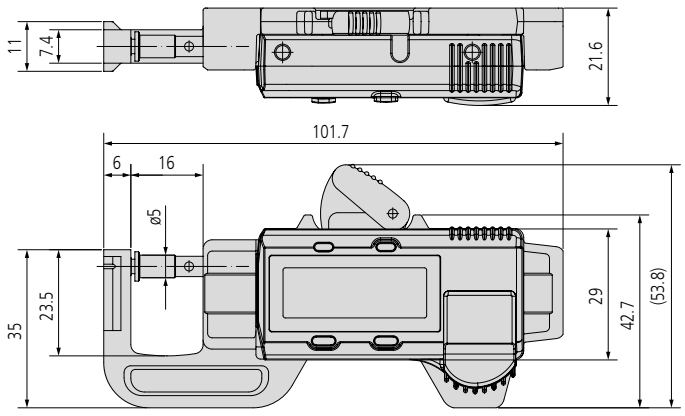
Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Price
700-118-30	0 - .5" (0 - 12.7 mm)	0.01 mm (.0005")	±0.02 mm (±.001")	**£174.00**

Dimensions

Unit: mm



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Micrometers

SERIES 155 – Telescoping Gauge Set

- A spring-loaded plunger expands within a bore (or groove) and is locked in place, allowing measurement of diameter (or width) with an outside micrometer after extraction.



155-905

B

Specifications

Metric

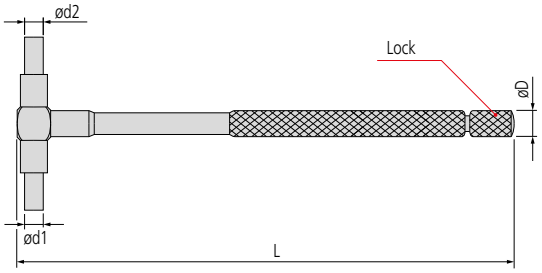
Code No.	Range	Price
6-gauge set		
155-905	8 - 150 mm	**£239.00**
Gauges included		
155-127	8 - 12.7 mm	**£30.30**
155-128	12.7 - 19 mm	**£37.10**
155-129	19 - 32 mm	**£37.10**
155-130	32 - 54 mm	**£47.00**
155-131	54 - 90 mm	**£47.00**
155-132	90 - 150 mm	**£47.00**

Inch

Code No.	Range	Price
6-gauge set		
155-903	.313 - 6"	**£239.00**
Gauges included		
155-121	.313 - .5"	**£30.30**
155-122	.5 - .75"	**£37.10**
155-123	.75 - 1.25"	**£37.10**
155-124	1.25 - 2.125"	**£47.00**
155-125	2.125 - 3.5"	**£47.00**
155-126	3.5 - 6"	**£47.00**

Dimensions

Unit: mm



Range	L	øD	ød1	ød2
8 - 12.7 mm	110	5	4	3
12.7 - 19 mm		5.5	5	3.5
19 - 32 mm				
32 - 54 mm	150	8	7.5	6
54 - 90 mm				
90 - 150 mm				

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Mitutoyo

Optional Accessories

SERIES 157 – Optical Parallel



- Designed to inspect parallelism and flatness of micrometer measuring faces.
- Each set consists of 4 sizes to enable testing parallelism at quarter-turn positions of the micrometer spindle.



157-903

Specifications

Metric

Code No.	Range of micrometer to be checked	Sizes of parallels included in set	Diameter	Flatness	Parallelism	Price
157-903	0 - 25 mm	12.00, 12.12, 12.25, 12.37 mm	30 mm	0.1 µm	0.2 µm	**£476.00**
157-904	25 - 50 mm	25.00, 25.12, 25.25, 25.37 mm				**£803.00**

Inch

Code No.	Range of micrometer to be checked	Sizes of parallels included in set	Diameter	Flatness	Parallelism	Price
157-901	0 - 1"	.5000",.5062", .5125", .5187"	30 mm	0.1 µm	0.2 µm	**£476.00**
157-902	1 - 2"	1.0000", 1.0062", 1.0125", 1.0187"				**£803.00**

SERIES 158 – Optical Flat



- Used for inspecting the flatness of very flat and reflective surfaces. A typical application is testing the measuring faces of gauge blocks for signs of wear or damage.



158-118

Specifications

Metric

Code No.	Thickness	Diameter	Flatness grade	Price
158-117	12 mm	45 mm	0.2 µm	**£340.00**
158-118			0.1 µm	**£367.00**
158-119	15 mm	60 mm	0.2 µm	**£434.00**
158-120			0.1 µm	**£532.00**

Inch

Code No.	Thickness	Diameter	Flatness grade	Price
158-122	.5"	1.8"	.000004"	**£367.00**
158-124	.6"	2.4"		**£532.00**

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Optional Accessories

SERIES 167 – Setting Standards for Outside Micrometers

- Used for accurately setting outside micrometers at the start or end of the measuring range.

Technical Data

Flatness: 0.3 µm
Parallelism: 2 µm





167-108



167-145



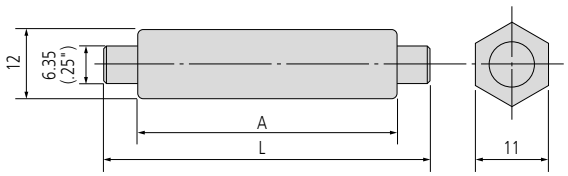
167-103



167-101

Specifications and Dimensions

Unit: mm



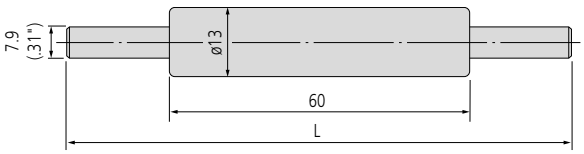
Metric

Code No.	Length (L)	Tolerance	A	Price
167-101	25 mm	±1.5 µm	18	£17.30
167-102	50 mm	±2.0 µm	40	£17.80
167-103	75 mm	±2.5 µm		£19.60

Inch

Code No.	Length (L)	Tolerance	A	Price
167-141	1"	±.00005"	18	£17.30
167-142	2"	±.0001"	40	£17.80
167-143	3"			£19.60

Unit: mm



Metric

Code No.	Length (L)	Tolerance	Price
167-104	100 mm	±3.0 µm	£22.10
167-105	125 mm	±3.5 µm	£24.70
167-106	150 mm	±4.0 µm	£26.40
167-107	175 mm	±4.5 µm	£29.40

Inch

Code No.	Length (L)	Tolerance	Price
167-144	4"	±.0001"	£22.10
167-145	5"	±.00015"	£24.70
167-146	6"		£26.40
167-147	7"		£29.40

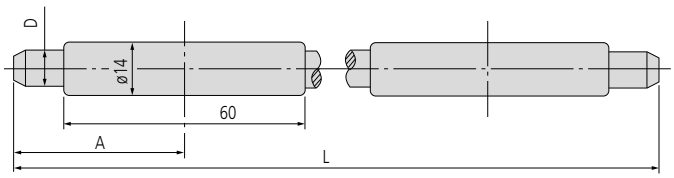
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Mitutoyo

Optional Accessories

SERIES 167 – Setting Standards for Outside Micrometers

Unit: mm



B

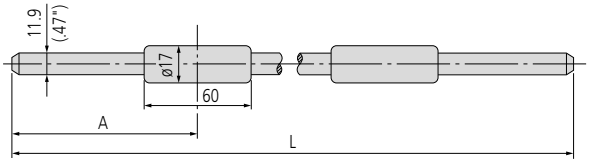
Metric

Code No.	Length (L)	Tolerance	A	Price
167-108	200 mm	±5.0 µm	47	**£33.70**
167-109	225 mm	±5.5 µm	47	**£36.60**
167-110	250 mm	±6.0 µm	52	**£40.40**
167-111	275 mm	±6.5 µm	57	**£44.60**
167-112	300 mm	±7.0 µm	64	**£48.70**
167-113	325 mm	±7.5 µm	69	**£53.40**
167-114	350 mm	±8.0 µm	74	**£58.50**
167-115	375 mm	±8.5 µm	80	**£65.20**
167-116	400 mm	±9.0 µm	85	**£72.70**
167-117	425 mm	±9.5 µm	90	**£80.20**
167-118	450 mm	±10.0 µm	95	**£87.50**
167-119	475 mm	±10.5 µm	101	**£95.60**

Inch

Code No.	Length (L)	Tolerance	A	Price
167-148	8"	±.00015"	47	**£33.70**
167-149	9"	±.0002"	47	**£36.60**
167-150	10"	±.0002"	52	**£40.40**
167-151	11"	±.0002"	57	**£44.60**
167-152	12"	±.00025"	64	**£48.70**
167-153	13"	±.00025"	69	**£53.40**
167-154	14"	±.00025"	74	**£58.50**
167-155	15"	±.00025"	80	**£65.20**
167-156	16"	±.00025"	85	**£72.70**
167-157	17"	±.00025"	90	**£80.20**
167-158	18"	±.00025"	95	**£87.50**
167-159	19"	±.0003"	101	**£95.60**

Unit: mm



Metric

Code No.	Length (L)	Tolerance	A	Price
167-120	500 mm	±11.0 µm	106	**£103.00**
167-121	525 mm	±11.5 µm	112	**£113.00**
167-122	550 mm	±12.0 µm	117	**£121.00**
167-123	575 mm	±12.5 µm	122	**£129.00**
167-124	600 mm	±13.0 µm	128	**£138.00**
167-125	625 mm	±13.5 µm	133	**£145.00**
167-126	650 mm	±14.0 µm	138	**£154.00**
167-127	675 mm	±14.5 µm	142	**£163.00**
167-128	700 mm	±15.0 µm	147	**£173.00**
167-129	725 mm	±15.5 µm	153	**£184.00**
167-130	750 mm	±16.0 µm	158	**£194.00**
167-131	775 mm	±16.5 µm	164	**£204.00**
167-132	800 mm	±17.0 µm	170	**£217.00**
167-133	825 mm	±17.5 µm	175	**£229.00**
167-134	850 mm	±18.0 µm	180	**£242.00**
167-135	875 mm	±18.5 µm	185	**£253.00**
167-136	900 mm	±19.0 µm	191	**£266.00**
167-137	925 mm	±19.5 µm	196	**£280.00**
167-138	950 mm	±20.0 µm	201	**£292.00**
167-139	975 mm	±20.5 µm	207	**£304.00**
167-140	1000 mm	±21.0 µm	211	**£389.00**

Available up to 2000 mm.

Inch

Code No.	Length (L)	Tolerance	A	Price
167-160	20"	±.0003"	106	**£103.00**
167-161	21"	±.0003"	112	**£113.00**
167-162	22"	±.0003"	117	**£121.00**
167-163	23"	±.0003"	122	**£129.00**
167-164	24"	±.0003"	128	**£138.00**
167-165	25"	±.00035"	133	**£145.00**
167-166	26"	±.00035"	138	**£154.00**
167-167	27"	±.00035"	142	**£163.00**
167-168	28"	±.00035"	147	**£173.00**
167-169	29"	±.00035"	153	**£184.00**
167-170	30"	±.00035"	158	**£194.00**
167-171	31"	±.00035"	164	**£204.00**
167-172	32"	±.00035"	170	**£217.00**
167-173	33"	±.00035"	175	**£229.00**
167-174	34"	±.00035"	180	**£242.00**
167-175	35"	±.00035"	185	**£253.00**
167-176	36"	±.00035"	191	**£266.00**
167-177	37"	±.0004"	196	**£280.00**
167-178	38"	±.0004"	201	**£292.00**
167-179	39"	±.0004"	207	**£304.00**
167-180	40"	±.0004"	211	**£389.00**

Available up to 79".

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Optional Accessories



SERIES 167 – Setting Standards for Screw Thread Micrometers

- Used for accurately setting screw thread micrometers at the start or end of the measuring range.



167-264



167-262

Specifications

Metric

Code No.	Length	Accuracy	Price
Metric (unified) θ = 60°			
167-261	25 mm	±4 µm	**£44.00**
167-262	50 mm	±5 µm	**£47.10**
167-263	75 mm	±6 µm	**£61.20**
167-264	100 mm	±7 µm	**£68.50**
167-265	125 mm	±8 µm	**£72.10**
167-266	150 mm	±9 µm	**£82.30**
167-267	175 mm	±10 µm	**£89.70**
167-268	200 mm	±11 µm	**£89.70**
167-269	225 mm	±12 µm	**£93.90**
167-270	250 mm	±13 µm	**£93.90**
167-271	275 mm	±14 µm	**£98.20**
Whitworth θ = 55°			
167-272	25 mm	±4 µm	**£44.00**
167-273	50 mm	±5 µm	**£47.10**
167-274	75 mm	±6 µm	**£61.20**
167-275	100 mm	±7 µm	**£68.50**
167-276	125 mm	±8 µm	**£72.10**
167-277	150 mm	±9 µm	**£82.30**
167-278	175 mm	±10 µm	**£89.70**
167-279	200 mm	±11 µm	**£95.20**
167-280	225 mm	±12 µm	**£97.10**
167-281	250 mm	±13 µm	**£97.10**
167-282	275 mm	±14 µm	**£101.00**

Inch

Code No.	Length	Accuracy	Price
Metric (unified) θ = 60°			
167-294	1"	±.00015"	**£44.00**
167-295	2"	±.0002"	**£47.10**
167-296	3"	±.00025"	**£61.20**
167-297	4"	±.0003"	**£68.50**
167-298	5"	±.00035"	**£72.10**
167-299	6"	±.0004"	**£80.30**
Whitworth θ = 55°			
167-283	1"	±.00015"	**£44.00**
167-284	2"	±.0002"	**£47.10**
167-285	3"	±.00025"	**£61.20**
167-286	4"	±.0003"	**£68.50**
167-287	5"	±.00035"	**£72.10**
167-288	6"	±.0004"	**£89.70**



SERIES 167 – Setting Standards for V-Anvil Micrometers

- Finely finished cylindrical standards of size designed for accurate setting of V-anvil micrometers.



167-329

Specifications

Metric

Code No.	Diameter	Accuracy	Type	Price
167-327	5 mm	±2 µm	Plug	**£44.00**
167-328	10 mm	±2 µm	Plug	**£49.90**
167-329	25 mm	±2 µm	Plug	**£71.00**
167-330	40 mm	±3 µm	Ring	**£125.00**
167-331	55 mm	±3 µm	Ring	**£173.00**
167-332	70 mm	±3 µm	Ring	**£218.00**
167-333	85 mm	±3 µm	Ring	**£257.00**

Available up to 130 mm.

Inch

Code No.	Diameter	Accuracy	Type	Price
167-337	.2"	±.0001"	Plug	**£44.00**
167-338	.4"	±.0001"	Plug	**£49.90**
167-339	1"	±.0001"	Plug	**£74.80**
167-340	1.6"	±.00015"	Ring	**£128.00**
167-341	2.2"	±.00015"	Ring	**£173.00**
167-342	2.8"	±.00015"	Ring	**£218.00**
167-343	3.4"	±.00015"	Ring	**£257.00**

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Optional Accessories

SERIES 156 – Micrometer Stands

- Designed to allow benchtop use of hand micrometers or other gauges which have frames suitable for gripping by the clamp.



156-105-10



156-101-10



156-102



156-105-10



156-101-10

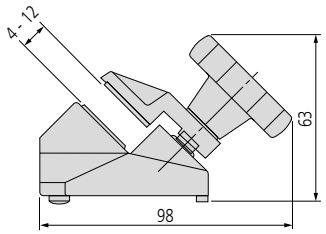
Specifications

Code No.	Micrometer ranges	Remarks	Price
156-101-10	Up to 100 mm (4")	Adjustable angle type	£56.20
156-105-10	0 - 25 mm (0 - 1"), 25 - 50 mm (1 - 2")	Fixed angle type	£42.70
156-102	125 - 300 mm (5 - 12")	Vertical type	£488.00
156-103	300 - 1000 mm (12 - 40")		£1,040.00

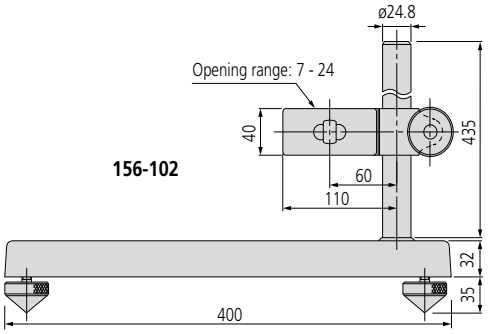
Dimensions

Unit: mm

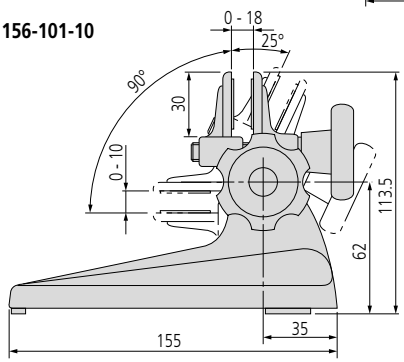
156-105-10



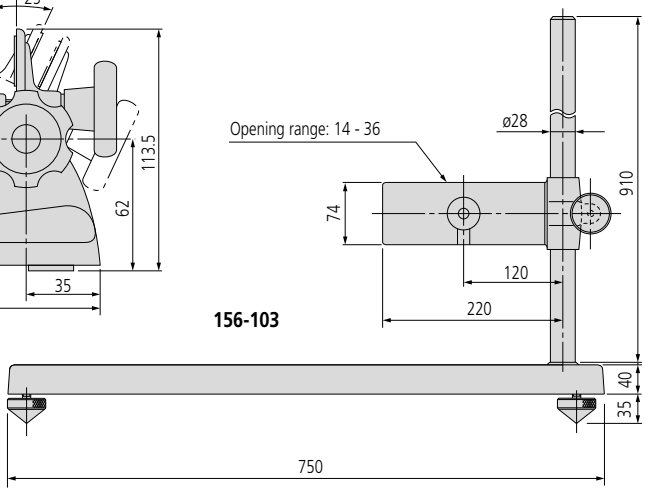
156-102



156-101-10



156-103



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Optional Accessories

Spindle Attachment Tips

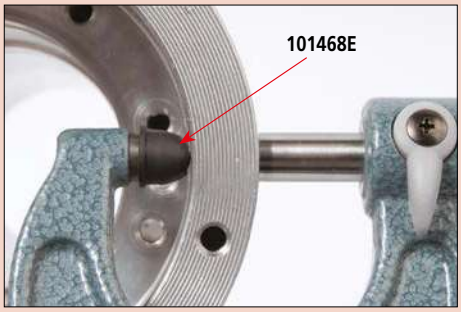
- Simple interchangeable tips attached to standard micrometer spindles enable measurement of contours otherwise unmeasurable (for 6.35 mm spindles only).
- Measuring range changes when a spindle attachment tip is mounted: the maximum measuring range is 10 mm or less (accuracy is not guaranteed).



101468E

Specifications

Code No.	Tip type	Price
101468M	Metric ball (5 mm)	**£28.40**
101468E	Inch ball (.2")	**£28.40**



Colour-Coded Ratchet and Speeder Covers

- Ratchet and speeder covers in a choice of seven colours for use in instrument identification control schemes: red, blue, yellow, green, brown, black and grey.



Standard outside micrometer

Ratchet



Speeder



Ratchet Cover Specifications

Code No.	Colour	Material	Price
Analogue type: 0 - 300 mm			
04GZA239	Grey	Plastic	**£6.10**
985056	Black		**£8.30**
985061	Red		**£8.30**
985081	Blue		**£8.30**
985071	Yellow		**£8.30**
985076	Green		**£8.30**
985066	Brown		**£8.30**
950700	Grey	Steel	**£6.20**
Analogue type: 300 - 1000 mm			
04GZA243	Grey	Plastic	**£7.30**
Digimatic type: 0 - 300 mm*			
04GZA241	Grey	Plastic	**£7.30**

* Cannot be used for non-digital micrometers.

Speeder Cover Specifications

Code No.	Colour	Material	Price
04GAA260	Grey	Plastic	**£1.50**
301708	Black		**£1.50**
301709	Red		**£1.50**
301713	Blue		**£1.50**
301711	Yellow		**£1.50**
301712	Green		**£1.50**
301710	Brown		**£1.50**



Ratchet thimble micrometer



QuantuMike

Speeder



Speeder Cover Specifications

Code No.	Colour	Material	Price
04GAA899	Black	Plastic	**£2.30**
04GAA900	Red		**£2.30**
04GAA901	Yellow		**£2.30**
04GAA902	Green		**£2.30**
04GAA903	Blue		**£2.30**
04AAB208	Grey		**£2.00**

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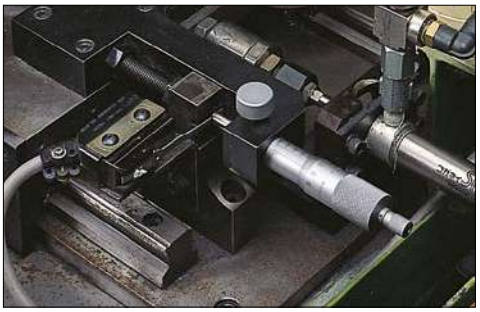
Mitutoyo

Micrometer Heads

Selection Guide

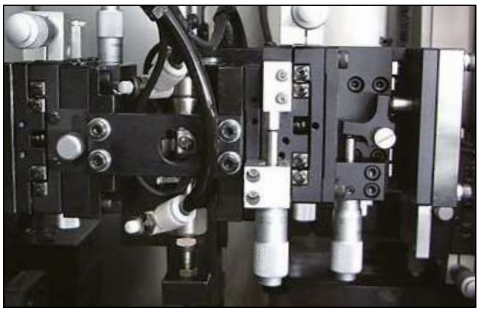
Mounted on measuring instruments and precision instruments, micrometer heads are used for various purposes including measurement, feeding and positioning. Recent developments in technology have seen the micrometer head widely utilized in precise feeding devices and cross-travel stages on laser instruments and manipulators, in addition to the usual duties on measurement jigs. In parallel with the application expansion, the customer's needs have increased. To meet customer demands, Mitutoyo provides standard micrometer heads with different measuring ranges, stem type and body size. Furthermore, high-performance types of Digimatic Micrometer Head, 0.1 mm spindle-pitch models (standard 0.5 mm), etc., are now available for the new applications. Mitutoyo also provides customization services for special applications. Micrometer heads with customized spindle tips and precision leadscrews manufactured to customer specification can be offered even in one-off quantities.

Measuring range	Main feature of head		Series	Page
0 - 2.5 mm	High-function	Fine spindle feed of 0.25 mm/rev	110	B-70
0 - 6.5 mm	Standard	Locking-screw type	148	B-75
	Standard	Small type	148	B-71
		Short body	148	B-72
0 - 13 mm	High-function	Fine spindle feed of 0.25 mm/rev	110	B-70
	Standard	Short body	148	B-72
		Small standard type	148	B-73
		Small standard type with zero-adjustable thimble	148	B-74
0 - 15 mm	High-function	Non-rotating spindle type	153	B-81
	Standard	Small standard type with carbide-tipped spindle	149	B-76
0 - 25 mm	Digimatic	Standard data output type	350	B-69
	High-function	Non-rotating spindle type	153	B-81
		XY-stage type	152	B-80
		Fine graduation and high accuracy	153	B-82
	Standard	Medium-sized standard type with carbide-tipped spindle	150	B-77
		Medium-sized standard type with ø8 mm spindle	151	B-78
0 - 50 mm	Digimatic	Rotatable-display data output type	164	B-68
		Large thimble type for fine feed	152	B-79
		Non-rotating spindle, 2X faster feed and large thimble	197	B-83
		Medium-sized standard type with ø8 mm spindle	151	B-78
60 - 75 mm	Micro Jack	High load bearing	7	B-84









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Micrometer Heads

SERIES 164 – Digimatic Rotatable Display Micrometer Head

- The display is rotatable to enable easy reading from practically any direction. This feature is especially useful in XY-table applications.
- The Digimatic output port enables inclusion in a statistical process control or networked measurement system.
- Non-rotating spindle.

DIGIMATIC U-WAVE



164-164

Functions

Origin point setting (ABS measurement system):
Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

Code No.	Description	Price
959149	SPC data cable with pushbutton (1 m)	£44.10
959150	SPC data cable with pushbutton (2 m)	£50.30
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790C	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE140C	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£160.00
06AFM380C	USB Input Tool Direct USB-ITN-C (2 m)	£143.00

*U-WAVE-R Receiver required.



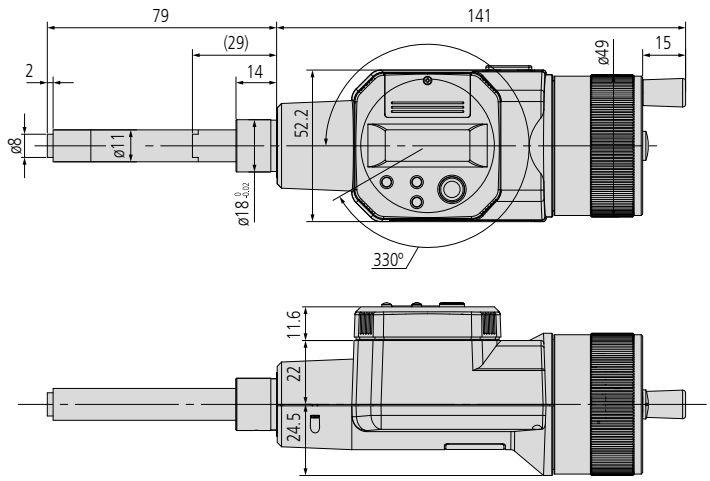
Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Price
164-164	0 - 50 mm (0 - 2")	0.001 mm (.00005")	±3 µm (±.00015")	£925.00

Dimensions

Unit: mm



( ): with spindle fully retracted

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Micrometer Heads

SERIES 350 – Digimatic Micrometer Head

- The Digimatic output port enables inclusion in a statistical process control or networked measurement system.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



350-351-30

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



350-361-30

Specifications

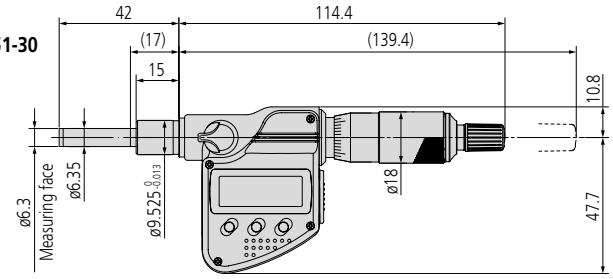
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Stem type	Spindle end	IP65	Price
350-351-30	0 - 25 mm (0 - 1")	0.001 mm (.00005")	±2 µm (±.0001")	Plain	Flat (carbide tip)	—	£353.00
350-352-30				Locknut	Flat (carbide tip)	—	£382.00
350-353-30				Plain	Spherical (SR4)	—	£413.00
350-354-30				Locknut	Spherical (SR4)	—	£456.00
350-361-30				Plain	Flat with non-rotating device	✓	£488.00

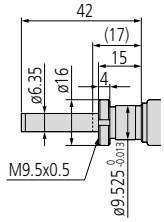
Dimensions

Unit: mm

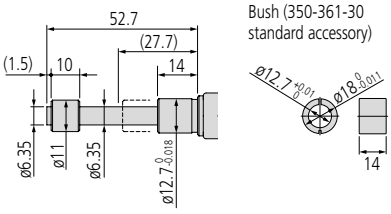
350-351-30



350-352-30

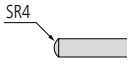


350-361-30



Bush (350-361-30 standard accessory)

Spherical type



( ): with spindle fully retracted

Functions

Origin point setting (ABS measurement system):
Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Auto power ON/OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.

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Micrometer Heads

SERIES 110 – Differential Screw Micrometer Head

- The differential movement of spindle threads and nuts allows ultra-fine feed.
- Especially useful in precision translation type applications such as found in electronics component manufacture, optical alignment, etc.



110-102



110-502-10

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}*	Stem	Stem type	Spindle end	Graduation features	Price
110-101	0 - 2.5 mm	0.001 mm	±5 µm / ±1.5 µm	ø12 mm	Locknut	Flat (carbide tip)	Standard	**£322.00**
110-102		0.0001 mm					Fine	**£357.00**
Double thimble type								
110-502-10	Thimble (fine) 0 - 0.2 mm Thimble (coarse) 0 - 13 mm	Thimble (fine) 0.0005 mm Thimble (coarse) 0.01 mm	±3 µm / ±1.5 µm	ø9.5 mm	Locknut	Spherical (SR3)	Dual scales; 0.2 mm fine-feed range	**£508.00**

Inch

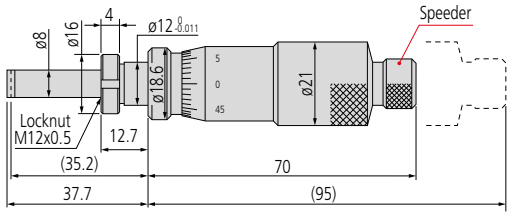
Code No.	Range	Graduation	Max. permissible error J_{MPE}*	Stem	Stem type	Spindle end	Graduation features	Price
Double thimble type								
110-504-10	Thimble (fine) 0 - .006" Thimble (coarse) 0 - .5"	Thimble (fine) .00002" Thimble (coarse) .001"	±.00015" / ±.00006"	ø.375"	Locknut	Spherical (SR3)	Dual scales; 0.2 mm/.006" fine-feed range	**£508.00**

* Wide range / narrow (1 rev) range.

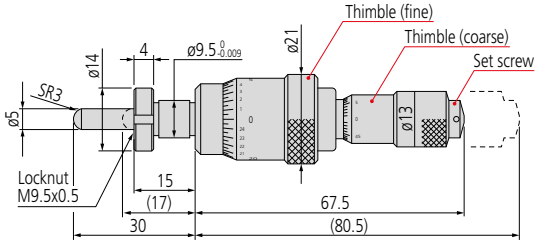
Dimensions

Unit: mm

110-101
110-102



110-502-10



( ): with spindle fully retracted

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Micrometer Heads

SERIES 148 – Short Range Small Micrometer Head

• Miniature micrometer heads for ease of incorporating into machines, jigs and fixtures.



148-201-10



148-203-10



148-205-10

Technical Data

Graduation: 0.01 mm / .001"

Specifications

Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Price
148-201-10	0 - 6.5 mm	±5 µm	ø6 mm	Plain	Flat	£57.40
148-203-10				Locknut		£64.90
148-205-10				Plain	Spherical (SR3)	£65.40

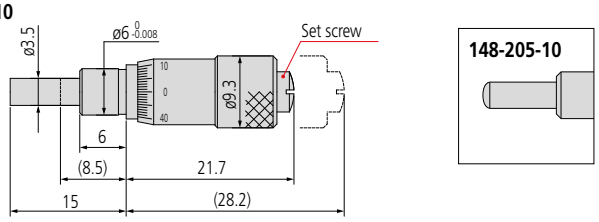
Inch

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Price
148-202-10	0 - .25"	±.00025"	ø.25"	Plain	Flat	£57.40

Dimensions

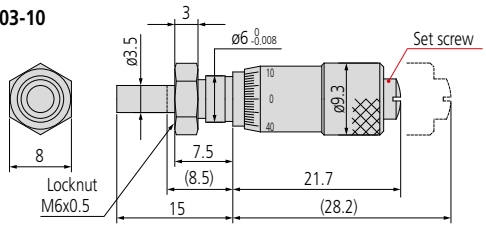
Unit: mm

148-201-10



148-205-10

148-203-10



( ): with spindle fully retracted

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Micrometer Heads

SERIES 148 – Short Body Micrometer Head

- Short body design maintains measuring range for limited space applications.

Technical Data

Graduation: 0.01 mm
Spindle pitch: 0.5 mm



148-303-10



148-308-10

Specifications

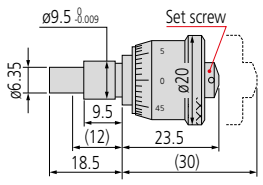
Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Thimble	Price
148-303-10	0 - 6.5 mm	±2 µm	ø9.5 mm	Plain	Flat	ø20 mm	**£87.40**
148-308-10	0 - 13 mm			Locknut		ø15 mm	**£87.40**

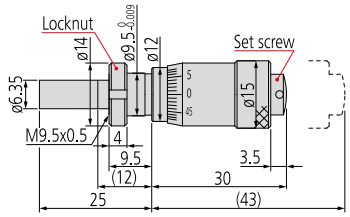
Dimensions

Unit: mm

148-303-10



148-308-10



( ): with spindle fully retracted

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Micrometer Heads

SERIES 148 – Small Standard Micrometer Head

• Measuring range 13 mm/.5".



148-104-10



148-801-10



148-821-10

Technical Data

Graduation:	0.01 mm/.001"
Spindle pitch:	0.5 mm/.025"
Spindle end:	Flat or spherical form, SKS-3 tool steel (more than HRC60), lapped surface
Scale:	Satin-chrome plated

Specifications

Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Graduation features	Price
148-104-10	0 - 13 mm	±2 µm	ø9.5 mm	Plain	Flat	Standard	**£58.30**
148-801-10					Spherical (SR4)		**£59.60**
148-821-10					Flat	Reverse reading	**£59.00**

Inch

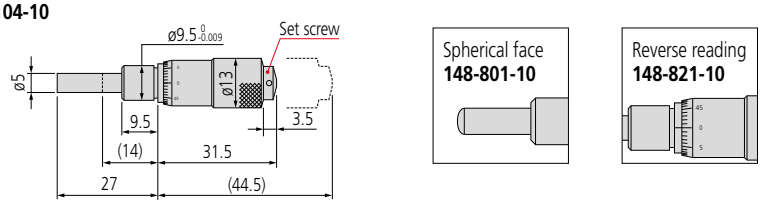
Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Graduation features	Price
148-112-10	0 - .5"	±.0001"	ø.375"	Plain	Flat	Standard	**£58.30**
148-811-10				Plain	Spherical (SR4)		**£59.60**
148-814*				Locknut			**£82.80**
148-831-10				Plain	Flat	Reverse reading	**£59.00**

* With spindle lock.

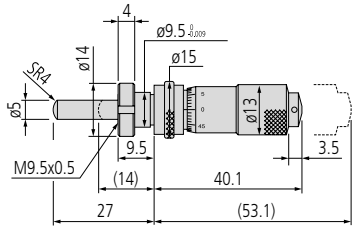
Dimensions

Unit: mm

148-104-10



148-814



( ): with spindle fully retracted

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Micrometer Heads

SERIES 148 – Adjustable Thimble Small Standard Micrometer Head

- Measuring range 13 mm / .5".
- The thimble can be set to zero at any position by loosening the setscrew.

Technical Data

Graduation: 0.01 mm / .001"
Spindle pitch: 0.5 mm / .025"



148-503



148-504



148-853



148-863



148-854



148-864

Specifications

Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Special features	Price
148-503	0 - 13 mm	±2 µm	ø9.5 mm	Plain	Flat	Standard	£60.00
148-504*				Locknut			£69.60
148-853				Plain	Spherical (SR4)		£68.10
148-854*				Locknut			£71.90
148-863				Plain	Flat	Reverse reading	£74.90
148-864*				Locknut			£73.20

Inch

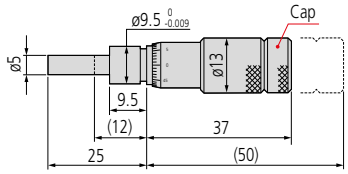
Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Special features	Price
148-501	0 - .5"	±.0001"	ø.375"	Plain	Flat	Standard	£60.00
148-502*				Locknut			£69.60
148-851				Plain	Spherical (SR4)		£68.10
148-852*				Locknut			£71.90
148-861				Plain	Flat	Reverse reading	£74.90
148-862*				Locknut			£73.20

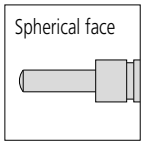
* With spindle lock.

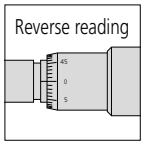
Dimensions

Unit: mm

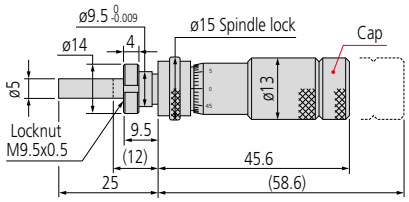
Plain stem type

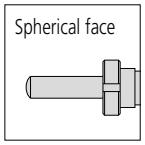


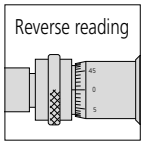




Stem locknut and spindle lock type







( ): with spindle fully retracted

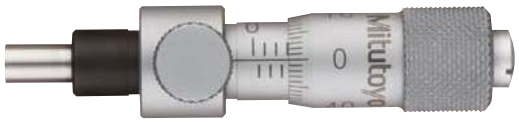
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Micrometer Heads

SERIES 148 – Locking Screw Micrometer Head

- Locking screw provides secure locking at any position of the spindle.
- Position of the locking screw is the same as the sleeve index line.



148-220-10

Technical Data

Graduation: 0.01 mm/.001"
Spindle pitch: 0.5 mm/.025"



Specifications

Metric

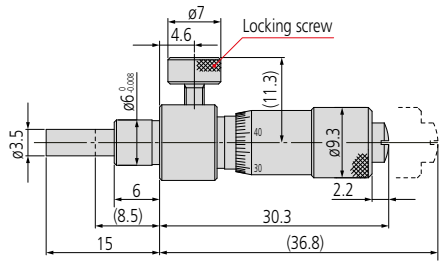
Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Price
148-220-10	0 - 6.5 mm	±5 µm	ø6 mm	Plain	Flat	**£57.40**

Inch

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Price
148-230-10	0 - .25"	±.00025"	ø.25"	Plain	Flat	**£57.40**

Dimensions

Unit: mm



( ): with spindle fully retracted

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Micrometer Heads

SERIES 149 – Carbide-Tipped Spindle Small Standard Micrometer Head

- Carbide-tipped spindle provides high abrasion resistance.

Technical Data

Graduation: 0.01 mm/.001"
Spindle pitch: 0.5 mm/.025"



149-131



149-132-10



149-802-10



149-801-10

Specifications

Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Price
149-132-10	0 - 15 mm	±2 µm	ø9.5 mm	Plain	Flat	£58.30
149-131				Locknut		£62.90
149-801-10				Plain	Spherical (SR4)	£59.60
149-802-10				Locknut		£65.20

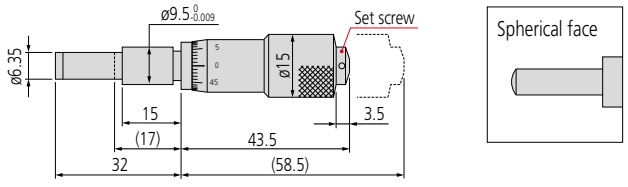
Inch

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Spindle end	Price
149-811-10	0 - .5"	±.0001"	ø.375"	Plain	Spherical (SR4)	£59.60
149-812-10				Locknut		£65.20

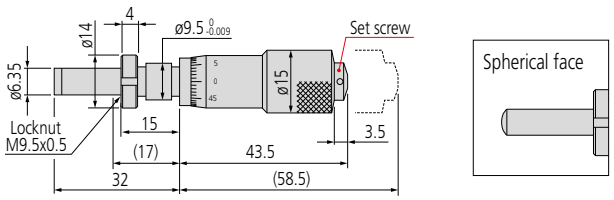
Dimensions

Unit: mm

Plain stem type



Stem locknut type



( ): with spindle fully retracted

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Micrometer Heads

SERIES 150 – Carbide-Tipped Spindle Medium Standard Micrometer Head

- Measuring range of 25 mm.
- Carbide-tipped spindle provides high abrasion resistance.



150-191



150-801



150-190

Technical Data

Spindle pitch:	0.5 mm/.025"
Stem:	ø10 mm/ø.375"
Max. permissible error J_{MPE}:	±2 µm/±.0001"

Specifications

Metric

Code No.	Range	Graduation	Stem type	Spindle end	Special features	Price
150-190	0 - 25 mm	0.001 mm	Plain	Flat	With vernier	**£82.50**
150-192		0.01 mm			Standard	**£56.20**
150-191			Locknut			**£56.20**
150-801			Plain	Spherical (SR4)		**£57.40**
150-802			Locknut			**£59.60**
150-821			Plain	Flat	Reverse graduation	**£59.60**
150-822			Locknut			**£64.10**

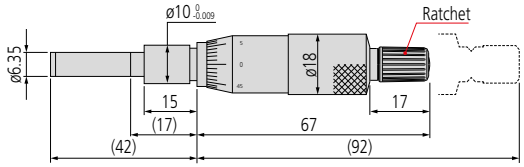
Inch

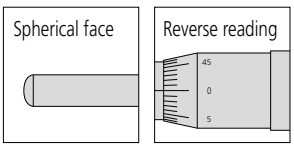
Code No.	Range	Graduation	Stem type	Spindle end	Special features	Price
150-206	0 - 1"	.0001"	Plain	Flat	With vernier	**£82.50**
150-208		.001"			Standard	**£56.20**
150-207			Locknut			**£56.20**
150-811			Plain	Spherical (SR4)		**£57.40**
150-812			Locknut			**£59.60**
150-831			Plain	Flat	Reverse graduation	**£59.60**
150-832			Locknut			**£64.10**

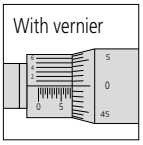
Dimensions

Unit: mm

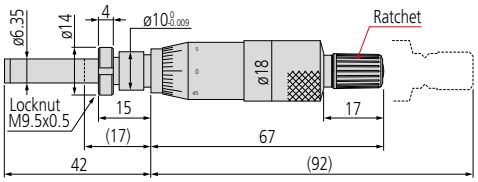
Plain stem type

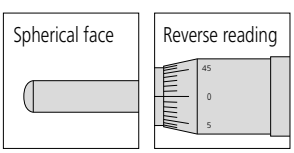






Stem locknut type





( ): with spindle fully retracted

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Micrometer Heads

SERIES 151 – ø8 mm Carbide-Tipped Spindle Medium Standard Micrometer Head

- Larger spindle for heavy-duty applications (normally ø6.35 mm).
- Carbide-tipped spindle provides high abrasion resistance.



151-221



151-224



151-255

Technical Data

Spindle pitch: 0.5 mm / .025"
Stem: ø12 mm / ø.5"

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Stem type	Special features	Price
151-224	0 - 25 mm	0.01 mm	±2 µm	Plain	—	**£90.80**
151-223				Locknut		**£90.80**
151-222		0.001 mm		Plain	With vernier	**£90.80**
151-221				Locknut		**£95.70**
151-256	0 - 50 mm	0.01 mm	±4 µm	Plain	—	**£165.00**
151-255				Locknut		**£165.00**

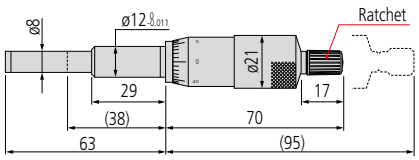
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Stem type	Special features	Price
151-240	0 - 1"	.001"	±.0001"	Plain	—	**£90.80**
151-239				Locknut		**£90.80**
151-238		.0001"		Plain	With vernier	**£90.80**
151-237				Locknut		**£95.70**
151-272	0 - 2"	.001"	±.0002"	Plain	—	**£165.00**
151-271				Locknut		**£165.00**

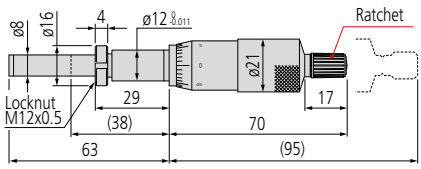
Dimensions

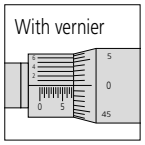
Unit: mm

Plain stem type

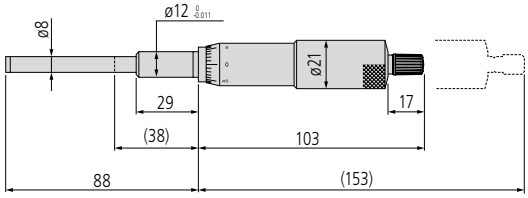


Stem locknut type

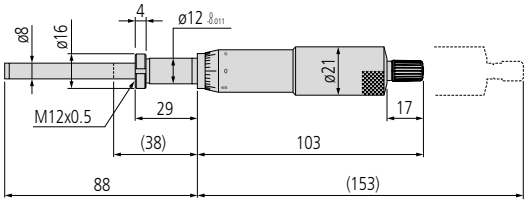




Plain stem type (0 - 50 mm range)



Stem locknut type (0 - 50 mm range)



( ): with spindle fully retracted

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Micrometer Heads

SERIES 152 – Large Diameter Thimble Micrometer Head

- Large-diameter thimble provides high discrimination without the need for a vernier scale on standard-range heads.
- Bidirectional graduations for use in either direction.
- Carbide-tipped spindle provides high abrasion resistance.

B

152-283



152-332



152-380



Technical Data

Graduation:	0.002 mm
Spindle pitch:	0.5 mm
Stem:	ø12 mm
Spindle end:	Flat (carbide tip)

Specifications

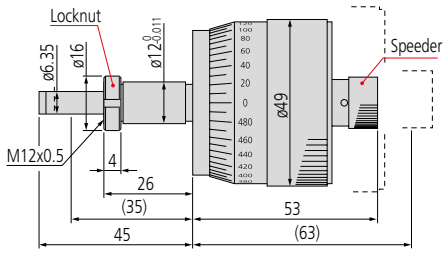
Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem type	Special features	Price
152-283	0 - 10 mm	±2 µm	Locknut	Standard	**£188.00**
152-332	0 - 25 mm		Plain		**£392.00**
152-380	0 - 50 mm	±4 µm		Bidirectional	**£494.00**

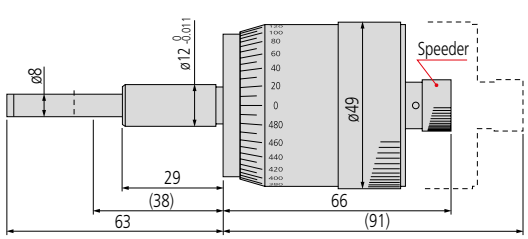
Dimensions

Unit: mm

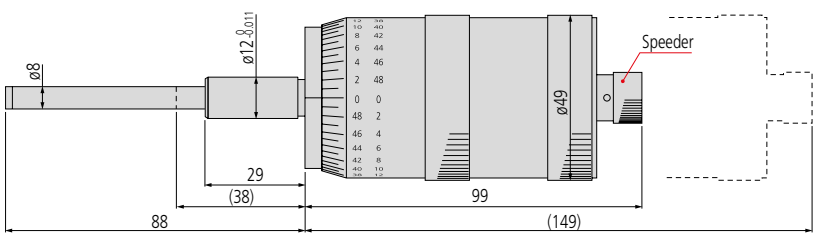
152-283



152-332



152-380



( ): with spindle fully retracted

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Micrometer Heads

SERIES 152 – XY-Stage Micrometer Head

- Bidirectional graduations for use in either direction, suitable for cross-travel stage translation in X and Y.
- Spindle end: Flat form and hardened, or spherical with carbide tip (more than HRA90), lapped surface.
- Rotating collar on thimble enables zero setting at any position.
- Non-rotating device on spindle reduces workpiece deformation and wear.

Technical Data

Graduation:	0.005 mm
Spindle pitch:	1 mm
Stem:	ø18 mm

152-389



152-390



Specifications

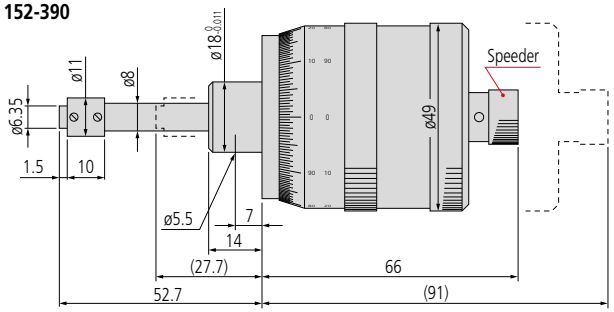
Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem type	Special features	Price
152-390	0 - 25 mm	±2 µm	Plain	For X-axis, bidirectional	**£229.00**
152-389				For Y-axis, bidirectional	**£229.00**

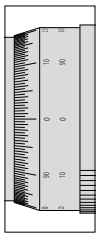
Dimensions

Unit: mm

152-390



152-389



( ): with spindle fully retracted

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Micrometer Heads

SERIES 153 – Non-Rotating Carbide-Tipped Spindle Micrometer Head

- Torsion-free feed reduces workpiece deformation and wear.
- Carbide-tipped spindle provides high abrasion resistance.



153-101



153-201



153-202

Technical Data

Spindle pitch:	0.5 mm/.025"
Max. permissible error J_{MPE}:	±3 µm/±.00015"

Specifications

Metric

Code No.	Range	Graduation	Stem	Stem type	Special features	Price
153-101	0 - 15 mm	0.01 mm	ø9.5 mm	Plain	—	**£132.00**
153-201*	0 - 25 mm		ø12 mm			**£150.00**
153-202*		0.001 mm			With vernier	**£150.00**

Inch

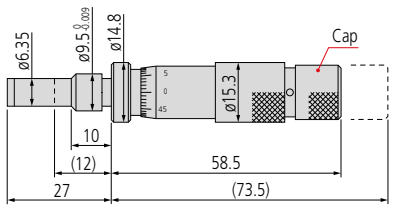
Code No.	Range	Graduation	Stem	Stem type	Special features	Price
153-205*	0 - 1"	.001"	ø.5"	Plain	—	**£150.00**
153-206*		.0001"			With vernier	**£150.00**

* With Ratchet Stop.

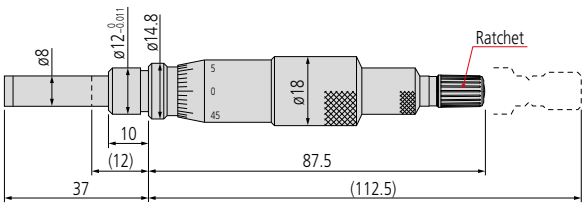
Dimensions

Unit: mm

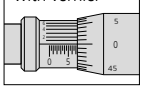
153-101



153-201



153-202
with vernier



( ): with spindle fully retracted

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Micrometer Heads

SERIES 153 – Large Diameter Thimble High Accuracy Micrometer Head

- Fine graduation and high accuracy model.
- Non-rotating spindle reduces workpiece deformation and wear.
- Bidirectional graduations for use in either direction.
- Carbide-tipped spindle provides high abrasion resistance.

Technical Data

Graduation:	0.0005 mm / .00001"
Spindle pitch:	0.5 mm / .025"
Stem:	ø18 mm / ø.709"
Spindle end:	Flat (carbide tip)



153-301

Specifications

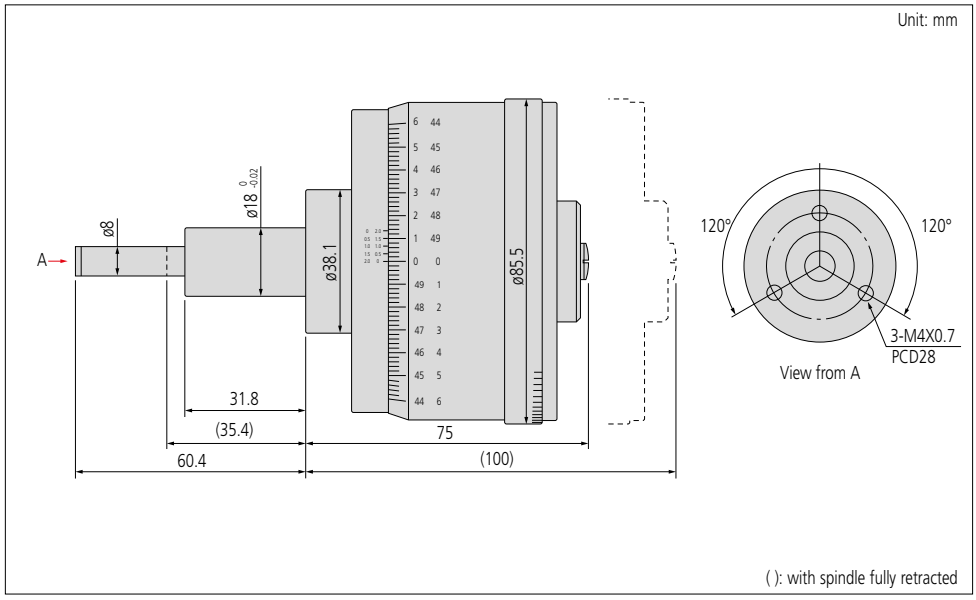
Metric

Code No.	Range	Max. permissible error J_{MPE}	Stem type	Special features	Price
153-301	0 - 25 mm	±1 µm / ±0.5 µm	Plain	Bidirectional	£1,170.00

Inch

Code No.	Range	Max. permissible error J_{MPE}	Stem type	Special features	Price
153-302	0 - 1"	±.00005" / ±.00003"	Plain	Bidirectional	£1,170.00

Dimensions



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Micrometer Heads

SERIES 197 – Large Diameter Thimble Non-Rotating Spindle Micrometer Head

- Large-thimble micrometer head with non-rotating spindle.
- Floating thimble allows easy zero setting at any spindle position.
- Dual-spindle mechanism for quick feed of 1 mm (.05") / rev (standard models: 0.5 mm (.025") / rev).
- Carbide-tipped spindle provides high abrasion resistance.

B

197-101



Technical Data

Graduation:	0.005 mm / .0002"
Spindle pitch:	1 mm / .05"
Max. permissible error J_{MPE}:	±5 µm / ±.0001"
Spindle end:	Flat (carbide tip)

Specifications

Metric

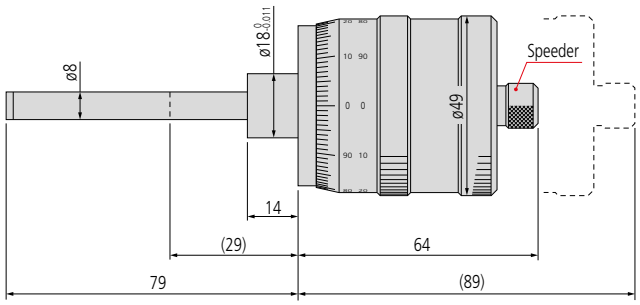
Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Special features	Price
197-101	0 - 50 mm	±5 µm	ø18 mm	Plain	Bidirectional	**£445.00**

Inch

Code No.	Range	Max. permissible error J_{MPE}	Stem	Stem type	Special features	Price
197-201	0 - 2"	±.0001"	ø.709"	Plain	Bidirectional	**£445.00**

Dimensions

Unit: mm



( ): with spindle fully retracted

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Micrometer Heads

SERIES 7 – Micro Jack

- Used for accurate levelling of machines, surface plates, and precision instruments.
- Zero-setting is possible at any position.
- Easy adjustment under heavy load.

Technical Data

Graduation: 0.01 mm





7850

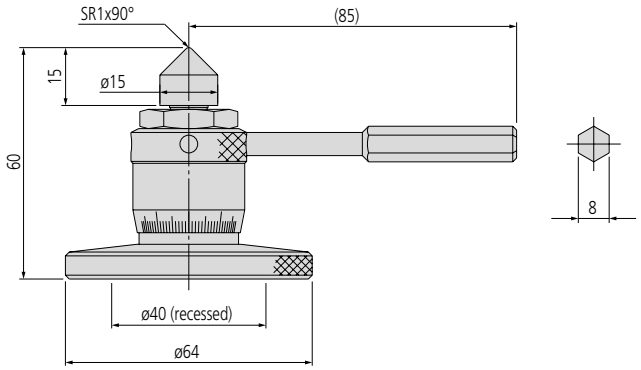
Specifications

Metric

Code No.	Range	Handle force at max. loading	Remarks	Price
7850	60 - 75 mm	90 N	Max. load: 400 kg	**£471.00**

Dimensions

Unit: mm



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HOLTEST
INSIDE MICROMETERS
BORE GAUGES



Holtest



Inside Micrometers



Bore Gauges



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Mitutoyo

Holtest

SERIES 468 – Digimatic Holtest Three-Point Bore Micrometer

- Three-point bore micrometer with large LCD readout (character height 7.5 mm).
- Titanium-coated measuring pins provide excellent durability and impact resistance and allow the instrument to measure right to the bottom of a blind hole.
- One SR44 battery is required and battery life is approx. 1.2 years under normal use.
- ABSolute and INCremental measurement modes allow highly efficient operation.
- The IP65 protection rating allows the instrument to be used in the presence of splashing coolant.
- Deep holes can be measured by attaching an extension rod (optional).
- A function lock prevents accidental change of reference point.
- Measurement data output enables operation with Statistical Process Control (SPC) and measurement control systems.
- An interface input tool is available for transferring measurement data, under keyboard control, directly to commercial spreadsheet software.
- Interchangeable-head sets (interchangeable measuring heads type) covering an extended measuring range using multiple heads and non-interchangeable-head sets are available.
- Optional setting rings are available for setting the instrument accurately before measurement (see pages C-37 to C-38).

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



468-264 **468-267** **468-273**

Technical Data

Display:	LCD
Dust/water protection level:	IP65 (IEC60529)*
Battery:	SR44 (1 pc), **938882**

* Rustproofing treatment to be applied after use.

Functions

Zero-setting, origin restoration, data hold, 2-point preset, function lock, inch/mm readout, automatic power ON/OFF, error alarm, data output.

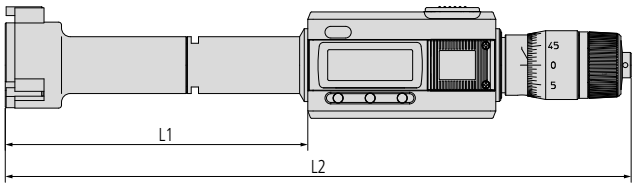


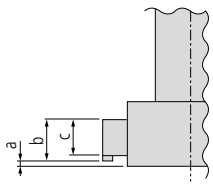
Data hold.



Dimensions

Unit: mm





Range	a	b	c	L1	L2
275 - .5"	2 or less	—	2.5	59	175 - 177
.5 - .8"	0.3 or less	5.6	3.5	84	197.5 - 201.5
.8 - 1.2"		8.3	5.2	93	206.9 - 211.9
1.2 - 2"		13	10	103.8	214.7 - 224.7
2 - 4"		17	14	105.4	219.6 - 232.6
4 - 12"	12.4 or less	21	13.8	151.4	286.3 - 311.3

Note: L1 is maximum depth of measurement possible.
External view differs depending on measurement range.

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Holtest

SERIES 468 – Digimatic Holtest Three-Point Bore Micrometer

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*[1]	**£242.00**
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*[1]	**£242.00**
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£179.00**
04AZB157	Mounting bracket	**£36.10**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB Input Tool Direct USB-ITN-B (2 m)	**£158.00**
Extension rods (refer to Specifications table)		
952322	100 mm	**£92.10**
952621	150 mm	**£74.80**
952622	150 mm	**£83.60**
952623	150 mm	**£135.00**

*[1] U-WAVE-R Receiver required.



Mounting bracket **04AZB157** (optional accessory).



Shown on stand using mounting bracket.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}*[2]	Extension rod (optional accessory)	Price
468-261	.275 - .35" (6.985 - 8.89 mm)	.00005" (0.001 mm)	±2 µm (range 2 µm) / ±.0001"(range .0001")	952322	**£1,110.00**
468-262	.35 - .425" (8.89 - 10.795 mm)				**£1,110.00**
468-263	.425 - .5" (10.795 - 12.7 mm)				**£1,110.00**
468-264	.5 - .65" (12.7 - 16.51 mm)		±3 µm (range 3 µm) / ±.00015" (range .00015")	952621	**£1,220.00**
468-265	.65 - .8" (16.51 - 20.32 mm)				**£1,220.00**
468-266	.8 - 1" (20.32 - 25.4 mm)			952622	**£1,250.00**
468-267	1 - 1.2" (25.4 - 30.48 mm)				**£1,250.00**
468-268	1.2 - 1.6" (30.48 - 40.64 mm)				**£1,250.00**
468-269	1.6 - 2" (40.64 - 50.8 mm)				**£1,250.00**
468-270	2 - 2.5" (50.8 - 63.5 mm)			952623	**£1,370.00**
468-271	2.5 - 3" (63.5 - 76.2 mm)		±4 µm (range 4 µm) / ±.0002" (range .0002")		**£1,400.00**
468-272	3 - 3.5" (76.2 - 88.9 mm)				**£1,420.00**
468-273	3.5 - 4" (88.9 - 101.6 mm)				**£1,450.00**
468-274	4 - 5" (101.6 - 127 mm)	.0001" (0.001 mm)	±5 µm (range 5 µm) / ±.00025" (range .00025")		**£1,850.00**
468-275	5 - 6" (127 - 152.4 mm)				**£1,930.00**
468-276	6 - 7" (152.4 - 177.8 mm)				**£2,020.00**
468-277	7 - 8" (177.8 - 203.2 mm)				**£2,130.00**
468-278	8 - 9" (203.2 - 228.6 mm)		±6 µm (range 5 µm) / ±.0003" (range .0003")		**£2,230.00**
468-279	9 - 10" (228.6 - 254 mm)				**£2,300.00**
468-280	10 - 11" (254 - 279.4 mm)				**£2,410.00**
468-281	11 - 12" (279.4 - 304.8 mm)				**£2,470.00**

*[2] Accuracy specifications apply to the whole length of the measuring pins, and are given both in terms of the limits of deviation of a measurement and the total width of the deviation range (in parentheses).

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)



Interchangeable-head sets (interchangeable measuring heads type).



Non-interchangeable-head sets.

C

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Mitutoyo

Holtest

SERIES 468 – Digimatic Holtest Three-Point Bore Micrometer Interchangeable-Head Sets

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



468-976



468-977



468-979

Specifications

Inch/Metric

Code No.	Range	Content of set			Price
468-976	.275 - .5" (6.985 - 12.7 mm)	Display unit		1 pc	£2,130.00
		Measuring head	.275 - .35"	1 pc	
			.35 - .425"	1 pc	
			.425 - .5"	1 pc	
		Setting ring	ø.35"	1 pc	
			ø.425"	1 pc	
		Extension rod	100 mm	1 pc	
		Spanner		2 pcs	
		Hex wrench		1 pc	
		Phillips screw driver		1 pc	
468-977	.5 - .8" (12.7 - 20.32 mm)	Display unit		1 pc	£1,770.00
		Measuring head	.5 - .65"	1 pc	
			.65 - .8"	1 pc	
		Setting ring	ø.65"	1 pc	
		Extension rod	150 mm	1 pc	
		Spanner		2 pc	
		Hex wrench		1 pc	
		Phillips screw driver		1 pc	
468-978	.8 - 2" (20.32 - 50.8 mm)	Display unit		1 pc	£2,980.00
		Measuring head	.8 - 1"	1 pc	
			1 - 1.2"	1 pc	
			1.2 - 1.6"	1 pc	
			1.6 - 2"	1 pc	
		Setting ring	ø1"	1 pc	
			ø1.6"	1 pc	
		Extension rod	150 mm	1 pc	
		Spanner		2 pc	
		Hex wrench		1 pc	
		Phillips screw driver		1 pc	
468-979	2 - 4" (50.8 - 101.6 mm)	Display unit		1 pc	£4,270.00
		Measuring head	2 - 2.5"	1 pc	
			2.5 - 3"	1 pc	
			3 - 3.5"	1 pc	
			3.5 - 4"	1 pc	
		Setting ring	ø2.5"	1 pc	
			ø3.5"	1 pc	
		Extension rod	150 mm	1 pc	
		Spanner		2 pc	
		Hex wrench		1 pc	
		Phillips screw driver		1 pc	
468-980	4 - 8" (101.6 - 203.2 mm)	Display unit		1 pc	£5,740.00
		Measuring head	4 - 5"	1 pc	
			5 - 6"	1 pc	
			6 - 7"	1 pc	
			7 - 8"	1 pc	
		Setting ring	ø5"	1 pc	
			ø7"	1 pc	
		Extension rod	150 mm	1 pc	
		Spanner		2 pc	
		Hex wrench		1 pc	
		Phillips screw driver		1 pc	

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
04AZB157	Mounting bracket	£36.10
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB Input Tool Direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.

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Holtest

SERIES 468 – Digimatic Holtest Three-Point Bore Micrometer Non-Interchangeable-Head Sets

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



468-987



468-990

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*[1]	£242.00
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
04AZB157	Mounting bracket	£36.10
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB Input Tool Direct USB-ITN-B (2 m)	£158.00
Extension rods (refer to Specifications table)		
952322	100 mm	£92.10
952621	150 mm	£74.80
952622	150 mm	£83.60
952623	150 mm	£135.00

*[1] U-WAVE-R Receiver required.

Specifications

Inch/Metric

Code No.	Range	Content of set			Extension rod (optional accessory)	Price
468-986	.275 - .5" (6.985 - 12.7 mm)	Display unit	.275 - .35"	1 pc	952322	£3,630.00
			.35 - .425"	1 pc		
			.425 - .5"	1 pc		
		Setting ring	ø.35"	1 pc		
			ø.425"	1 pc		
		Spanner		2 pcs		
		Hex wrench		1 pc		
		Phillips screw driver		1 pc		
468-987	.5 - 1" (12.7 - 25.4 mm)	Display unit	.5 - .65"	1 pc	952621, 952622*[2]	£3,860.00
			.65 - .8"	1 pc		
			.8 - 1"	1 pc		
		Setting ring	ø.65"	1 pc		
			ø.8"	1 pc		
		Spanner		2 pcs		
		Hex wrench		1 pc		
		Phillips screw driver		1 pc		
468-988	1 - 2" (25.4 - 50.8 mm)	Display unit	1 - 1.2"	1 pc	952622	£4,490.00
			1.2 - 1.6"	1 pc		
			1.6 - 2"	1 pc		
		Setting ring	ø1.2"	1 pc		
			ø1.6"	1 pc		
		Spanner		1 pc		
		Hex wrench		1 pc		
		Phillips screw driver		1 pc		
468-989	2 - 3" (50.8 - 76.2 mm)	Display unit	2 - 2.5"	1 pc	952623	£3,310.00
			2.5 - 3"	1 pc		
		Setting ring	ø2.5"	1 pc		
		Spanner		1 pc		
		Hex wrench		1 pc		
		Phillips screw driver		1 pc		
468-990	3 - 4" (76.2 - 101.6 mm)	Display unit	3 - 3.5"	1 pc		£3,550.00
			3.5 - 4"	1 pc		
		Setting ring	ø3.5"	1 pc		
		Spanner		1 pc		
		Hex wrench		1 pc		
		Phillips screw driver		1 pc		

*[2] 952621 for measuring range 12.7 - 16.51 mm and 16.51 - 20.32 mm, 952622 for measuring range 20.32 - 25.4 mm

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Mitutoyo

Holtest

SERIES 368 – Holtest Three-Point/Two-Point Bore Micrometers

- Titanium-coated measuring pins on the three-point type (over 6 mm range models) provide excellent durability and impact resistance and allow the instrument to measure right to the bottom of a blind hole.
- Three-point bore micrometer with measuring range 6 mm or larger allows stable measurement through automatic centering.
- Can measure deep holes using an Extension rod (optional) which is available on models over 6 mm (.275") measuring range.
- Ratchet Stop ensures constant-force, repeatable measurement.
- Optional setting rings are available for setting the instrument accurately before measurement (see pages C-37 to C-38).



368-001
(Two-point contact model)



368-170



368-174

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}*	Extension rod (optional accessory)	Price
Two-point					
368-001	2 - 2.5 mm	0.001 mm	±2 µm (range 2 µm)	—	**£1,040.00**
368-002	2.5 - 3 mm				**£1,040.00**
368-003	3 - 4 mm				**£867.00**
368-004	4 - 5 mm				**£867.00**
368-005	5 - 6 mm				**£867.00**
Three-point					
368-161	6 - 8 mm	0.001 mm	±2 µm (range 2 µm)	952322	**£341.00**
368-162	8 - 10 mm				**£341.00**
368-163	10 - 12 mm				**£341.00**
368-164	12 - 16 mm	0.005 mm	±3 µm (range 3 µm)	952621	**£414.00**
368-165	16 - 20 mm				**£436.00**
368-166	20 - 25 mm			952622	**£436.00**
368-167	25 - 30 mm				**£436.00**
368-168	30 - 40 mm				**£542.00**
368-169	40 - 50 mm				**£555.00**
368-170	50 - 63 mm			952623	**£558.00**
368-171	62 - 75 mm		±4 µm (range 4 µm)		**£600.00**
368-172	75 - 88 mm				**£618.00**
368-173	87 - 100 mm				**£631.00**
368-174	100 - 125 mm		±5 µm (range 5 µm)		**£908.00**
368-175	125 - 150 mm				**£967.00**
368-176	150 - 175 mm				**£1,120.00**
368-177	175 - 200 mm				**£1,150.00**
368-178	200 - 225 mm		±6 µm (range 6 µm)		**£1,150.00**
368-179	225 - 250 mm				**£1,150.00**
368-180	250 - 275 mm				**£1,220.00**
368-181	275 - 300 mm				**£1,420.00**

* Accuracy specifications apply to the whole length of the measuring pins, and are given both in terms of the limits of deviation of a measurement and the total width of the deviation range (in parentheses).

Optional Accessories

Code No.	Description	Price
Extension rods (refer to Specifications table)		
952322	100 mm	**£92.10**
952621	150 mm	**£74.80**
952622	150 mm	**£83.60**
952623	150 mm	**£135.00**



Rocker-arm bearing housing measurement using an extension rod.



Measuring diameters down to 2 mm with the two-point model.



Ball-bearing inner-race inside diameter measurement.

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Holtest

SERIES 368 – Holtest Three-Point/Two-Point Bore Micrometers

Specifications

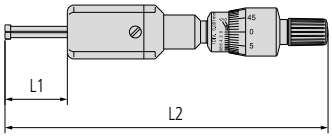
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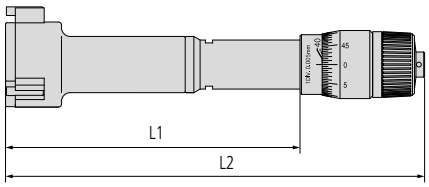
Code No.	Range	Graduation	Max. permissible error J_{MPE}*	Extension rod (optional accessory)	Price
Two-point					
368-021	.08 - .1"	.0001"	±.0001" (range .0001")	—	**£1,040.00**
368-022	.1 - .12"				**£1,040.00**
368-023	.12 - .16"				**£867.00**
368-024	.16 - .2"				**£867.00**
368-025	.2 - .24"				**£867.00**
368-026	.24 - .28"				**£867.00**
Three-point					
368-261	.275 - .35"	.0001"	±.0001" (range .0001")	952322	**£341.00**
368-262	.35 - .425"				**£341.00**
368-263	.425 - .5"				**£341.00**
368-264	.5 - .65"	.0002"	±.00015" (range .00015")	952621	**£414.00**
368-265	.65 - .8"				**£436.00**
368-266	.8 - 1"			952622	**£436.00**
368-267	1 - 1.2"				**£436.00**
368-268	1.2 - 1.6"				**£542.00**
368-269	1.6 - 2"				**£555.00**
368-270	2 - 2.5"			952623	**£558.00**
368-271	2.5 - 3"		±.0002" (range .0002")		**£600.00**
368-272	3 - 3.5"				**£618.00**
368-273	3.5 - 4"				**£631.00**
368-274	4 - 5"		±.00025" (range .00025")		**£908.00**
368-275	5 - 6"				**£967.00**
368-276	6 - 7"				**£1,110.00**
368-277	7 - 8"				**£1,140.00**
368-278	8 - 9"		±.0003" (range .0003")		**£1,140.00**
368-279	9 - 10"				**£1,140.00**
368-280	10 - 11"				**£1,220.00**
368-281	11 - 12"				**£1,410.00**

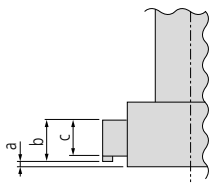
* Accuracy specifications apply to the whole length of the measuring pins, and are given both in terms of the limits of deviation of a measurement and the total width of the deviation range (in parentheses).

Dimensions

Unit: mm







Range	a	b	c	L1	L2
2 - 3 mm	—	—	2	12	103.5 - 104
3 - 6 mm				22	113 - 114
6 - 12 mm	2 or less	—	2.5	59	102 - 104
12 - 20 mm	0.3 or less	5.6	3.5	82	126 - 130
20 - 30 mm		8.3	5.2	94	137 - 142
30 - 50 mm		13	10	102	145 - 155
50 - 100 mm		17	14	105	150 - 163
100 - 300 mm	12.4 or less	21	13.8	161	227 - 252

Note: External view differs depending on measurement range.

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Mitutoyo

Holtest

SERIES 368 – Holtest Three-Point/Two-Point Bore Micrometer Sets



368-907



368-912

Specifications

Metric

Code No.	Range	Graduation	Content of Set			Price
Two-point						
368-906	2 - 3 mm	0.001 mm	Micrometer head unit	2 - 2.5 mm	1 pc	**£2,040.00**
				2.5 - 3 mm	1 pc	
			Setting ring	ø2.5 mm	1 pc	
			Hex wrench		1 pc	
368-907	3 - 6 mm		Micrometer head unit	3 - 4 mm	1 pc	**£2,400.00**
				4 - 5 mm	1 pc	
				5 - 6 mm	1 pc	
			Setting ring	ø4 mm	1 pc	
				ø5 mm	1 pc	
			Hex wrench		1 pc	
Three-point						
368-911	6 - 12 mm	0.001 mm	Micrometer head unit	6 - 8 mm	1 pc	**£1,120.00**
				8 - 10 mm	1 pc	
				10 - 12 mm	1 pc	
			Setting ring	ø8 mm	1 pc	
				ø10 mm	1 pc	
			Extension rod	100 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-912	12 - 20 mm	0.005 mm	Micrometer head unit	12 - 16 mm	1 pc	**£828.00**
				16 - 20 mm	1 pc	
			Setting ring	ø16 mm	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-913	20 - 50 mm		Micrometer head unit	20 - 25 mm	1 pc	**£2,540.00**
				25 - 30 mm	1 pc	
				30 - 40 mm	1 pc	
				40 - 50 mm	1 pc	
			Setting ring	ø25 mm	1 pc	
				ø40 mm	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-914	50 - 100 mm		Micrometer head unit	50 - 63 mm	1 pc	**£3,160.00**
				62 - 75 mm	1 pc	
				75 - 88 mm	1 pc	
				87 - 100 mm	1 pc	
			Setting ring	ø62 mm	1 pc	
				ø87 mm	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-915	100 - 200 mm		Micrometer head unit	100 - 125 mm	1 pc	**£5,140.00**
				125 - 150 mm	1 pc	
				150 - 175 mm	1 pc	
				175 - 200 mm	1 pc	
			Setting ring	ø125 mm	1 pc	
				ø175 mm	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		1 pc	
			Hex wrench		1 pc	

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)

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Holtest

SERIES 368 – Holtest Three-Point/Two-Point Bore Micrometer Sets



368-913



368-915

C

Specifications

Inch

Code No.	Range	Graduation	Content of Set			Price
Two-point						
368-926	.08 - .12"	.0001"	Micrometer head unit	.08 - 1"	1 pc	**£2,040.00**
				.1 - .12"	1 pc	
			Setting ring	ø.1"	1 pc	
			Hex wrench		1 pc	
368-927	.12 - .28"		Micrometer head unit	.12 - .16"	1 pc	**£3,170.00**
				.16 - .2"	1 pc	
				.2 - .24"	1 pc	
				.24 - .28"	1 pc	
			Setting ring	ø.16"	1 pc	
				ø.24"	1 pc	
			Hex wrench		1 pc	
Three-point						
368-916	.275 - .5"	.0001"	Micrometer head unit	.275 - .35"	1 pc	**£1,120.00**
				.35 - .425"	1 pc	
				.425 - .5"	1 pc	
			Setting ring	ø.35"	1 pc	
				ø.5"	1 pc	
			Extension rod	100 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-917	.5 - .8"	.0002"	Micrometer head unit	.5 - .65"	1 pc	**£798.00**
				.65" - .8"	1 pc	
			Setting ring	ø.65"	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-918	.8 - 2"		Micrometer head unit	.8 - 1"	1 pc	**£2,540.00**
				1 - 1.2"	1 pc	
				1.2 - 1.6"	1 pc	
				1.6 - 2"	1 pc	
			Setting ring	ø1"	1 pc	
				ø1.6"	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-919	2 - 4"		Micrometer head unit	2 - 2.5"	1 pc	**£3,160.00**
				2.5 - 3"	1 pc	
				3 - 3.5"	1 pc	
				3.5 - 4"	1 pc	
			Setting ring	ø2.5"	1 pc	
				ø3.5"	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		2 pcs	
			Hex wrench		1 pc	
368-920	4 - 8"		Micrometer head unit	4 - 5"	1 pc	**£5,140.00**
				5 - 6"	1 pc	
				6 - 7"	1 pc	
				7 - 8"	1 pc	
			Setting ring	ø5"	1 pc	
				ø7"	1 pc	
			Extension rod	150 mm	1 pc	
			Spanner		1 pc	
			Hex wrench		1 pc	

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)

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Mitutoyo

Holtest

SERIES 368 – Holtest (Type II) Three-Point Bore Micrometer

- Hardened tool-steel anvils (instead of titanium-coated carbide) allow a more economically priced tool.
- Same accuracy as the titanium-coated Holtest models.
- Constant-force device allows repeatable measurement.
- Measurement can be made close to the bottom of a blind hole.
- Can measure deep holes using an Extension Rod (optional).
- Optional setting rings are available for setting the instrument accurately before measurement (see pages C-37 to C-38).



368-769



368-770



368-774

Optional Accessories

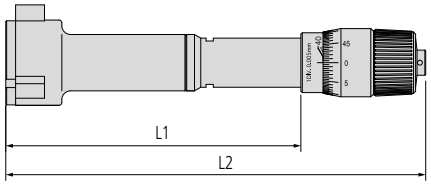
Code No.	Description	Price
Extension rods (refer to Specifications table)		
952621	150 mm	**£74.80**
952622	150 mm	**£83.60**
952623	150 mm	**£135.00**

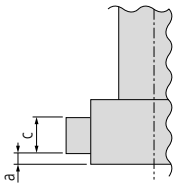


Constant-force device ensures repeatable measurement.

Dimensions

Unit: mm





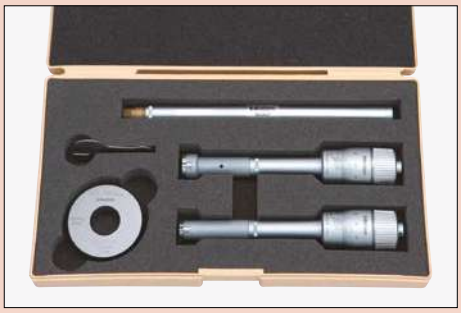
Range	a	c	L1	L2
12 - 20 mm	2.6 or less	3.5	82	126 - 130
20 - 30 mm	3.4 or less	5.2	94	137 - 142
30 - 50 mm		10	102	145 - 155
50 - 100 mm		14	105	150 - 163
100 - 300 mm	19.6 or less	13.8	161	227 - 252

Note: External view differs depending on measurement range.

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Holtest

SERIES 368 – Holtest (Type II) Three-Point Bore Micrometer



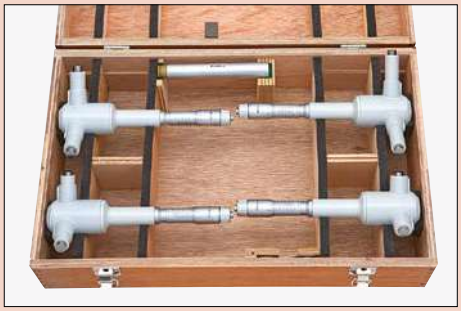
368-991



368-992



368-993



368-994

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}*	Extension rod (optional accessory)	Price
368-764	12 - 16 mm	0.005 mm	±3 µm (range 3 µm)	952621	£322.00
368-765	16 - 20 mm				£341.00
368-766	20 - 25 mm			952622	£360.00
368-767	25 - 30 mm				£384.00
368-768	30 - 40 mm				£421.00
368-769	40 - 50 mm				£421.00
368-770	50 - 63 mm			952623	£484.00
368-771	62 - 75 mm		±4 µm (range 4 µm)		£502.00
368-772	75 - 88 mm				£518.00
368-773	87 - 100 mm				£535.00
368-774	100 - 125 mm		±5 µm (range 5 µm)		£850.00
368-775	125 - 150 mm				£908.00
368-776	150 - 175 mm				£996.00
368-777	175 - 200 mm				£1,010.00
368-778	200 - 225 mm		±6 µm (range 6 µm)		£1,010.00
368-779	225 - 250 mm				£1,010.00
368-780	250 - 275 mm				£1,010.00
368-781	275 - 300 mm				£1,170.00

Sets

Code No.	Range	Micrometer head units	Setting rings	Extension rod (included)	Price
368-991	12 - 20 mm	12 - 16, 16 - 20 mm	ø16 mm	150 mm	£759.00
368-992	20 - 50 mm	20 - 25, 25 - 30, 30 - 40, 40 - 50 mm	ø25, ø40 mm		£1,890.00
368-993	50 - 100 mm	50 - 63, 62 - 75, 75 - 88, 87 - 100 mm	ø62, ø87 mm		£2,780.00
368-994	100 - 200 mm	100 - 125, 125 - 150, 150 - 175, 175 - 200 mm	ø125, ø175 mm		£4,080.00

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}*	Extension rod (optional accessory)	Price
368-864	.5 - .65"	.0002"	±.00015" (range .00015")	952621	£322.00
368-865	.65 - .8"				£341.00
368-866	.8 - 1"			952622	£360.00
368-867	1 - 1.2"				£384.00
368-868	1.2 - 1.6"				£421.00
368-869	1.6 - 2"				£421.00
368-870	2 - 2.5"			952623	£484.00
368-871	2.5 - 3"		±.0002" (range .0002")		£502.00
368-872	3 - 3.5"				£518.00
368-873	3.5 - 4"				£535.00
368-874	4 - 5"		±.00025" (range .00025")		£850.00
368-875	5 - 6"				£908.00
368-876	6 - 7"				£996.00
368-877	7 - 8"				£1,010.00
368-878	8 - 9"		±.0003" (range .0003")		£1,010.00
368-879	9 - 10"				£1,010.00
368-880	10 - 11"				£1,010.00
368-881	11 - 12"				£1,170.00

Sets

Code No.	Range	Micrometer head units	Setting rings	Extension rod (included)	Price
368-995	.5 - .8"	.5 - .65, .65 - .8"	ø.65"	150 mm	£759.00
368-996	.8 - 2"	.8 - 1, 1 - 1.2, 1.2 - 1.6, 1.6 - 2"	ø1, 1.6"		£1,890.00
368-997	2 - 4"	2 - 2.5, 2.5 - 3, 3 - 3.5, 3.5 - 4"	ø2.5, ø3.5"		£2,780.00
368-998	4 - 8"	4 - 5, 5 - 6, 6 - 7, 7 - 8"	ø5, ø7"		£4,080.00

* Accuracy specifications apply to the whole length of the measuring jaws, and are given both in terms of the limits of deviation of a measurement and the total width of the deviation range (in parentheses).

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)

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Holtest

SERIES 568 – ABSOLUTE Digimatic Boremetic Snap-Open Bore Gauge

- A snap-type digital display, inside-diameter measuring instrument allows easy and speedy measurement by lever operation.
- Titanium-coated measuring pins provide excellent durability and impact resistance and allow the instrument to measure right to the bottom of a blind hole.
- Three-Point contact measuring head enables highly repeatable measurement data to be obtained.
- The ABSOLUTE linear encoder eliminates overspeed errors.
- GO/NO-GO judgement function.
- Dual HOLD function buttons, optimally located, enable high operability.
- 330° rotatable display unit for easy reading at any angle.
- Can measure deep holes by attaching an optional extension rod.
- Digimatic output port enables inclusion in a statistical process control or networked measurement system.
- Interface Input Tools are available that enable the conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software such as Excel.
- Interchangeable-Head Bore Gauges are available in part sets and full sets.
- Optional setting rings are available for setting the instrument accurately before measurement (see pages C-37 to C-38).

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



568-464-10



568-468-10

Technical Data

Display:	LCD
Response speed:	Infinite
Battery:	SR44 (1 pc), **938882**
Battery life:	Approx. 5,000 hours in continuous use

Functions

GO/±NG judgement, GO/±NG judgement zoom, 2-point preset, zero-setting, data hold, error alarm, low battery voltage alert, data output, function lock, 330° rotatable display.



Function lock prevents accidental change of settings.



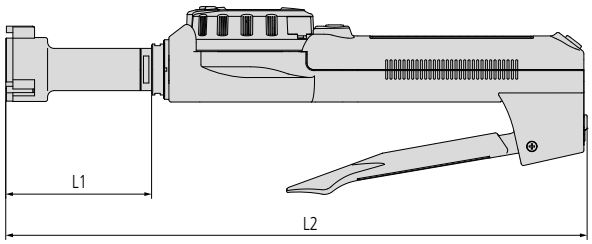
Large LCD ensures easy reading of measurement values.

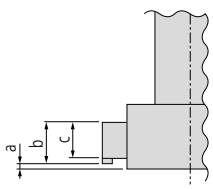


Constant-force device ensures repeatable measurement.

Dimensions

Unit: mm





Range	a	b	c	L1	L2
.275 - .5"	2 or less	—	2.5	83	285
.5 - .8"	0.3 or less	5.6	3.5	53	255
.8 - 1.2"		8.3	5.2	59	261
1.2 - 2"		13	10	67	269
2 - 5"		17	13.8	75	277

Note: External view differs depending on measurement range.

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SERIES 568 – ABSOLUTE Digimatic Boremetic Snap-Open Bore Gauge

Optional Accessories

Code No.	Description	Price
905338	SPC data cable with pushbutton (1 m)	£42.00
905409	SPC data cable with pushbutton (2 m)	£47.10
02AZD730G	U-WAVE-T IP67 transmitter*[1]	£242.00
02AZD790F	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*[1]	£242.00
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	£160.00
06AFM380F	USB Input Tool Direct USB-ITN-B (2 m)	£143.00
Extension rods (refer to Specifications table)		
952322	100 mm	£92.10
952621	150 mm	£74.80
952622	150 mm	£83.60
952623	150 mm	£135.00

*[1] U-WAVE-R Receiver required.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}*[2]	Extension rod (optional accessory)	Price
568-461-10	.275 - .35" (6.985 - 8.89 mm)	.00005" (0.001 mm)	±5 µm (range 5 µm)/ ±.00025" (range .00025")	952322	£1,370.00
568-462-10	.35 - .425" (8.89 - 10.795 mm)				£1,350.00
568-463-10	.425 - .5" (10.795 - 12.7 mm)				£1,350.00
568-464-10	.5 - .65" (12.7 - 16.51 mm)			952621	£1,350.00
568-465-10	.65 - .8" (16.51 - 20.32 mm)				£1,350.00
568-466-10	.8 - 1" (20.32 - 25.4 mm)		±6 µm (range 6 µm)/ ±.0003" (range .0003")	952622	£1,400.00
568-467-10	1 - 1.2" (25.4 - 30.48 mm)				£1,400.00
568-468-10	1.2 - 1.6" (30.48 - 40.64 mm)				£1,530.00
568-469-10	1.6 - 2" (40.64 - 50.8 mm)				£1,530.00
568-470-10	2 - 2.5" (50.8 - 63.5 mm)			952623	£1,560.00
568-471-10	2.5 - 3" (63.5 - 76.2 mm)				£1,560.00
568-472-10	3 - 3.5" (76.2 - 88.9 mm)				£1,740.00
568-473-10	3.5 - 4" (88.9 - 101.6 mm)				£1,740.00
568-474-10	4 - 4.5" (101.6 - 114.3 mm)				£1,820.00
568-475-10	4.5 - 5" (114.3 - 127 mm)				£1,850.00

Code No.	Range	Measuring head units	Setting rings	Price
Interchangeable-head bore gauge sets				
568-928-10	.275 - .5" (6.985 - 12.7 mm)	.275 - .35", .35 - .425", .425 - .5"	ø.35", ø.425"	£1,980.00
568-929-10	.5 - 1" (12.7 - 25.4 mm)	.5 - .65", .65 - .8", .8 - 1"	ø.65", ø.8"	£2,180.00
568-930-10	1 - 2" (25.4 - 50.8 mm)	1 - 1.2", 1.2 - 1.6", 1.6 - 2"	ø1.2", ø1.6"	£2,600.00
568-936-10	2 - 4" (50.8 - 101.6 mm)	2 - 2.5", 2.5 - 3", 3 - 3.5", 3.5 - 4"	ø2.5", ø3.5"	£4,280.00
Non-interchangeable-head bore gauge sets				
568-965-10	.275 - .5" (6.985 - 12.7 mm)	.275 - .35", .35 - .425", .425 - .5"	ø.35", ø.425"	£4,490.00
568-966-10	.5 - 1" (12.7 - 25.4 mm)	.5 - .65", .65 - .8", .8 - 1"	ø.65", ø.8"	£4,640.00
568-967-10	1 - 2" (25.4 - 50.8 mm)	1 - 1.2", 1.2 - 1.6", 1.6 - 2"	ø1.2", ø1.6"	£5,180.00
568-968-10	2 - 3" (50.8 - 76.2 mm)	2 - 2.5", 2.5 - 3"	ø2.5"	£3,720.00
568-969-10	3 - 4" (76.2 - 101.6 mm)	3 - 3.5", 3.5 - 4"	ø2.5", ø3.5"	£4,140.00

*[2] Accuracy specifications apply to the whole length of the measuring jaws, and are given both in terms of the limits of deviation of a measurement and the total width of the deviation range (in parentheses).

Note: It is not advisable to use measuring heads other than those supplied as standard accessories, or attempt to widen a measuring range by using any other heads. (The measuring accuracy in such cases is not guaranteed.)



568-930-10



568-969-10

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Inside Micrometers

SERIES 133 – Tubular Inside Micrometer

- Standard single tube type inside micrometer.
- The sleeve is rotated to adjust the index line position when setting to a length standard.
- Carbide measuring faces.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.



133-143



133-144



133-145



133-146



133-147



133-148



133-149



133-150

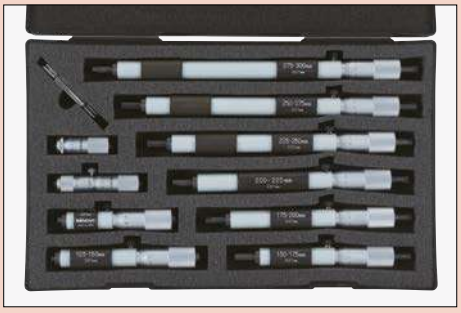


133-151



133-152



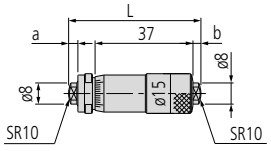


133-902 Inside Micrometer Set.

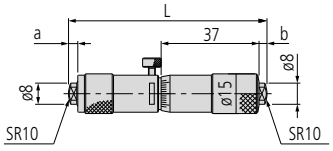
Dimensions

Unit: mm

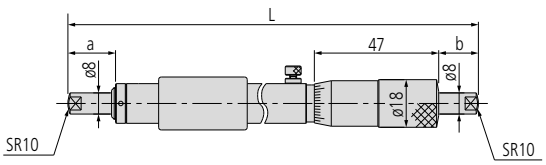
133-143



133-144



Models over 100 mm measuring range



See Specifications table on next page for parameter values.

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Inside Micrometers

SERIES 133 – Tubular Inside Micrometer

Optional Accessory

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	L	a	b	Price
133-143	50 - 75 mm	0.01 mm	±3 µm	50	3.5	3	**£113.00**
133-144	75 - 100 mm		±4 µm	75			**£115.00**
133-145	100 - 125 mm		±5 µm	100	5		**£120.00**
133-146	125 - 150 mm			125			**£127.00**
133-147	150 - 175 mm			150	18	15	**£137.00**
133-148	175 - 200 mm			175			**£147.00**
133-149	200 - 225 mm			200			**£156.00**
133-150	225 - 250 mm		±6 µm	225			**£162.00**
133-151	250 - 275 mm			250			**£173.00**
133-152	275 - 300 mm			275			**£184.00**
133-153	300 - 325 mm		±7 µm	300			**£188.00**
133-154	325 - 350 mm			325			**£192.00**
133-155	350 - 375 mm			350			**£194.00**
133-156	375 - 400 mm		±8 µm	375			**£199.00**
133-157	400 - 425 mm			400			**£202.00**
133-158	425 - 450 mm			425			**£204.00**
133-159	450 - 475 mm		±9 µm	450			**£206.00**
133-160	475 - 500 mm			475			**£211.00**
133-161	500 - 525 mm			500			**£217.00**
133-162	525 - 550 mm		±10 µm	525			**£223.00**
133-163	550 - 575 mm			550			**£226.00**
133-164	575 - 600 mm			575			**£229.00**
133-165	600 - 625 mm		±11 µm	600			**£231.00**
133-166	625 - 650 mm			625			**£237.00**
133-167	650 - 675 mm			650			**£240.00**
133-168	675 - 700 mm		±12 µm	675			**£244.00**
133-169	700 - 725 mm			700			**£253.00**
133-170	725 - 750 mm			725			**£255.00**
133-171	750 - 775 mm		±13 µm	750			**£260.00**
133-172	775 - 800 mm			775			**£263.00**
133-173	800 - 825 mm			800			**£264.00**
133-174	825 - 850 mm		±14 µm	825			**£266.00**
133-175	850 - 875 mm			850			**£273.00**
133-176	875 - 900 mm			875			**£278.00**
133-177	900 - 925 mm		±15 µm	900			**£280.00**
133-178	925 - 950 mm			925			**£289.00**
133-179	950 - 975 mm			950			**£292.00**
133-180	975 - 1000 mm		±16 µm	975			**£293.00**

Micrometer sets

Code No.	Range	Models included	Price
133-901	50 - 150 mm (4 heads/set)	**133-143/4/5/6**	**£596.00**
133-902	50 - 300 mm (10 heads/set)	**133-143/44/45/46/47/48/49/50/51/52**	**£1,460.00**

Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Price
133-223	2 - 3"	.001"	±.00015"	**£113.00**
133-224	3 - 4"		±.0002"	**£115.00**
133-225	4 - 5"		±.00025"	**£120.00**
133-226	5 - 6"			**£127.00**
133-227	6 - 7"			**£137.00**
133-228	7 - 8"			**£147.00**
133-229	8 - 9"			**£156.00**
133-230	9 - 10"		±.0003"	**£162.00**
133-231	10 - 11"			**£173.00**
133-232	11 - 12"			**£184.00**

Micrometer sets

Code No.	Range	Models included	Price
133-903	2 - 6" (4 heads/set)	**133-223/4/5/6**	**£596.00**
133-904	2 - 12" (10 heads/set)	**133-223/24/25/26/27/28/29/30/31/32**	**£1,460.00**

C

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Mitutoyo

Inside Micrometers

SERIES 337 – Digimatic Extension Tube Inside Micrometer

- Wide range of inside measurements possible by combining extension tubes with the micrometer head.
- The sleeve is rotated to adjust the index line position when setting to a length standard.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.

337-303/304 features:

- IP65 (water-proof) protection level that enables use in the presence of cutting fluid.
- A large-character LCD display.
- Storage of 2 preset values for use when setting to an inside length standard.
- A function lock that prevents accidental changing of the reference setting during measurement.
- An output port for measurement data that enables inclusion in a statistical process control or networked measurement system.
- Ability to use Interface Input Tools that enable conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



337-303

Specifications

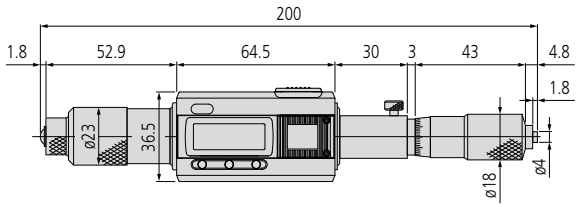
Inch/Metric

Code No.	Range	Micrometer head stroke	Extension tubes	Display unit	Price
337-102	8-9" (203.2-228.6 mm)	1" (25 mm)	—	8-9" (200-225 mm)	£1,070.00
337-303	8-40" (203.2-1016 mm)		1", 2", 4" (2 pcs.), 8", 12"		£1,420.00
337-304	8-60" (203.2-1524 mm)		1", 2", 4", 8", 12" (3 pcs.)		£1,550.00

Dimensions

Unit: mm

Display unit



Technical Data

Dust/water protection level:	IP65 (IEC60529)
Resolution:	0.001 mm/.0001"
Battery:	SR44 (1 pc) **938882**
Spindle feed error:	3 µm/0.00015"

Note: *Spindle feed error* refers to the difference between the maximum and minimum indication error values within the measuring range of the micrometer head.

Functions (for 337-303/304)

Zero-setting, origin restoration, data hold, 2-point preset, function lock, inch/mm readout, automatic power ON/OFF, error alarm, data output.

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB Input Tool Direct USB-ITN-B (2 m)	£158.00

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.

* U-WAVE-R Receiver required.



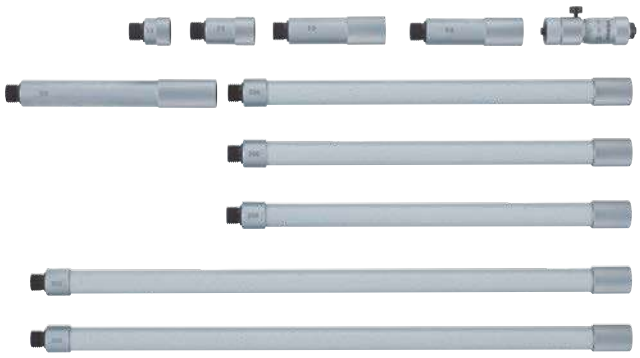
Using a setting ring to accurately set an inside micrometer.

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Inside Micrometers

SERIES 137 – Extension Tube Inside Micrometer

- Wide range of inside measurements possible by combining extension tubes with the micrometer head.
- The sleeve is rotated to adjust the index line position when setting to a length standard.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.
- Carbide measuring faces on the micrometer head are available.



137-205

Technical Data

Graduation: 0.01 mm/.001"
Micrometer head stroke: 13 mm/.5"
Spindle feed error: 3 µm/0.00015"

Note: *Spindle feed error* refers to the difference between the maximum and minimum indication error values within the measuring range of the micrometer head.

Optional Accessory

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.



137-011

Specifications

Metric

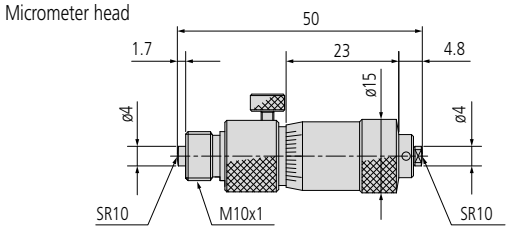
Code No.	Range	Extension tubes	Main unit	Price
137-011	50 - 63 mm	—	50 - 63 mm	**£184.00**
137-201	50 - 150 mm	13, 25, 50 mm		**£211.00**
137-202	50 - 300 mm	13, 25, 50 (2 pcs.), 100 mm		**£318.00**
137-203	50 - 500 mm	13, 25, 50 (2 pcs.), 100, 200 mm		**£392.00**
137-204	50 - 1000 mm	13, 25, 50 (2 pcs.), 100, 200 (2 pcs.), 300 mm		**£529.00**
137-205	50 - 1500 mm	13, 25, 50 (2 pcs.), 100, 200 (3 pcs.), 300 (2 pcs.) mm		**£696.00**
Carbide measuring faces				
137-013	50 - 63 mm	—	50 - 63 mm	**£250.00**
137-206	50 - 150 mm	13, 25, 50 mm		**£265.00**
137-207	50 - 300 mm	13, 25, 50 (2 pcs.), 100 mm		**£355.00**
137-208	50 - 500 mm	13, 25, 50 (2 pcs.), 100, 200 mm		**£518.00**
137-209	50 - 1000 mm	13, 25, 50 (2 pcs.), 100, 200 (2 pcs.), 300 mm		**£639.00**
137-210	50 - 1500 mm	13, 25, 50 (2 pcs.), 100, 200 (3 pcs.), 300 (2 pcs.) mm		**£817.00**

Inch

Code No.	Range	Extension tubes	Main unit	Price
137-012	2 - 2.5"	—	2 - 2.5"	**£184.00**
137-211	2 - 6"	.5", 1", 2"		**£211.00**
137-212	2 - 12"	.5", 1", 2" (2 pcs.), 4"		**£318.00**
137-213	2 - 20"	.5", 1", 2" (2 pcs.), 4", 8"		**£392.00**
137-214	2 - 40"	.5", 1", 2" (2 pcs.), 4", 8" (2 pcs.), 12"		**£529.00**
137-215	2 - 60"	.5", 1", 2" (2 pcs.), 4", 8" (3 pcs.), 12" (2 pcs.)		**£696.00**
Carbide measuring faces				
137-014	2 - 2.5"	—	2 - 2.5"	**£250.00**
137-216	2 - 6"	.5", 1", 2"		**£265.00**
137-217	2 - 12"	.5", 1", 2" (2 pcs.), 4"		**£355.00**
137-218	2 - 20"	.5", 1", 2" (2 pcs.), 4", 8"		**£518.00**
137-219	2 - 40"	.5", 1", 2" (2 pcs.), 4", 8" (2 pcs.), 12"		**£639.00**
137-220	2 - 60"	.5", 1", 2" (2 pcs.), 4", 8" (3 pcs.), 12" (2 pcs.)		**£817.00**

Dimensions

Unit: mm



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Inside Micrometers

SERIES 339 – Digimatic Long Range Extension Tube Inside Micrometer

- Wide range of inside measurements possible by combining extension tubes with the micrometer head.
- The sleeve is rotated to adjust the index line position when setting to a length standard.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.

339-303/304 features:

- IP65 (water-proof) protection level that enables use in the presence of cutting fluid.
- A large-character LCD display.
- Storage of 2 preset values for use when setting to an inside length standard.
- A function lock that prevents accidental changing of the reference setting during measurement.
- An output port for measurement data that enables inclusion in a statistical process control or networked measurement system.
- Ability to use Interface Input Tools that enable conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software.

DIGIMATIC COOLANT PROOF™ IP65 U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



339-303

Specifications

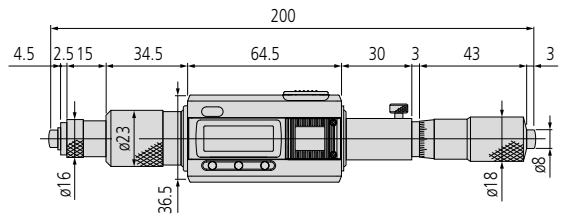
Inch/Metric

Code No.	Range	Micrometer head stroke	Extension tubes	Display unit	Price
339-102	8-9" (203.2-228.6 mm)	1" (25 mm)	—	8-9" (200-225 mm)	**£1,070.00**
339-303	8-40" (203.2-1016 mm)		1", 2", 4", 8", 16"		**£1,470.00**
339-304	8-80" (203.2-2032 mm)		1", 2", 4", 8" (2 pcs.), 16" (3 pcs.)		**£1,880.00**

Dimensions

Unit: mm

Micrometer head



Technical Data

Dust/water protection level:	IP65 (IEC60529)
Resolution:	0.001 mm/.0001"
Battery:	SR44 (1 pc) **938882**
Spindle feed error:	3 µm/0.00015"

Note: *Spindle feed error* refers to the difference between the maximum and minimum indication error values within the measuring range of the micrometer head.

Functions (for 339-303/304)

Zero-setting, origin restoration, data hold, 2-point preset, function lock, inch/mm readout, automatic power ON/OFF, error alarm, data output.

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*	**£242.00**
02AZD790B	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*	**£242.00**
02AZE140B	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£179.00**
05CZA662	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA663	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380B	USB Input Tool Direct USB-ITN-B (2 m)	**£158.00**

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.

* U-WAVE-R Receiver required.



Using a setting ring to accurately set an inside micrometer.

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Inside Micrometers

SERIES 139/140 – Long Range Extension Tube Inside Micrometer

- Wide range of inside measurements possible by combining extension tubes with the micrometer head.
- The sleeve is rotated to adjust the index line position when setting to a length standard.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.



139-177

Technical Data

Graduation: 0.01 mm/.001"
Spindle feed error: 3 µm/0.00015"

Note: *Spindle feed error* refers to the difference between the maximum and minimum indication error values within the measuring range of the micrometer head.

Optional Accessory

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.



139-001

Specifications

Metric

Code No.	Range	Head adjustment range	Extension tubes	Main unit	Price
139-001	100 - 125 mm	25 mm	—	100 - 125 mm	**£184.00**
139-173	100 - 500 mm		25, 50, 100, 200 mm		**£615.00**
139-174	100 - 900 mm		25, 50, 100, 200, 400 mm		**£685.00**
139-175	100 - 1300 mm		25, 50, 100, 200, 400 (2 pcs.) mm		**£799.00**
139-176	100 - 1700 mm		25, 50, 100, 200, 400 (3 pcs.) mm		**£925.00**
139-177	100 - 2100 mm		25, 50, 100, 200, 400 (4 pcs.) mm		**£1,010.00**
140-157	1000 - 2000 mm	50 mm	50, 100 (2 pcs.), 200, 500 mm	1000 - 1050 mm	**£2,640.00**
140-158	1000 - 3000 mm		50, 100 (2 pcs.), 200, 500, 1000 mm		**£2,760.00**
140-159	1000 - 4000 mm		50, 100 (2 pcs.), 200, 500, 1000 (2 pcs.) mm		**£3,620.00**
140-160	1000 - 5000 mm		50, 100 (2 pcs.), 200, 500, 1000 (3 pcs.) mm		**£4,500.00**

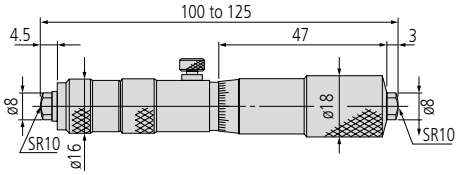
Inch

Code No.	Range	Head adjustment range	Extension tubes	Main unit	Price
139-002	4 - 5"	1"	—	4 - 5"	**£184.00**
139-178	4 - 20"		1", 2", 4", 8"		**£615.00**
139-179	4 - 36"		1", 2", 4", 8", 16"		**£685.00**
139-180	4 - 52"		1", 2", 4", 8", 16" (2 pcs.)		**£799.00**
139-181	4 - 68"		1", 2", 4", 8", 16" (3 pcs.)		**£925.00**
139-182	4 - 84"		1", 2", 4", 8", 16" (4 pcs.)		**£1,010.00**
140-161	40 - 80"	2"	2", 4" (2 pcs.), 8", 20"	40 - 42"	**£2,640.00**
140-162	40 - 120"		2", 4" (2 pcs.), 8", 20", 40"		**£2,760.00**
140-163	40 - 160"		2", 4" (2 pcs.), 8", 20", 40" (2 pcs.)		**£3,620.00**
140-164	40 - 200"		2", 4" (2 pcs.), 8", 20", 40" (3 pcs.)		**£4,500.00**

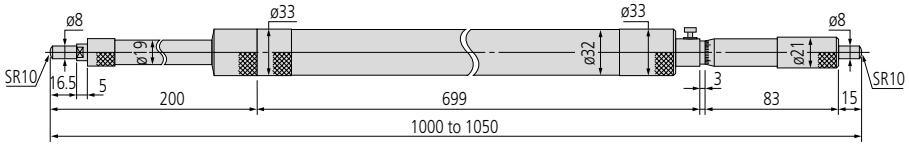
Dimensions

Unit: mm

Micrometer head for Series 139



Micrometer head for Series 140



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Inside Micrometers

SERIES 345 – Digimatic Inside Caliper Micrometer

- Designed for accurate measurement of the diameter of small and short holes or bores.
- Carbide measuring faces.
- Equipped with a constant measuring-force device.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



345-350-30



345-351-30

Specifications

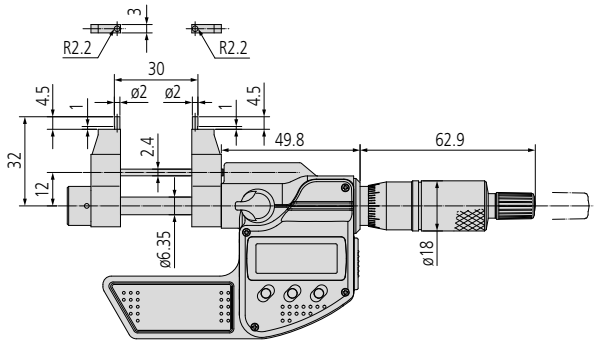
Inch/Metric

Code No.	Range	Resolution	Max. permissible error J_{MPE}	Price
345-350-30	.2 - 1.2" (5.08 - 30.48 mm)	.00005" (0.001 mm)	±.00025" (±5 µm)	£704.00
345-351-30	1 - 2" (25.4 - 50.8 mm)		±.0003" (±6 µm)	£847.00

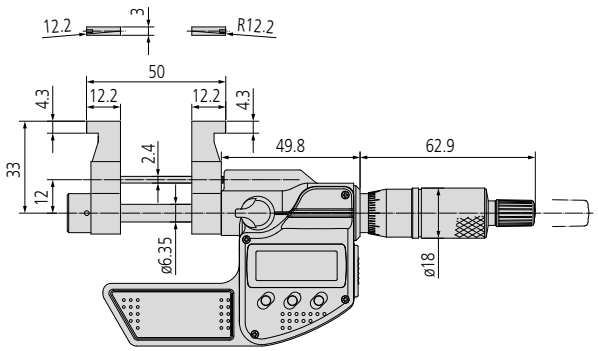
Dimensions

Unit: mm

345-350-30



345-351-30



Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB Input Tool Direct USB-ITN-B (2 m)	£158.00

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.

* U-WAVE-R Receiver required.



Measuring a small inside diameter.



Using an Inside Micro Checker to accurately set an inside micrometer.

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Inside Micrometers

SERIES 145 – Inside Caliper Micrometer

- Designed for accurate diameter measurement of short holes or bores.
- Carbide measuring faces.
- Equipped with a constant measuring-force device.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.



145-185



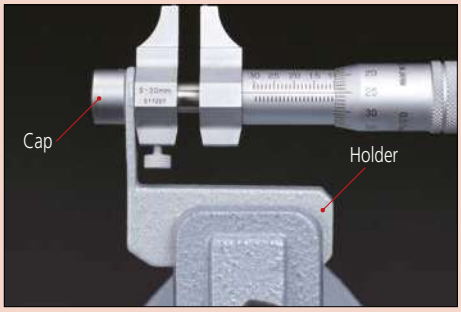
145-187

Optional Accessories

Code No.	Description	Price
300401	Micrometer stand cap*	£4.30
300400	Micrometer stand holder*	£11.90

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.

* Only for models with measuring range up to 50 mm / 2".



This instrument requires the cap and the holder for mounting on a micrometer stand.

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Price
145-185	5 - 30 mm	0.01 mm	±5 µm	£301.00
145-186	25 - 50 mm		±6 µm	£317.00
145-187	50 - 75 mm		±7 µm	£334.00
145-188	75 - 100 mm		±8 µm	£352.00
145-189	100 - 125 mm		±9 µm	£534.00
145-190	125 - 150 mm			£606.00
145-191	150 - 175 mm		±10 µm	£658.00
145-192	175 - 200 mm			£706.00
145-217	200 - 225 mm		±11 µm	£737.00
145-218	225 - 250 mm			£746.00
145-219	250 - 275 mm		±12 µm	£769.00
145-220	275 - 300 mm			£796.00

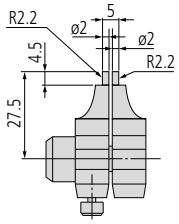
Inch

Code No.	Range	Graduation	Max. permissible error J_{MPE}	Price
145-193	.2 - 1.2"	.001"	±.00025"	£301.00
145-194	1 - 2"		±.0003"	£317.00
145-195	2 - 3"		±.00035"	£334.00
145-196	3 - 4"		±.0004"	£352.00

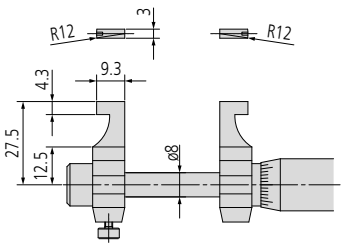
Dimensions

Unit: mm

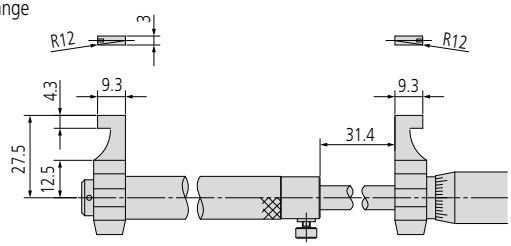
145-185



145-186



Models with a measuring range 50 - 300 mm



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Inside Micrometers

SERIES 141 – Interchangeable Rod Inside Micrometer

- Wide range of inside diameter measurements possible by combining one or more interchangeable rods.
- Each interchangeable rod is marked with its measuring range.
- For models supplied with more than one interchangeable rod, the full measuring range is achieved by combining spacing collars with the rods.
- Both micrometer head and rods are satin-chrome finished throughout.
- A handle extension that screws into the fixed handle on the micrometer head enables the head to be inserted deep into a hole.
- The sleeve is rotated to adjust the index line position when setting to a length standard.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the micrometer before measurement.

C



141-101

Specifications

Metric

Code No.	Range	Graduation	Stroke	No. of rods	Price
141-101	25 - 50 mm	0.01 mm	7 mm	2	**£150.00**
141-205	50 - 200 mm		13 mm	3	**£245.00**
141-206	50 - 300 mm			5	**£298.00**
141-117	200 - 500 mm		25 mm	3	**£360.00**
141-118	200 - 1000 mm			8	**£532.00**
Carbide measuring face					
141-103	25 - 50 mm	0.01 mm	7 mm	2	**£188.00**
141-211	50 - 200 mm		13 mm	3	**£427.00**
141-212	50 - 300 mm			5	**£543.00**

Inch

Code No.	Range	Graduation	Stroke	No. of rods	Price
141-102	1 - 2"	.001"	.25"	2	**£150.00**
141-208	2 - 8"		5"	3	**£245.00**
141-233	2 - 12"			5	**£298.00**
141-121	8 - 20"		1"	3	**£360.00**
141-122	8 - 40"			8	**£532.00**
Carbide measuring face					
141-104	1 - 2"	.001"	.25"	2	**£188.00**
141-214	2 - 8"		5"	3	**£427.00**
141-215	2 - 12"			5	**£543.00**

Technical Data

Spindle feed error: 3 µm/0.00015"

Note: *Spindle feed error* refers to the difference between the maximum and minimum indication error values within the measuring range of the micrometer head.

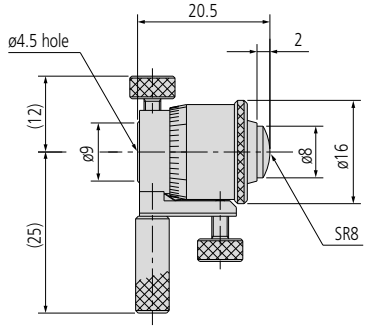
Optional Accessory

Setting rings (up to ø300 mm/ø12") refer to pages C-37 to C-38.

Dimensions

Unit: mm

141-101





The handle extension enables measurement deep within a hole.



Interchangeable rod inside micrometer.



Fitted with one of the extension rods supplied.

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Inside Micrometers

SERIES 515 – Inside Micro Checker

- The Inside Micro Checker is designed to act as a setting standard for inside micrometers.
- Each measuring block is made of zirconia based ceramic that is free from deterioration and dimensional changes over time.
- Can be used for calibration in conjunction with a set of gauge blocks (optional).

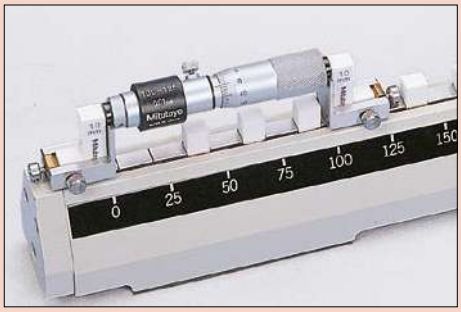


515-585

Standard Accessories

Code No.	Description
600324	Clamp screwdriver
602195	Collar
940286	Support clamps (x2





The two auxiliary gauge blocks are held against the appropriate measuring blocks by the support clamps, which also provide accurate location for the inside micrometer by means of the V-grooved extensions.

Optional Accessories

Code No.	Description	Price
602160	Wooden box (for 515-585)	£191.00
602163	Wooden box (for 515-586)	£416.00

Specifications

Metric

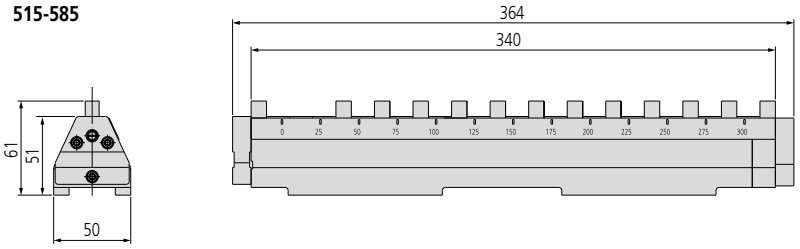
Code No.	Range	Block pitch accuracy	Price
515-585	25 - 300 mm	±(1+L/150) µm L: Length to check (mm)	£1,830.00
515-586	25 - 600 mm		£3,490.00

Note: The bottom surface and the contact faces are not perpendicular to each other.

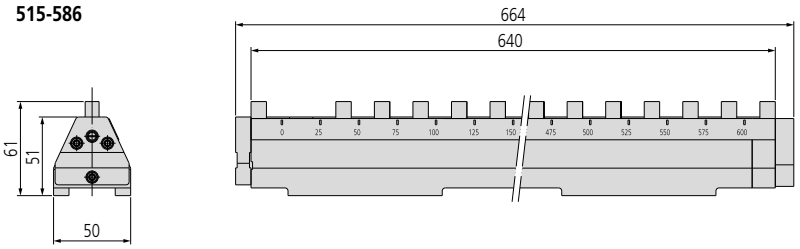
Dimensions

Unit: mm

515-585



515-586



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Bore Gauges

SERIES 526 – Extra Small Hole Bore Gauge

- This gauge is designed to measure the diameters of very small holes. The radial displacement of the split-ball anvil is converted to axial displacement of the measuring rod, which is shown on the dial indicator.
- An optional stand (**215-120-10**) is available for efficient measurement of multiple small holes.



526-172-20



526-125-20

Technical Data

Accuracy
Range 0.95 - 10 mm: 4 µm
Range 10 - 18 mm: 6 µm
Range .037-.4": .00016"
Range .4-.7": .00024"
Repeatability: 2 µm / .00008"

Optional Accessory

Code No.	Description	Price
215-120-10	Stand for small holes	**£1,350.00**

Setting rings (up to ø300 mm / ø12") refer to pages C-37 to C-38.



A heatshield prevents accuracy degradation due to hand heat during prolonged use.



526-156-10

Specifications

Metric

Code No.	Range	Content of set					Probing depth	Price
		Bore gauge	Indicator	Anvils	Pin point	Setting rings		
Graduation 0.001 mm								
526-172-20	0.95 - 1.55 mm	526-170-10	2109AB-10	5 pcs.	1 pc.	—	11.5 mm	**£2,190.00**
526-162-20	1.50 - 4.00mm	526-160-10		9 pcs.	2 pcs.	—	17.5, 22.5 mm	**£2,950.00**
526-152-20	3.70 - 7.30 mm	526-150-10		7 pcs.	1 pc.	—	32 mm	**£1,810.00**
526-124-20	7 - 10 mm	526-101		6 pcs	—	—		**£428.00**
526-125-20	10 - 18 mm	526-102		8 pcs	—	—	62 mm	**£524.00**
Graduation 0.01 mm								
526-173-20	0.95 - 1.55 mm	526-170-10	2046AB	5 pcs.	1 pc.	—	11.5 mm	**£1,960.00**
526-163-20	1.50 - 4.00mm	526-160-10		9 pcs.	2 pcs.	—	17.5, 22.5 mm	**£2,690.00**
526-153-20	3.70 - 7.30 mm	526-150-10		7 pcs.	1 pc.	—	32 mm	**£1,460.00**
526-126-20	7 - 10 mm	526-101		6 pcs	—	—		**£310.00**
526-127-20	10 - 18 mm	526-102		8 pcs	—	—	62 mm	**£456.00**

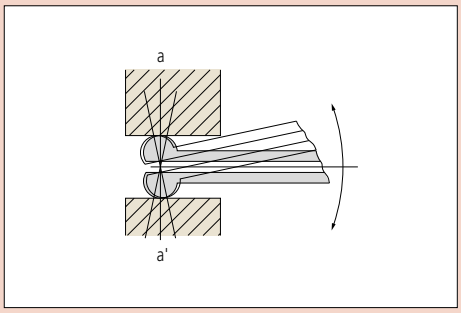
Inch

Code No.	Range	Content of set					Probing depth	Price
		Bore gauge	Indicator	Anvils	Pin point	Setting rings		
Graduation .0001"								
526-176-20	.037 - .061"	526-175-10	2923AB-10	5 pcs.	1 pc.	5 pcs.	.45"	**£2,140.00**
526-166-20	.06 - .155"	526-165-10		9 pcs.	2 pcs.	9 pcs.	.68, .88"	**£3,090.00**
526-156-20	.145 - .29"	526-155-10		7 pcs.	1 pc.	7 pcs.	1.25"	**£1,810.00**
526-122-20	.3 - .4"	526-103		6 pcs	—	—		**£428.00**
526-123-20	.4 - .7"	526-104		8 pcs	—	—	2.42"	**£524.00**
Graduation .0005"								
526-119-20	.3 - .4"	526-103	2922AB	6 pcs	—	—	1.25"	**£456.00**
526-120-20	.4 - .7"	526-104		8 pcs	—	—	2.42"	**£456.00**

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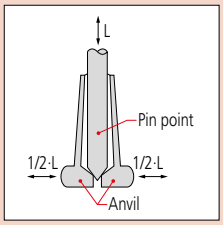
Bore Gauges

SERIES 526 – Extra Small Hole Bore Gauge



How to measure a hole diameter

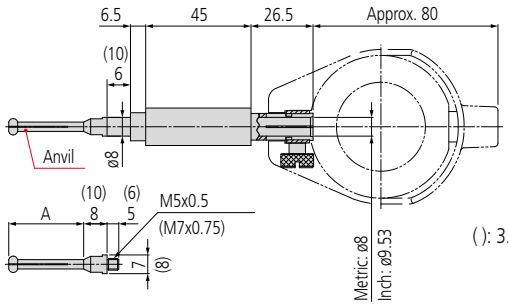
The 526 series has a gauge head with high curvature to ensure accurate reading in use. Aligning the measuring direction of the gauge with the diameter (a-a') is achieved by rocking the gauge head within the hole as indicated, and the required diameter is the minimum value seen (at the reversal point) on the dial indicator.



Measurement principle

Dimensions

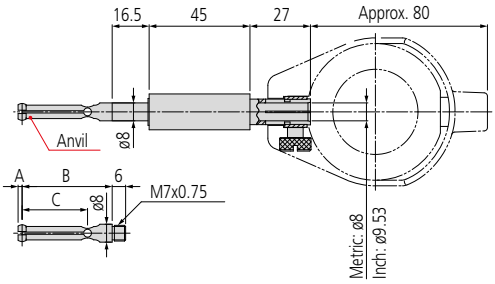
Unit: mm



( ): 3.7 - 7.3 mm / .145 - .29" range model

Measuring range	Anvil			Setting ring
	Marked No.	Measuring range	A	mm / inch
0.95 - 1.55 mm / .037 - .061"	1.0	0.95 - 1.15 mm / .037 - .045"	11.5 mm / .45"	1.0 mm / .04"
	1.1	1.07 - 1.25 mm / .042 - .049"		1.1 mm / .045"
	1.2	1.17 - 1.35 mm / .046 - .053"		1.2 mm / .05"
	1.3	1.27 - 1.45 mm / .050 - .057"		1.3 mm / .055"
	1.4	1.37 - 1.55 mm / .054 - .061"		1.4 mm / .06"
1.50 - 4.00 mm / .60 - .155"	1.75	1.50 - 1.90 mm / .060 - .075"	17.5 mm / .68"	1.75 mm / .07"
	2.00	1.80 - 2.20 mm / .070 - .085"		2.00 mm / .08"
	2.25	2.05 - 2.45 mm / .080 - .095"		2.25 mm / .09"
	2.50	2.25 - 2.75 mm / .090 - .105"		2.50 mm / .10"
	2.75	2.50 - 3.00 mm / .100 - .115"	22.5 mm / .88"	2.75 mm / .11"
	3.00	2.75 - 3.25 mm / .110 - .125"		3.00 mm / .12"
	3.25	3.00 - 3.50 mm / .120 - .135"		3.25 mm / .13"
	3.50	3.25 - 3.75 mm / .130 - .145"		3.50 mm / .14"
	3.75	3.50 - 4.00 mm / .140 - .155"		3.75 mm / .15"
3.70 - 7.30 mm / .145 - .29"	4.0	3.70 - 4.30 mm / .145 - .170"	32.0 mm / 1.25"	4.0 mm / .16"
	4.5	4.20 - 4.80 mm / .165 - .190"		4.5 mm / .18"
	5.0	4.70 - 5.30 mm / .185 - .210"		5.0 mm / .20"
	5.5	5.20 - 5.80 mm / .205 - .230"		5.5 mm / .22"
	6.0	5.70 - 6.30 mm / .225 - .250"		6.0 mm / .24"
	6.5	6.20 - 6.80 mm / .245 - .270"		6.5 mm / .26"
	7.0	6.70 - 7.30 mm / .265 - .290"		7.0 mm / .28"

Unit: mm



Measuring range	Anvil				
	Marked No.	Measuring range	A	B	C
7 - 10 mm / .3 - .4"	1	7.0 - 7.5 mm / .28 - .30"	1.8 mm / .07"	40 mm / 1.57"	29.2 mm / 1.15"
	2	7.5 - 8.0 mm / .28 - .30"			
	3	8.0 - 8.5 mm / .32 - .34"			
	4	8.5 - 9.0 mm / .34 - .36"			
	5	9.0 - 9.5 mm / .36 - .38"			
	6	9.5 - 10.0 mm / .38 - .40"			
10 - 18 mm / .4 - .7"	1	10 - 11 mm / .40 - .44"	2.1 mm / .08"	46 mm / 1.81"	38 mm / 1.50"
	2	11 - 12 mm / .44 - .48"	2.7 mm / .11"		
	3	12 - 13 mm / .48 - .52"			
	4	13 - 14 mm / .52 - .56"			
	5	14 - 15 mm / .56 - .60"			
	6	15 - 16 mm / .60 - .64"			
	7	16 - 17 mm / .64 - .68"			
	8	17 - 18 mm / .68 - .72"			

C

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Bore Gauges

SERIES 511 – Small Hole Bore Gauge

- The interchangeable anvils used on this gauge are made of high-grade tool steel.
- Interchangeable washers 0.5 mm thick are supplied as standard accessories to enable setting the 10 - 18.5 mm / .4 - .74" models in small steps.
- The dial indicator is fully protected by a rugged cover.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the gauge before measurement.



511-203-20



511-211-20

Technical Data

Accuracy: 5 µm / .0002"
Repeatability: 2 µm / .00008"
Narrow-range accuracy: 2 µm / .00008"



A heatshield prevents accuracy degradation due to hand heat during prolonged use.

Specifications

Metric

Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Anvils		
Graduation 0.001 mm							
511-210-20	6 - 10 mm	2 N or less	511-209	2109AB-10	9 pcs.	50 mm	**£543.00**
511-203-20	10 - 18.5 mm		511-201			100 mm	**£543.00**
Graduation 0.01 mm							
511-211-20	6 - 10 mm	2 N or less	511-209	2046AB	9 pcs	50 mm	**£485.00**
511-204-20	10 - 18.5 mm		511-201			100 mm	**£471.00**

Inch

Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Anvils		
Graduation .0001"							
511-212-20	.24 - .4"	2 N or less	511-214	2923AB-10	9 pcs.	2"	**£543.00**
511-206-20	.4 - .74"		511-205			4"	**£543.00**
Graduation .0005"							
511-213-20	.24 - .4"	2 N or less	511-214	2922AB	9 pcs	2"	**£485.00**
511-207-20	.4 - .74"		511-205			4"	**£428.00**

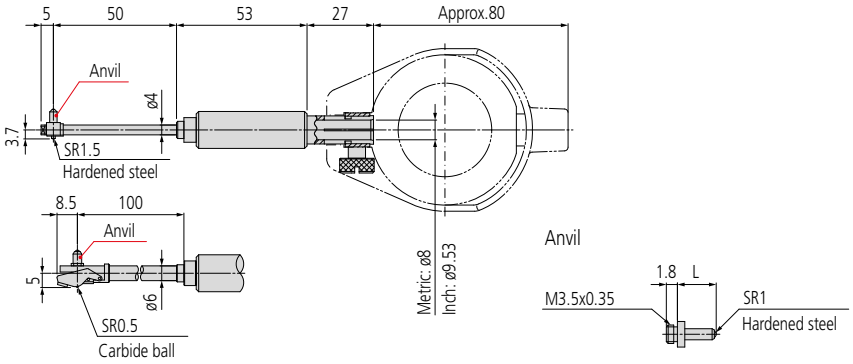
Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances.
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Bore Gauges

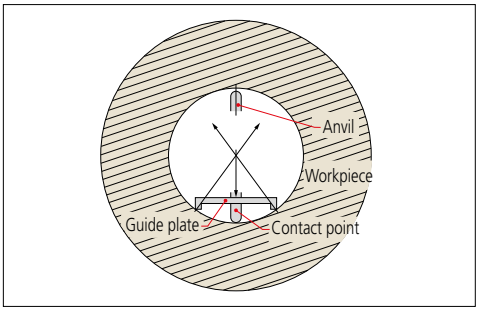
SERIES 511 – Small Hole Bore Gauge

Dimensions

Unit: mm



Measuring range	Anvil		
	Marked No.	Size	L
6 - 10 mm/ .24 - .4"	1	6.0 mm/.24"	1.2 mm/.05"
	2	6.5 mm/.26"	1.7 mm/.07"
	3	7.0 mm/.28"	2.2 mm/.09"
	4	7.5 mm/.30"	2.7 mm/.11"
	5	8.0 mm/.32"	3.2 mm/.13"
	6	8.5 mm/.34"	3.7 mm/.15"
	7	9.0 mm/.36"	4.2 mm/.17"
	8	9.5 mm/.38"	4.7 mm/.19"
	9	10.0 mm/.40"	5.2 mm/.21"
10 - 18.5 mm/ .4 - .74"	1	10 mm/.40"	2 mm/.08"
	2	11 mm/.44"	3 mm/.12"
	3	12 mm/.48"	4 mm/.16"
	4	13 mm/.52"	5 mm/.20"
	5	14 mm/.56"	6 mm/.24"
	6	15 mm/.60"	7 mm/.28"
	7	16 mm/.64"	8 mm/.32"
	8	17 mm/.68"	9 mm/.36"
	9	18 mm/.72"	10 mm/.40"



How to measure a hole diameter

The 511 series provides a guide plate to align the hole or bore diameter with the measurement axis of the bore gauge.

C

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Bore Gauges

SERIES 511 – Bore Gauge

- Now offers a longer spindle stroke while maintaining original accuracy.
- Carbide is used for the contact point ensuring high durability and wear resistance.
- This model reduces the influence of heat from the operator's hand by 50% by increasing the grip size and making the grip hollow-structured, thereby retaining high-accuracy measurement.
- Interchangeable washers 0.5 mm thick are supplied as standard accessories to enable setting in small steps.
- Optional extension rods can be attached for measuring deep holes (see page C-35).
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the gauge before measurement.



511-723-20



511-712-20

Technical Data

Accuracy: 2 µm/.00008"
Repeatability: 0.5 µm/.00002"
Narrow-range accuracy: 1 µm/.00004"



The powerful self-centering action ensures accuracy.



New grip improves accuracy during prolonged use.

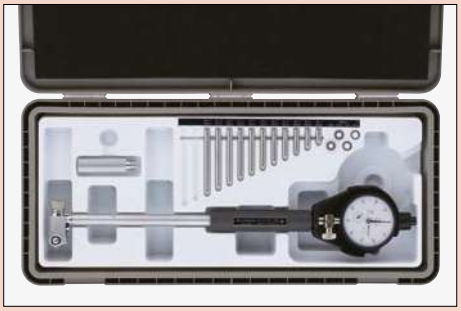
Specifications

Metric

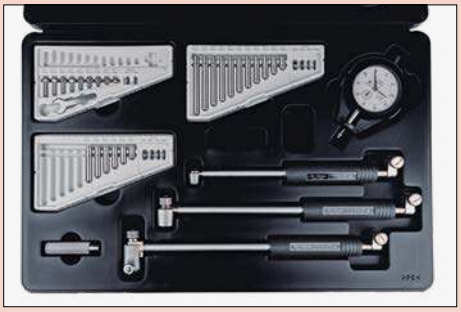
Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Anvils		
Graduation 0.001 mm							
511-721-20	18 - 35 mm	4 N or less	511-701	2109AB-10	9 pcs.	100 mm	**£362.00**
511-722-20	35 - 60 mm		511-702		6 pcs.	150 mm	**£362.00**
511-723-20	50 - 150 mm	5 N or less	511-703		11 pcs.		**£399.00**
511-724-20	100 - 160 mm		511-704		13 pcs.		**£543.00**
511-725-20	160 - 250 mm	6 N or less	511-705		6 pcs.	250 mm	**£642.00**
511-726-20	250 - 400 mm		511-706		5 pcs.		**£759.00**
Graduation 0.01 mm							
511-711-20	18 - 35 mm	4 N or less	511-701	2046AB	9 pcs.	100 mm	**£289.00**
511-712-20	35 - 60 mm		511-702		6 pcs.	150 mm	**£289.00**
511-713-20	50 - 150 mm	5 N or less	511-703		11 pcs.		**£320.00**
511-714-20	100 - 160 mm		511-704		13 pcs.		**£485.00**
511-715-20	160 - 250 mm	6 N or less	511-705		6 pcs.	250 mm	**£584.00**
511-716-20	250 - 400 mm		511-706		5 pcs.		**£700.00**

Bore gauge sets

Code No.	Range	Bore gauge	Indicator	Price
511-921-20	18 - 150 mm	511-701	2046AB	**£538.00**
511-922-20		511-702	2109AB-10	**£826.00**
511-925-10		511-703	543-310B-10	**£952.00**



511-713-20



511-921-20

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Bore Gauges

SERIES 511 – Bore Gauge

Contact Points



18 - 35 mm / .7 - 1.4"



35 - 60 mm / 1.4 - 2.5"



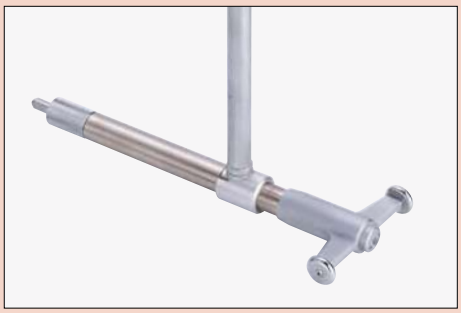
50 - 150 mm / 2.0 - 6.0"



100 - 160 mm / 4.0 - 6.5"



160 - 250 mm / 6.5 - 10.0"



250 - 400 mm / 10.0 - 16.0"

Specifications

Inch

Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Anvils		
Graduation .0001"							
511-751-20	.7 - 1.4"	4 N or less	511-731	2923AB-10	9 pcs.	4"	**£362.00**
511-752-20	1.4 - 2.5"		511-732		6 pcs.	6"	**£362.00**
511-753-20	2.0 - 6.0"	5 N or less	511-733		11 pcs.		**£399.00**
511-754-20	4.0 - 6.5"		511-734		13 pcs.		**£543.00**
511-755-20	6.5 - 10.0"	6 N or less	511-735		6 pcs.	10"	**£642.00**
511-756-20	10.0 - 16.0"		511-736		5 pcs.		**£759.00**
Graduation .0005"							
511-741-20	.7 - 1.4"	4 N or less	511-731	2922AB	9 pcs.	4"	**£292.00**
511-742-20	1.4 - 2.5"		511-732		6 pcs.	6"	**£304.00**
511-743-20	2.0 - 6.0"	5 N or less	511-733		11 pcs.		**£320.00**
511-744-20	4.0 - 6.5"		511-734		13 pcs.		**£485.00**
511-745-20	6.5 - 10.0"	6 N or less	511-735		6 pcs.	10"	**£584.00**
511-746-20	10.0 - 16.0"		511-736		5 pcs.		**£700.00**

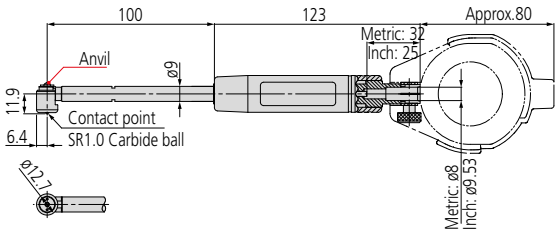
Bore gauge sets

Code No.	Range	Measuring head units	Indicator	Price
511-931-20	.7 - 6.0"	511-731	2922AB	**£717.00**
511-932-20		511-732	2923AB-10	**£826.00**
511-935-10		511-733	543-312B-10	**£952.00**

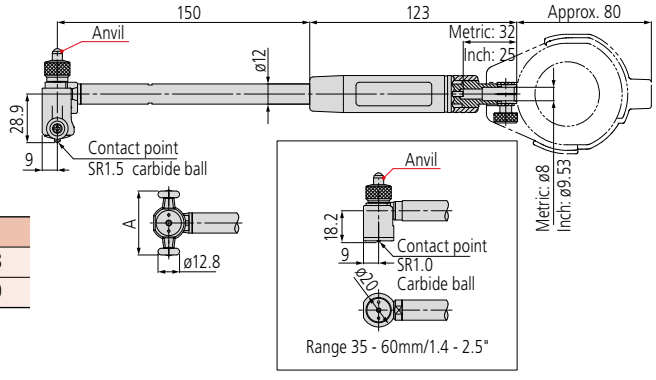
Dimensions

Unit: mm

Models with a measuring range 18 - 35 mm

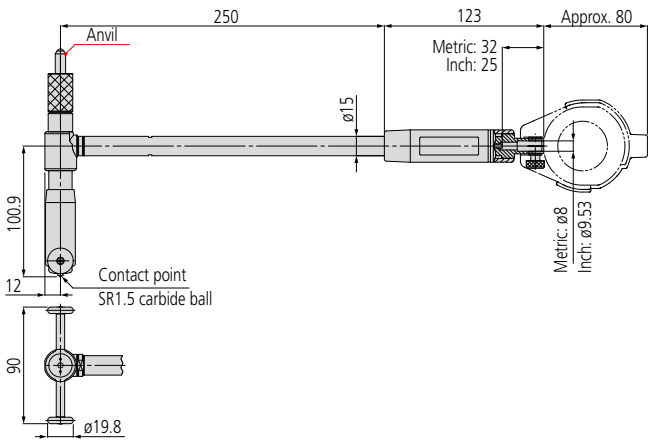


Models with a measuring range 35 - 160 mm



Range	A
50 - 150 mm / 2 - 6"	38
100 - 160 mm / 4 - 6.5"	50

Models with a measuring range 160 - 300 mm



C

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Bore Gauges

SERIES 511 – Micrometer Head Bore Gauge

- Micrometer head is attached to the anvil for convenient and accurate dimensional setting.
- Now offers a longer spindle stroke while maintaining original accuracy.
- Carbide is used for the contact point ensuring high durability and wear resistance.
- High-accuracy measurement is aided by a large grip with a sponge-like structure that reduces heat transfer from the operator's hand by 50%.
- Wide measuring range with sub-anvils.
- Optional extension rods can be attached for measuring deep holes (see page C-35).
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the gauge before measurement.

Technical Data

Accuracy:	2 µm/.00008"
Repeatability:	0.5 µm/.00002"
Narrow-range accuracy:	1 µm/.00004"



511-813-20



511-814-20



511-824-20



511-816-20

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Bore Gauges

SERIES 511 – Micrometer Head Bore Gauge

Contact Points



60 - 100 mm / 2.4 - 4"



100 - 160 mm / 4 - 6.4"



150 - 250 mm / 6 - 10"



250 - 400 mm / 10 - 16"



400 - 600 mm / 16 - 24"



600 - 800 mm / 24 - 32"

Specifications

Metric

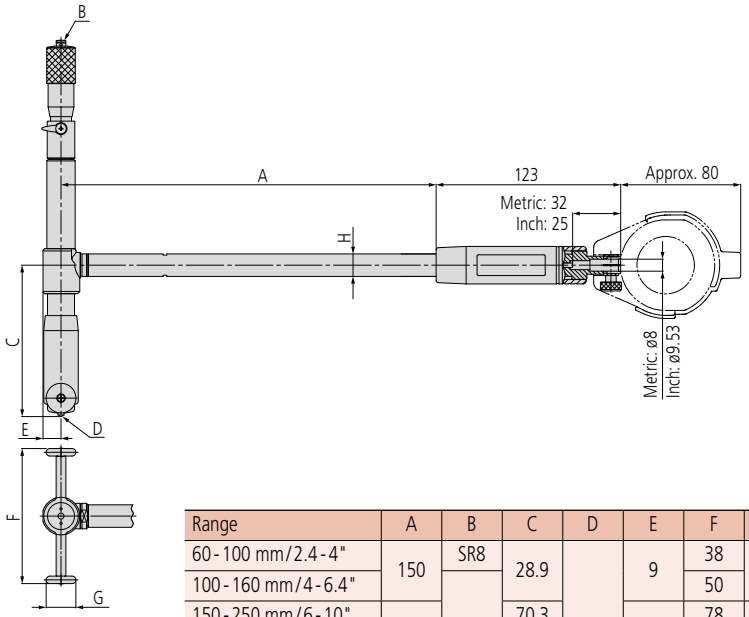
Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Sub-anvils		
Graduation 0.001 mm							
511-823-20	60 - 100 mm	5 N or less	511-803	2109AB-10	2 pcs.	150 mm	**£558.00**
511-824-20	100 - 160 mm		511-804		3 pcs.		**£586.00**
511-825-20	150 - 250 mm	6 N or less	511-805		4 pcs.	250 mm	**£679.00**
511-826-20	250 - 400 mm		511-806		3 pcs.		**£805.00**
511-827-20	400 - 600 mm		511-807		2 pcs.		**£1,180.00**
511-828-20	600 - 800 mm		511-808		2 pcs.		**£1,340.00**
Graduation 0.01 mm							
511-813-20	60 - 100 mm	5 N or less	511-803	2046AB	2 pcs.	150 mm	**£507.00**
511-814-20	100 - 160 mm		511-804		3 pcs.		**£556.00**
511-815-20	150 - 250 mm	6 N or less	511-805		4 pcs.	250 mm	**£661.00**
511-816-20	250 - 400 mm		511-806		3 pcs.		**£746.00**
511-817-20	400 - 600 mm		511-807		2 pcs.		**£1,020.00**
511-818-20	600 - 800 mm		511-808		2 pcs.		**£1,280.00**

Inch

Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Sub-anvils		
Graduation .0001"							
511-853-20	2.4 - 4.0"	5 N or less	511-833	2923AB-10	2 pcs.	4"	**£558.00**
511-854-20	4.0 - 6.4"		511-834		3 pcs.	6"	**£586.00**
511-855-20	6.0 - 10.0"	6 N or less	511-835		4 pcs.		**£679.00**
511-856-20	10.0 - 16.0"		511-836		3 pcs.		**£805.00**
511-857-20	16.0 - 24.0"		511-837		2 pcs.	10"	**£1,180.00**
511-858-20	24.0 - 32.0"		511-838		2 pcs.		**£1,340.00**
Graduation .0005"							
511-843-20	2.4 - 4.0"	5 N or less	511-833	2922AB	2 pcs.	4"	**£507.00**
511-844-20	4.0 - 6.4"		511-834		3 pcs.	6"	**£556.00**
511-845-20	6.0 - 10.0"	6 N or less	511-835		4 pcs.		**£661.00**
511-846-20	10.0 - 16.0"		511-836		3 pcs.		**£746.00**
511-847-20	16.0 - 24.0"		511-837		2 pcs.	10"	**£1,020.00**
511-848-20	24.0 - 32.0"		511-838		2 pcs.		**£1,280.00**

Dimensions

Unit: mm



Range	A	B	C	D	E	F	G	H
60 - 100 mm / 2.4 - 4"	150	SR8	28.9	SR1.5	9	38	ø12.8	ø12
100 - 160 mm / 4 - 6.4"		SR10				50		
150 - 250 mm / 6 - 10"	250		70.3		12	78	ø19.8	ø15
250 - 400 mm / 10 - 16"			100.9			90		
400 - 600 mm / 16 - 24"			200.9		16	120		
600 - 800 mm / 24 - 32"			300.9					

C

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Bore Gauges

SERIES 511 – Blind Hole Bore Gauge



511-425-20



511-437-20

- Flat-bottomed head design enables measurement right down to the bottom of blind holes or bores.
- Carbide-tipped contact point for durability.
- Extension rods (optional) can be attached for measuring deep holes (see page C-35).
- Wide measuring range with sub-anvils.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the gauge before measurement.

Technical Data

Accuracy: 5 µm/.0002"
Repeatability: 2 µm/.00008"
Narrow-range accuracy: 2 µm/.00008"

Contact Points



15 - 35 mm/.6 - 1.4"



50 - 100 mm/2 - 4",
50 - 150 mm/2 - 6"



The powerful self-centering action ensures accuracy.



511-426-20

Specifications

Metric

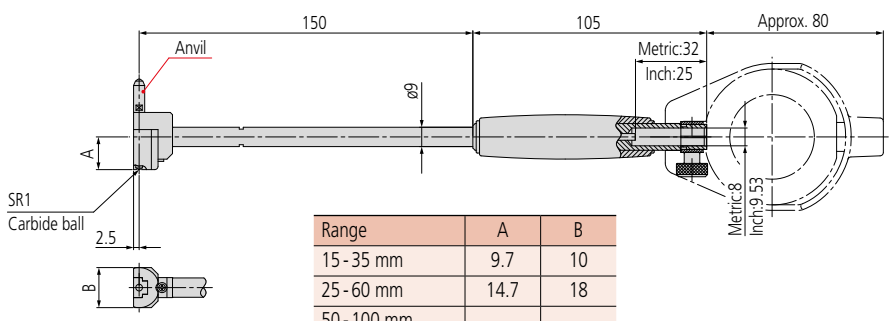
Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Anvils		
Graduation 0.001 mm							
511-435-20	15 - 35 mm	4 N or less	511-415	2109AB-10	11 pcs.	150 mm	**£592.00**
511-436-20	35 - 60 mm		511-416		6 pcs.		**£606.00**
511-437-20	50 - 150 mm	5 N or less	511-417		11 pcs.		**£667.00**
Graduation 0.01 mm							
511-425-20	15 - 35 mm	4 N or less	511-415	2046AB	11 pcs.	150 mm	**£512.00**
511-426-20	35 - 60 mm		511-416		6 pcs.		**£524.00**
511-427-20	50 - 150 mm	5 N or less	511-417		11 pcs.		**£587.00**

Inch

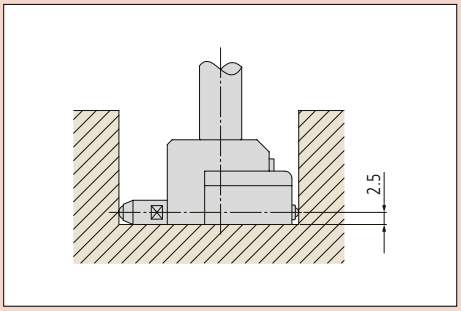
Code No.	Range	Measuring force	Content of set			Probing depth	Price
			Bore gauge	Indicator	Anvils		
Graduation .0001"							
511-438-20	.6 - 1.4"	4 N or less	511-418	2923AB-10	11 pcs.	6"	**£592.00**
511-439-20	1.4 - 2.4"		511-419		6 pcs.		**£606.00**
511-440-20	2.0 - 6.0"	5 N or less	511-420		11 pcs.		**£667.00**
Graduation .0005"							
511-428-20	.6 - 1.4"	4 N or less	511-418	2922AB	11 pcs.	6"	**£512.00**
511-429-20	1.4 - 2.4"		511-419		6 pcs.		**£524.00**
511-430-20	2.0 - 6.0"	5 N or less	511-420		11 pcs.		**£587.00**

Dimensions

Unit: mm



Range	A	B
15 - 35 mm	9.7	10
25 - 60 mm	14.7	18
50 - 100 mm	23.7	22
50 - 150 mm		



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Bore Gauges

SERIES 511 – ABSOLUTE Digimatic Bore Gauge

- This ABSOLUTE Digimatic bore gauge is exclusively designed for inside diameter measurement.
- Up to four extension rods (250 mm or 500 mm) can be used for measuring at the bottom of a hole 2 m deep.
- The display and grip can be rotated up to 320° and the display can be inclined up to 90°, so that it is easily readable from any direction.
- The minimum value holding function provides easy measurement of hole diameter.
- Interchangeable washers are supplied as standard accessories to enable setting in small steps.
- Setting the bore gauge to a master value using a gauge block set allows quick and accurate setting.
- An optional inside-length standard, such as a setting ring or Inside Micro Checker (see pages C-37 to C-38 or page C-24, respectively), is required for accurately setting the gauge before measurement.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo

Technical Data

Accuracy*1: 3 µm/.00012"
Repeatability: 2 µm/.00008"
Narrow-range accuracy: 2 µm/.00008"
Scale type: ABSOLUTE electrostatic linear encoder
Max. response speed: Unlimited
Battery: SR44 (2 pcs.), **938882**
Battery life: Approx. 2000 hours under normal use

*1 Excluding quantizing error

Functions

Presetting, preset, power on/off, inch/mm conversion, data output, GO/±NG tolerance judgement, min value holding, data hold, alarm: low battery voltage/scale contamination/overflow error/tolerance/limit setting error.

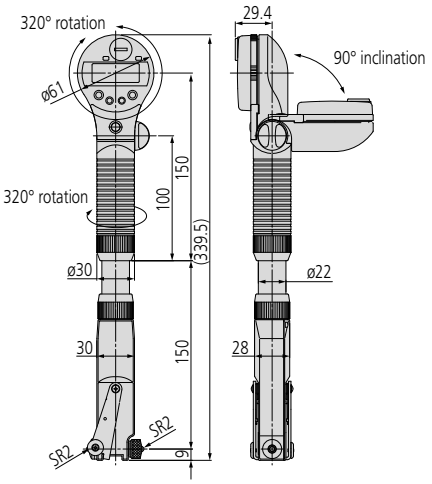
Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	**£42.00**
905409	SPC data cable (2 m)	**£47.10**
02AZD730G	U-WAVE-T IP67 transmitter*2	**£242.00**
02AZD790F	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*2	**£242.00**
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£160.00**
06AFM380F	USB input tool direct (2 m)	**£143.00**
21DZA081	Extension rod 500 mm (20")	**£381.00**
21DZA089	Extension rod 250 mm (10")	**£419.00**

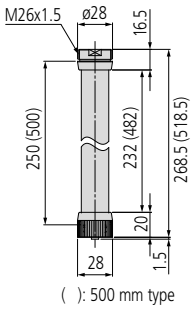
*2 U-WAVE-R Receiver required.

Dimensions

Unit: mm



Extension rod



( ): 500 mm type



511-521





With optional extension rods

Specifications

Inch/Metric

Code No.	Range	Measuring force	Resolution	Anvils	Probing depth	Price
511-521	1.8 - 4.0" (45.72 - 101.6 mm)	5 N or less	.0005" (0.001 mm)	12 pcs.	6" (150 mm)	**£1,400.00**
511-522	4.0 - 6.5" (101.6 - 165.1 mm)			13 pcs.		**£1,620.00**

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Optional Accessories

Bore Gauge Extension Rods

- Extension rods are available to assist in deep-hole measurement.
- If two or more extension rods are connected together, measurement errors may occur due to flexure of the rod assembly. Therefore it is best to use no more than a single extension rod.
- Extension rods are available in sizes up to 1000 mm long.
- When using a 500 mm (or longer) extension rod, use the bore gauge in an upright position.
- The accuracy and security of the assembly should be confirmed after connecting a rod.

C



953549



953557

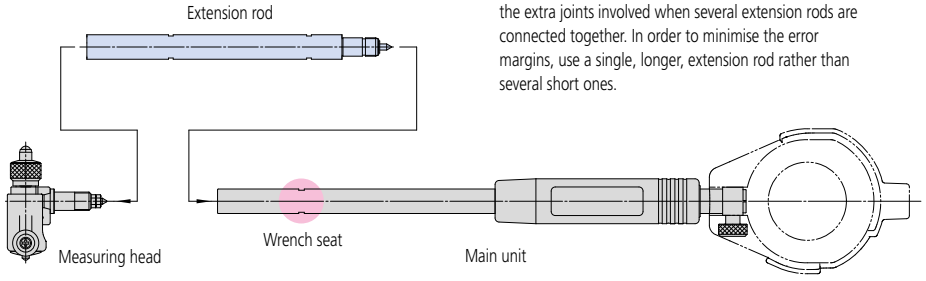


Extension rods enable extremely deep holes to be measured.

Specifications

Inch/Metric

Code No.	Length	Diameter	Applicable measuring range	Price
953549	125 mm/5"	ø9 mm/.342"	18-35 mm/.7-1.4"	**£158.00**
953550	250 mm/10"			**£182.00**
953551	500 mm/20"			**£281.00**
953552	125 mm/5"	ø12 mm/.472"	35-160 mm/1.4-6.5"	**£169.00**
953553	250 mm/10"			**£195.00**
953554	500 mm/20"			**£336.00**
953555	750 mm/30"			**£446.00**
953556	1000 mm/40"			**£612.00**
953557	125 mm/5"	ø15 mm/.59"	160-400 mm/6.5-16.0"	**£182.00**
952361	250 mm/10"			**£260.00**
953558	500 mm/20"			**£419.00**
953559	750 mm/30"			**£557.00**
953560	1000 mm/40"			**£721.00**



* There is the possibility of measurement errors arising from the extra joints involved when several extension rods are connected together. In order to minimise the error margins, use a single, longer, extension rod rather than several short ones.

*A wrench is provided for inserting/removing extension rods between the main unit and measuring head.

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.



Optional Accessories

SERIES 515 – Dial Bore Gauge Checker

- The Bore Gauge Checker allows easy setting of dial bore gauges with ranges of 18 mm (.7") through 400 mm (16") using gauge blocks.



515-590

Standard configuration: Stand
Attachment A, B, C (1 pc each)
Parallel jaw (2 pcs)

Specifications

Code No.	Applicable range	Flatness of parallel jaw	Price
515-590	18 - 400 mm / .7 - 16"	0.5 µm (parallelism 1 µm)	**£1,830.00**

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Optional Accessories

SERIES 177 – Steel Setting Rings for Inside Micrometers, Holtest and Dial Bore Gauges

- Used for quick and accurate setting of dial bore gauges, Holtest, and inside micrometers.
- A setting ring should be selected that is closest in size to the dimension to be measured and that falls within the measuring range of the instrument.

177-140



177-139



C

Specifications

Inch

Code No.	Nominal size ød	Dimensions (mm)			Type	Accuracy					Price
		øD	øE	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked diameter value (inch)*1	Roundness/ cylindricity (inch)*2	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)	
177-209	.1"	25	—	7	A	±.0004"	±.00006"	.00004"	1.5	4.0	**£122.00**
177-206	.16"	25	—	7	A	±.0004"	±.00006"	.00004"	1.5	4.0	**£122.00**
177-207	.24"	25	—	7	A	±.0004"	±.00006"	.00004"	1.5	4.0	**£122.00**
177-281	.275"	25	—	7	A	±.0004"	±.00006"	.00004"	1.8	3.4	**£122.00**
177-179	.35"	32	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£122.00**
177-283	.425"	32	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£122.00**
177-180	.5"	32	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£122.00**
177-181	.6"	38	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£122.00**
177-182	.65"	45	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£122.00**
177-183	.7"	45	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£122.00**
177-287	.8"	45	—	10	A	±.0004"	±.00006"	.00004"	1.8	6.4	**£133.00**
177-184	1"	53	—	15	A	±.0004"	±.00006"	.00004"	3.0	9.0	**£142.00**
177-289	1.2"	71	—	15	A	±.0004"	±.00006"	.00004"	3.0	9.0	**£164.00**
177-185	1.4"	71	—	15	A	±.0004"	±.00006"	.00004"	3.0	9.0	**£206.00**
177-291	1.6"	71	—	15	A	±.0004"	±.00006"	.00004"	3.0	9.0	**£193.00**
177-186	1.8"	85	—	15	A	±.0004"	±.00006"	.00004"	3.5	8.0	**£206.00**
177-187	2"	85	—	20	A	±.0008"	±.00006"	.00004"	3.5	13.0	**£206.00**
177-293	2.4"	112	—	20	A	±.0008"	±.00006"	.00004"	3.5	13.0	**£254.00**
177-315	2.5"	112	—	20	A	±.0008"	±.00006"	.00006"	4.0	12.0	**£325.00**
177-188	2.8"	112	—	20	A	±.0008"	±.00006"	.00006"	4.0	12.0	**£280.00**
177-317	3"	125	—	25	A	±.0008"	±.00006"	.00006"	4.0	17.0	**£336.00**
177-295	3.2"	125	—	25	A	±.0008"	±.00006"	.00006"	4.0	17.0	**£335.00**
177-319	3.5"	140	—	25	A	±.0008"	±.00006"	.00006"	4.0	17.0	**£440.00**
177-189	3.6"	140	—	25	A	±.0008"	±.00006"	.00006"	4.0	17.0	**£448.00**
177-297	4"	160	—	25	A	±.0008"	±.00006"	.00008"	4.0	17.0	**£502.00**
177-299	5"	210	168	38.1	B	±.0008"	±.00010"	.00008"	5.0	28.1	**£923.00**
177-301	6"	235	187	38.1	B	±.0008"	±.00010"	.00008"	5.0	28.1	**£996.00**
177-303	7"	260	215	38.1	B	±.0008"	±.00010"	.00010"	5.0	28.1	**£1,430.00**
177-305	8"	311	244	38.1	B	±.0008"	±.00010"	.00010"	5.0	28.1	**£1,840.00**
177-307	9"	337	264	38.1	B	±.0008"	±.00010"	.00010"	5.0	28.1	**£2,050.00**
177-309	10"	362	290	38.1	B	±.0008"	±.00010"	.00012"	5.0	28.1	**£2,230.00**
177-311	11"	413	321	38.1	B	±.0008"	±.00010"	.00012"	5.0	28.1	**£2,550.00**
177-313	12"	438	340	38.1	B	±.0008"	±.00010"	.00012"	5.0	28.1	**£3,110.00**

*1 Actual diameter is marked in 0.00001" increments.

*2 Cylindricity is defined as per JIS B 0621 Definitions and designations of geometrical deviations, Section 4.4 "Cylindricity." Cylindricity is measured using three cross-sections between the top and bottom face of a ring, namely, close to the face near each side and the centre.

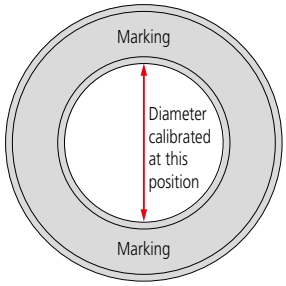
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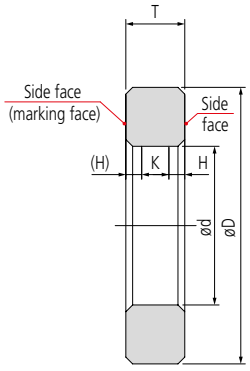
Optional Accessories

SERIES 177 – Steel Setting Rings for Inside Micrometers, Holtest and Dial Bore Gauges

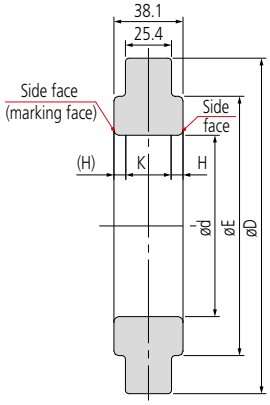
Dimensions

Unit: mm





Type A



Type B

Specifications

Metric

Code No.	Nominal size ød	Dimensions (mm)			Type	Accuracy					Price
		øD	øE	T		Tolerance between the nominal size and the actual diameter (µm)	Uncertainty of marked diameter value (µm)*1	Roundness/ Cylindricity (µm)*2	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)	
177-220	1 mm	20	—	4	A	±10	±1.5	1	1.6	0.8	**£122.00**
177-222	1.1 mm	20	—	4	A	±10	±1.5	1	1.6	0.8	**£122.00**
177-225	1.2 mm	20	—	4	A	±10	±1.5	1	1.6	0.8	**£122.00**
177-227	1.3 mm	20	—	4	A	±10	±1.5	1	1.6	0.8	**£122.00**
177-230	1.4 mm	20	—	4	A	±10	±1.5	1	1.6	0.8	**£122.00**
177-236	1.75 mm	25	—	5	A	±10	±1.5	1	1.6	1.8	**£122.00**
177-239	2 mm	25	—	5	A	±10	±1.5	1	1.6	1.8	**£122.00**
177-242	2.25 mm	25	—	5	A	±10	±1.5	1	1.6	1.8	**£122.00**
177-208	2.5 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-246	2.75 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-248	3 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-250	3.25 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-252	3.5 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-255	3.75 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-204	4 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-257	4.5 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-205	5 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-263	5.5 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-267	6 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-271	6.5 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-275	7 mm	25	—	7	A	±10	±1.5	1	1.7	3.6	**£122.00**
177-125	8 mm	32	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-279	9 mm	32	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-126	10 mm	32	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-284	12 mm	32	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-132	14 mm	38	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-177	16 mm	45	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-133	17 mm	45	—	10	A	±10	±1.5	1	2.0	6.0	**£122.00**
177-285	18 mm	45	—	10	A	±10	±1.5	1	2.0	6.0	**£135.00**
177-286	20 mm	45	—	10	A	±10	±1.5	1	2.0	6.0	**£133.00**
177-139	25 mm	53	—	15	A	±10	±1.5	1	3.2	8.6	**£142.00**
177-288	30 mm	71	—	15	A	±10	±1.5	1	3.2	8.6	**£164.00**
177-140	35 mm	71	—	15	A	±10	±1.5	1	3.2	8.6	**£206.00**
177-290	40 mm	71	—	15	A	±10	±1.5	1	3.2	8.6	**£193.00**
177-178	45 mm	85	—	15	A	±10	±1.5	1	3.7	7.6	**£206.00**
177-146	50 mm	85	—	20	A	±20	±1.5	1	3.7	12.6	**£206.00**
177-292	60 mm	112	—	20	A	±20	±1.5	1	3.7	12.6	**£254.00**
177-314	62 mm	112	—	20	A	±20	±1.5	1.5	3.7	12.6	**£273.00**
177-147	70 mm	112	—	20	A	±20	±1.5	1.5	3.7	12.6	**£280.00**
177-316	75 mm	125	—	25	A	±20	±1.5	1.5	4.2	16.6	**£338.00**
177-294	80 mm	125	—	25	A	±20	±1.5	1.5	4.2	16.6	**£335.00**
177-318	87 mm	140	—	25	A	±20	±1.5	1.5	4.2	16.6	**£368.00**
177-148	90 mm	140	—	25	A	±20	±1.5	1.5	4.2	16.6	**£376.00**
177-296	100 mm	160	—	25	A	±20	±1.5	2	4.2	16.6	**£502.00**
177-298	125 mm	210	168	38.1 (25.4)	B	±20	±2.5	2	5.3	27.5	**£923.00**
177-300	150 mm	235	187		B	±20	±2.5	2	5.3	27.5	**£952.00**
177-302	175 mm	260	215		B	±20	±2.5	2.5	5.3	27.5	**£1,160.00**
177-304	200 mm	311	244		B	±20	±2.5	2.5	5.3	27.5	**£1,840.00**
177-306	225 mm	337	264		B	±20	±2.5	2.5	5.3	27.5	**£2,050.00**
177-308	250 mm	362	290		B	±20	±2.5	3	5.3	27.5	**£2,230.00**
177-310	275 mm	413	321		B	±20	±2.5	3	5.3	27.5	**£2,550.00**
177-312	300 mm	438	340		B	±20	±2.5	3	5.3	27.5	**£3,110.00**

*1 Actual diameter is marked in 0.001 mm increments.

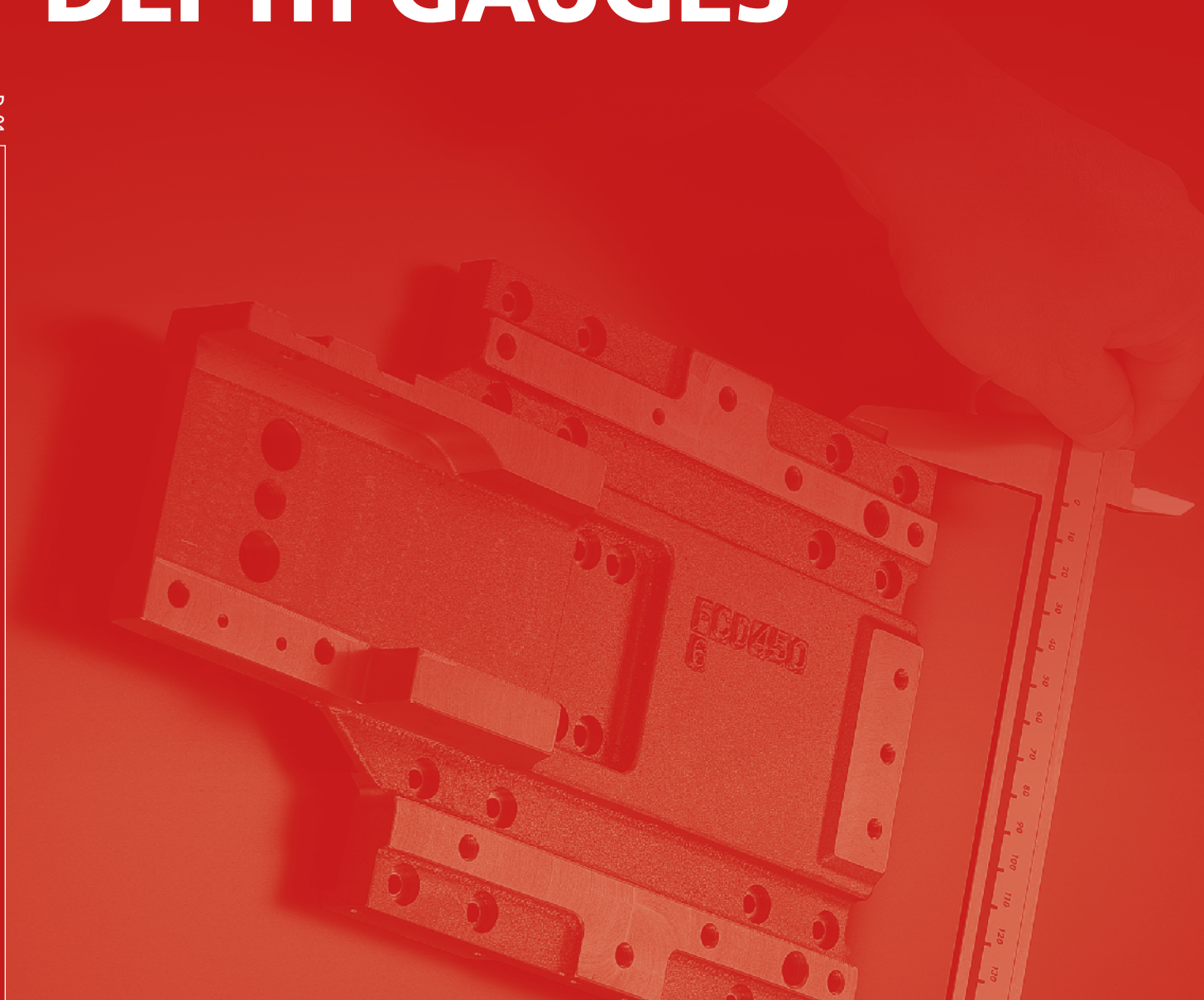
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C

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Mitutoyo

CALIPERS
HEIGHT GAUGES
DEPTH GAUGES



Calipers



Height Gauges



Depth Gauges



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Mitutoyo

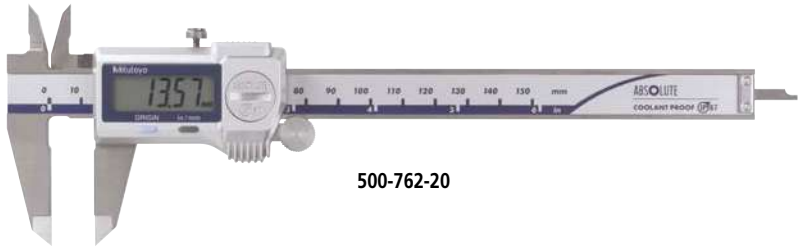
Calipers

SERIES 500 – ABSOLUTE Digimatic Coolant Proof Caliper

- Can be used in workshop conditions exposed to coolant, water, dust or oil. Other specifications and price are the same as the conventional products. 100% inspection by air leak test is performed to ensure quality and reliability.
- Large LCD characters make the display easy to read.
- Incorporates Mitutoyo's ABSOLUTE measurement system. No need to reset the origin.
- SPC data output models can be integrated into statistical process control and measurement systems.
- Can measure outside and inside dimensions, depth, and steps.
- The automatic power-on/off function shuts down the LCD display after 20 minutes inactivity, but the ABS scale unit origin is stored. Power is restored when the slider is moved.
- A convenient interface input tool is available so that measurement data can be converted to keyboard signals and input directly to commercial spreadsheet software.

ABSOLUTE DIGIMATIC COOLANT PROOF IP67 U-WAVE fit

MeasurLink ENABLED
Data Management Software by Mitutoyo



500-762-20

D

Specifications

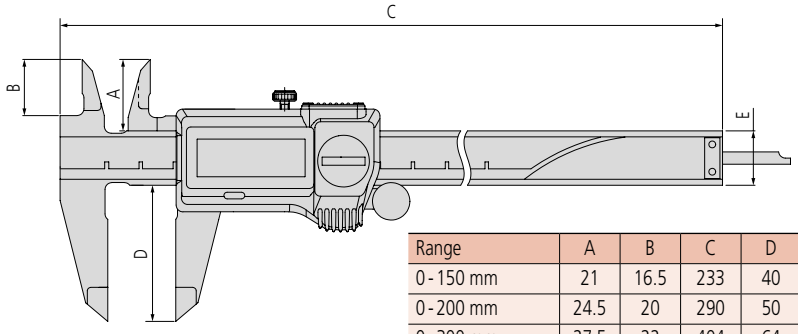
Inch/Metric

Code No.	Range	Max. permissible error		Remarks	Price
		*E*MPE	*S*MPE		
With SPC data output					
500-762-20	0-150 mm (0-6")	±0.02 mm (.001")	±0.04 mm (.002")	—	**£243.00**
500-735-20				Carbide-tipped jaws for outside measurement	**£371.00**
500-737-20				Carbide-tipped jaws for outside and inside measurement	**£512.00**
500-763-20	0-200 mm (0-8")			—	**£342.00**
500-736-20				Carbide-tipped jaws for outside measurement	**£413.00**
500-738-20				Carbide-tipped jaws for outside and inside measurement	**£519.00**
500-764-20	0-300 mm (0-12")	±0.03 mm (.0015")	±0.05 mm (.0025")	—	**£477.00**
Without SPC data output					
500-752-20	0-150 mm (0-6")	±0.02 mm (.001")	±0.04 mm (.002")	—	**£199.00**
500-731-20				Carbide-tipped jaws for outside measurement	**£335.00**
500-733-20				Carbide-tipped jaws for outside and inside measurement	**£390.00**
500-753-20	0-200 mm (0-8")			—	**£273.00**
500-732-20				Carbide-tipped jaws for outside measurement	**£371.00**
500-734-20				Carbide-tipped jaws for outside and inside measurement	**£413.00**
500-754-20	0-300 mm (0-12")	±0.03 mm (.0015")	±0.05 mm (.0025")	—	**£384.00**

Note: Partial Surface Contact Error, *E*MPE and Shift Error, *S*MPE are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E
0-150 mm	21	16.5	233	40	16
0-200 mm	24.5	20	290	50	
0-300 mm	27.5	22	404	64	20

Outside jaw thickness: 3.5 mm (500-714-10: 3.8 mm)

Technical Data

Resolution:	0.01 mm (.0005")
Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

*1 Care should be taken to dry tool after use.

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Zero-setting (INC measurement mode):
Displayed value can be set to zero at any arbitrary position of the slider for comparative measurements.

Auto ON/OFF:
The reading on the LCD disappears after this instrument is idle for a short time, but the origin point is retained. Moving the slider causes the reading on the LCD to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Inch/mm selection:
Switches the units of measurement (at any time).

Alerts:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. If the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced. If contamination on the surface of the scale causes a calculation error, an error message is displayed and measurement stops.

Optional Accessories*2

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*3	**£242.00**
264-621	U-WAVE-TC transmitter*3	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 Only for models with data output function.
*3 U-WAVE-R Receiver required.

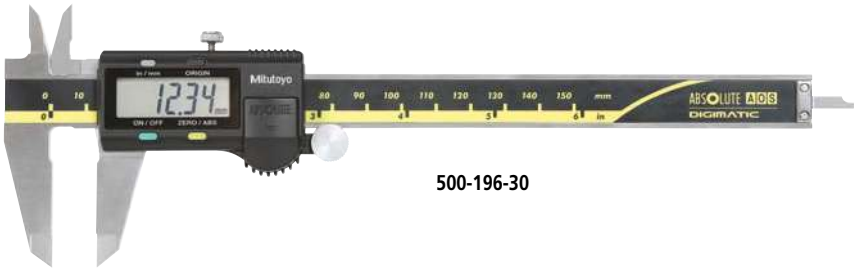
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Calipers

SERIES 500 – ABSOLUTE Digimatic Caliper

- The ZERO/ABS button allows the display to be Zero-Set at any slider position along the scale for comparison measurements. This button will also allow return to the absolute (ABS) mode and display of the true position from the origin (usually jaws closed point).
- Large and clear LCD readout with 20,000 hours battery life.
- Smooth slider movement makes for comfortable operation.
- Can measure outside and inside dimensions, depth, and steps.
- Carbide-tipped jaw calipers give the longest life when measuring rough finished parts, castings, grinding wheels, etc.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



500-196-30

Technical Data

Resolution: 0.01 mm (.0005")
Scale type: ABSOLUTE electrostatic linear encoder
Max. response speed: Unlimited
Battery: SR44 (1 pc.), **938882**
Battery life: Approx. 5 years under normal use (20,000 hours for continuous use)

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Incremental measurement:
Display can be set to zero at any arbitrary position for comparative measurements.

Scale contamination detection:
Contamination on the surface of the scale is detected and an error message (ErrC) is displayed.

Low-voltage alert:
If the battery voltage becomes low, a "B" appears in the display to alert the user before measurement is no longer possible. A battery change advisory alert precedes this alert.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Data hold:
By using the data hold unit (option), the displayed value can be held. This cannot be used with the data output function.

Optional Accessories*1

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
959143	Data hold unit	**£25.20**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZF300	U-WAVE-TC connection unit	**£77.30**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**

*1 Only for models with data output function.
*2 U-WAVE-R Receiver required.



U-WAVE transmitter with buzzer fitted to a Digimatic caliper.

Specifications

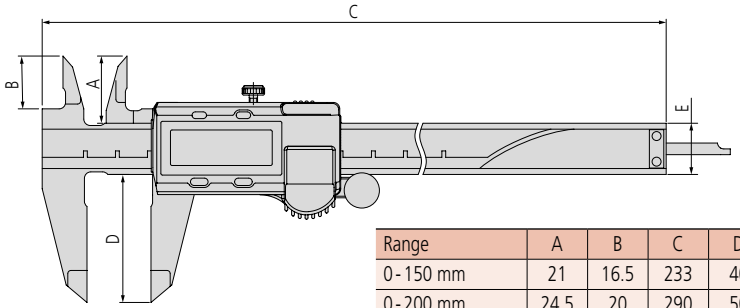
Inch/Metric

Code No.	Range	Max. permissible error E_{MPE}	Max. permissible error S_{MPE}	Remarks	Price
With SPC data output					
500-171-30	0-150 mm (0-6")	±0.02 mm (.001")	±0.04 mm (.002")	—	**£205.00**
500-174-30				Carbide-tipped jaws for outside measurement	**£335.00**
500-175-30				Carbide-tipped jaws for outside and inside measurement	**£499.00**
500-172-30	0-200 mm (0-8")			—	**£254.00**
500-176-30				Carbide-tipped jaws for outside measurement	**£352.00**
500-177-30				Carbide-tipped jaws for outside and inside measurement	**£562.00**
500-173-30	0-300 mm (0-12")	±0.03 mm (.0015")	±0.05 mm (.0025")	—	**£459.00**
500-167-30				Carbide-tipped jaws for outside measurement	**£679.00**
500-168-30				Carbide-tipped jaws for outside and inside measurement	**£840.00**
Without SPC data output					
500-196-30	0-150 mm (0-6")	±0.02 mm (.001")	±0.04 mm (.002")	—	**£146.00**
500-159-30				Carbide-tipped jaws for outside measurement	**£316.00**
500-160-30				Carbide-tipped jaws for outside and inside measurement	**£453.00**
500-197-30	0-200 mm (0-8")			—	**£211.00**
500-163-30				Carbide-tipped jaws for outside measurement	**£325.00**
500-164-30				Carbide-tipped jaws for outside and inside measurement	**£544.00**
500-193-30	0-300 mm (0-12")	±0.03 mm (.0015")	±0.05 mm (.0025")	—	**£420.00**
500-165-30				Carbide-tipped jaws for outside measurement	**£603.00**
500-166-30				Carbide-tipped jaws for outside and inside measurement	**£824.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E
0-150 mm	21	16.5	233	40	16
0-200 mm	24.5	20	290	50	
0-300 mm	27.5	22	404	64	20

D

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Mitutoyo

Calipers

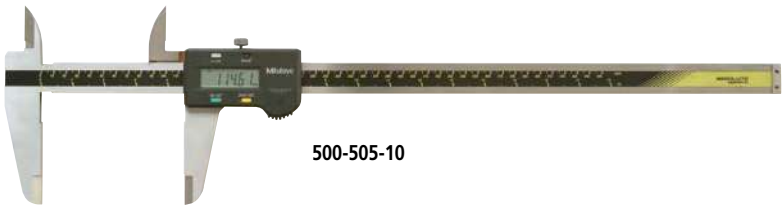
SERIES 500 – ABSOLUTE Digimatic Long Beam Caliper

- Long Digimatic caliper incorporating Mitutoyo's ABSOLUTE scale and available with a measuring range from 450 mm to 1000 mm.
- Can measure outside and inside dimensions, depth, and steps.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



500-506-10



500-505-10

D

Specifications

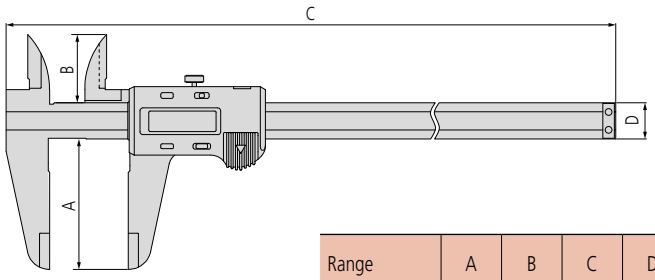
Inch/Metric

Code No.	Range	Resolution	Max. permissible error		Repeatability	Price
			E_{MPE}	S_{MPE}		
500-505-10	0 - 450 mm (0 - 18")	0.01 mm (.0005")	±0.05 mm (±.002")	±0.07 mm (±.003")	0.01 mm	**£823.00**
500-506-10	0 - 600 mm (0 - 24")					**£872.00**
500-507-10	0 - 1000 mm (0 - 40")		±0.07 mm (±.003")	±0.09 mm (±.004")		**£1,540.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	Measuring surface width
0 - 450 mm	90	47	630	25	6
0 - 600 mm			780		
0 - 1000 mm	130	60	1240	32	8

Technical Data

Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3.5 years under normal use (20,000 hours for continuous use)

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Incremental measurement:
Display can be set to zero at any arbitrary position for comparative measurements.

Scale contamination detection:
Contamination on the surface of the scale is detected and an error message (ErrC) is displayed.

Low-voltage alert:
If the battery voltage becomes low, a "B" appears in the display to alert the user before measurement is no longer possible. A battery change advisory alert precedes this alert.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Data hold:
By using the data hold unit (option), the displayed value can be held. This cannot be used with the data output function.

Optional Accessories

Code No.	Description	Price
959143	Data hold unit	**£25.20**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZD730G	U-WAVE-T IP67 transmitter*	**£242.00**
02AZD790C	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*	**£242.00**
02AZE140C	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£160.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**

* U-WAVE-R Receiver required.



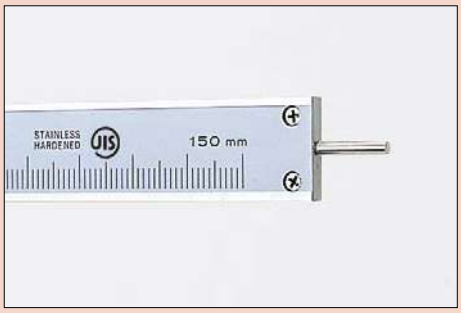
Data hold unit fitted to a Digimatic caliper (no data output possible).

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Calipers

SERIES 530 – Vernier Caliper

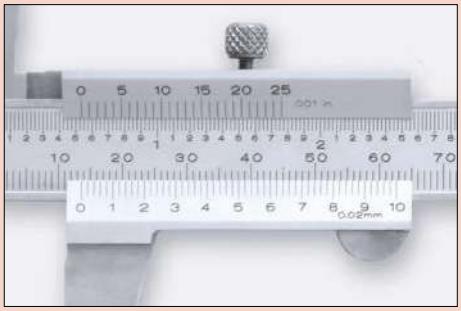
- Stepped graduation face prevents dust ingress between the main scale and slider.
- The small vernier face angle (14°) provides easy reading.
- Can measure outside and inside dimensions, depth, and steps.
- Carbide-tipped jaw calipers give the longest life when measuring rough finished parts, castings, grinding wheels, etc.



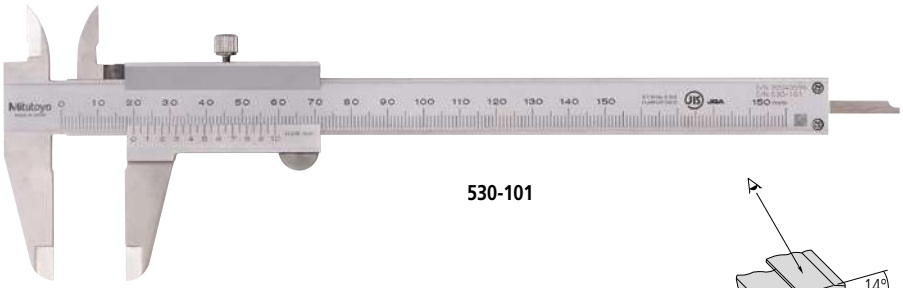
530-102 (round rod depth bar type).



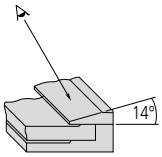
530-320 (carbide-tipped jaw type).



Decimal and fractional graduated scales (inch/metric models only).



530-101



D

Specifications

Metric

Code No.	Range	Max. permissible error *1 EMPE and SMPE	Graduation	Depth bar	Remarks	Price
530-101	0 - 150 mm	±0.05 mm	0.05 mm	Blade	—	£43.90
530-108	0 - 200 mm				—	£86.00
530-109	0 - 300 mm	±0.08 mm			—	£212.00

Code No.	Range	Max. permissible error *2 EMPE	Max. permissible error *2 SMPE	Graduation	Depth bar	Remarks	Price
530-102	0 - 150 mm	±0.05 mm	±0.07 mm	0.05 mm	ø1.9 mm rod	—	£63.90
530-320					Blade	Carbide-tipped jaws for outside measurement	£141.00
530-321	0 - 200 mm						£156.00
530-322	0 - 300 mm	±0.08 mm	±0.10 mm				£368.00
530-501	0 - 600 mm	±0.10 mm	±0.12 mm		—	—	£636.00
530-502	0 - 1000 mm	±0.15 mm	±0.17 mm				£1,320.00

Inch/Metric

Code No.	Range	Max. permissible error *2 EMPE	Max. permissible error *2 SMPE	Graduation	Depth bar	Remarks	Price
530-104	0 - 150 mm (0 - 6")	±0.05 mm	±0.07 mm	0.05 mm (1/128")	Blade	—	£43.90
530-312		±0.03 mm	±0.05 mm	0.02 mm (.001")		High accuracy model	£61.70
530-118	0 - 200 mm (0 - 8")			0.02 mm (.001")		High accuracy model: ±0.03 mm	£86.00
530-115	0 - 300 mm (0 - 12")	±0.08 mm	±0.10 mm	0.05 mm (1/128")		—	£212.00
530-119		±0.04 mm	±0.06 mm	0.02 mm (.001")		High accuracy model: ±0.04 mm	£245.00

*1 Partial Measuring Face Contact Error, EMPE and Shift Error, SMPE are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011.
*2 Partial Surface Contact Error, EMPE and Shift Error, SMPE are terms (notations) used in ISO 13385-1:2019.

Measurement Applications



Outside measurement.



Inside measurement.



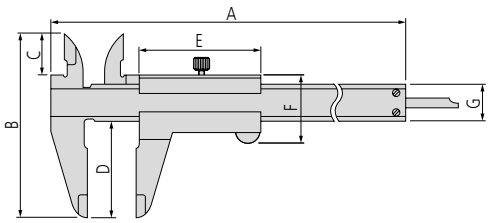
Step measurement.



Depth measurement.

Dimensions

Unit: mm



Range	A	B	C	D	E	F	G	Outside jaw thickness
0 - 100 mm	182	77.5	17	40	53.5	30	16	3
0 - 150 mm	229							
0 - 200 mm	288	91	20.5	50				
0 - 300 mm	404	111.5	22	64	66.5	36	20	3.8
0 - 600 mm	780	162	38	90	89	50	25	6
0 - 1000 mm	1240	222	50	130	111	61	32	8

Note: Code No. 530-102 incorporates a round rod depth bar (ø1.9 mm). The depth bar shown above is a blade type.

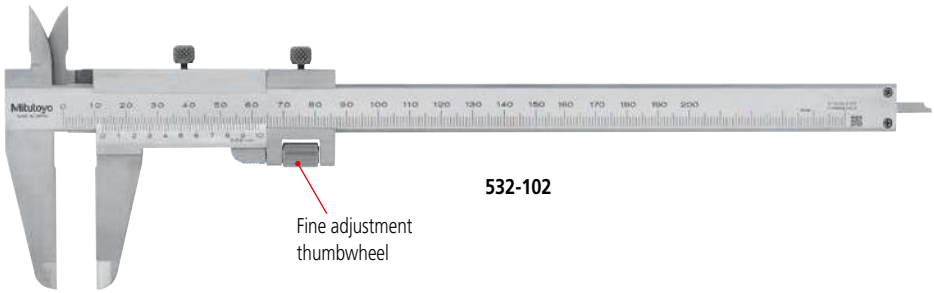
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Mitutoyo

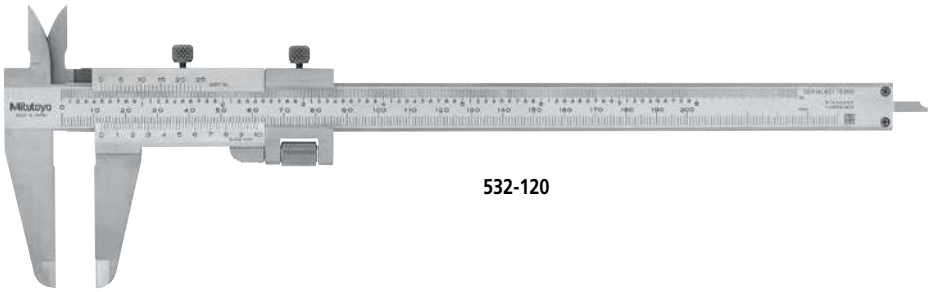
Calipers

SERIES 532 – Vernier Thumbwheel Caliper

- Fine-adjustment thumbwheel aids slider positioning.
- Can measure outside and inside dimensions, depth, and steps.



532-102



532-120

D

Specifications

Metric

Code No.	Range	Max. permissible error *Empe* and *Smpe*	Graduation	Price
532-101	0 - 130 mm	±0.03 mm	0.02 mm	**£89.20**
532-102	0 - 180 mm			**£119.00**
532-103	0 - 280 mm	±0.04 mm		**£264.00**

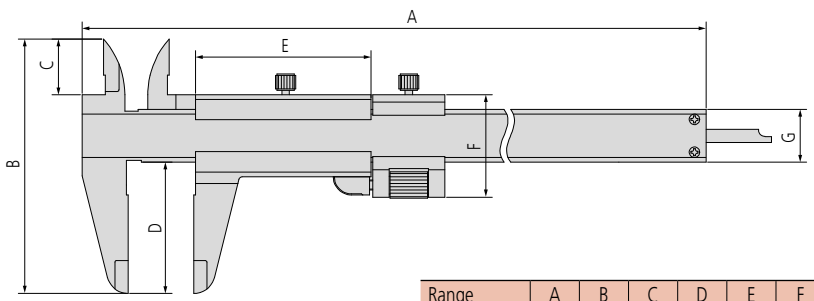
Inch/Metric

Code No.	Range	Max. permissible error *Empe* and *Smpe*	Graduation	Price
532-119	0 - 130 mm (0 - 5")	±0.03 mm	0.02 mm (.001")	**£89.20**
532-120	0 - 180 mm (0 - 7")			**£119.00**
532-121	0 - 280 mm (0 - 11")	±0.04 mm		**£264.00**

Note: Partial Measuring Face Contact Error, *Empe* and Shift Error, *Smpe* are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011.

Dimensions

Unit: mm



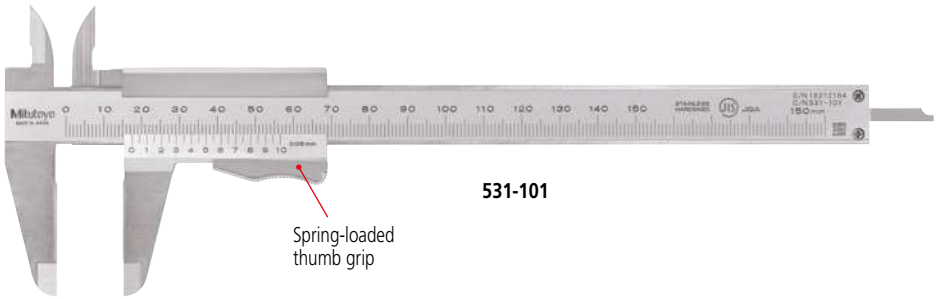
Range	A	B	C	D	E	F	G
0 - 130 mm	229	77.5	17	40	53.5	31.2	16
0 - 180 mm	288	91	20.5	50			
0 - 280 mm	404	111.5	22	64	66.5	38	20

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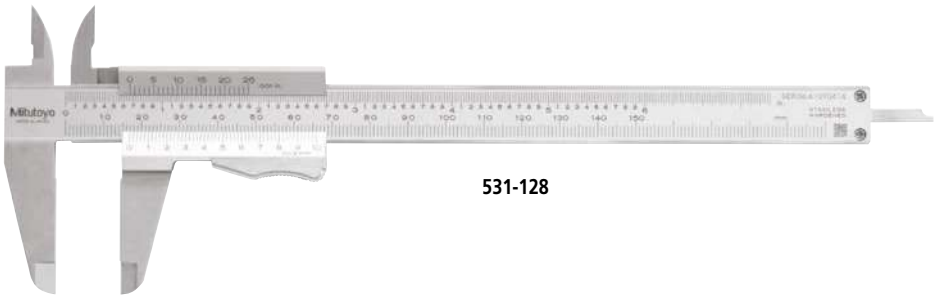
Calipers

SERIES 531 – Vernier Thumb Clamp Caliper

- The slider moves only when the spring-loaded thumb clamp is depressed.
- Can measure outside and inside dimensions, depth, and steps.



531-101



531-128

D

Specifications

Metric

Code No.	Range	Max. permissible error *E*MPE and *S*MPE	Graduation	Remarks	Price
531-101	0 - 150 mm	±0.05 mm	0.05 mm	—	**£60.60**
531-102	0 - 200 mm				**£98.20**
531-103	0 - 300 mm	±0.08 mm			**£240.00**

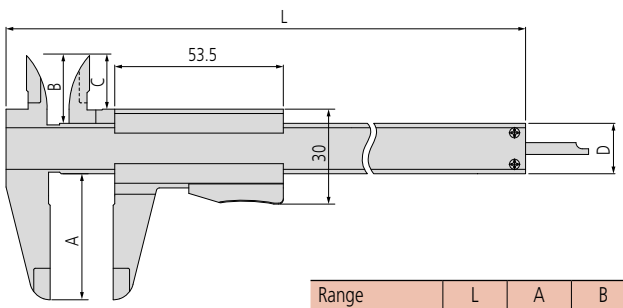
Inch/Metric

Code No.	Range	Max. permissible error *E*MPE and *S*MPE	Graduation	Remarks	Price
531-128	0 - 150 mm (0 - 6")	±0.03 mm	0.02 mm (.001")	High accuracy model	**£60.60**
531-129	0 - 200 mm (0 - 8")				**£98.20**
531-112	0 - 300 mm (0 - 12")	±0.04 mm			**£240.00**

Note: Partial Measuring Face Contact Error, *E*MPE and Shift Error, *S*MPE are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011.

Dimensions

Unit: mm



Range	L	A	B	C	D
0 - 150 mm	229	40	21.5	17	16
0 - 200 mm	288	50	25	20.5	
0 - 300 mm	403	64	27.5	22	20

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Mitutoyo

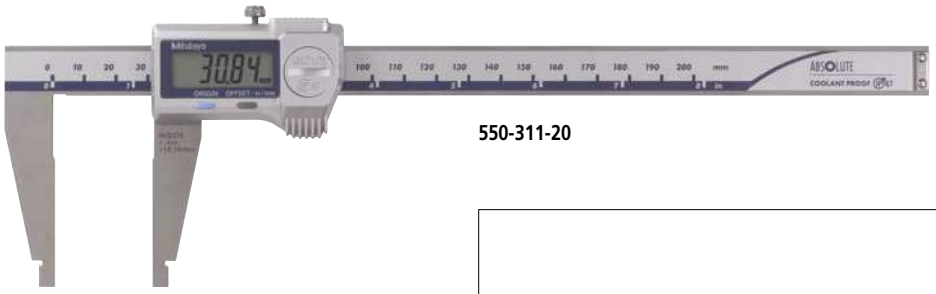
Calipers

SERIES 550 – ABSOLUTE Digimatic Nib Jaw Caliper

- Offers a resolution of 0.01 mm with corresponding accuracy.
- Incorporates Mitutoyo's ABSOLUTE measurement system. No need to reset the origin after switching on.
- Models **550-311-20** and **550-341-20** are IP67 rated.
- Data output function allows integration into statistical process control and measurement systems.
- OFFSET button automatically adds the thickness of the inside jaws to the measured value so that the result can be read directly (**550-311-20** and **550-341-20**). Preset function enables an arbitrary reference value to be added to the measured value for comparison measurements (**550-341-20**).

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink ENABLED Data Management Software by Mitutoyo



550-311-20



550-223-10

Technical Data

Resolution:	0.01 mm (.0005")
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3 years under normal use (1 year for models over 300 mm)
Dust/water protection level:	IP67*2 (models up to 300 mm)

*2 Care should be taken to dry tool after use.

Optional Accessories

Code No.	Description	Price
For 550-311-20 and 550-341-20		
264-620	U-WAVE-TC IP67 transmitter*3	**£242.00**
264-621	U-WAVE-TC transmitter*3	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**
For 550-223-10, 550-225-10 and 550-227-10		
959143	Data hold unit	**£25.20**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZD730G	U-WAVE-T IP67 transmitter*3	**£242.00**
02AZD790C	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*3	**£242.00**
02AZE140C	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£160.00**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**

*3 U-WAVE-R Receiver required.

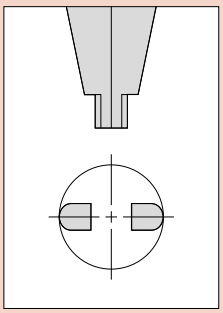
Specifications

Inch/Metric

Code No.	Range*1	Max. permissible error *E*MPE and *S*MPE	Remarks	Price
550-311-20	0-200 mm/0-8" (10-210 mm/.4-8.4")	±0.03 mm/±.0015"	IP67	**£333.00**
550-341-20	0-300 mm/0-12" (10-310 mm/.4-12.4")	±0.05 mm/±.002"	IP67, with offset/preset functions for easy inside and comparison measurement	**£509.00**
550-223-10	0-450 mm/0-18" (20-470 mm/.5-18.5")		—	**£713.00**
550-225-10	0-600 mm/0-24" (20-620 mm/.5-24.5")			**£801.00**
550-227-10	0-1000 mm/0-40" (20-1020 mm/1-41")	±0.07 mm/±.003"		**£1,530.00**

*1 ( ): Inside measurement.
Note 1: Partial Surface Contact Error, *E*MPE and Shift Error, *S*MPE are terms (notations) used in ISO 13385-1:2019.
Note 2: Series 550 is not equipped with a depth bar.

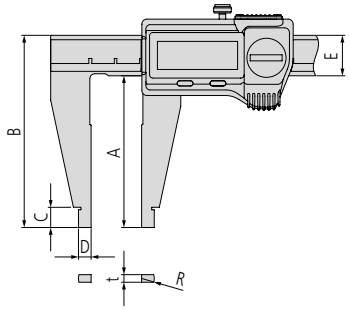




Radiused jaws for accurate ID measurement.

Dimensions

Unit: mm



Range	A	B	C	D	E	t	R
0-200 mm	60	76	8	5	16	3	5
0-300 mm	75	95	12		20	3.8	
0-450 mm	100	125	18	10	25	6	10
0-600 mm							
0-1000 mm	140	172	24		32	8	

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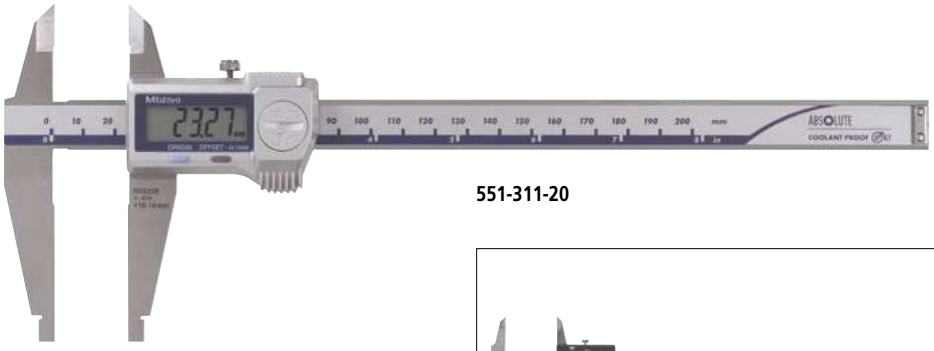
Calipers

SERIES 551 – ABSOLUTE Digimatic Nib/Standard Jaw Caliper

- Offers a resolution of 0.01 mm with corresponding accuracy.
- Incorporates Mitutoyo's ABSOLUTE measurement system. No need to reset the origin after switching on.
- Data output function allows integration into statistical process control and measurement systems.
- OFFSET button automatically adds the thickness of the inside jaws to the measured value so that the result can be read directly (**551-311-20** and **551-341-20**). Preset function enables an arbitrary reference value to be added to the measured value for comparison measurements (**551-341-20**).
- Tips of the outside measurement jaw are relieved for easy measurement of thin parts.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



551-311-20



551-224-10

Technical Data

Resolution:	0.01 mm (.0005")
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3 years under normal use (1 year for models over 300 mm)
Dust/water protection level:	IP67*1 (models up to 300 mm)

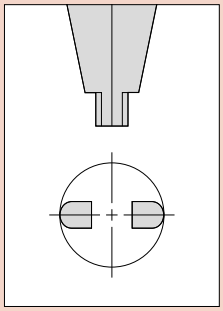
*1 Care should be taken to dry tool after use.

Optional Accessories

Code No.	Description	Price
For 551-311-20 and 551-341-20		
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**
For 551-224-10, 551-226-10 and 551-227-10		
959143	Data hold unit	**£25.20**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZD730G	U-WAVE-T IP67 transmitter*2	**£242.00**
02AZD790C	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*2	**£242.00**
02AZE140C	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£160.00**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**

*2 U-WAVE-R Receiver required.





Radiused jaws for accurate ID measurement.

Specifications

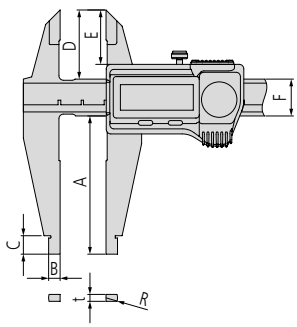
Inch/Metric

Code No.	Range*3	Max. permissible error E_{MPE} and S_{MPE}	Remarks	Price
551-311-20	0-200 mm/0-8" (10-210 mm/.4-8.4")	±0.03 mm/±.0015"	IP67	**£392.00**
551-341-20	0-300 mm/0-12" (10-310 mm/.4-12.4")	±0.04 mm/±.002"	IP67, with offset/preset functions for easy inside and comparison measurement	**£610.00**
551-224-10	0-500 mm/0-20" (20-520 mm/.5-20.5")	±0.06 mm/±.0025"	—	**£973.00**
551-226-10	0-750 mm/0-30" (20-770 mm/.5-30.5")			**£1,580.00**
551-227-10	0-1000 mm/0-40" (20-1020 mm/1-41")	±0.07 mm/±.003"		**£1,760.00**

*3 ( ): Inside measurement.
Note 1: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note 2: Series 551 is not equipped with a depth bar.

Dimensions

Unit: mm



Range	A	B	C	D	E	F	t	R
0-200 mm	60	5	8	30	23.6	16	3	5
0-300 mm	90		10	40.1	32.4	20	3.8	
0-500 mm	150	10	15	56	44.9	25	6	10
0-750 mm								
0-1000 mm			20		43.8	32	8	

D

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Mitutoyo

Calipers

SERIES 552 – ABSOLUTE Digimatic Coolant Proof Carbon Fibre Caliper

- A lightweight Digimatic caliper that uses CFRP (Carbon Fibre Reinforced Plastics) in the beam and jaws.
- Interchangeable measuring jaws available as optional accessories.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP66 U-WAVE

MeasurLink® ENABLED
Data Management Software by Mitutoyo



552-312-10



552-314-10

D

Specifications

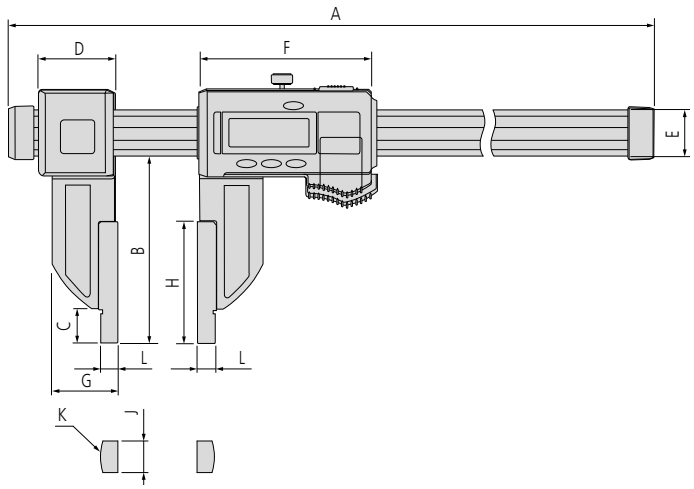
Inch/Metric

Code No.	Range*1	Resolution	Max. permissible error E_{MPE} and S_{MPE}	Price
552-312-10	0 (20) - 450 mm / 0 (.5") - 18"	0.01 mm / .0005"	±0.04 mm / ±.002"	**£1,080.00**
552-313-10	0 (20) - 600 mm / 0 (.5") - 24"			**£1,130.00**
552-314-10	0 (20) - 1000 mm / 0 (1") - 40"			**£1,820.00**
552-315-10	0 (20) - 1500 mm / 0 (1") - 60"		±0.09 mm / ±.004"	**£2,120.00**
552-316-10	0 (20) - 2000 mm / 0 (1") - 80"		±0.12 mm / ±.005"	**£2,780.00**

*1 ( ): Minimum dimension in inside measurement.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E	F	G	H	J	K	L
0 - 450 mm	640	100	18	41.2	25	91.8	35	65	8	R10	6.35
0 - 600 mm	790										
0 - 1000 mm	1230	150	24	62.8	32	113.8	45	100			12.7
0 - 1500 mm	1740										
0 - 2000 mm	2250										

Technical Data

Scale type:	ABSOLUTE electromagnetic induction 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*2

*2 Care should be taken to dry tool after use.

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Zero-setting (INC measurement mode):
Displayed value can be set to zero at any arbitrary position of the slider for comparative measurements.

Auto ON/OFF:
The reading on the LCD disappears after this instrument is idle for a short time, but the origin point is retained. Moving the slider causes the reading on the LCD to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Data hold:
By using the data hold button the displayed value can be held.

Presetting (ABS INC measurement mode):
Displayed value can be set to any arbitrary value.

Offsetting:
Automatically adds the thickness of the inside jaws to the measured value so that the result can be read directly, without calculation.

Inch/mm selection:
Switches the units of measurement (at any time).

Alerts:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. If the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced. If contamination on the surface of the scale causes a calculation error, an error message is displayed and measurement stops.



Light weight is an advantage when measuring large dimensions.

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Calipers

SERIES 552 – ABSOLUTE Digimatic Coolant Proof Carbon Fibre Caliper

Optional Accessories

Code No.	Description	Price
914053	Clamp (1 pair) for **552-312-10** and **552-313-10**	£174.00
914054	Clamp (1 pair) for **552-314-10**, **552-315-10** and **552-316-10**	£185.00
914056	Centre-to-centre jaws (1 pair)	£232.00
914058	Point jaws	£265.00
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790A	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE140A	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
02AZE200	U-WAVE-T mounting plate	£26.70
05CZA624	SPC data cable with pushbutton (1 m)	£85.60
05CZA625	SPC data cable with pushbutton (2 m)	£104.00
06AFM380A	USB Input Tool Direct USB-ITN-A (2 m)	£158.00

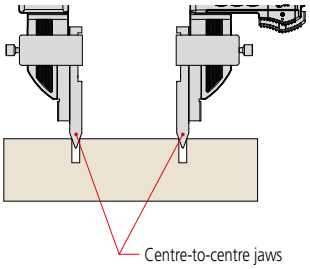
* U-WAVE-R Receiver required.

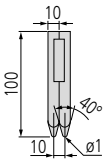
Optional Accessories

Unit: mm

914056
Centre-to-centre jaws
Accuracy: ±0.03 mm



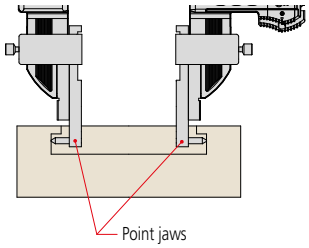


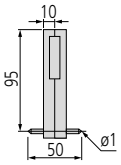


Unit: mm

914058
Point jaws
Accuracy: ±0.02 mm







Clamp (1 pair)

914053





914054

D

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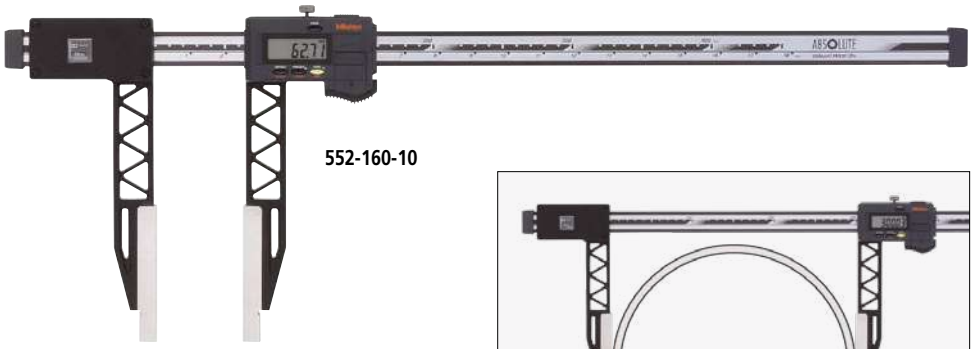
Calipers

SERIES 552 – ABSOLUTE Digimatic Long Jaw Carbon Fibre Caliper

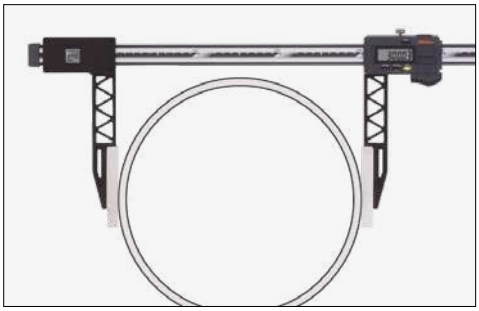
- A lightweight Digimatic caliper that uses CFRP (Carbon Fibre Reinforced Plastics) in the beam and jaws.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF IP66 U-WAVE

MeasurLink ENABLED
Data Management Software by Mitutoyo



552-160-10



Specifications

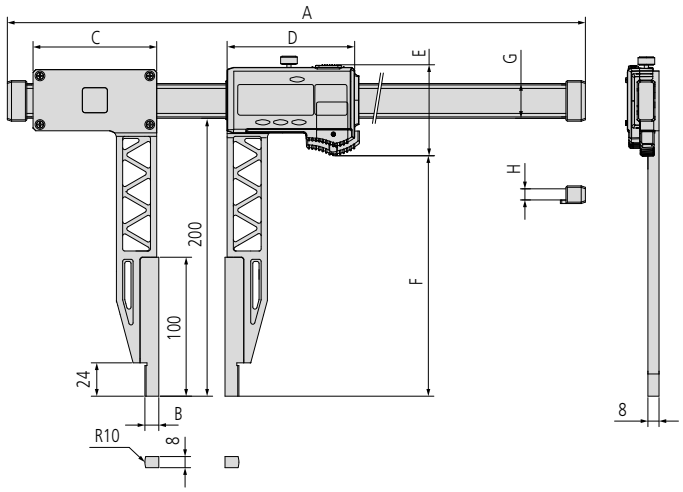
Inch/Metric

Code No.	Range*1	Resolution	Max. permissible error E_{MPE} and S_{MPE}	Price
552-160-10	0 (20) - 450 mm / 0 (.5") - 18"	0.01 mm / .0005"	±0.06 mm / ±.0025"	£1,480.00
552-161-10	0 (20) - 600 mm / 0 (.5") - 24"			£1,590.00
552-162-10	0 (20) - 1000 mm / 0 (1") - 40"		±0.07 mm / ±.003"	£2,270.00
552-163-10	0 (20) - 1500 mm / 0 (1") - 60"		±0.11 mm / ±.0045"	£2,600.00
552-164-10	0 (20) - 2000 mm / 0 (1") - 80"		±0.14 mm / ±.0055"	£3,290.00

*1 ( ): Minimum dimension in inside measurement.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E	F	G	H
0 - 450 mm	680	6.35	89	91.8	65.5	173	25	8
0 - 600 mm	830							
0 - 1000 mm	1280	12.7	110	113.8	73	170.5	32	12
0 - 1500 mm	1790							
0 - 2000 mm	2300							

Technical Data

Scale type:	ABSOLUTE electromagnetic induction 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*2

*2 Care should be taken to dry tool after use.

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Zero-setting (INC measurement mode):
Displayed value can be set to zero at any arbitrary position of the slider for comparative measurements.

Auto ON/OFF:
The reading on the LCD disappears after this instrument is idle for a short time, but the origin point is retained. Moving the slider causes the reading on the LCD to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Data hold:
By using the data hold button the displayed value can be held.

Presetting (ABS INC measurement mode):
Displayed value can be set to any arbitrary value.

Offsetting:
Automatically adds the thickness of the inside jaws to the measured value so that the result can be read directly, without calculation.

Inch/mm selection:
Switches the units of measurement (at any time).

Alerts:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. If the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced. If contamination on the surface of the scale causes a calculation error, an error message is displayed and measurement stops.

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*3	£242.00
02AZD790A	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*3	£242.00
02AZE140A	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
02AZE200	U-WAVE-T mounting plate	£26.70
05CZA624	SPC data cable with pushbutton (1 m)	£85.60
05CZA625	SPC data cable with pushbutton (2 m)	£104.00
06AFM380A	USB Input Tool Direct USB-ITN-A (2 m)	£158.00

*3 U-WAVE-R Receiver required.

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Calipers

SERIES 552 – ABSOLUTE Digimatic Coolant Proof Ceramic Jaw Carbon Fibre Caliper

- A lightweight Digimatic caliper that uses CFRP (Carbon Fibre Reinforced Plastics) in the beam and jaws.
- Rustless and nonmagnetic. Suitable for measuring magnetic components.
- Zirconia ceramic contact surfaces for high resistance to wear.
- Data output function allows integration into statistical process control and measurement systems.
- Interchangeable measuring jaws available as optional accessories.

ABSOLUTE DIGIMATIC COOLANT PROOF IP66 U-WAVE

MeasurLink ENABLED Data Management Software by Mitutoyo



552-165-10



Technical Data

Scale type:	ABSOLUTE electromagnetic induction 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*1

*1 Care should be taken to dry tool after use.

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Zero-setting (INC measurement mode):
Displayed value can be set to zero at any arbitrary position of the slider for comparative measurements.

Auto ON/OFF:
The reading on the LCD disappears after this instrument is idle for a short time, but the origin point is retained. Moving the slider causes the reading on the LCD to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Data hold:
By using the data hold unit (option), the displayed value can be held. This cannot be used with the data output function.

Presetting (ABS INC measurement mode):
Displayed value can be set to any arbitrary value.

Offsetting:
Automatically adds the thickness of the inside jaws to the measured value so that the result can be read directly, without calculation.

Inch/mm selection:
Switches the units of measurement (at any time).

Alerts:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. If the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced. If contamination on the surface of the scale causes a calculation error, an error message is displayed and measurement stops.

Optional Accessories

Code No.	Description	Price
914053	Clamp (1 pair)*2	**£174.00**
914056	Centre-to-centre jaws (1 pair)*2	**£232.00**
914058	Point jaws*2	**£265.00**
02AZD730G	U-WAVE-T IP67 transmitter*3	**£242.00**
02AZD790A	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*3	**£242.00**
02AZE140A	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	**£179.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB Input Tool Direct USB-ITN-A (2 m)	**£158.00**

*2 Refer to page D-12 for details.
*3 U-WAVE-R Receiver required.

Specifications

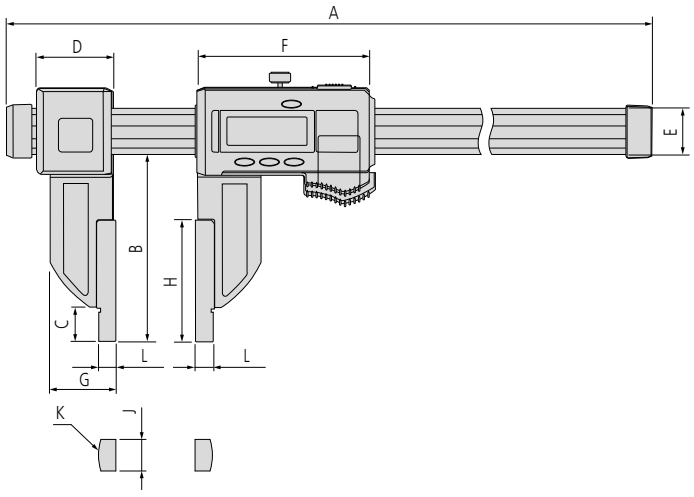
Inch/Metric

Code No.	Range*4	Resolution	Max. permissible error E_{MPE} and S_{MPE}	Price
552-165-10	0 (20) - 450 mm/0 (.5") - 18"	0.01 mm/.0005"	±0.04 mm/±.002"	**£1,480.00**
552-166-10	0 (20) - 600 mm/0 (.5") - 24"			**£1,580.00**

*4 ( ): Minimum dimension in inside measurement.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E	F	G	H	J	K	L
0 - 450 mm	640	100	18	41.2	25	91.8	35	65	8	R10	6.35
0 - 600 mm	790										

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Mitutoyo

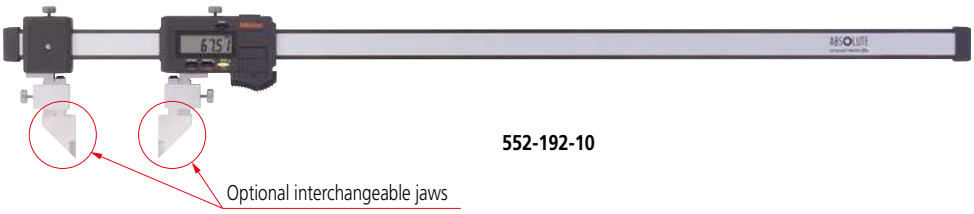
Calipers

SERIES 552 – ABSOLUTE Digimatic Coolant Proof Interchangeable Jaw Carbon Fibre Caliper

- A lightweight Digimatic caliper that uses CFRP (Carbon Fibre Reinforced Plastics) in the beam and jaws.
- Provided with preset function for setting a desired starting point, which allows direct readout of offset measurement.
- The range of applications can be expanded by using interchangeable jaws (optional).
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP66 U-WAVE

MeasurLink® ENABLED Data Management Software by Mitutoyo



552-192-10

D

Specifications

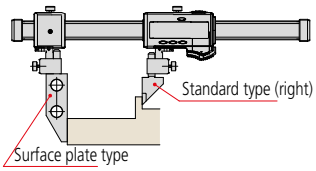
Inch/Metric

Code No.	Range	Resolution	Max. permissible error *E*MPE and *S*MPE	Price
552-191-10	0-450 mm/0-18"	0.01 mm/.0005"	±0.04 mm/±.002"	£1,120.00
552-192-10	0-600 mm/0-24"			£1,170.00
552-193-10	0-1000 mm/0-40"			£1,870.00
552-194-10	0-1500 mm/0-60"		±0.09 mm/±.004"	£2,230.00
552-195-10	0-2000 mm/0-80"		±0.12 mm/±.005"	£2,880.00

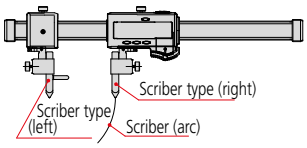
Note: Partial Surface Contact Error, *E*MPE and Shift Error, *S*MPE are terms (notations) used in ISO 13385-1:2019.

Application Examples

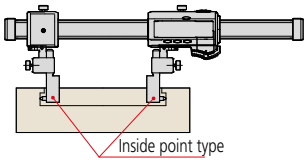
Surface plate and standard types



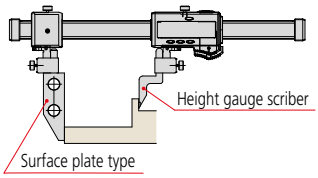
Scriber type



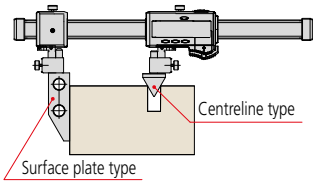
Inside point type



Surface plate and height gauge scriber types



Surface plate and centreline types



Technical Data

Scale type:	ABSOLUTE electromagnetic induction 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*1
Standard accessory:	Jaw clamps (2 pcs.), **05GZA033**

*1 Care should be taken to dry tool after use.

Functions

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Zero-setting (INC measurement mode):
Displayed value can be set to zero at any arbitrary position of the slider for comparative measurements.

Auto ON/OFF:
The reading on the LCD disappears after this instrument is idle for a short time, but the origin point is retained. Moving the slider causes the reading on the LCD to reappear.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Data hold:
By using the data button the displayed value can be held.

Presetting (ABS INC measurement mode):
Displayed value can be set to any arbitrary value.

Offsetting:
Automatically adds the thickness of the inside jaws to the measured value so that the result can be read directly, without calculation.

Inch/mm selection:
Switches the units of measurement (at any time).

Alerts:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. If the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced. If contamination on the surface of the scale causes a calculation error, an error message is displayed and measurement stops.

Optional Accessories

Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*2	£242.00
02AZD790A	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*2	£242.00
02AZE140A	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
02AZE200	U-WAVE-T mounting plate	£26.70
05CZA624	SPC data cable with pushbutton (1 m)	£85.60
05CZA625	SPC data cable with pushbutton (2 m)	£104.00
06AFM380A	USB Input Tool Direct USB-ITN-A (2 m)	£158.00

*2 U-WAVE-R Receiver required.

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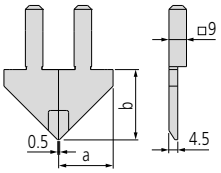
Calipers

SERIES 552 – ABSOLUTE Digimatic Coolant Proof Interchangeable Jaw Carbon Fibre Caliper

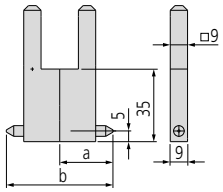
Interchangeable Jaw Dimensions

Unit: mm

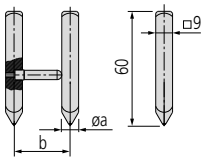
Standard type



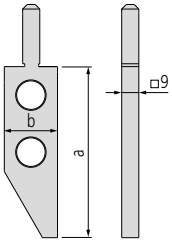
Inside point type



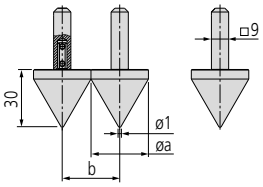
Scriber type



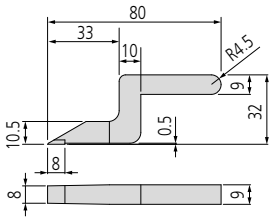
Surface plate type



Centreline type



Height gauge scriber



Interchangeable Jaw Specifications

Code No.	Components	a	b	Price
Standard type*1				
07CZA056	2 pcs.	28 mm	30 mm	**£297.00**
Inside point type*1				
07CZA058	2 pcs.	25 mm	50 mm	**£347.00**
07CZA059	2 pcs.	1"	2"	**£347.00**
Scriber type*1				
07CZA055	2 pcs.	8 mm	30 mm	**£206.00**
07CZA061	2 pcs.	.031"	1.2"	**£247.00**

Code No.	Components	a	b	Price
Surface plate type				
07CZA044	1 pc.	90 mm	28 mm	**£248.00**
Centreline type*1				
07CZA057	2 pcs.	30 mm	30 mm	**£353.00**
07CZA060	2 pcs.	1.2"	1.2"	**£353.00**
Height gauge scriber type				
07GZA000	1 pc.	—	—	**£51.30**

*1 Individual components available, price on application.

Interchangeable jaw	Applicable calipers	Range	Max. permissible error*2	
			E_{MPE}	S_{MPE}
Standard type	**552-191-10**	0 - 450 mm (0 - 18")	±0.06 mm (±.0025")	—
	552-192-10	0 - 600 mm (0 - 24")		
	552-193-10	0 - 1000 mm (0 - 40")	±0.07 mm (±.0030")	
	552-194-10	0 - 1500 mm (0 - 60")	±0.11 mm(±.0045")	
	552-195-10	0 - 2000 mm (0 - 80")	±0.14 mm (±.0055")	
Inside point type	**552-191-10**	Inside: 50.1 - 500 mm (2.004 - 20")	—	±0.09 mm(±.0035")
		Outside: 0 - 450 mm (0 - 18")	±0.09 mm(±.0035")	—
	552-192-10	Inside: 50.1 - 650 mm (2.004 - 26")	—	±0.09 mm(±.0035")
		Outside: 0 - 600 mm (0 - 24")	±0.09 mm(±.0035")	—
	552-193-10	Inside: 50.1 - 1050 mm (2.004 - 42")	—	±0.10 mm (±.0040")
		Outside: 0 - 1000 mm (0 - 40")	±0.10 mm (±.0040")	—
	552-194-10	Inside: 50.1 - 1550 mm (2.004 - 62")	—	±0.14 mm (±.0055")
		Outside: 0 - 1500 mm (0 - 60")	±0.14 mm (±.0055")	—
	552-195-10	Inside: 50.1 - 2050 mm (2.004 - 82")	—	±0.17 mm (±.0070")
		Outside: 0 - 2000 mm (0 - 80")	±0.17 mm (±.0070")	—
Centreline type	**552-191-10**	30.1 - 480 mm (1.204 - 19.2")	—	±0.08 mm (±.0030")
	552-192-10	30.1 - 630 mm (1.204 - 25.2")		
	552-193-10	30.1 - 1030 mm (1.204 - 41.2")		±0.10 mm (±.0040")
	552-194-10	30.1 - 1530 mm (1.204 - 61.2")		±0.13 mm (±.0055")
	552-195-10	30.1 - 2030 mm (1.204 - 81.2")		±0.16 mm (±.0065")
Scriber type	**552-191-10**	30.1 - 480 mm (1.204 - 19.2")	—	±0.11 mm (±.0045")
	552-192-10	30.1 - 630 mm (1.204 - 25.2")		
	552-193-10	30.1 - 1030 mm (1.204 - 41.2")		
	552-194-10	30.1 - 1530 mm (1.204 - 61.2")		±0.15 mm (±.0060")
	552-195-10	30.1 - 2030 mm (1.204 - 81.2")		±0.18 mm (±.0070")
Surface plate and height gauge scriber types	**552-191-10**	0 - 450 mm (0 - 17.7")	±0.10 mm(±.0040")	—
	552-192-10	0 - 600 mm (0 - 23.7")		
	552-193-10	0 - 1000 mm (0 - 39.4")	±0.11 mm (±.0045")	
	552-194-10	0 - 1500 mm (0 - 59.4")	±0.15 mm (±.0060")	
	552-195-10	0 - 2000 mm (0 - 79.6")	±0.18 mm (±.0070")	
Surface plate and inside point types	**552-191-10**	Outside: 0 - 450 mm (1 - 18")	±0.12 mm (±.0050")	
	552-192-10	Outside: 0 - 600 mm (1 - 24")		
	552-193-10	Outside: 0 - 1000 mm (1 - 40")	±0.13 mm (±.0055")	
	552-194-10	Outside: 0 - 1500 mm (1 - 60")	±0.17 mm (±.0070")	
	552-195-10	Outside: 0 - 2000 mm (1 - 80")	±0.20 mm (±.0080")	
Surface plate and centreline types	**552-191-10**	15.1 - 465 mm (0.6 - 18.6")	—	±0.11 mm (±.0045")
	552-192-10	15.1 - 615 mm (0.6 - 24.6")		
	552-193-10	15.1 - 1015 mm (0.6 - 40.6")		±0.12 mm (±.0050")
	552-194-10	15.1 - 1515 mm (0.6 - 60.6")		±0.16 mm (±.0065")
	552-195-10	15.1 - 2015 mm (0.6 - 80.6")		±0.19 mm (±.0075")

Note: The values described in the above table are MPE values when attached to a caliper.
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

D

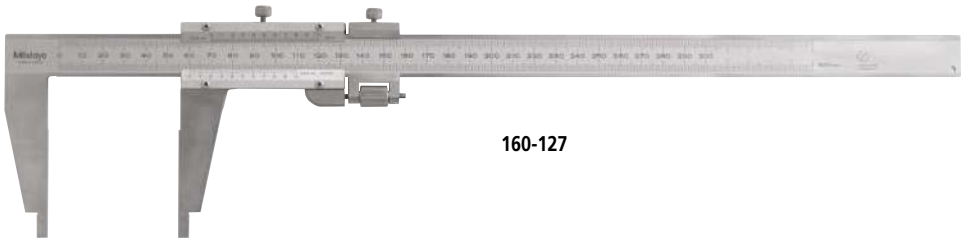
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Mitutoyo

Calipers

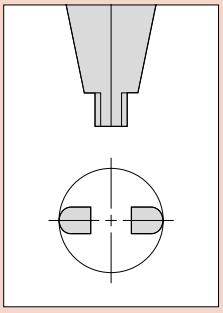
SERIES 160 – Vernier Nib Jaw Thumbwheel Caliper

- Inside and outside measurements can be read directly from the upper and lower vernier scales.
- The jaws have radiused measuring faces for accurate inside diameter (ID) measurement.



160-127





Radiused jaws for accurate ID measurement.

D

Specifications

Metric

Code No.	Range*	Max. permissible error E_{MPE} and S_{MPE}	Graduation	Remarks	Price
160-127	0 (10) - 300 mm	±0.04 mm	0.02 mm	—	**£366.00**
160-128	0 (20) - 450 mm	±0.05 mm			**£576.00**
160-101	0 (20) - 600 mm				**£661.00**
160-104	0 (20) - 1000 mm	±0.07 mm			**£1,200.00**

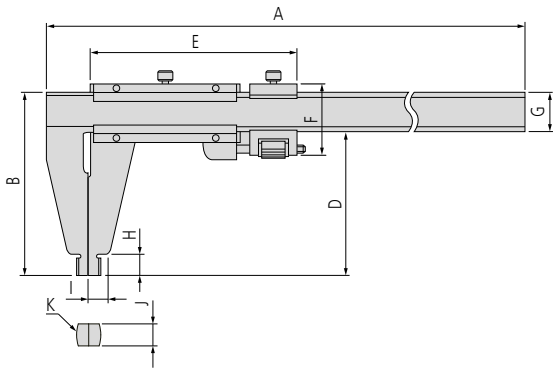
Inch/Metric

Code No.	Range*	Max. permissible error E_{MPE} and S_{MPE}	Graduation	Remarks	Price
160-125	0 (10) - 300 mm/ 0 (.3) - 12"	±0.04 mm/±.0015"	0.02 mm/ .001"	+.3"/7.62 mm to reading in inside measurement	**£366.00**
160-119	0 (20) - 450 mm/ 0 (.5) - 18"	±0.05 mm/±.002"		+.5"/12.7 mm to reading in inside measurement	**£576.00**
160-103	0 (20) - 600 mm/ 0 (.5) - 24"				**£661.00**
160-106	0 (20) - 1000 mm/ 0 (1) - 40"	±0.07 mm/±.003"		+1"/25.4 mm to reading in inside measurement	**£1,200.00**

*( ): Minimum measurable inside dimension.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



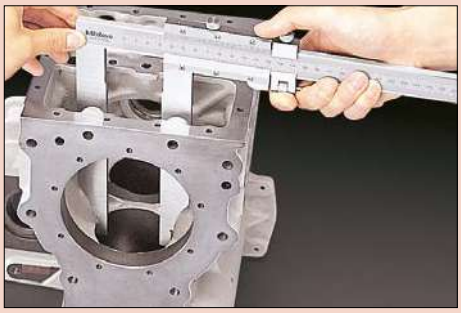
Range	A	B	D	E	F	G	H	I	J	K
0 - 300 mm	445	95	75	103	38	20	12	10	3.8	R5
0 - 450 mm	630	125	100	112	51	25	18	14.8	6	R10
0 - 600 mm	780									
0 - 1000 mm	1240	172	140	150	62.5	32	24	17	8	

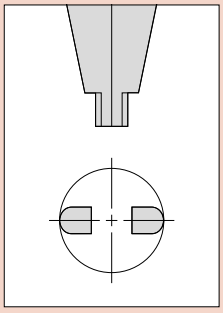
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Calipers

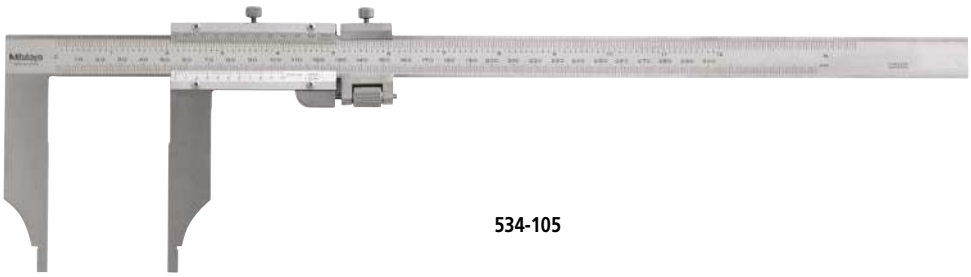
SERIES 534 – Vernier Long Jaw Thumbwheel Caliper

- Long jaws for measuring hard-to-reach workpiece features.
- Inside and outside measurements can be read directly from the upper and lower vernier scales.
- The jaws have radiused measuring faces for accurate inside diameter (ID) measurement.





Radiused jaws for accurate ID measurement.



534-105

D

Specifications

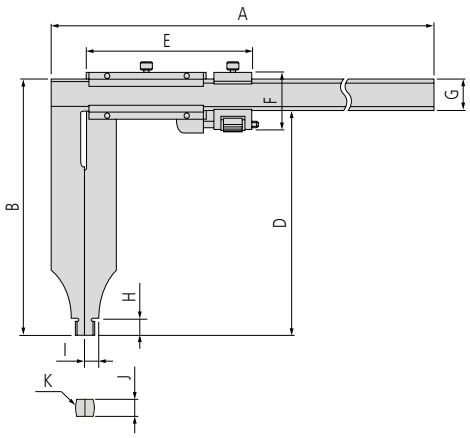
Inch/Metric

Code No.	Range*	Max. permissible error E_{MPE} and S_{MPE}	Graduation	Remarks	Price
534-105	0 (10) - 300 mm/ 0 (.3) - 12"	±0.04 mm/ ±.0015"	0.02 mm/ .001"	+10 mm/.394" to reading in inside measurement	£327.00
534-106	0 (20) - 500 mm/ 0 (.8) - 20"	±0.06 mm/ ±.0025"		+20 mm/.787" to reading in inside measurement	£764.00
534-107	0 (20) - 750 mm/ 0 (.8) - 30"	±0.08 mm/ ±.003"			£1,100.00
534-108	0 (20) - 1000 mm/ 0 (1) - 40"	±0.1 mm/ ±.004"			£1,470.00

*( ): Minimum measurable inside dimension.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	D	E	F	G	H	I	J	K
0 - 300 mm	445	110	90	103	38	20	12	7	3.8	R5
0 - 500 mm	682	225	200	112	51	25	18.5	12	6	R10
0 - 750 mm	995	232		150	62.5	32			8	
0 - 1000 mm	1230									

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Mitutoyo

Calipers

SERIES 505 – Dial Caliper

- Newly designed dial movement for ultra-smooth sliding and high shock protection.
- Titanium coating is applied to the sliding surfaces to enhance durability (except for 0 - 300 mm and 0 - 12" models).
- Easy-to-read yellow dial.
- Large finger rest aids ease of use.
- Jaw tips are relieved for easy measurement of thin parts.
- Can measure outside and inside dimensions, depth, and steps.



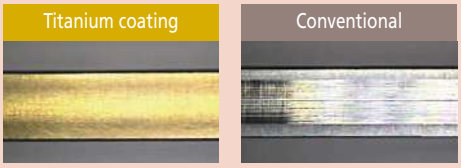
505-730



505-731

Wear comparison of main scale slider face

The photographs below show the condition of the main beam sliding surfaces after a sliding test comprising 100,000 movements. Smooth movement over the entire measuring range is assured even when you use a particular part of the sliding surface repeatedly.



Wear: 0 µm　　Wear: 4 µm

Specifications

Metric

Code No.	Range	Max. permissible error		Graduation	Remarks	Price
		*E*MPE	*S*MPE			
505-730	0 - 150 mm	±0.03 mm	±0.05 mm	0.02 mm, 2 mm/rev	—	**£140.00**
505-732		±0.02 mm	±0.04 mm	0.01 mm, 1 mm/rev	Silver cover type	**£146.00**
505-731	0 - 200 mm	±0.03 mm	±0.05 mm	0.02 mm, 2 mm/rev	—	**£185.00**
505-733				0.01 mm, 1 mm/rev	Silver cover type	**£185.00**
505-745	0 - 300 mm	±0.04 mm	±0.06 mm	0.02 mm, 2 mm/rev	—	**£310.00**

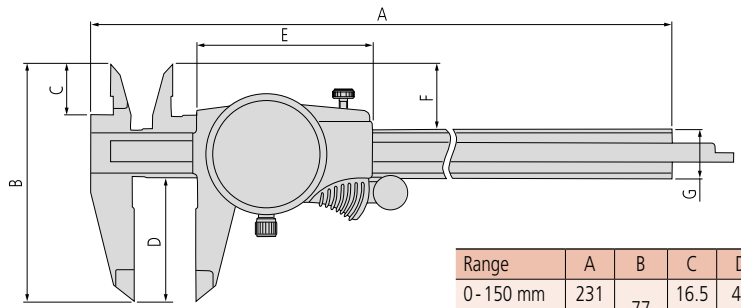
Inch

Code No.	Range	Max. permissible error		Graduation	Remarks	Price
		*E*MPE	*S*MPE			
505-742J	0 - 6"	±.001"	±.0020"	.001", .1"/rev	Silver cover type	**£140.00**
505-743J	0 - 8"	±.002"	±.0025"			**£185.00**
505-746	0 - 12"					**£310.00**
505-749				.001", .2"/rev	—	**£269.00**

Note: Partial Surface Contact Error, *E*MPE and Shift Error, *S*MPE are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E	F	G
0 - 150 mm	231	77	16.5	40	57.2	21	16
0 - 200 mm	288		20	50		24.5	
0 - 300 mm	404	111.5	22	64	70.2	27.5	20

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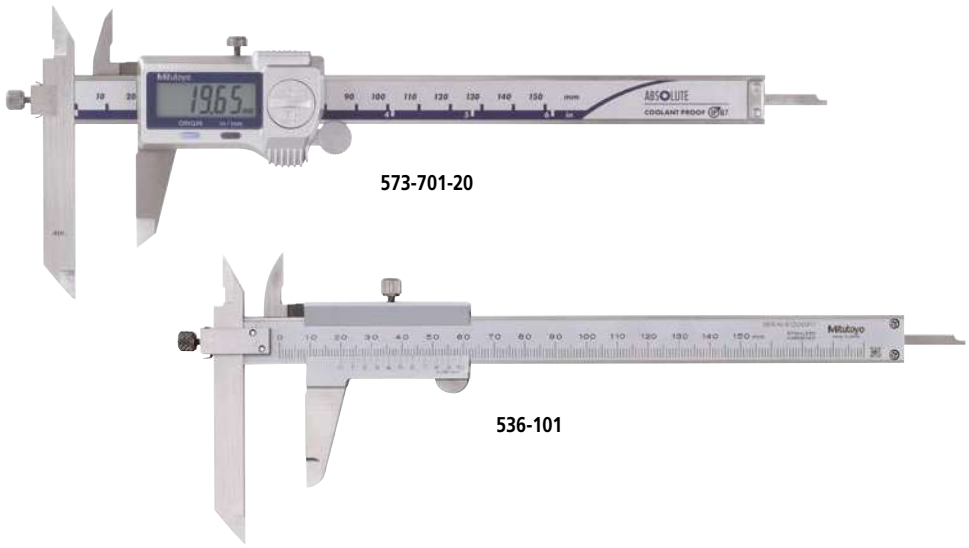
Calipers

SERIES 573, 536 – Offset Jaw Caliper

- The beam-mounted jaw can be adjusted to facilitate measurement of stepped sections and hard-to-get-at workpiece features.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED
Data Management Software by Mitutoyo



573-701-20

536-101

Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

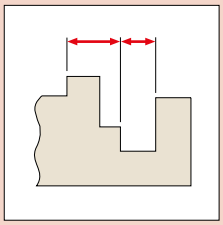
*1 Care should be taken to dry tool after use.

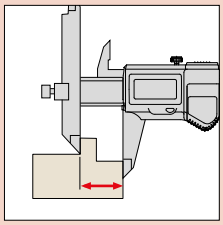
Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.







Application example.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
ABSOLUTE Digimatic type					
573-701-20	0-150 mm (0-6")	0.01 mm (.0005")	±.0010"	±.0020"	**£483.00**
573-702-20	0-200 mm (0-8")				**£580.00**
573-704-20	0-300 mm (0-12")		±.0015"	±.0025"	**£690.00**

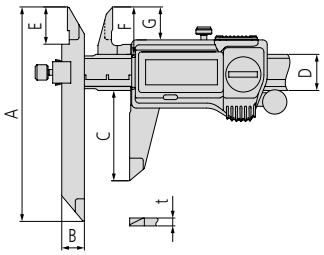
Metric

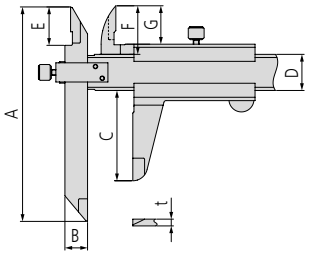
Code No.	Range	Graduation	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
Vernier type					
536-101	0-150 mm	0.05 mm	±0.05 mm	±0.07 mm	**£266.00**
536-102	0-200 mm				**£312.00**
536-103	0-300 mm		±0.08 mm	±0.10 mm	**£456.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm





Range	A	B	C	D	E	F	G	t
0-150 mm	95	10	40	16	16.5	21	14.6	3.5
0-200 mm			50		20	24.5	18.1	
0-300 mm	135	15	64	20	22	27.5	19.8	3.8

Range	A	B	C	D	E	F	G	t
0-150 mm	95	10	40	16	17	21.5	17	3
0-200 mm			50		20.5	25	20.5	
0-300 mm	135	15	64	20	22	27.5	27.5	3.8

D

Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances.
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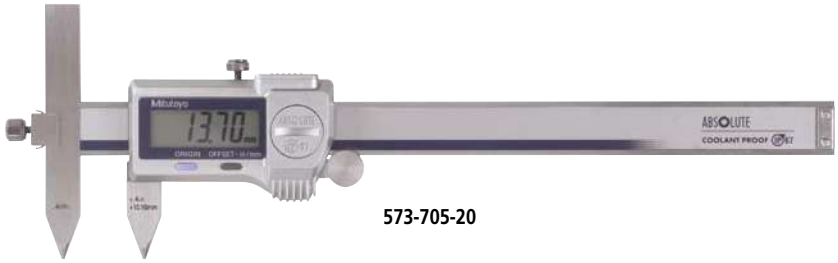
Calipers

SERIES 573, 536 – Offset Centreline Caliper

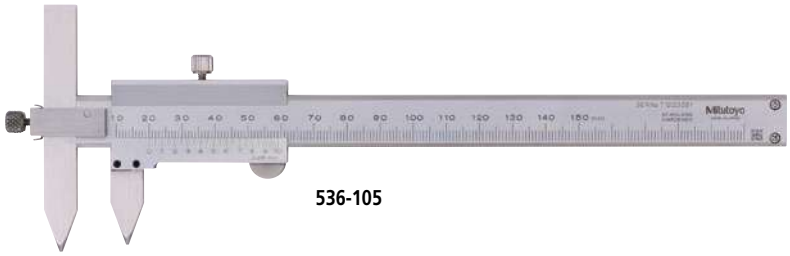
- Specially designed for hole centre-to-centre measurements on the same, or offset, planes.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Direct reading of pitch measurements is available due to the offset-value setting function.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



573-705-20



536-105

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
ABSOLUTE Digimatic type					
573-705-20	10 - 160 mm (.4 - 6.4")	0.01 mm (.0005")	—	±.0015"	**£455.00**
573-706-20	10 - 210 mm (.4 - 8.4")				**£483.00**
573-708-20	10 - 310 mm (.4 - 12.4")				**£748.00**

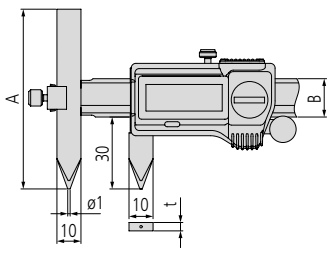
Metric

Code No.	Range	Graduation	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
Vernier type					
536-105	10 - 150 mm	0.05 mm	—	±0.05 mm	**£360.00**
536-106	10 - 200 mm				**£411.00**
536-107	10 - 300 mm			±0.08 mm	**£463.00**

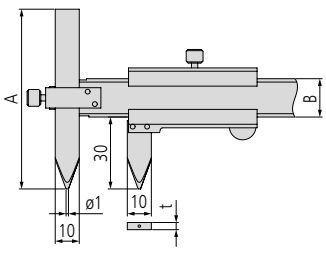
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	t	Applicable hole
10 - 160 mm	75	16	3.5	ø1.5 - ø9.5 mm
10 - 210 mm				
10 - 310 mm	100	20	3.8	



Range	A	B	t	Applicable hole
10 - 150 mm	75	16	3	ø1.5 - ø9.5 mm
10 - 200 mm				
10 - 300 mm	100	20	3.8	

Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

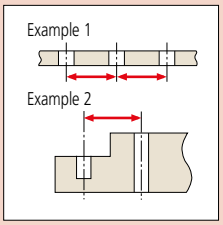
*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.





Application example.

Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.

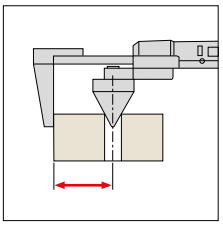
Calipers

SERIES 573 – ABSOLUTE Digimatic Coolant Proof Back Jaw Centreline Caliper

- Specially designed to measure hole centre-to-centre and edge-to-centre distances.
- Features Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Provided with jaws on the back of the slider, measurements can be read easily from above.
- Direct reading of pitch measurements is possible due to the offset-value setting function.
- Data output function allows integration into statistical process control and measurement systems.
- Dedicated calibration inspection tools are available.

ABSOLUTE DIGIMATIC COOLANT PROOF IP67 U-WAVE

MeasurLink ENABLED Data Management Software by Mitutoyo



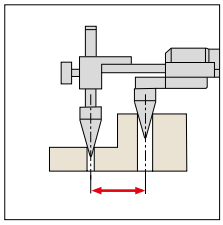
Application example.



573-718-20



573-716-20



Application example.

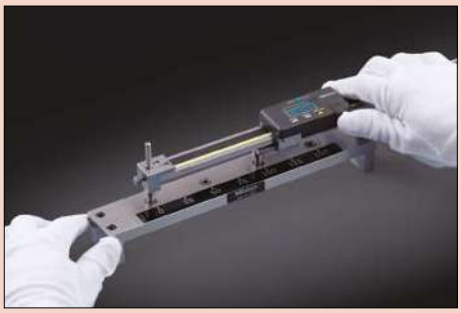
Technical Data

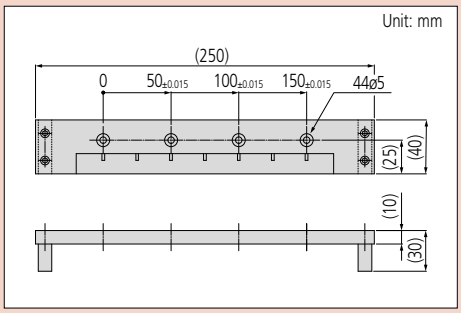
Scale type: ABSOLUTE electrostatic linear encoder
Max. response speed: Unlimited
Battery: SR44 (1 pc.), **938882**
Battery life: Approx. 5 years under normal use

Optional Accessories

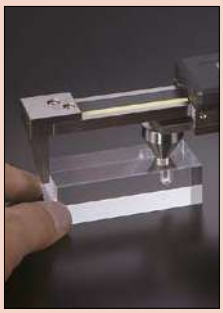
Code No.	Description	Price
02AZD730G	U-WAVE-T IP67 transmitter*1	£242.00
02AZD790A	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*1	£242.00
02AZE140A	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£179.00
02AZE200	U-WAVE-T mounting plate	£26.70
05CZA624	SPC data cable with pushbutton (1 m)	£85.60
05CZA625	SPC data cable with pushbutton (2 m)	£104.00
05FAJ735	Centreline caliper inspection gauge	£1,400.00
06AFM380A	USB Input Tool Direct USB-ITN-A (2 m)	£158.00

*1 U-WAVE-R Receiver required.









Specifications

Metric

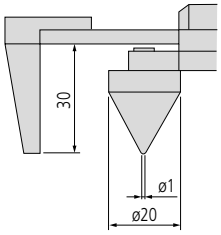
Code No.	Range	Resolution	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
Edge-to-centre type*2					
573-718-20	10.1 - 200 mm	0.01 mm	—	±0.10 mm	£1,280.00
573-719-20	10.1 - 300 mm			±0.15 mm	£1,300.00
Centre-to-centre type*2					
573-716-20	10.1 - 200 mm	0.01 mm	—	±0.10 mm	£1,330.00
573-717-20	10.1 - 300 mm			±0.15 mm	£1,350.00

*2 Applicable hole diameter: ø1.5 - ø19.5 mm
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

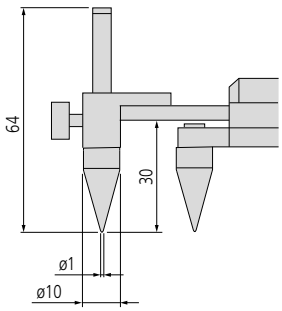
Dimensions

Unit: mm

573-718-20
573-719-20



573-716-20
573-717-20



D

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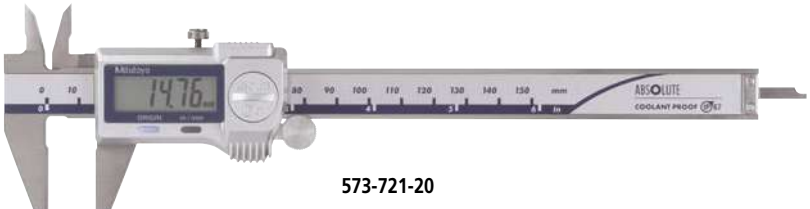
Calipers

SERIES 573, 536 – Point Caliper

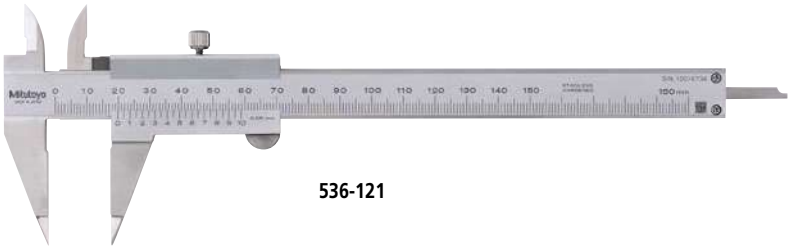
- Narrow-tip jaws fit into very small grooves and tracks, making many previously difficult outside measurements far easier to obtain.
- Can measure outside and inside dimensions, depth, and steps.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink ENABLED Data Management Software by Mitutoyo



573-721-20



536-121

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
ABSOLUTE Digimatic type					
573-721-20	0 - 150 mm (0 - 6")	0.01 mm (.0005")	±.001"	±.002"	**£366.00**
573-725-20					**£458.00**

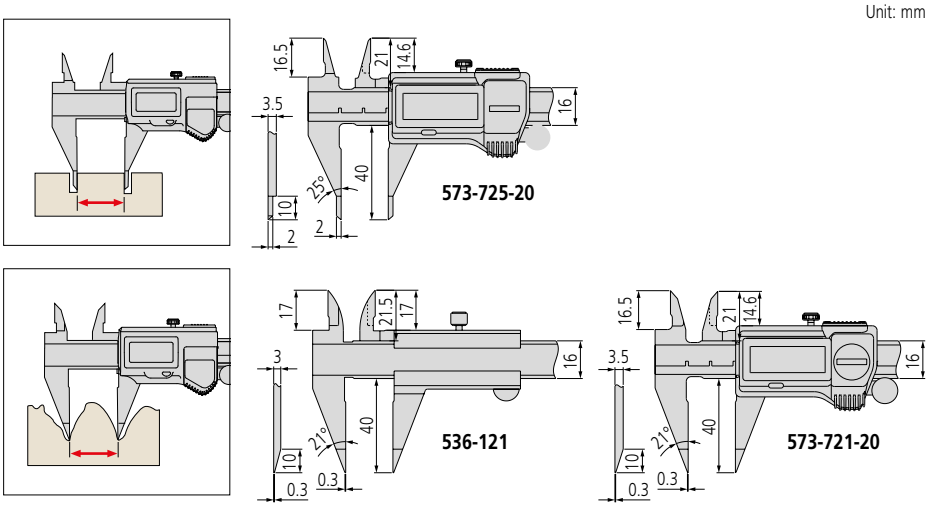
Metric

Code No.	Range	Graduation	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
Vernier type					
536-121	0 - 150 mm	0.05 mm	±0.05 mm	±0.07 mm	**£203.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.



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Calipers

SERIES 573, 536 – Blade Caliper

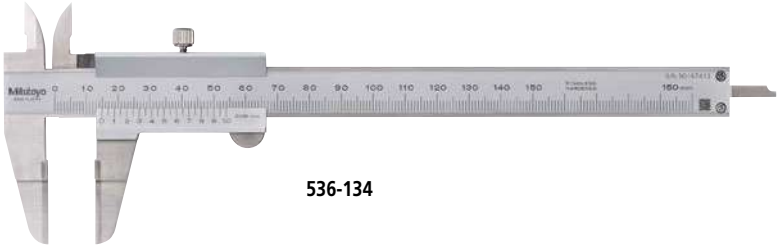
- The thin blade-type jaws fit into very small grooves and make previously difficult outside measurements far easier to obtain.
- The outside measuring faces are carbide tipped.
- Can measure outside and inside dimensions, depth, and steps.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



573-734-20



536-134

Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

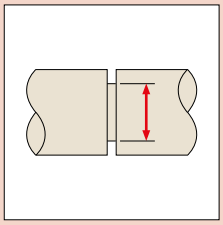
*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.





Application example.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
ABSOLUTE Digimatic type					
573-734-20	0 - 150 mm (0 - 6")	0.01 mm (.0005")	±.001"	±.002"	**£551.00**

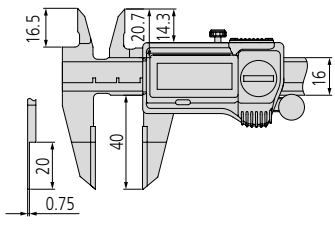
Metric

Code No.	Range	Graduation	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
Vernier type					
536-134	0 - 150 mm	0.05 mm	±0.05 mm	±0.07 mm	**£411.00**
536-135	0 - 200 mm				**£480.00**
536-136	0 - 300 mm		±0.08 mm	±0.10 mm	**£524.00**

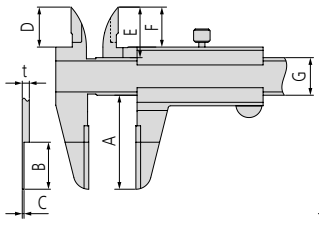
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



573-734-20



Range	A	B	C	D	E	F	G	t
0 - 150 mm	40	20	0.75	17	21.5	17	16	3
0 - 200 mm	50	25		20.5	25	20.5		
0 - 300 mm	64	30	1	22	27.5	22	20	3.8

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Calipers

SERIES 573, 536 – Knife Edge Inside Caliper

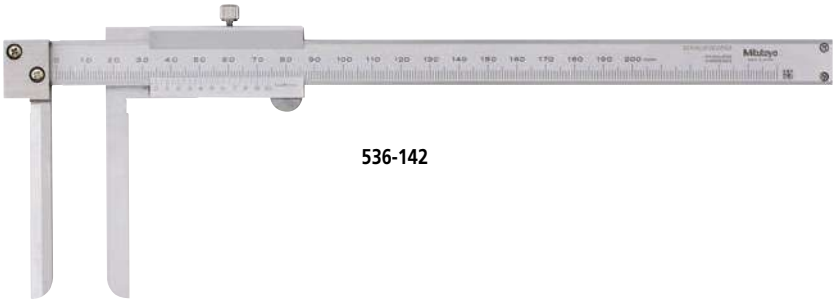
- Specially designed for inside measurements in hard-to-reach places.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



573-742-20



536-142

D

Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

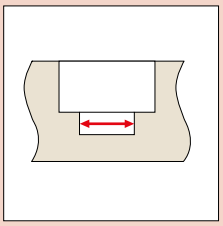
*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.





Application example.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error S_{MPE}	Min. measurable hole	Price
ABSOLUTE Digimatic type					
573-742-20	10 - 200 mm (.4 - 8")	0.01 mm (.0005")	±0.05 mm (±.002")	ø10 mm (ø.4")	**£704.00**

Metric

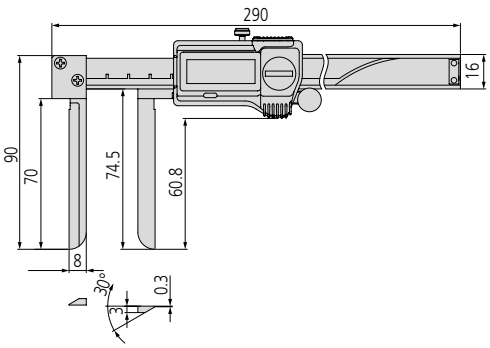
Code No.	Range	Graduation	Max. permissible error S_{MPE}	Min. measurable hole	Price
Vernier type					
536-142	10 - 200 mm	0.05 mm	±0.12 mm	ø10 mm	**£603.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

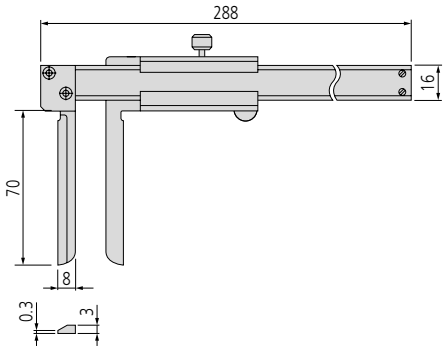
Dimensions

Unit: mm

573-742-20



536-142



Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.

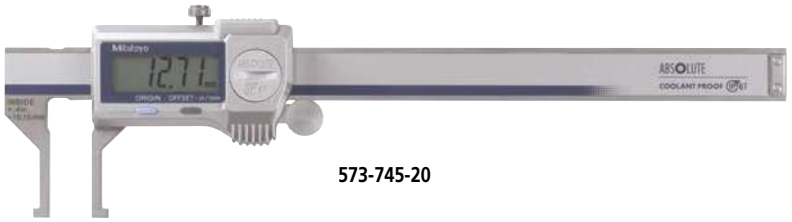
Calipers

SERIES 573, 536 – Inside Groove Caliper

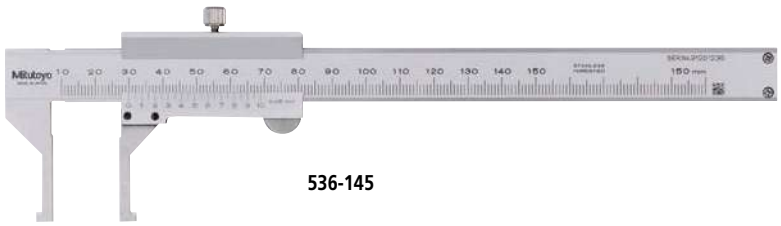
- Specially designed for inside measurements in hard-to-reach places.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF IP67 U-WAVE fit

MeasurLink ENABLED Data Management Software by Mitutoyo



573-745-20



536-145

Technical Data for 573 series

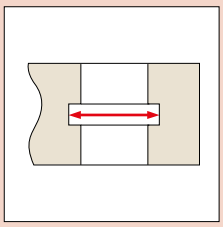
Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.



Application example.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error S_{MPE}	Min. measurable hole	Price
ABSOLUTE Digimatic type*3					
573-745-20	10 - 160 mm (.4 - 6")	0.01 mm (.0005")	±0.05 mm (±.0025")	ø10 mm (ø.4")	**£551.00**

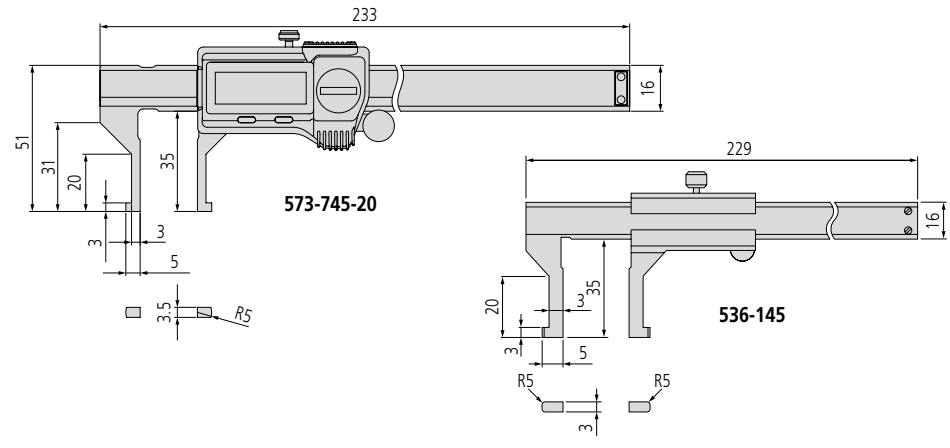
Metric

Code No.	Range	Graduation	Max. permissible error S_{MPE}	Min. measurable hole	Price
Vernier type					
536-145	10 - 150 mm	0.05 mm	±0.05 mm	ø10 mm	**£463.00**

*3 Equipped with the offsetting function, which indicates the actual measurement value.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Calipers

SERIES 573, 536 – Point Jaw Inside Caliper

- Specially designed for inside measurements in hard-to-reach places.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



573-746-20



536-146

D

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error S_{MPE}	Min. measurable hole	Price
ABSOLUTE Digimatic type*1					
573-746-20	20 - 170 mm (.8 - 6")	0.01 mm (.0005")	±0.03 mm (±.0015")	ø20 mm (ø.8")	**£692.00**

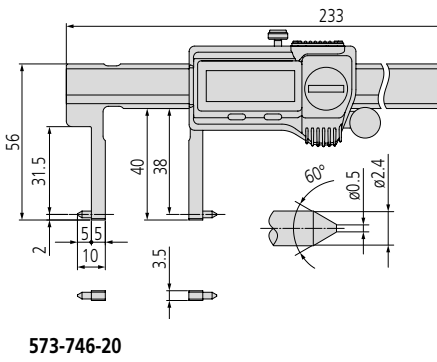
Metric

Code No.	Range	Graduation	Max. permissible error S_{MPE}	Min. measurable hole	Price
Vernier type					
536-146	20 - 150 mm	0.05 mm	±0.05 mm	ø20 mm	**£615.00**
536-147	30 - 300 mm		±0.08 mm	ø30 mm	**£803.00**
536-148	70 - 450 mm		±0.10 mm	ø70 mm	**£1,580.00**
536-149	70 - 600 mm		±0.12 mm		**£1,640.00**

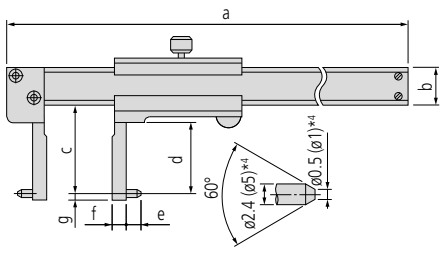
*1 Equipped with the offsetting function, which indicates the actual measurement value.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



573-746-20



*4 450 and 600 mm range models

Range	a	b	c	d	e	f	g
20 - 150 mm	229	16	38	31	5	5	2
30 - 300 mm	403	20	98	89		10	
70 - 450 mm	610	25	145	136	10	25	5
70 - 600 mm	750						

Technical Data for 573 series

Dust/water protection level:	IP67*2
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3 years under normal use (1 year for models over 300 mm)

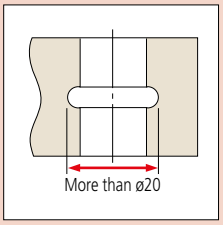
*2 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*3	**£242.00**
264-621	U-WAVE-TC transmitter*3	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*3 U-WAVE-R Receiver required.





Application example.

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Calipers

SERIES 573, 536 – Neck Jaw Caliper

- Can measure wall thickness inside bores and recesses.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



573-752-20



536-151

Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

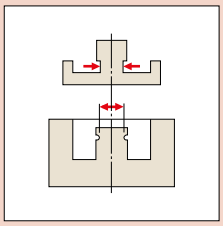
*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	£242.00
264-621	U-WAVE-TC transmitter*2	£242.00
264-624	U-WAVE-TCB IP67 transmitter	£242.00
264-625	U-WAVE-TCB transmitter	£242.00
02AZF310	U-WAVE-TC connection unit	£77.30
05CZA624	SPC data cable with pushbutton (1 m)	£85.60
05CZA625	SPC data cable with pushbutton (2 m)	£104.00
06AFM380A	USB input tool direct USB-ITN-A (2 m)	£158.00

*2 U-WAVE-R Receiver required.





Application example.

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error E_{MPE}	Remarks	Price
ABSOLUTE Digimatic type					
573-751-20	0 - 150 mm (0 - 6")	0.01 mm (.0005")	±0.03 mm (±.0015")	—	£555.00
573-752-20				Point type	£682.00

Metric

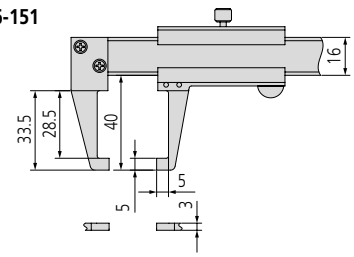
Code No.	Range	Graduation	Max. permissible error E_{MPE}	Remarks	Price
Vernier type					
536-151	0 - 150 mm	0.05 mm	±0.05 mm	—	£399.00
536-152				Point type	£477.00

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

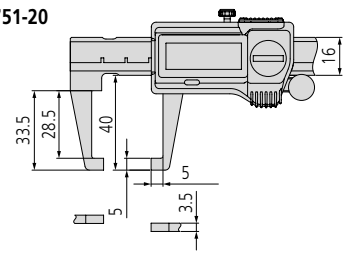
Dimensions

Unit: mm

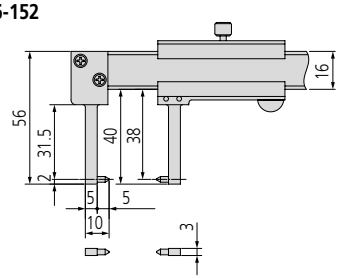
536-151



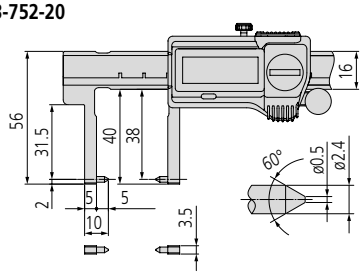
573-751-20



536-152



573-752-20



D

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Mitutoyo

Calipers

SERIES 573, 536 – Tube Thickness Caliper

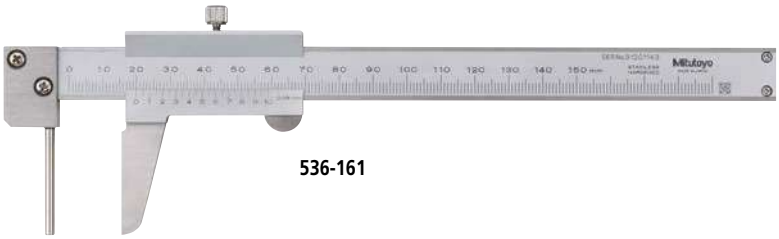
- The beam-mounted jaw is a round bar that facilitates measurements of tube wall thickness.
- Digimatic models feature Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Digimatic models enable integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



573-761-20



536-161

D

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error E_{MPE}	Price
ABSOLUTE Digimatic type				
573-761-20	0 - 150 mm (0 - 6")	0.01 mm (.0005")	±0.05 mm (±.002")	**£458.00**

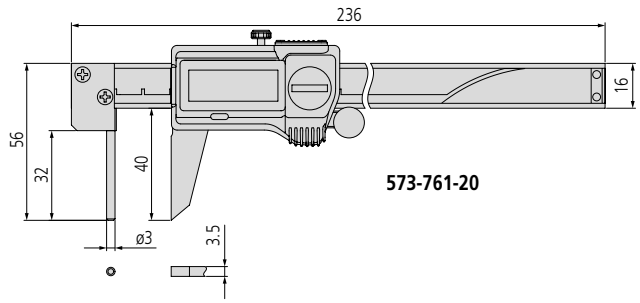
Metric

Code No.	Range	Graduation	Max. permissible error E_{MPE}	Price
Vernier type				
536-161	0 - 150 mm	0.05 mm	±0.05 mm	**£363.00**

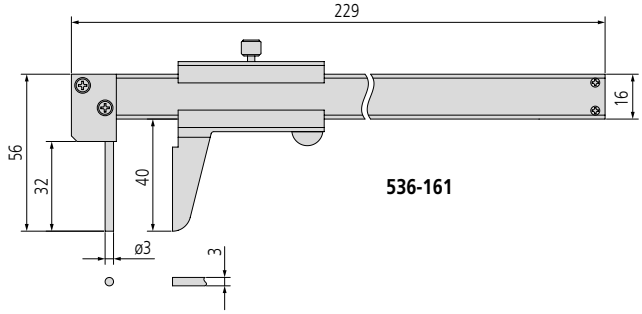
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



573-761-20



536-161

Technical Data for 573 series

Dust/water protection level:	IP67*1
Scale type:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 5 years under normal use (1 year for models over 300 mm)

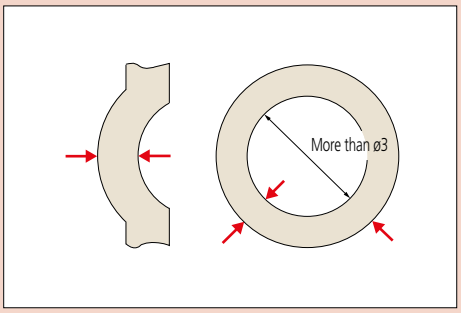
*1 Care should be taken to dry tool after use.

Optional Accessories for 573 series

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-A (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.





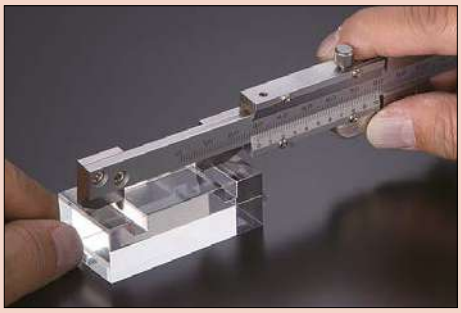
Application example.

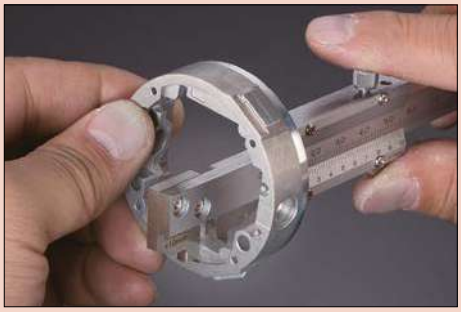
Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.

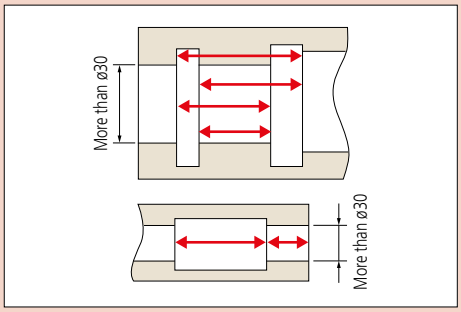
Calipers

SERIES 536 – Vernier Hook Jaw Caliper

- Can measure width of grooves and lands inside bores and recesses.







Application example.



536-171



536-172
Inside-groove type

D

Specifications

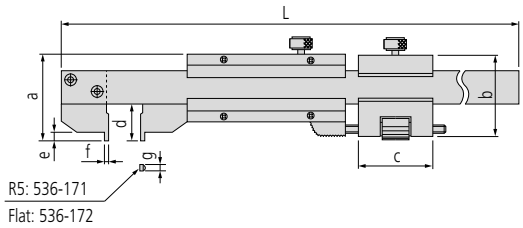
Metric

Code No.	Range*	Graduation	Max. permissible error E_{MPE} and S_{MPE}	Remarks	Price
536-171	0 - 200 mm (10.1 - 200 mm)	0.02 mm	±0.03 mm	—	**£561.00**
536-172	0 - 200 mm (2.1 - 200 mm)			With fine adjustment	**£581.00**

* ( ): Dimension in inside measurement.
Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Code No.	L	a	b	c	d	e	f	g
536-171	320	28	—	—	12	4	5	3.5
536-172			28.5	20			1	

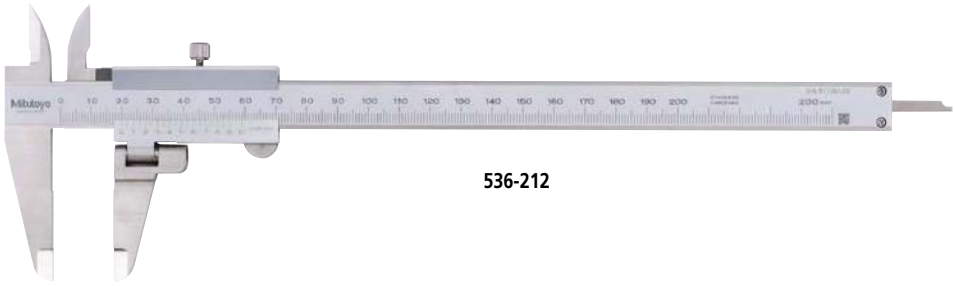
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Mitutoyo

Calipers

SERIES 536 – Vernier Moving Jaw Caliper

- The moving jaw can be rotated to measure sectioned shafts.
- Can measure outside and inside dimensions, depth, and steps.



536-212



Measuring the distance from a shoulder to the end of a shaft.

D

Specifications

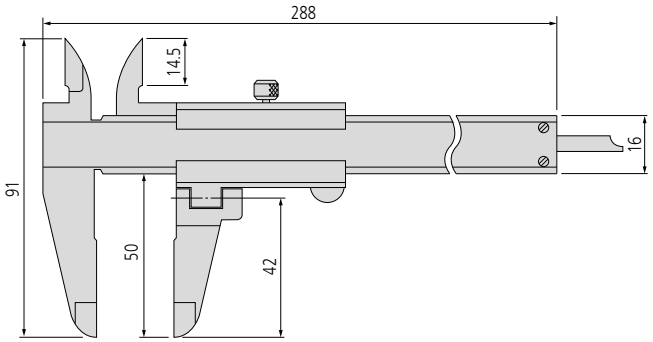
Metric

Code No.	Range	Graduation	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
536-212	0 - 200 mm	0.05 mm	±0.05 mm	±0.07 mm	**£505.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



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Calipers

SERIES 573 – ABSOLUTE Digimatic Low Force Caliper

- Due to the low measuring force, this caliper is ideal for measuring elastic workpieces such as plastic parts and rubber parts that standard calipers cannot measure accurately.
- The thumb roller allows smooth and easy fine adjustment.
- Movement of main scale jaw is 0.3 mm.
- Measuring force: 0.49 to 0.98 N (50 to 100 gf).
- Features Mitutoyo's ABSOLUTE system. No need to reset the origin after switching on.
- Slider operation is smooth and comfortable.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



573-291-30

Technical Data

Scale type: ABSOLUTE electrostatic linear encoder
Jaw retraction: 0.3 mm
Max. response speed: Unlimited
Battery: SR44 (1 pc.), **938882**
Battery life: Approx. 3.5 years under normal use

Optional Accessories

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*	**£242.00**
264-621	U-WAVE-TC transmitter*	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
959143	Data hold unit	**£25.20**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZF300	U-WAVE-TC connection unit	**£77.30**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**

* U-WAVE-R Receiver required.





Measurement procedure
A consistently low measuring force can be guaranteed by only taking measurements when the pointer is between the two fiducial lines.

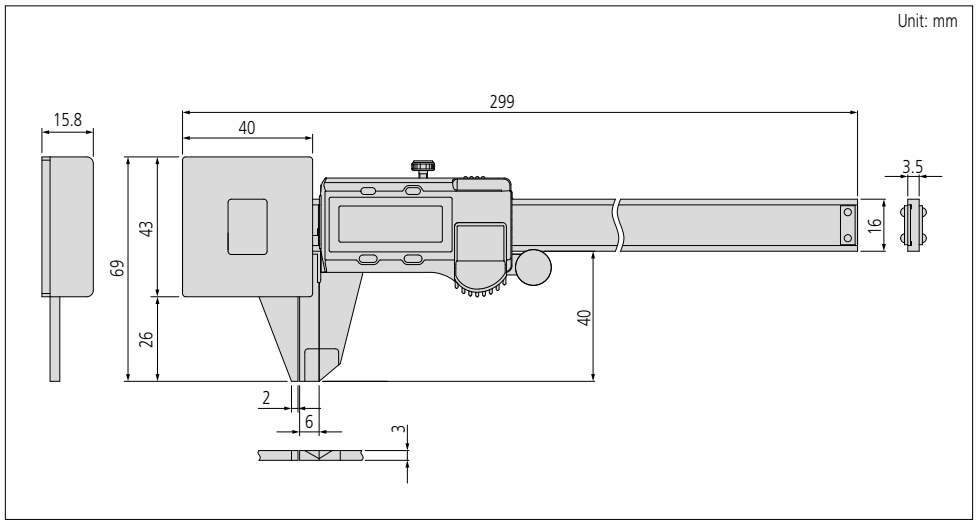
Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error E_{MPE}	Price
573-291-30	0 - 180 mm (0 - 7")	0.01 mm (.0005")	±0.05 mm (±.002")	**£803.00**

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions



D

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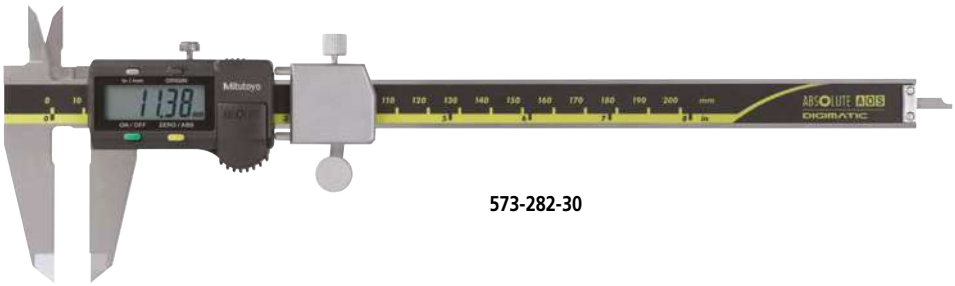
Mitutoyo

Calipers

SERIES 573 – ABSOLUTE Digimatic Snap Caliper

- Features a 'snap action' movement control of the slider via a spring-loaded mechanism attached to a movable clamp on the beam.
- Enables quick and efficient repetitive GO/NO-GO inspection of a specific dimension on mass produced parts by just moving a lever.
- Can measure outside and inside dimensions, depth, and steps.
- Measuring force: 7 - 14 N (700 - 1400 gf).
- The slider can be retracted by up to 2 mm from the measuring position.
- Features Mitutoyo's ABSOLUTE system. No need to reset the origin after switching on.
- Slider operation is smooth and comfortable.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



573-282-30

Specifications

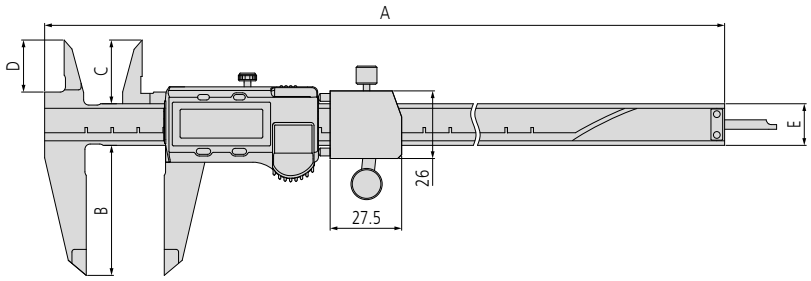
Inch/Metric

Code No.	Range	Resolution	Max. permissible error		Price
			E_{MPE}	S_{MPE}	
573-281-30	0 - 100 mm (0 - 4")	0.01 mm (.0005")	±0.02 mm (±.001")	±0.04 mm (±.002")	£427.00
573-282-30	0 - 150 mm (0 - 6")				£477.00

Note: Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Dimensions

Unit: mm



Range	A	B	C	D	E
0 - 100 mm	233	40	21	16.5	16
0 - 150 mm	290	50	24.5	20	

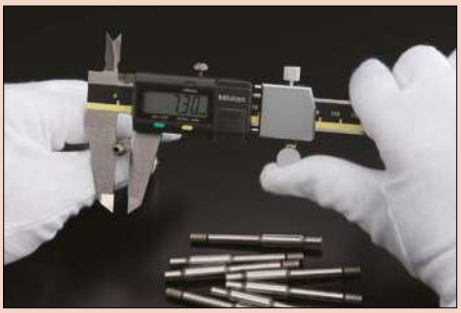
Technical Data

Repeatability:	0.01 mm
Scale type:	ABSOLUTE electrostatic linear encoder
Jaw retraction:	2 mm
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3.5 years under normal use

Optional Accessories

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*	£242.00
264-621	U-WAVE-TC transmitter*	£242.00
264-624	U-WAVE-TCB IP67 transmitter	£242.00
264-625	U-WAVE-TCB transmitter	£242.00
959143	Data hold unit	£25.20
959149	SPC data cable with pushbutton (1 m)	£44.10
959150	SPC data cable with pushbutton (2 m)	£50.30
02AZF300	U-WAVE-TC connection unit	£77.30
06AFM380C	USB input tool direct USB-ITN-C (2 m)	£143.00

* U-WAVE-R Receiver required.



Spring-loaded action enables rapid repetitive measurement.

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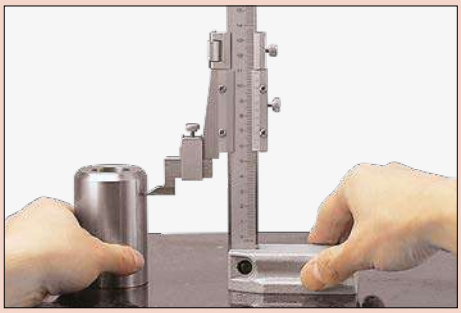
Height Gauges

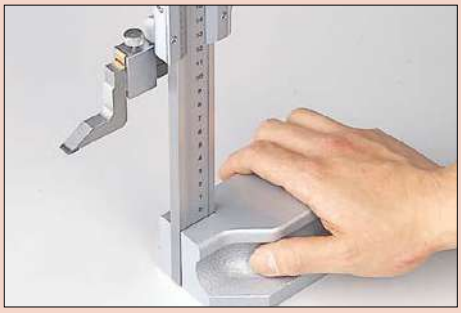
SERIES 506, 514 – Vernier Adjustable Scale Height Gauge

- Fits comfortably in the hand and moves easily on the surface plate.
- The main scale slides and clamps within the column for quick and convenient zero-setting.
- Large locking screws are used both for the slider and fine adjustment clamps to make clamping easy and secure.
- Operability of slider has been improved.
- Large mainscale engraving for fatigue-free working.
- Carbide-tipped scriber provided as a standard accessory.

Technical Data

Graduation: 0.02 mm (.001")





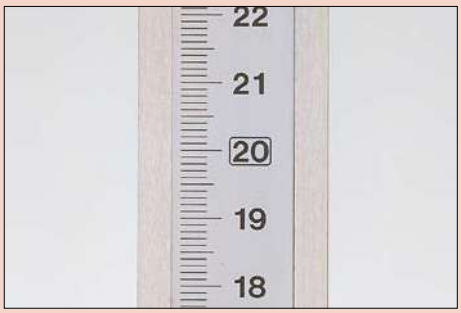
Base fits the hand comfortably.



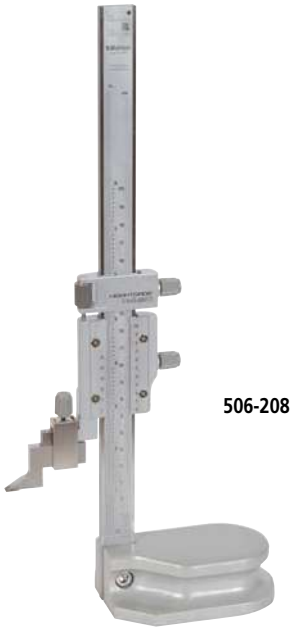
Fine-adjustment knob.



Locking screws.



Large main-scale engraving.



506-208



514-103

Specifications

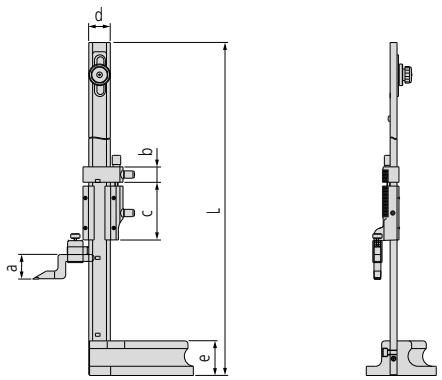
Inch/Metric

Code No.	Range	Max. permissible error E_{MPE}	Scale adjustment	Fine feed	Height	Mass	Price
506-208	0 - 200 mm (0 - 8")	±0.03 mm (±.001")	—	4 mm (.16")	341 mm	1.4 kg	**£361.00**
514-103	0 - 300 mm (0 - 12")	±0.04 mm (±.002")	15 mm (.6")		525 mm	3.1 kg	**£453.00**
514-105	0 - 450 mm (0 - 18")	±0.05 mm (±.002")			675 mm	3.4 kg	**£867.00**
514-107	0 - 600 mm (0 - 24")			7 mm (.27")	870 mm	7.4 kg	**£1,150.00**
514-109	0 - 1000 mm (0 - 40")	±0.07 mm (±.004")	25 mm (1")	6 mm (.24")	1340 mm	20.0 kg	**£2,540.00**

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

Dimensions

Unit: mm



Range	L	a	b	c	d	e
0 - 200 mm	341	25	20	57	20	35
0 - 300 mm	525	32		70	28	45
0 - 450 mm	675					
0 - 600 mm	870		24	85	35	54
0 - 1000 mm	1340	42	30	110	45	65

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Height Gauges

SERIES 570 – ABSOLUTE Digimatic Ergonomic Height Gauge

- Allows smooth elevation by the slider adjustment wheel, which is the same type used on the well-established double-column height gauge.
- Large slider-clamp lever ensures positive and accurate clamping action.
- The 12 mm high character display (20% bigger than the previous model) – makes it easier to read the measured values.
- Due to the built-in ABSOLUTE scale function, origin setting is not required each time power is turned ON.
- Allows integration into statistical process control and measurement systems.
- The 3-button operation makes it consistent with other Mitutoyo devices. And when used together with U-WAVE, it makes data management operations easy.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo

570-412







Slider height adjustment wheel and large clamp lever.

Specifications

Inch/Metric

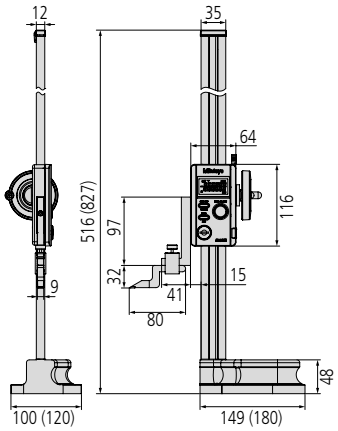
Code No.	Range	Max. permissible error E_{MPE}	Resolution	Price
570-412	0 - 300 mm (0 - 12")	±0.03 mm (±.0015")	0.01 mm (.0005")	£852.00
570-413	0 - 450 mm (0 - 18")	±0.05 mm (±.0020")		£1,110.00
570-414	0 - 600 mm (0 - 24")			£1,190.00

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

Dimensions

Unit: mm

570-412 (570-414)



Technical Data

Max. response speed: Unlimited
Battery: SR44 (1 pc.), **938882**
Battery life: 5 years under normal use

Functions

Origin-setting:
Any convenient reference surface, such as a surface plate, etc., can be stored as the absolute origin point.

ABSOLUTE system measurement:
After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The ABS (absolute) origin position can be changed by the ORIGIN button.

Incremental measurement:
Allows origin setting at any arbitrary position. In this case, the origin point is not stored after turning off the power.

Data hold:
Display value can be held.

Data output:
Allows integration into statistical process control and measurement systems.

Standard Accessories

Code No.	Description
900258	Scriber
900322	Clamp (with dovetail groove)
901385	Scriber clamp
953639	Holding bar C (test indicator mount)



Optional Accessories

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*	£242.00
264-621	U-WAVE-TC transmitter*	£242.00
264-624	U-WAVE-TCB IP67 transmitter	£242.00
264-625	U-WAVE-TCB transmitter	£242.00
905338	SPC data cable (1 m)	£42.00
905409	SPC data cable (2 m)	£47.10
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790F	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
06AFM380F	USB input tool direct USB-ITN-F (2 m)	£143.00

* U-WAVE-R Receiver required.

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Height Gauges

SERIES 570 – ABSOLUTE Digimatic Height Gauge

- ABS and INC measurement modes allow efficient operation.
- Rigid structure makes instrument suitable for use in severe work environments.
- The +/- measurement function widens the application range.
- Allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo

Technical Data

Repeatability:	0.01 mm
Fine feed:	6 mm (.24")
Battery:	SR44 (1 pc.), **938882**
Battery life:	20,000 hours under normal use

Functions

Zero-setting
+/- directional measurement
Data hold
Data output
Presetting
inch/mm reading (inch/mm models)
Preset value memory
Origin restoration
Low battery voltage alert
Counting value composition error alert

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	**£42.00**
905409	SPC data cable (2 m)	**£47.10**
02AZD730G	U-WAVE-T IP67 transmitter*	**£242.00**
02AZD790F	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*	**£242.00**
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£160.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
06AFM380F	USB input tool direct USB-ITN-F (2 m)	**£143.00**

* U-WAVE-R Receiver required.

570-244



Specifications

Inch/Metric

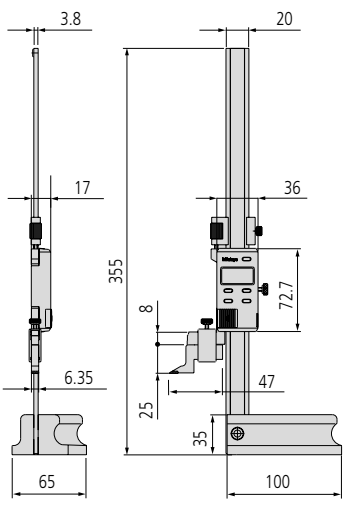
Code No.	Range	Max. permissible error E_{MPE}	Resolution	Height	Mass	Price
570-244	0 - 200 mm (0 - 8")	±0.05 mm (±.002")	0.01 mm (.0005")	355 mm	1.4 kg	**£865.00**
570-248	0 - 1000 mm (0 - 40")	±0.07 mm (±.003")		1260 mm	16.8 kg	**£2,920.00**

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

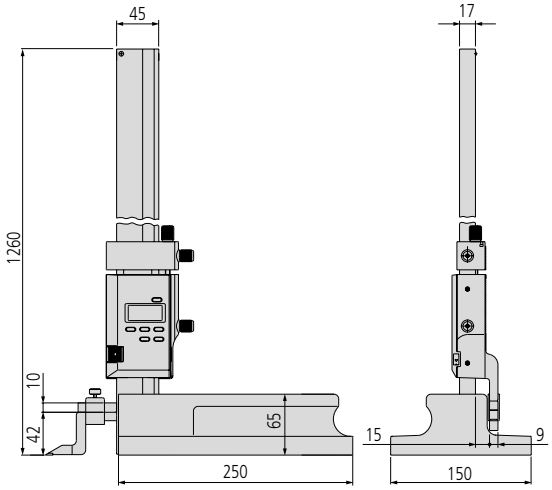
Dimensions

Unit: mm

570-244



570-248



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Height Gauges

SERIES 192 – Digimatic Double Column Height Gauge

- Double-column structure ensures high measuring accuracy.
- Available in Standard and Multifunctional types.
- Ergonomic base fits comfortably in the hand.
- Bidirectional touch-trigger probe is available as an optional accessory.
- Character height of the display has been increased (10 to 11 mm) and the high-contrast LCD display provides improved readability.
- Inclined handle improves slider ergonomics.
- Allows integration into statistical process control and measurement systems.
- Carbide-tipped long scriber is provided as a standard accessory.

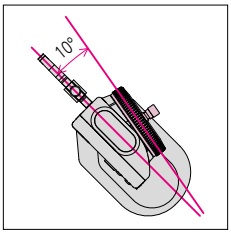
DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



192-630-10



192-670-10





Offset height adjustment wheel improves ergonomics.



① Height adjustment wheel
② Power ON/OFF button
③ Zero set/ABS button
④ Preset/probe-tip-diameter compensation mode button
⑤ Hold/data button
⑥ Inch/metric button
⑦ Button used when presetting measuring direction (and compensating for probe-tip diameter on Multifunctional type)

Specifications

Inch/Metric

Order No.	Range	Max. permissible error E_{MPE}	Resolution (switchable)	Height	Mass	Price
Standard type						
192-630-10	0 - 300 mm (0 - 12")	±0.02 mm (±.0010")	0.01 / 0.005 mm (.0005 / .0002")	475 mm	4.7 kg	**£1,040.00**
192-631-10	0 - 450 mm (0 - 18")	±0.05 mm (±.0020")		649 mm	7.5 kg	**£1,460.00**
192-632-10	0 - 600 mm (0 - 24")			802 mm	8.3 kg	**£1,530.00**
192-633-10	0 - 1000 mm (0 - 40")	±0.07 mm (±.0030")		1228 mm	15.7 kg	**£3,050.00**
Multifunctional type						
192-670-10	0 - 300 mm (0 - 12")	±0.02 mm (±.0010")	0.01 / 0.005 mm (.0005 / .0002")	510 mm	5.7 kg	**£1,410.00**
192-671-10	0 - 450 mm (0 - 18")	±0.04 mm (±.0015")		649 mm	7.5 kg	**£1,630.00**
192-672-10	0 - 600 mm (0 - 24")			802 mm	8.3 kg	**£1,890.00**
192-673-10	0 - 1000 mm (0 - 40")	±0.06 mm (±.0025")		1228 mm	15.7 kg	**£3,270.00**

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

Technical Data

Repeatability:	0.01 mm
Max. response speed:	500 mm/s
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3500 hours in continuous use

Functions

Origin-setting (ABS measurement mode):
Any arbitrary value can be stored as the origin point.

Zero-setting (INC measurement mode):
Displayed value can be set to zero at any arbitrary position of the slider.

Origin restoration:
Previously set origin is restored when switching back to ABS mode.

Presetting (ABS INC measurement mode):
Displayed value can be set to any arbitrary value, including negative values.

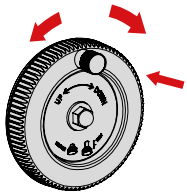
Measuring direction:
Measuring direction can be switched at the press of a button.

Data hold:
Display value can be held. Reverts to ABS or INC mode when cancelled.

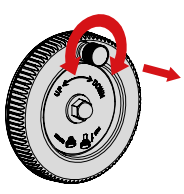
Alarm:
Error message is displayed when overflow or overspeed of displayed value arises and measurement is stopped.

Data output:
Allows integration into statistical process control and measurement systems.

Fine and coarse height adjustment:
Through knob and wheel combination. Slider height adjustment wheel allows fine and coarse height adjustment.



Coarse adjustment
Push the small fine-adjustment knob in to disengage gearing and then turn the large wheel.



Fine adjustment
Pull the fine-adjustment knob out to engage gearing and then turn this knob, which then slowly turns the wheel.

Low-voltage alert:
When battery voltage becomes low, a warning appears in the display.

Probe-tip diameter compensation*:
An adjustment is applied to the raw measurement data to compensate for the effect of the size of the spherical contact point used by the bidirectional touch-trigger probe.

* Multifunctional type only.

Standard Accessories

Code No.	Description
900258	Scriber (for Standard type)
901385	Scriber clamp
905201	Scriber (for Multifunctional type)

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Height Gauges

SERIES 192 – Digimatic Double Column Height Gauge

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	**£42.00**
905409	SPC data cable (2 m)	**£47.10**
02AZD730G	U-WAVE-T IP67 transmitter*1	**£242.00**
02AZD790F	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*1	**£242.00**
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£160.00**
02AZE990	U-WAVE-T mounting plate*2	**£33.30**
06AFM380F	USB input tool direct USB-ITN-F (2 m)	**£143.00**
For Multifunctional type only		
192-007	Bidirectional touch-trigger probe (metric)*3	**£542.00**
192-008	Bidirectional touch-trigger probe (inch)*3	**£556.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**

*1 U-WAVE-R Receiver required.
*2 Standard type only.
*3 See below for details.

Bidirectional Touch-Trigger Probe

(optional accessory for Multifunctional type only)

Improves accuracy in step, internal thickness, and outside width measurement by minimizing reproducibility error.



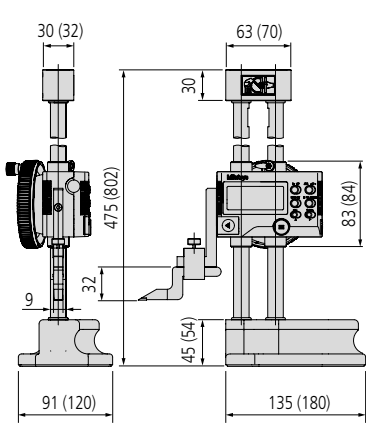


Code No.	192-007	192-008
Measuring direction	Bidirectional	
Relay contact type	Normally open	
Probe overtravel	1.5 mm	
Probe tip size	ø3 mm	
Repeatability	σ: 2 µm	
Measuring force	0.4 N	
Standard accessories	Holder arm, clamp	

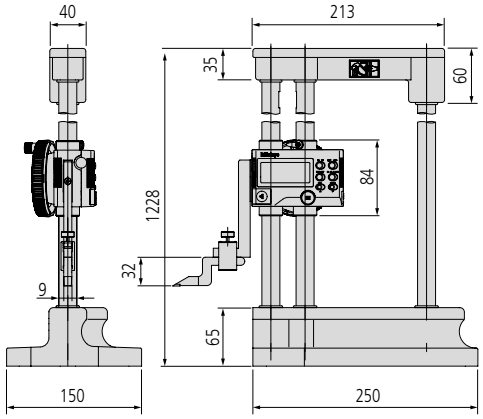
Dimensions

Unit: mm

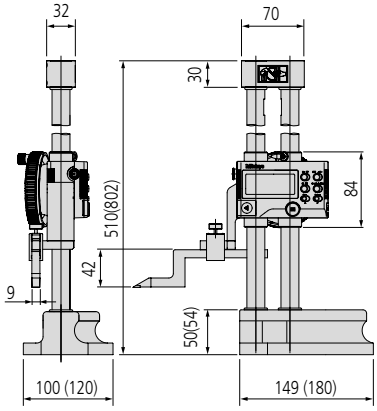
192-630-10 (**192-632-10**)



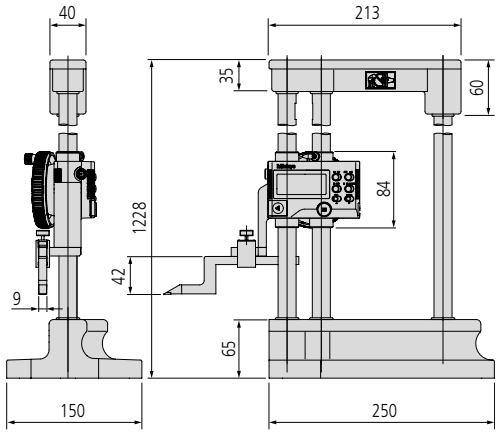
192-633-10



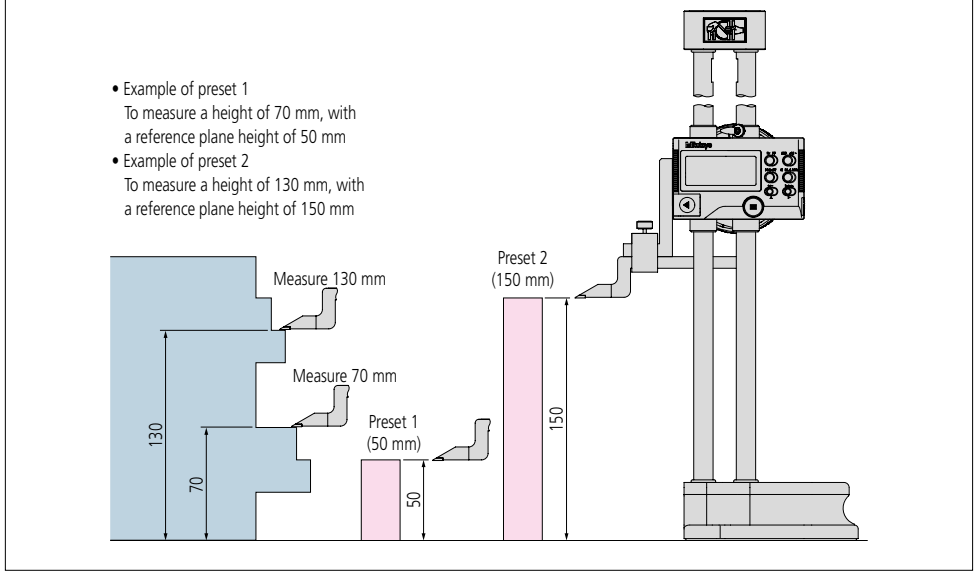
192-670-10 (**192-672-10**)



192-673-10



Presetting (2 positions)



With two preset functions, two reference heights created by gauge blocks can be used to make repetitive measurements with high accuracy relative to a datum plane (surface plate). This is an example of gaining accuracy from an instrument by taking advantage of its narrow range accuracy.

D

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Optional Accessories

SERIES 515 – CERA Caliper Checker

- Enables efficient setting and inspection of calipers and height gauges.



515-555

Specifications

Metric

Code No.	Range	Block pitch accuracy*		Parallelism of blocks*		Mass	Price
		20 - 300 mm	350 - 600 mm	20 - 300 mm	350 - 600 mm		
515-555	0 - 300 mm	±5.0 µm	—	2.0 µm	—	4 kg	**£2,910.00**
515-556-2	0 - 600 mm		±7.0 µm		4.0 µm	8.5 kg	**£4,720.00**

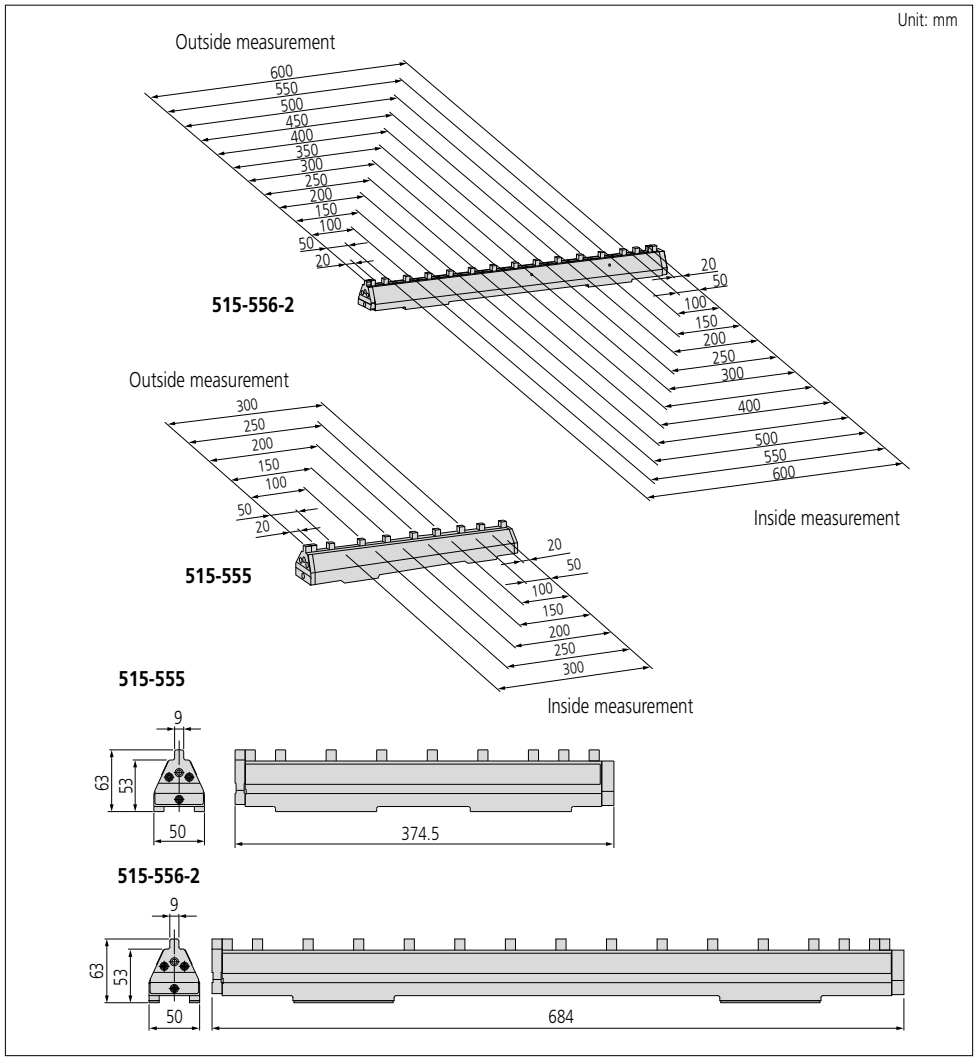
Inch

Code No.	Range	Block pitch accuracy* 1 - 12"	Parallelism of blocks* 1 - 12"	Mass	Price
515-565	0 - 12"	±.0002"	.00008"	4 kg	**£2,310.00**

* The block accuracy and parallelism are based on the following:
Outside caliper and height gauge: lower end reference plane
Inside caliper: inside reference plane

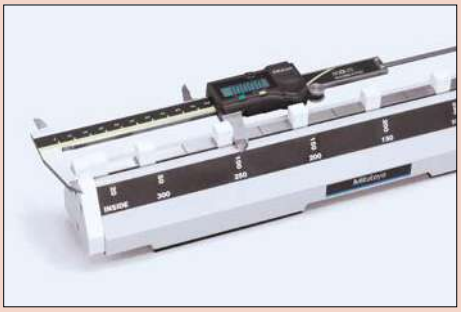
Dimensions

Unit: mm



Optional Accessories

Code No.	Description	Price
602162	Wooden case for 300 mm / 12" model	**£303.00**
602164	Wooden case for 600 mm model	**£330.00**



Checking the accuracy of a caliper (outside measurement).



Checking the accuracy of a caliper (inside measurement).



Setting a height gauge.

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Optional Accessories

For Height Gauges

Scriber



07GZA000

Metric

Code No.	Applicable Height Gauges	Price
07GZA000	514 Series Vernier Height Gauges (**514-103**, **514-105**, **514-107**)	£51.30
905200	514 Series Vernier Height Gauges (**514-109**)	£121.00

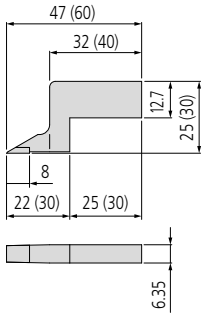
Inch

Code No.	Applicable Height Gauges	Price
900173	570 Series Digimatic Height Gauges (**570-244**) 506 Series Vernier Height Gauges (**506-208**)	£55.10
900258	192 Series Digimatic Height Gauges (**192-630-10**, **192-631-10**, **192-632-10**, **192-633-10**) 570 Series Digimatic Height Gauges (**570-412**, **570-413**, **570-414**)	£55.10
905201	192 Series Digimatic Height Gauges (**192-670-10**, **192-671-10**, **192-672-10**, **192-673-10**) 570 Series Digimatic Height Gauges (**570-248**)	£117.00

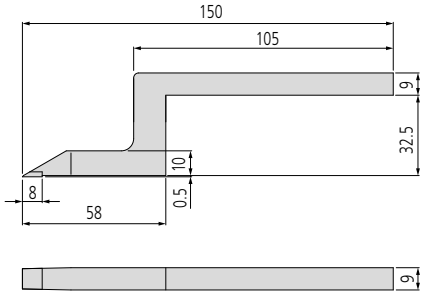
Scriber Dimensions

Unit: mm

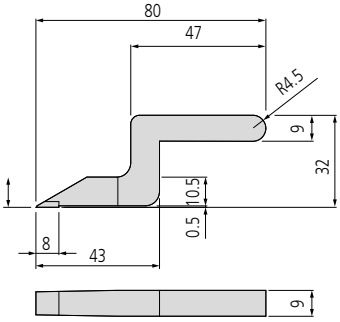
900173 (**900258**)



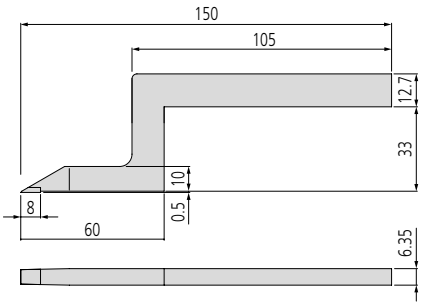
905200



07GZA000



905201



Contact Sensor

The contact sensor eliminates errors caused by non-contact of the scriber with a workpiece while making measurements. When the scriber of a height gauge touches a conductive workpiece, an indicator lights up to indicate that a measurement can be taken, which results in consistent results.

- Magnet is incorporated.
- Battery (PR44, 2 pcs required) is not included.

Code No.	Description	Price
900872	Contact sensor	£95.10





Centre Probe

Allows quick measurement of Centre-to-Centre distance between holes.

- Measurable hole diameters: 1 - 38 mm/.04 - 1.5".
- Mounting position dimension: 99 mm.

Code No.	Description	Price
951144	Metric centre probe	£143.00
900581	Inch centre probe	£143.00





Depth Gauge Attachment

Attaches to a height gauge for measuring groove and hole depth.

- Minimum hole diameter: 5.5 mm/.22".
- Maximum distance from the bottom of the holding bar to the contact point: 80 mm (metric type), 2.95" (inch type).
- Dial indicator contact points are usable.
- Mounting position dimension: 99 mm.
- Holding bar length: 100 mm.

Code No.	Description	Price
900764	Metric depth gauge attachment	£38.90
900878	Inch depth gauge attachment	£38.90





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Mitutoyo

Height Gauges

SERIES 518 – Linear Height Digimatic 2D Measurement System

- Achieves best-in-class accuracy of (1.1+0.6L/600) µm with 0.1 µm/0.4 µm resolution/repeatability.
- This is a precision height gauge featuring high accuracy and outstanding ease of use.
- It is useful not only in height measurement but also in a wide range of application such as inspection of moulds and precision parts.
- Easy operation using keypad and touchscreen navigation allows intuitive operation that suitable even for beginners.
- The built-in scale is dirt-resistant and can be reliably used on shop floors.
- Various interfaces are available, including connection to a printer, a PC, and our wired or wireless communication system.
- Pneumatic full-/semi-floating suspension system allows adjustment of air-cushion height.
- It is easily expandable to support various types of optional probes to meet your different measurement needs.

DIGIMATIC U-WAVE

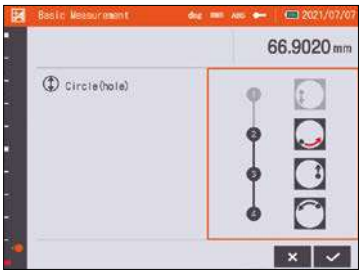
MeasurLink ENABLED
Data Management Software by Mitutoyo

PROPRIETARY INSPECTION CERTIFICATE

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518-361-13



Intuitive operation thanks to guidance.



Homescreen
Measurement menu display is easy to understand visually. The guidance makes it easy for first-time users to operate.



Part program measurement
You can easily create, execute, edit, and even display the results of part programs.



Perpendicular/straightness measurement – Graph creation
You can check the measurement results of perpendicularity and straightness in real time during measurement.



2D measurement – Preplacement
This function allows the user to register the hole position of the workpiece before measurement.

Specifications

Inch/Metric

Code No.		518-360-13	518-361-13
Power grip pre-installed		—	✓
Measuring range		0-977 mm (0-38")	
Slider stroke		600 mm (24")	
Resolution (switchable)		0.0001/0.001/0.01/0.1 mm or .000001/.00001/.0001/.001"	
Accuracy (at 20 °C) *1		(1.1+0.6L/600) µm, L = measuring length in mm	
Repeatability (2σ)*1	Plane	0.4 µm	
	Bore	0.9 µm	
Perpendicularity*2		5 µm (after compensation)	
Straightness*2		4 µm (mechanical straightness)	
Mass		26.1 kg	26.6 kg
Price		**£7,350.00**	**£7,710.00**

*1 Guaranteed when using the standard eccentric ø5 probe.
*2 Guaranteed when using the Lever Head (MLH-321) and Mu-checker (M-411).

Technical Data

Drive method:	Manual/motor (5-40 mm/s, 7 steps)
Measuring force:	1 N
Suspension method:	Full/semi-floating with built-in air compressor
Display:	8.4 inch touch-screen, LCD
Power supply:	AC adapter/battery (Ni-MH)
Battery operation time:	Approx. 4 hours (air suspension and slider elevation: 25% duty cycle)

Standard Accessories

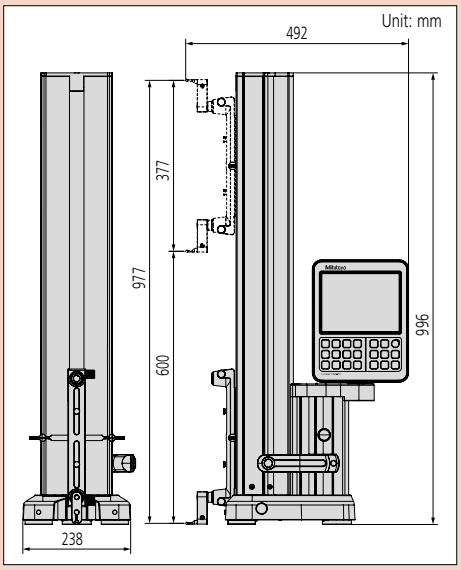
Code No.	Description
12AAF712	Battery pack
12AAY343	ø5 stepped probe

Optional Accessories

Code No.	Description	Price
264-020	Input tool (IT-020U)	**£273.00**
264-505E	DP-1VA LOGGER digimatic mini processor	**£503.00**
264-622	U-WAVE-TM IP67 transmitter*3	**£242.00**
264-623	U-WAVE-TM transmitter*3	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
519-521	Lever head probe MLH-521	**£475.00**
519-562E	Mu-checker M-562	**£1,840.00**
936937	Digimatic cable (1 m)	**£42.00**
965014	Digimatic cable (2 m)	**£61.60**
02AZD730G	U-WAVE-T IP67 transmitter*3	**£242.00**
02AZD880G	U-WAVE-T transmitter*3	**£242.00**
02AZG011	Bidirectional digimatic S1 cable for U-WAVE-T (160 mm)	**£89.00**
06AGL011	SPC data cable (1 m)	**£47.60**
06AGL021	SPC data cable (2 m)	**£51.20**
06AGQ001F	USB input tool direct (2 m)	**£132.00**
12AAJ088	Footswitch	**£312.00**
12AAN052	Receipt printer paper (set of 10)	**£114.00**
12AAN146	Connection cable for printer	**£110.00**
12AAY484	Receipt printer*4	**£1,030.00**
12AAY486	U-WAVE-T mounting plate	**£36.80**
12BAF812	USB cable, type A - type B (2 m)	**£26.00**

*3 U-WAVE-R Receiver required.
*4 A small printer (optionally battery-powered) that can be mounted on the main unit. It includes a printer cable and mounting plate.

Dimensions



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Height Gauges

SERIES 518 – Linear Height Digimatic 2D Measurement System

Optional Attachments

Code No.	Description	Price
226117	M2 CMM stylus adapter*	£75.50
226118	M3 CMM stylus adapter*	£75.50
957261	ø2 mm ball probe (coaxial type)	£141.00
957262	ø3 mm ball probe (coaxial type)	£147.00
957263	ø4 mm ball probe (coaxial type)	£158.00
957264	ø14 mm disc probe	£208.00
957265	ø20 mm disc probe	£250.00
12AAA788	ø4 mm ball offset probe	£154.00
12AAA789	ø6 mm ball offset probe	£163.00
12AAA792	Metric indicator holder (ø8 mm stem)	£91.90
12AAA793	Probe extension holder (85 mm / 3.3")	£91.90
12AAA837	Inch indicator holder (ø3/8" stem)	£91.90
12AAB136	ø10 mm cylindrical probe	£320.00
12AAB552	ø10 mm ball probe, L = 55 mm (coaxial type)	£188.00
12AAC072	Depth probe	£454.00
12AAC073	ø20 mm taper probe	£100.00
12AAF666	ø1 mm ball probe (coaxial type)	£149.00
12AAF667	ø2 mm ruby ball probe (coaxial type)	£195.00
12AAF668	ø10 mm ball probe, L = 82 mm (coaxial type)	£142.00
12AAF669	ø10 mm ball probe, L = 120 mm (coaxial type)	£255.00
12AAF670	ø5 mm disc probe	£164.00
12AAF671	ø10 mm disc probe	£124.00
12AAF672	ø1 mm ball offset probe	£134.00
12AAF673	ø1 mm ball stylus (eccentric type)	£160.00
12AAY595	Extension holder (100 mm)	£237.00
12AAY596	Extension holder (200 mm)	£247.00
12AAY597	ø5 mm ball stylus, L = 130 mm	£396.00
12AAY598	ø25 mm disk stylus	£156.00
12AAY599	Depth stylus, L = 70 mm	£110.00
12AAY600	Depth stylus, L = 150 mm	£135.00
12AAY601	Depth stylus, L = 300 mm	£135.00
12AAY602	ø2 mm ball depth stylus, L = 70 mm	£199.00
12AAY603	ø2 mm ball depth stylus, L = 150 mm	£198.00
12AAY604	ø2 mm ball depth stylus, L = 300 mm	£208.00
12AAY605	ø4 mm ball depth stylus, L = 70 mm	£177.00
12AAY606	ø4 mm ball depth stylus, L = 150 mm	£177.00
12AAY607	ø4 mm ball depth stylus, L = 300 mm	£198.00
K650986	M3 stylus kit	£392.00

* Styli for CMMs can be provided.



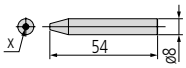


Adjustable for easy-to-view angles.

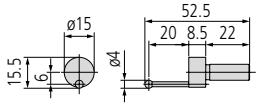
Optional Accessories

Unit: mm

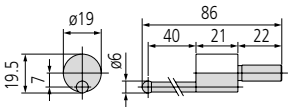
226117 (x = M2)
226118 (x = M3)



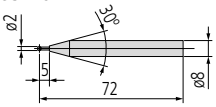
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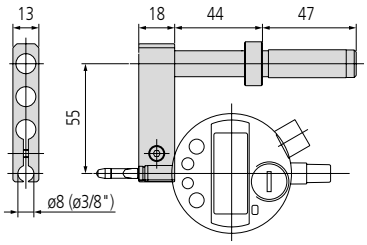
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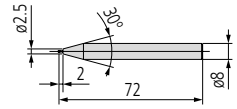
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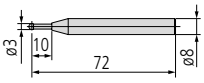
12AAA792 (**12AAA837**)
shown with optional indicator



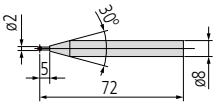
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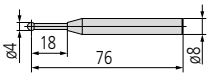
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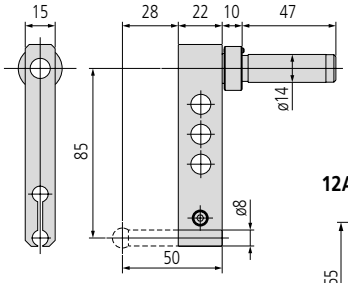
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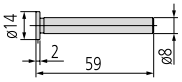
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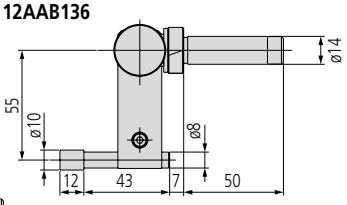
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12AAF669 (L = 120)



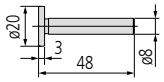
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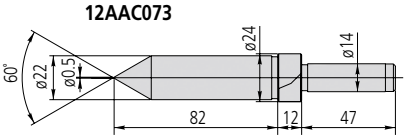
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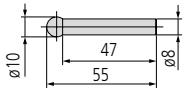
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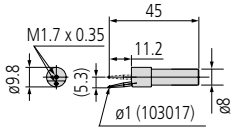
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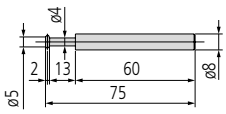
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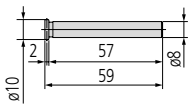
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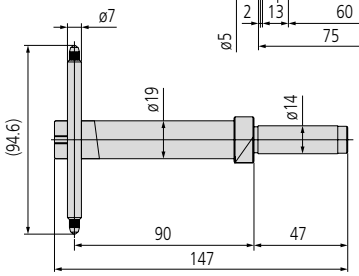
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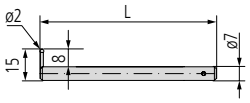
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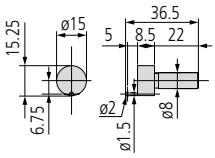
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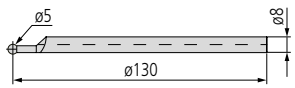
12AAY602 (L = 89.25)
12AAY603 (L = 169.25)
12AAY604 (L = 319.25)



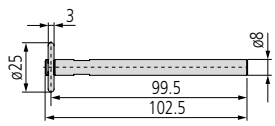
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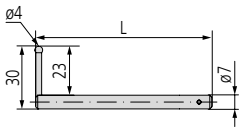
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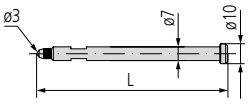
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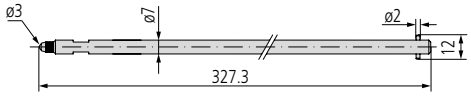
12AAY605 (L = 88.5)
12AAY606 (L = 168.5)
12AAY607 (L = 318.5)



12AAY599 (L = 97.3)
12AAY600 (L = 177.3)



12AAY601



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Mitutoyo

Height Gauges

SERIES 518 – QM-Height ABSOLUTE Digimatic High Precision Height Gauge

- High-performance height gauge with best-in-class accuracy and perpendicularity plus GO/±NG judgement functionality.
- Redesigned control panel features a dual-numeric display that shows the difference between the previous measurement value and the current value as well as the current value.
- Newly developed high accuracy and high resolution ABSOLUTE linear encoder for position detection. Once origin is set, origin setting is not required each time you turn the power ON (except in the case of a large environmental temperature change).
- GO/NO-GO judgement is performed by setting upper and lower tolerances. If a judgement result is out of tolerance the 3-colour LED above the display changes from green to red or orange, so tolerance judgement can be made at a glance.
- Frequent-use measurement such as inside/outside diameter and pitch calculation can be implemented by icon-based commands that also support easy one-key operation.
- Inside/outside diameters can be measured via a unique method (detect circle apex by tracing measurement*[1]).
- Slider elevation knob (for travel) and wheel (for measurement) enable coarse and fine height adjustment.
- An angled grip is conveniently placed for moving the QM-Height on the surface plate and the pneumatic suspension system enables easy, friction-free positioning.
- SPC (Digimatic) and RS-232C data output enables incorporation into statistical process control and measurement systems.

*[1] Tracing measurement stroke is approx. 1 mm upwards and downwards from the measurement start point.

ABSOLUTE DIGIMATIC MeasurLink® ENABLED Data Management Software by Mitutoyo



518-247

Specifications

Inch/Metric

Code No.	518-255	518-257
Range	0 - 350 mm (0 - 14")	0 - 600 mm (0 - 24")
Perpendicularity	7 µm	12 µm
Mass	26 kg	30 kg
Price	**£3,630.00**	**£4,110.00**

Technical Data

Resolution:	0.001 / 0.0005 mm (.00005" / .00001")
Accuracy at 20°C*[2]:	±(2.4+2.1L/600) µm, L = measuring length in mm
Repeatability (2σ)*[2]:	≦1.8 µm
Guiding method:	Roller bearing
Drive method:	Manual
Scale type:	ABSOLUTE electromagnetic linear encoder
Measuring force:	1.5 ± 0.5 N
Display:	LCD
Power supply:	AC adapter (optional) / battery (LR6 x 4)
Battery operation time:	Approx. 1200 hours not using pneumatic suspension system, (approx. 90 hours using pneumatic suspension system regularly)

*[2] Guaranteed when using the standard ø5 mm offset probe.

Standard Accessories

Code No.	Description
05HZA148	ø5 mm offset probe
12AAA715	Probe diameter calibration block



The power grip provides easy handling.



GO shown on the display and the panel LED showing GREEN means the measurement is within the tolerance limits.



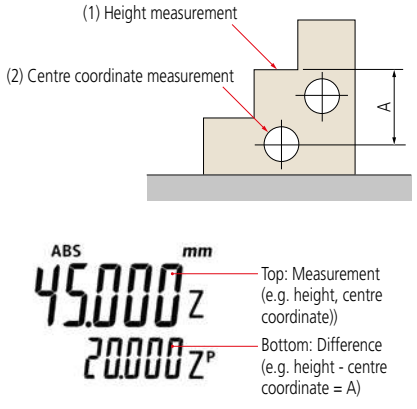
±NG shown on the display and the panel LED showing ORANGE (-NG) or RED (+NG) means the measurement is outside the tolerance limits.

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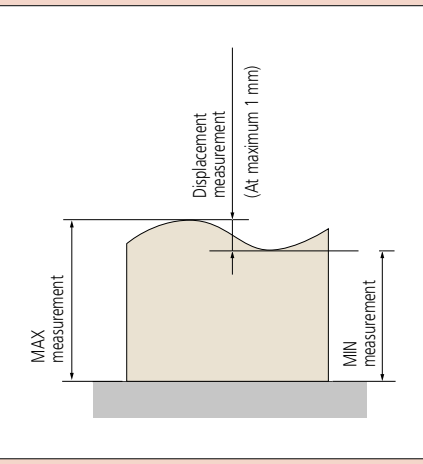
Height Gauges

SERIES 518 – QM-Height ABSOLUTE Digimatic High Precision Height Gauge

Application Examples



Dimension difference measurement.



Maximum/minimum and displacement measurement.

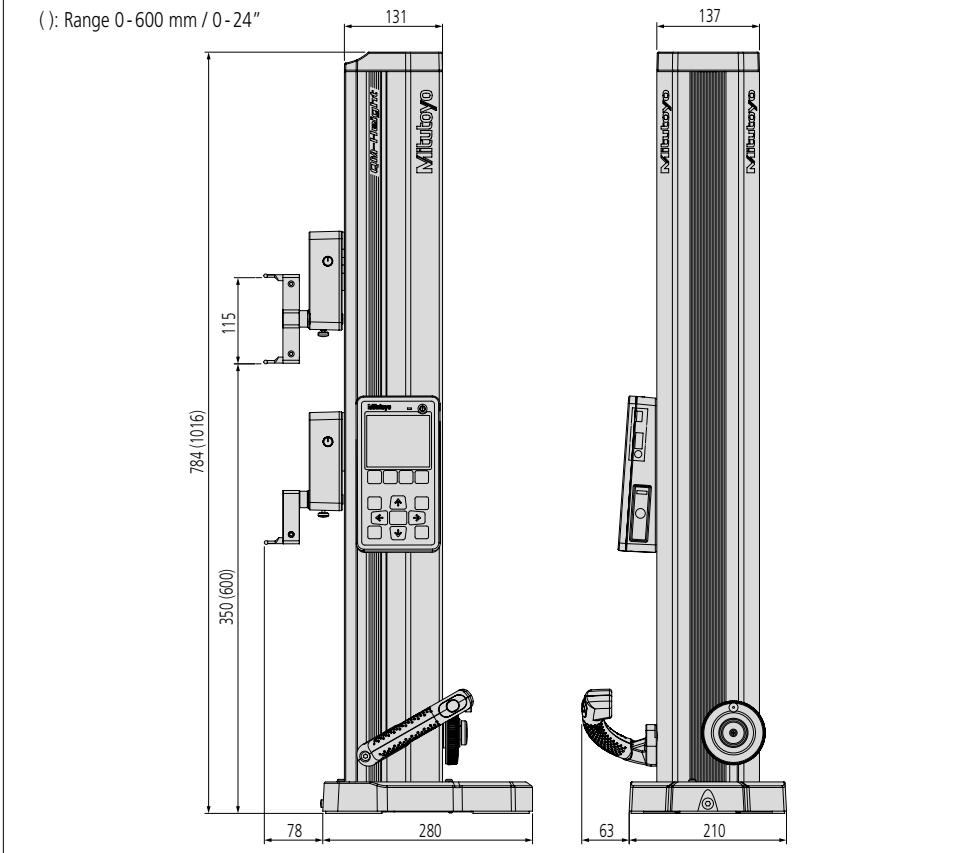
Optional Accessories

Code No.	Description	Price
264-505E	DP-1VA LOGGER digimatic mini processor	£503.00
936937	Digimatic cable (1 m)	£42.00
957261	ø2 mm ball probe (coaxial type)	£141.00
957262	ø3 mm ball probe (coaxial type)	£147.00
957263	ø4 mm ball probe (coaxial type)	£158.00
957264	ø14 mm disc probe	£208.00
957265	ø20 mm disc probe	£250.00
965014	Digimatic cable (2 m)	£61.60
06AFM380D	USB input tool direct USB-ITN-D (2 m)	£143.00
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790D	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE990	U-WAVE-T mounting plate	£33.30
06AFZ050	USB cable, type A - micro B	£14.60
06AGZ369E	AC adapter	£58.30
12AAA788	ø4 mm ball offset probe	£154.00
12AAA789	ø6 mm ball offset probe	£163.00
12AAA792	Dial indicator (ø8 mm stem) holder	£91.90
12AAA793	Probe extension holder (85 mm /3.3")	£91.90
12AAC072	Depth probe	£454.00

* U-WAVE-R Receiver required.

Dimensions

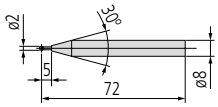
Unit: mm



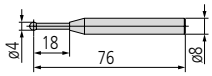
Optional Accessories

Unit: mm

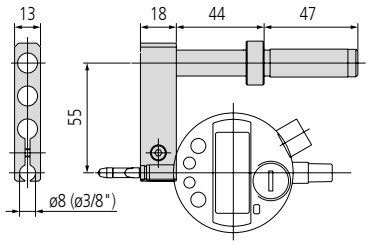
957261



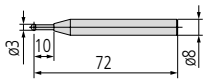
957263



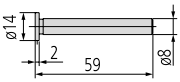
12AAA792 (shown with optional indicator)



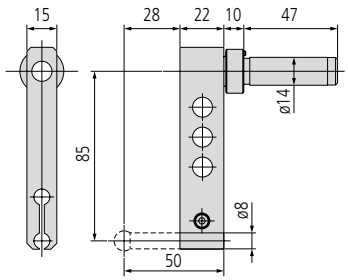
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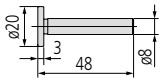
957264



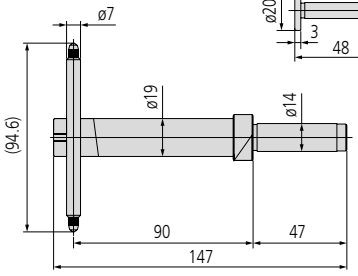
12AAA793



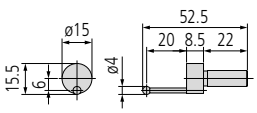
957265



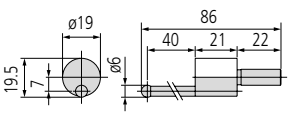
12AAC072



12AAA788



12AAA789



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Depth Gauges

SERIES 329 – Digimatic Interchangeable Rod Depth Micrometer

- This type uses interchangeable rods to enable wide-range measurement.
- Data output function allows integration into statistical process control and measurement systems.
- Measuring rod diameter: ø4 mm.
- Measuring rod lock.
- Ratchet stop provides constant measuring force.

DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



329-350-30



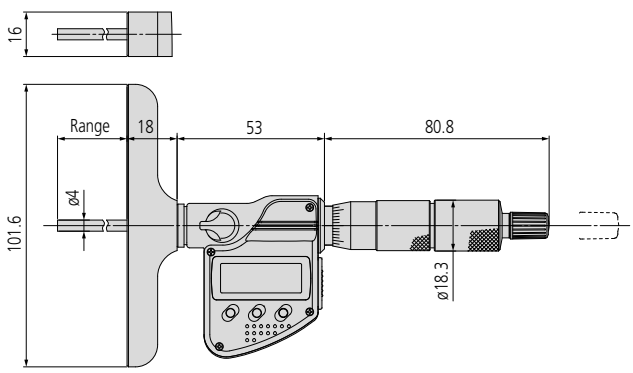
Specifications

Inch/Metric

Code No.	Range	Resolution	Base	No. of rods	Price
329-350-30	0-150 mm (0-6")	0.001 mm (.00005")	4 x .63"	6	£719.00
329-351-30	0-300 mm (0-12")	0.001 mm (.00010")		12	£1,010.00

Dimensions

Unit: mm



Technical Data

Accuracy
- Spindle feed error: ±3 µm (±.00015")
- Zero point error of rods
  - 0-150mm (0-6"): ±4 µm (.0002")
  - 0-300mm (0-12"): ±6 µm (.0003")

Flatness of reference face (base): 2 µm (.00008")

Flatness of measuring face (rod): 0.3 µm (.000012")

Parallelism between reference face and measuring face
- 0-150mm (0-6"): 7 µm (.0003")
- 0-300mm (0-12"): 10 µm (.0004")

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

Battery life: Approx. 2.4 years under normal use

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*	£242.00
264-623	U-WAVE-TM transmitter*	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF310	U-WAVE-TM connection unit	£77.30
05CZA662	SPC data cable with pushbutton (1 m)	£85.60
05CZA663	SPC data cable with pushbutton (2 m)	£104.00
06AFM380B	USB input tool direct USB-ITN-B (2 m)	£158.00

* U-WAVE-R Receiver required.



Ratchet stop provides consistent reproducibility.

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Depth Gauges

SERIES 129 – Interchangeable Rod Depth Micrometer

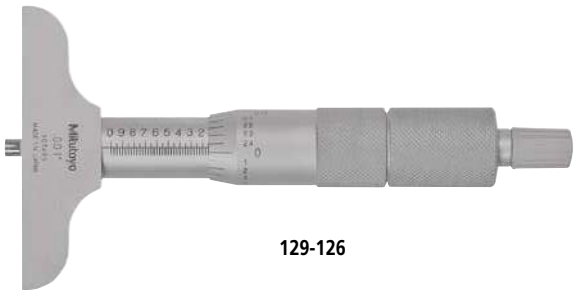
- This type uses interchangeable rods to enable wide-range measurement.
- Measuring rod diameter: ø4 mm.
- Measuring rod lock.
- Ratchet stop provides constant measuring force.

Technical Data

Graduation: 0.01 mm (.001")
Spindle feed error: ±3 µm (±.00015")
Flatness of measuring face (rod): 0.3 µm (.000012")



Dedicated fixtures enable rapid checking of depth micrometer setting accuracy after a rod change.



129-126



D

Specifications

Metric

Code No.	Range	Base	Flatness of reference face (base)	Parallelism between reference face and measuring face	Zero point error of rods	No. of rods	Price
129-109	0 - 50 mm	63.5 x 16 mm	1.3 µm	5 µm	3 µm	2	**£170.00**
129-110	0 - 75 mm			6 µm		3	**£193.00**
129-111	0 - 100 mm				4 µm	4	**£199.00**
129-112	0 - 150 mm			7 µm		6	**£273.00**
129-116		101.6 x 16 mm	2.0 µm				**£289.00**
129-153	0 - 300 mm			10 µm	6 µm	12	**£446.00**
129-154	0 - 25 mm	63.5 x 16 mm	1.3 µm	5 µm	3 µm	1	**£166.00**

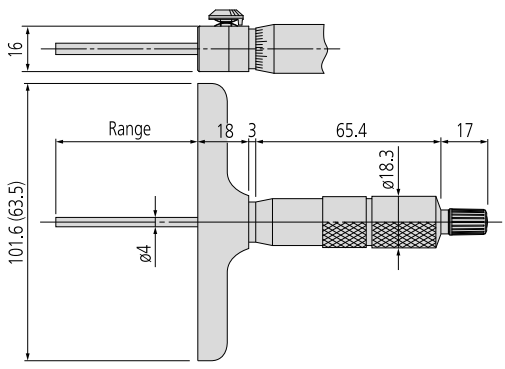
Inch

Code No.	Range	Base	Flatness of reference face (base)	Parallelism between reference face and measuring face	Zero point error of rods	No. of rods	Price
129-126	0 - 3"	2.5 x .63"	.00005"	.00030"	.00015"	3	**£193.00**
129-127	0 - 4"				.00020"	4	**£199.00**
129-128	0 - 6"			.00035"		6	**£273.00**
129-129	0 - 2"	4 x .63"	.00008"	.00025"	.00015"	2	**£170.00**
129-132	0 - 6"			.00035"	.00020"	6	**£289.00**
129-150	0 - 12"			.00050"	.00030"	12	**£446.00**

Dimensions

Unit: mm

129-116 (**129-110**)



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Mitutoyo

Depth Gauges

SERIES 128 – Depth Micrometer

- Measuring rod diameter: ø4 mm.
- Ratchet stop provides constant measuring force.



128-101

Technical Data

Maximum permissible error J_{MPE}: 3 µm (.00015")
Flatness of measuring face (rod): 0.3 µm (.00012")
Parallelism between reference face and measuring face: Within 5 µm (.00025")



Specifications

Metric

Code No.	Range	Graduation	Flatness of reference face (base)	Base	Price
128-101	0 - 25 mm	0.01 mm	1.3 µm	63.5 x 16 mm	**£122.00**
128-102			2.0 µm	101.6 x 16 mm	**£174.00**

Inch

Code No.	Range	Graduation	Flatness of reference face (base)	Base	Price
128-105	0 - 1"	.001"	.00005"	2.5 x .63"	**£122.00**
128-106			.00008"	4 x .63"	**£174.00**

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Depth Gauges

SERIES 571 – ABSOLUTE Digimatic Coolant Proof Depth Gauge

- Enables stable depth measurement with a resolution of 0.01 mm.
- Features Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Optional longer extension bases are available.
- Sliding operation is smooth and comfortable.
- Data output function allows integration into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo



571-261-20

Technical Data

Dust/water protection level:	IP67*1
Repeatability:	0.01 mm (.0005")
Scale type:	ABSOLUTE electrostatic linear encoder
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3 years under normal use (1 year for 300 mm / 12" model)

*1 Care should be taken to dry tool after use.

Optional Accessories

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	**£242.00**
264-621	U-WAVE-TC transmitter*2	**£242.00**
264-624	U-WAVE-TCB IP67 transmitter	**£242.00**
264-625	U-WAVE-TCB transmitter	**£242.00**
02AZF310	U-WAVE-TC connection unit	**£77.30**
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB input tool direct USB-ITN-C (2 m)	**£158.00**

*2 U-WAVE-R Receiver required.

Specifications

Inch/Metric

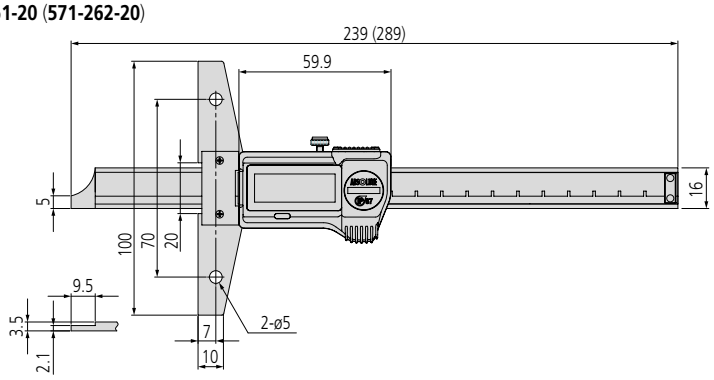
Code No.	Range	Resolution	Max. permissible error E_{MPE}	Base	Price
571-261-20	0 - 150 mm (0 - 6")	0.01 mm (.0005")	±0.02 mm (±.0010")	100 x 6 mm	**£492.00**
571-262-20	0 - 200 mm (0 - 8")				**£561.00**
571-263-10	0 - 300 mm (0 - 12")		±0.03 mm (±.0015")	100 x 6.3mm	**£596.00**

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

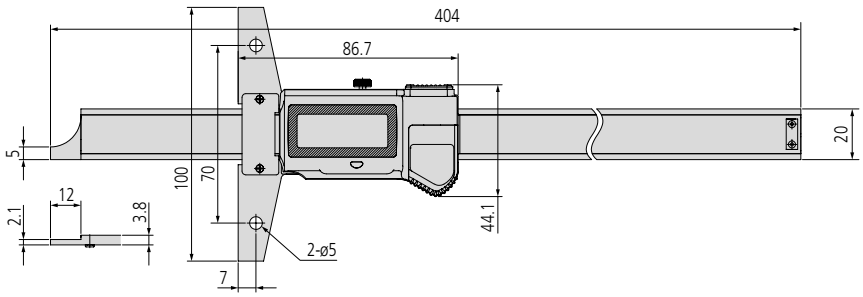
Dimensions

Unit: mm

571-261-20 (**571-262-20**)



571-263-10



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Mitutoyo

Depth Gauges

SERIES 571 – ABSOLUTE Digimatic Depth Gauge

- Enables stable depth measurement with a resolution of 0.01 mm.
- Features Mitutoyo's ABSOLUTE system. No need to reset the origin after switching on.
- Optional longer extension bases are available*1.
- Data output function allows integration into statistical process control and measurement systems.

*1 Except for models with measuring ranges of 450, 600, 750, 1000 mm.

ABSOLUTE DIGIMATIC U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



571-211-30

D

Specifications

Inch/Metric

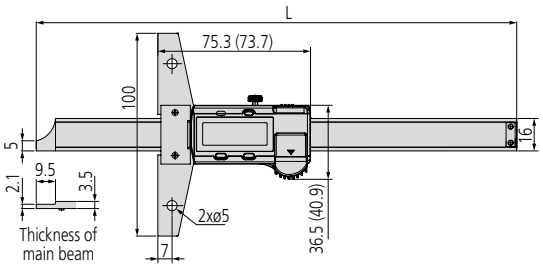
Code No.	Range	Resolution	Max. permissible error E_{MPE}	Price
571-211-30	0 - 150 mm (0 - 6")	0.01 mm (.0005")	±0.02 mm (±.0010")	£434.00
571-212-30	0 - 200 mm (0 - 8")			£463.00
571-213-30	0 - 300 mm (0 - 12")		±0.03 mm (±.0015")	£579.00
571-214-10	0 - 450 mm (0 - 18")		±0.05 mm (±.0020")	£926.00
571-215-10	0 - 600 mm (0 - 24")			£976.00
571-216-10	0 - 750 mm (0 - 30")		±0.06 mm (±.0025")	£1,030.00
571-217-10	0 - 1000 mm (0 - 40")		±0.07 mm (±.0025")	£1,150.00

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

Dimensions

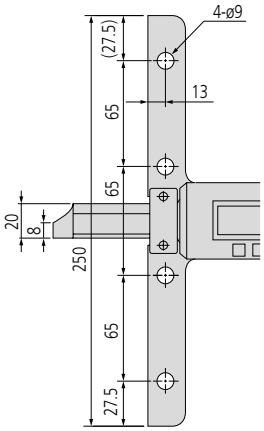
Unit: mm

Models up to 300 mm measuring range



Range	L	Base (W x T)
0 - 150 mm	237	100 x 6
0 - 200 mm	287	
0 - 300 mm	403	
0 - 450 mm	635	250 x 10
0 - 600 mm	785	
0 - 750 mm	935	
0 - 1000 mm	1200	

Models with measuring range 450 mm and over



Technical Data

Repeatability:	0.01 mm (.0005")
Scale type:	ABSOLUTE electrostatic linear encoder
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3 years under normal use (1 year for 300 mm / 12" model)

Optional Accessories

Code No.	Description	Price
For 571-211-30, 571-212-30 and 571-213-10		
264-620	U-WAVE-TC IP67 transmitter*2	£242.00
264-621	U-WAVE-TC transmitter*2	£242.00
264-624	U-WAVE-TCB IP67 transmitter	£242.00
264-625	U-WAVE-TCB transmitter	£242.00
959143	Data hold unit	£25.20
959149	SPC data cable with pushbutton (1 m)	£44.10
959150	SPC data cable with pushbutton (2 m)	£50.30
02AZF300	U-WAVE-TC connection unit	£77.30
06AFM380C	USB input tool direct USB-ITN-C (2 m)	£143.00
For 571-214-10, 571-215-10, 571-216-10 and 571-217-10		
959143	Data hold unit	£25.20
959149	SPC data cable with pushbutton (1 m)	£44.10
959150	SPC data cable with pushbutton (2 m)	£50.30
02AZD730G	U-WAVE-T IP67 transmitter*2	£242.00
02AZD790C	U-WAVE-T data cable with pushbutton (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*2	£242.00
02AZE140C	U-WAVE-T data cable with pushbutton and footswitch connection (160/500 mm)	£160.00
02AZE200	U-WAVE-T mounting plate	£26.70
06AFM380C	USB input tool direct USB-ITN-C (2 m)	£143.00

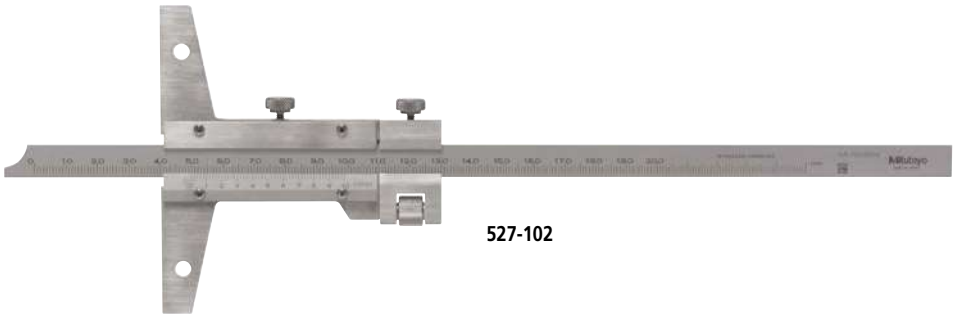
*2 U-WAVE-R Receiver required.

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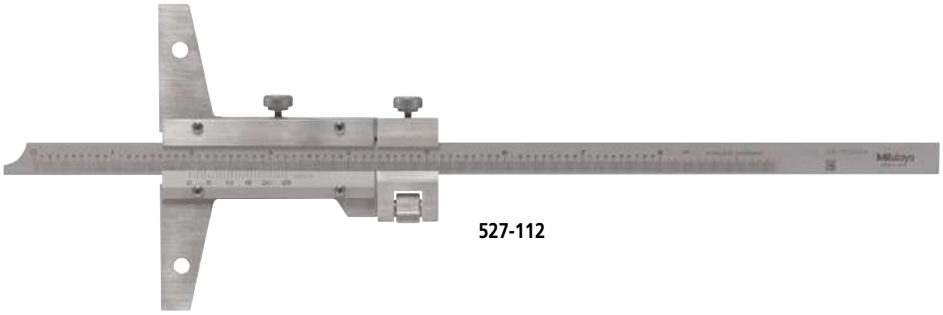
Depth Gauges

SERIES 527 – Vernier Depth Gauge

- Standard gauge for depth measurement.
- Optional longer extension bases are available (except for models with measuring ranges of 600 and 1000 mm).



527-102



527-112

D

Specifications

Metric

Code No.	Range	Graduation	Max. permissible error E_{MPE}	Base (W x T)	Remarks	Price
527-101	0 - 150 mm	0.02 mm	±0.03 mm	100 x 6.5 mm	With fine adjustment	**£138.00**
527-102	0 - 200 mm					**£150.00**
527-103	0 - 300 mm		±0.04 mm			**£205.00**
527-104	0 - 600 mm		±0.05 mm	250 x 10 mm		**£821.00**
527-105	0 - 1000 mm		±0.07 mm			**£881.00**

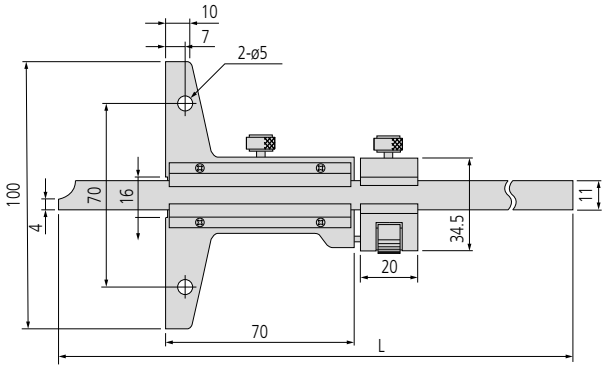
Inch

Code No.	Range	Graduation	Max. permissible error E_{MPE}	Base (W x T)	Remarks	Price
527-111	0 - 6"	.001"	±.0010"	3.93 x .25"	With fine adjustment	**£138.00**
527-112	0 - 8"					**£150.00**
527-113	0 - 12"		±.0015"	9.8 x .39"		**£205.00**
527-114	0 - 24"		±.0020"			**£821.00**
527-115	0 - 40"		±.0030"			**£881.00**

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

Dimensions

Unit: mm



Range	L
0 - 150 mm	260
0 - 200 mm	310
0 - 300 mm	410
0 - 600 mm	800
0 - 1000 mm	1200

Models with measuring range 600 mm and over have different configurations

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Mitutoyo

Depth Gauges

SERIES 571 – ABSOLUTE Digimatic Coolant Proof Hook End Depth Gauge

- The end of the main beam is hook-shaped to allow depth and thickness measurements of a projected portion or lip in a hole, in addition to standard depth measurement.
- Enables stable depth measurement with a resolution of 0.01 mm.
- Features Mitutoyo's ABSOLUTE system with IP67 ingress protection. No need to reset the origin after switching on.
- Optional longer extension bases are available.
- The OFF button is used to switch between direct display of hook and depth readings.
- Slider operation is smooth and comfortable.
- Models with measurement data output connector may be integrated into statistical process control and measurement systems.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP67 U-WAVE fit

MeasurLink® ENABLED Data Management Software by Mitutoyo

D



571-264-20

Technical Data

Scale type:	ABSOLUTE electrostatic linear encoder
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 3 years under normal use

Optional Accessories

Code No.	Description	Price
264-620	U-WAVE-TC IP67 transmitter*2	£242.00
264-621	U-WAVE-TC transmitter*2	£242.00
264-624	U-WAVE-TCB IP67 transmitter	£242.00
264-625	U-WAVE-TCB transmitter	£242.00
02AZF310	U-WAVE-TC connection unit	£77.30
05CZA624	SPC data cable with pushbutton (1 m)	£85.60
05CZA625	SPC data cable with pushbutton (2 m)	£104.00
06AFM380A	USB input tool direct USB-ITN-C (2 m)	£158.00

*2 U-WAVE-R Receiver required.

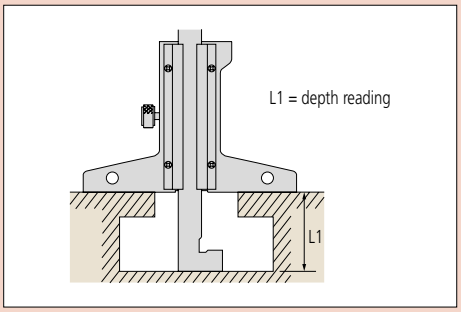
Specifications

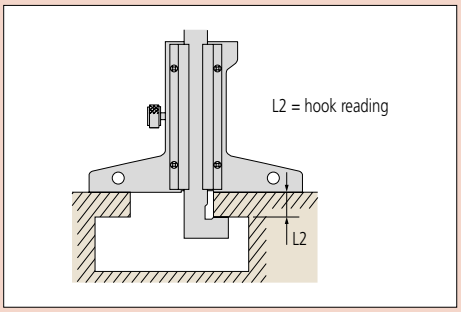
Inch/Metric

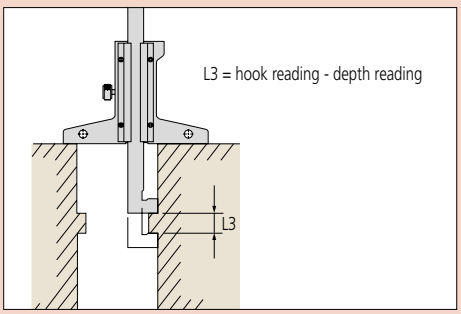
Code No.	Range: L1 (L2)*1	Resolution	Max. permissible error E_{MPE}	Base	Price
571-264-20	10 - 160 mm (0 - 150 mm)/ .4 - 6.4" (0 - 6")	0.01 mm/.0005"	±0.03 mm/±.0015"	100 x 6 mm	£508.00
571-265-20	10 - 210 mm (0 - 200 mm)/ .4 - 8.4" (0 - 8")				£596.00

*1 The range of L3 extends from the minimum range value of L1 to the maximum range value of L2, and is therefore less than that of L2 by at least the length of the hook.

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.



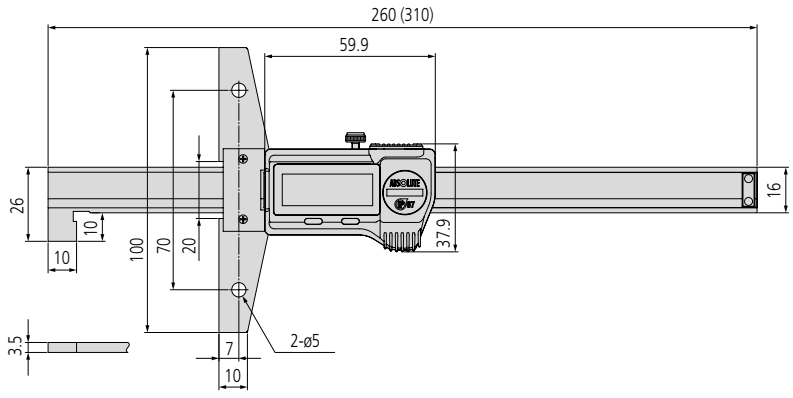




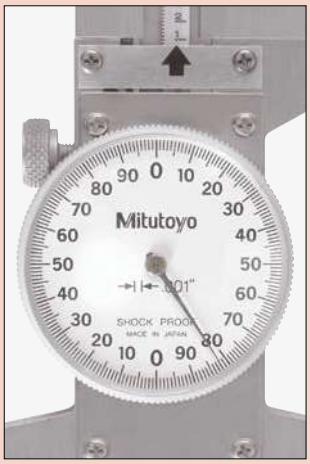
Dimensions

Unit: mm

571-264-20 (**571-265-20**)



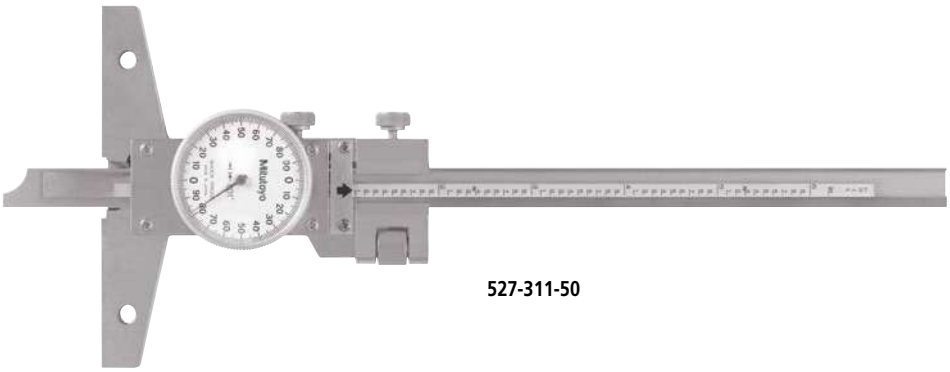
Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.



Depth Gauges

SERIES 527 – Dial Fine Adjustment Depth Gauge

- Easy-to-read dial caliper with rack and pinion magnification mechanism.
- Optional longer extension bases are available.



527-311-50

D

Specifications

Metric

Code No.	Range	Dial graduation	Max. permissible error E_{MPE}	Base	Price
527-301-50	0 - 150 mm	0.05 mm	±0.05 mm	100 x 6.5 mm	**£285.00**

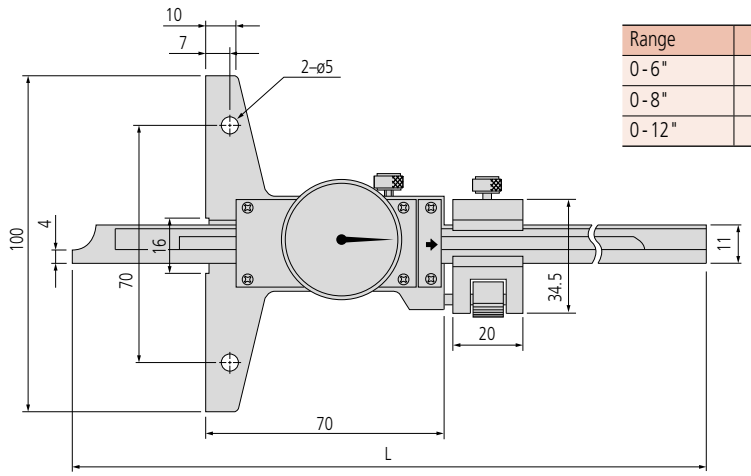
Inch

Code No.	Range	Dial graduation	Max. permissible error E_{MPE}	Base	Price
527-311-50	0 - 6"	.001"	±.001"	100 x 6.5 mm	**£285.00**
527-312-50	0 - 8"				**£310.00**
527-313-50	0 - 12"		±.0015"		**£353.00**

Note: Maximum permissible error, E_{MPE}, is the term (notation) used in JIS B 7517: 2018, revised based on ISO/TR 14253-6: 2012.

Dimensions

Unit: mm



Range	L
0 - 6"	260
0 - 8"	310
0 - 12"	410

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Depth Gauges

SERIES 547 – ABSOLUTE Digimatic Depth Gauge

- Easy-to-read dial effectively prevents misreading.
- Allows integration into statistical process control and measurement systems for models with a measurement data output connector.

ABSOLUTE DIGIMATIC S1 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



547-217A



547-258A

D

Specifications

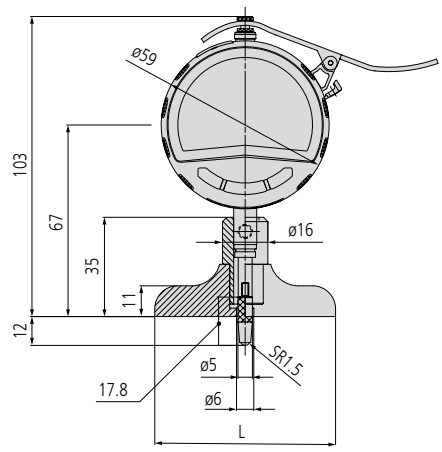
Inch/Metric

Code No.	Range	Resolution	Accuracy*1	Extension rod	Indicator	Price
547-217A	0-200 mm/ 0-8"	0.01 mm/.0005"	±20 µm/±.001"	4 pcs. (.5", 1", 2", 4")	543-712B*2	£494.00
547-218A						£507.00
547-257A		0.0005 mm/.00002"	±5 µm/±.0002"		543-702B	£578.00
547-258A						£588.00

*1 Excluding quantizing error.
*2 The measuring force of this indicator is different from that of the standard 543-702B.

Dimensions

Unit: mm



Code No.	L	Base thickness
547-217A	2.5"	.63"
547-218A	4.0"	
547-257A	2.5"	
547-258A	4.0"	

Technical Data

Stroke:	12.7 mm/.5"
Measuring force:	1.5 N
Base flatness:	5 µm/.0002" (2 µm/.00008": **543-702B**)
Base thickness:	16 mm/.63"
Contact point:	Carbide-tipped ball point
Max. response speed:	Unlimited
Battery:	CR2032 (1 pc.), **05SAA217**
Battery life:	Approx. 2.5 years under normal use

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*3	£242.00
264-623	U-WAVE-TM transmitter*3	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02AZF670	U-WAVE-TM mounting plate	£37.20
02AZF700	U-WAVE-TM/TMB connection	£77.30
02AZG021	U-WAVE-T data cable with footswitch connection (160/500 mm)	£203.00
06AGL011	SPC data cable (1 m)	£47.60
06AGL021	SPC data cable (2 m)	£51.20
06AGQ001F	USB input tool direct (2 m)	£132.00

*3 U-WAVE-R Receiver required.

Caution should be used when exchanging the contact point of a depth gauge

The measurement range may not be maintained when mounting a differently sized contact point than the standard accessory. Zero-setting will not be possible if the contact-point diameter is too large for the spindle hole in the bottom face of the base. Parallelism adjustment with the bottom face of the base is required when mounting a flat contact point such as the flat/needle or carbide-tipped contact point.

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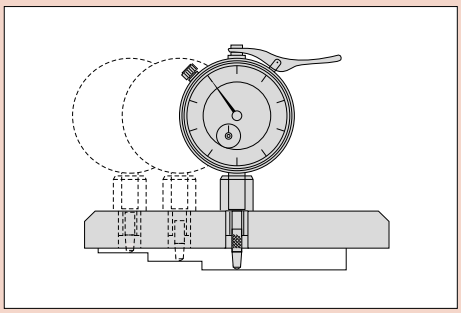
Depth Gauges

SERIES 7 – Dial Depth Gauges

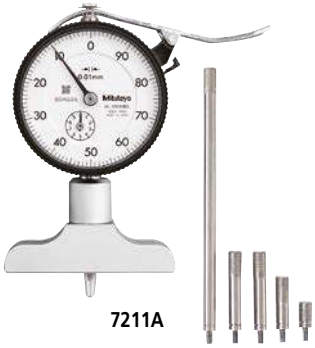
• Optimal for hole, narrow groove and step measurement.

Technical Data

Graduation: 0.01 mm/.0005"
Base flatness: 5 µm/.0002"
Base thickness: 16 mm (18 mm: **7221A**)
Mounting positions for the dial indicator: 1 (3: **7221A**)
Contact point: Carbide-tipped ball point (needle point: **7222A**)



7221A allows the mounting position of the dial indicator to be varied.



7211A



7214A



7222A

D

Specifications

Metric

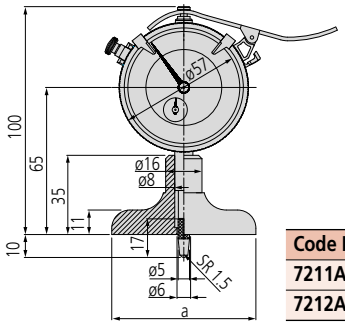
Code No.	Range	Accuracy	Stroke	Measuring force	Extension rod	Dial indicator	Price
7211A	0 - 200 mm	±15 µm	10 mm	1.4 N	5 pcs. (10, 20, 30, 30, 100 mm)	**2902AB**	**£211.00**
7212A							**£223.00**
7213A	0 - 210 mm	±30 µm	30 mm	2.5 N	3 pcs. (30, 60, 90 mm)	**2952AB**	**£310.00**
7214A							**£387.00**
7221A	0 - 200 mm	±15 µm	10 mm	1.4 N	5 pcs. (10, 20, 30, 30, 100 mm)	**2902AB**	**£279.00**
7222A	0 - 10 mm				—	**2902AB**	**£147.00**

Inch

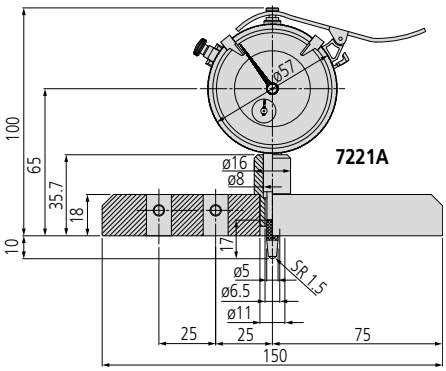
Code No.	Range	Accuracy	Stroke	Measuring force	Extension rod	Dial indicator	Price
7217A	0 - 8"	±.002"	1"	2.5 N	3 pcs. (1", 2", 4")	**2904AB**	**£230.00**
7218A							**£242.00**

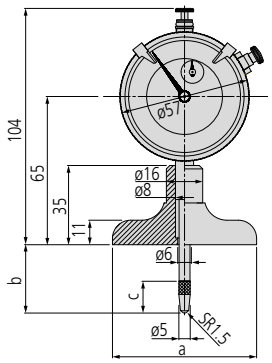
Dimensions

Unit: mm

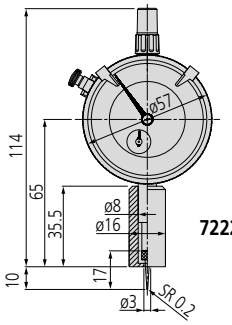


Code No.	a
7211A	63.5
7212A	101.6





Code No.	a	b	c
7213A	63.5	30	14
7214A	101.6		
7217A	63.5	26	17.8
7218A	101.6		



Caution should be used when exchanging the contact point of a depth gauge

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Optional Accessories

SERIES 515 – Depth Micro Checker

- The Depth Micro Checker is designed to check and help set the range-end points of a depth micrometer.



A 25 mm anvil block provides the reference surface for the depth micrometer rod.



515-570



515-571

D

Specifications

Metric

Code No.	Range	Block pitch accuracy	Anvil block accuracy	Price
515-570	0 - 150 mm	±(1+L/150) µm, L = length to check (mm)	±0.5 µm	£1,580.00
515-571	0 - 300 mm			£4,180.00

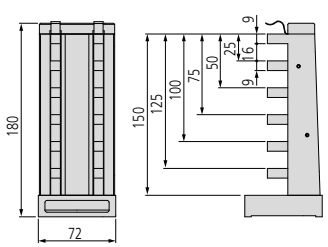
Inch

Code No.	Range	Block pitch accuracy	Anvil block accuracy	Price
515-575	0 - 6"	±(40+L/0.15) µinch, L = length to check (inch)	±20 µinch	£1,580.00

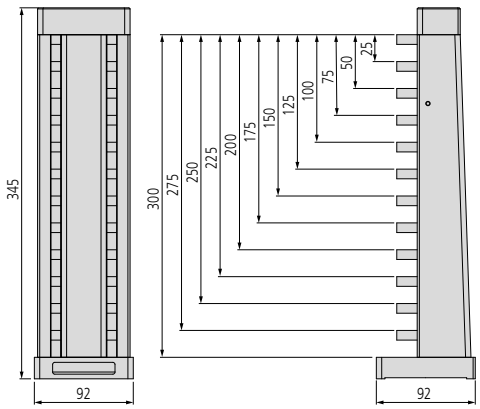
Dimensions

Unit: mm

515-570



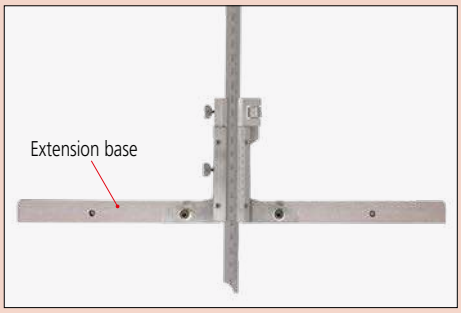
515-571

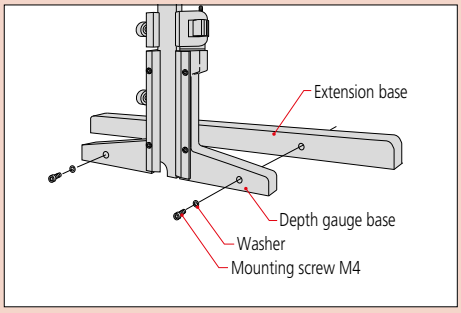


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Optional Accessories

Extension Bases for Depth Gauges





- Attaches to the base (reference face) plate of a depth gauge to extend its span.
- Refer to the illustrations at left for attachment details.
- These extension bases cannot be attached to Digimatic models of 18" /450 mm and over or vernier models of 24" /600 mm and over.



900372

Specifications

Metric

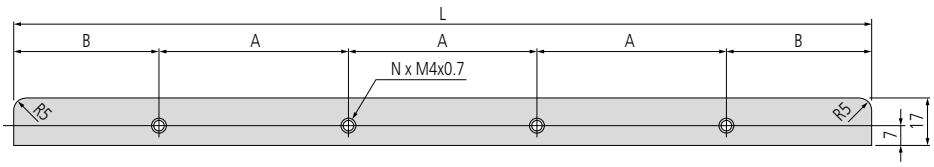
Code No.	Size L	Price
900370	180 mm	**£44.00**
900371	260 mm	**£64.20**
900372	320 mm	**£77.30**

Inch

Code No.	Size L	Price
900367	7"	**£44.00**
900368	10"	**£64.20**
900369	12"	**£77.30**

Dimensions

Unit: mm



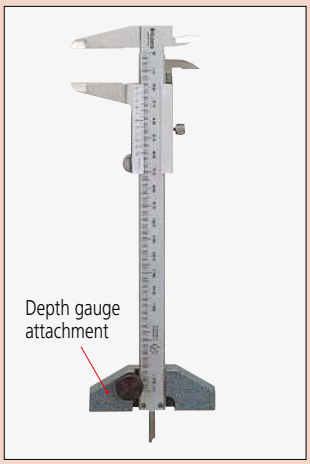
Code No.	L	A	B	Number of holes (N)	Base thickness	Mass
900370	180	70	55	2	8	200 g
900371	260	35	60	5		270 g
900372	320	70	55	4		345 g

Depth Gauge Attachment for Calipers

- Fixing this attachment to the end of a caliper's main beam so that its reference face is flush with that of the caliper makes depth measurement accurate and secure.



050084-10



The attachment is fixed flush with the end of the caliper's main beam before use.

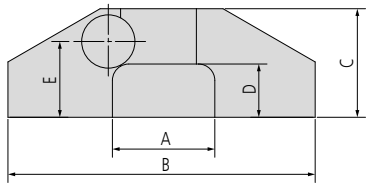
Specifications

Metric

Code No.	Size	Applicable measuring range of caliper	Price
050083-10	75 mm	100 mm, 150 mm, 200 mm, 4", 6" and 8"	**£51.40**
050084-10	100 mm		**£58.60**
050085-10	125 mm	300 mm and 12"	**£66.00**

Dimensions

Unit: mm



Size	A	B	C	D	E	T
75 mm	25	75	26.5	13	18.5	12
100 mm		100				
125 mm	30	125	28.5		20	14

T: Attachment thickness

D

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Mitutoyo

GAUGE BLOCKS
REFERENCE GAUGES



Gauge Blocks



Reference Gauges



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Gauge Blocks

Features and Accuracies

Features of Mitutoyo Gauge Blocks

Mitutoyo offers rectangular steel and ceramic (CERA Blocks) gauge blocks for use as length standards in variously sized sets and as individual blocks. Accessories include wear blocks in tungsten carbide and ceramic in the standard thicknesses. Mitutoyo gauge blocks are recognized to be of the highest quality and are available in various grades to meet every need in respect of working conditions, environment and application.

Accuracy

As a world-leading precision measuring equipment manufacturer, Mitutoyo is certified by the Japanese government as an accredited calibration laboratory, which means that the accuracy of its gauge blocks is guaranteed through traceability to the Metrology Management Centre of the National Institute of Advanced Industrial Science and Technology (AIST).

Wringing

Lapping measuring surfaces is one of Mitutoyo's specialties. Our advanced technique, developed over more than half a century, enables us to achieve the optimum flatness and surface finish needed for gauge blocks and thus maximize the wringing force.

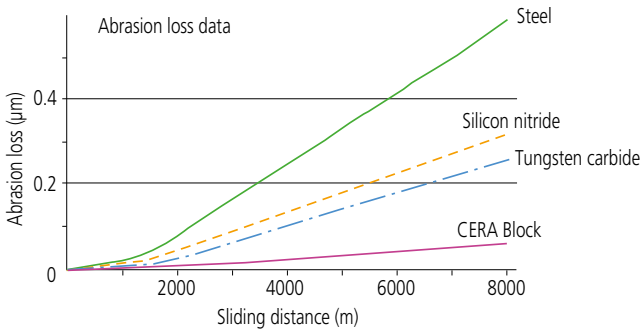
Abrasion Resistance and Dimensional Stability of Steel Blocks

High-carbon high-chrome steel is employed to satisfy a variety of the material characteristics required for gauge blocks. Our advanced heat treatment technology for steel blocks, which involves repeated temperature cycling, simultaneously achieves excellent abrasion resistance and minimizes any change in length over time.

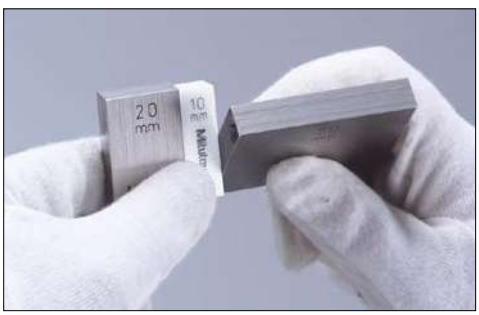
CERA Blocks

CERA blocks are made of a ceramic material with a superior surface finish, created by Mitutoyo's ultra-precision machining techniques, that provides a premium quality block with significant advantages:

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 Accidental Mishandling**
   Since the CERA Block is very hard, it will not scratch easily and is highly resistant to burrs. If a burr is formed, it can easily be removed with a ceramic deburring stone (Ceraston).
3. **Abrasion Resistant**
   CERA Blocks have 10 times the abrasion resistance of steel gauge blocks.



4. **Dimensionally Stable**
   CERA Blocks are free from dimensional change over time.
5. **Clearly Marked Sizes**
   Black characters, indicating the nominal length, are inscribed by laser and are clearly visible against the white surface of the block.
6. **Non-Magnetic Nature Prevents Steel Swarf Contamination**
7. **High Wringing Force**
   Superior flatness and surface finish provides maximum wringing force.



Grade and Application

Grade 2:
These gauge blocks are intended for shop floor use to set and calibrate fixtures as well as precision instruments.

Grade 1:
This grade is used within an inspection area to verify the accuracy of plug and snap gauges as well as for setting electronic measuring devices.

Grade 0:
These higher accuracy gauges are intended for use within a controlled environment by skilled inspection staff. Mainly used as reference standards for setting high precision measuring equipment and for the calibration of lower grade gauge blocks.

The following table can be used to select the gauge block grade according to usage (specified by DIN861, BS4311, and JIS B 7506).

Usage	Applications	Grade
Workshop use	• Mounting tools and cutters	2
	• Manufacturing gauges • Calibrating instruments	1 or 2
Inspection use	• Inspecting mechanical parts, tools, etc.	1 or 2
	• Checking the accuracy of gauges • Calibrating instruments	0 or 1
Calibration use	• Checking the accuracy of gauge blocks for workshop • Checking the accuracy of gauge blocks for inspection • Checking the accuracy of instruments	0

Constructing a Gauge Block Stack

The following points should be noted when constructing a gauge block stack:

1. Use as few gauge blocks as possible to obtain the required length by selecting thick blocks wherever possible.
2. Select the block for the least significant digit first, then work back through the more significant digits until the required length is attained.
3. There are multiple combinations for the integer part of a length. To reduce wear as much as possible, do not always use the same gauge blocks.

Example: Required length = 30.6785 mm

- Using an 88-block metric set

  1.0005
  1.008
  1.17
  7.5
  20
  30.6785 mm

Example: Required length = 1.8761"

- Using an 81-block inch set

  0.1001
  0.126
  0.65
  1
  1.8761"

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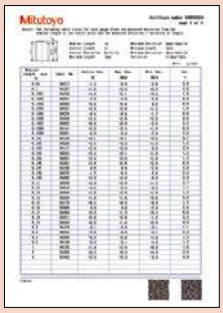
Gauge Blocks

Features and Accuracies

Mitutoyo Gauge Blocks and Inspection Certificates

A Certificate of Inspection is furnished with all Mitutoyo gauge blocks with a serial number on the box (in the case of sets) and an identification number on each block. The deviation of each block from nominal length, at the time of inspection, is stated. For this inspection, each gauge block is measured relative to the upper level master using a gauge block comparator.





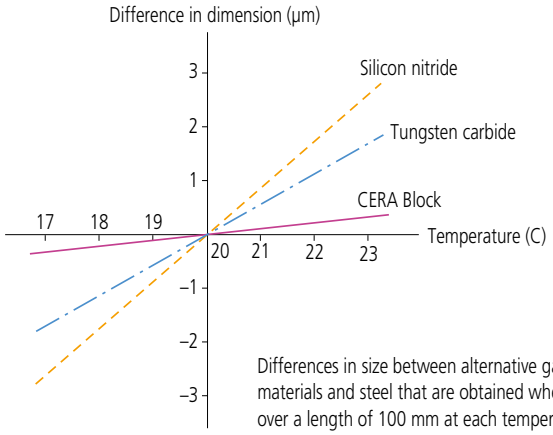
8. Characteristics of CERA Blocks Compared with other Gauge Block Materials

Property	Material			
	CERA Block (ZrO_2)	Steel (Fe)	Tungsten Carbide (WC-Co)	Silicon nitride (Si_3N_4)
Hardness (HV)	1350	800	1650	1500
Coefficient of thermal expansion (10^{-6}/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•$m^{1/2}$)	7	120	12	6.5
Young's modulus x10^{-4} (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

Note: Ceramics have the advantage of a slow response to temperature changes due to the low thermal conductivity. However, caution is required when using CERA blocks in an environment subject to rapid temperature change.

9. Closest Expansion Coefficient to Steel

The thermal expansion coefficient of a CERA Block is quite similar to that of a steel gauge block.



10. Highly Resistant to Impact Damage

The CERA Block material is one of the toughest ceramics. It is extremely difficult to crack a CERA block in normal use.

Accuracy Specifications: BS 4311: Part 1: 1993 (UK)

Inch

Grade*		Nominal length (inch)				
		over 0 up to 0.4	over 0.4 up to 1	over 1 up to 2	over 2 up to 3	over 3 up to 4
0	Tolerance on deviation of measured central length	±5 µin	±6 µin	±8 µin	±10 µin	±12 µin
	Parallelism	4 µin			5 µin	
	Flatness	4 µin				
1	Tolerance on deviation of measured central length	±10 µin	±12 µin	±15 µin	±20 µin	±25 µin
	Parallelism	6 µin		7 µin		8 µin
	Flatness	6 µin				
2	Tolerance on deviation of measured central length	±20 µin	±25 µin	±30 µin	±40 µin	±50 µin
	Parallelism	12 µin			14 µin	
	Flatness	10 µin				

Metric

Grade*		Nominal length (mm)				
		over 0 up to 10	over 10 up to 25	over 25 up to 50	over 50 up to 75	over 75 up to 100
0	Tolerance on deviation of measured central length	±0.12 µm	±0.15 µm	±0.2 µm	±0.25 µm	±0.3 µm
	Parallelism	0.1 µm			0.12 µm	
	Flatness	0.1 µm				
1	Tolerance on deviation of measured central length	±0.25 µm	±0.3 µm	±0.4 µm	±0.5 µm	±0.6 µm
	Parallelism	0.16 µm		0.18 µm		0.2 µm
	Flatness	0.15 µm				
2	Tolerance on deviation of measured central length	±0.5 µm	±0.6 µm	±0.8 µm	±1.0 µm	±1.2 µm
	Parallelism	0.3 µm			0.35 µm	
	Flatness	0.25 µm				

* At 20°C

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Mitutoyo

Gauge Blocks

SERIES 516 – Gauge Block Sets

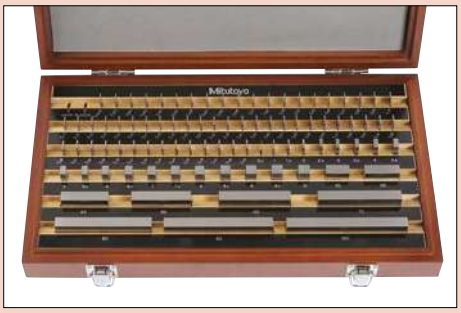
- Mitutoyo provides a wide selection of boxed sets of gauge blocks to meet the various needs of industry. Selecting the best set, or sets, to acquire usually depends on the accuracy required by the target applications, the level of convenience desired (larger sets offer more combination possibilities) and the environmental conditions in which they will be used.



Steel 103-block set



CERA 81-block set



Steel 88-block set.



CERA 47-block set.



Steel 32-block set.



Steel 9-block set.

E

Specifications

Metric

Blocks per set	Code No.	Grade	Set configuration	Price
Steel 1 mm base block sets				
103	516-942-10	0	1.005 mm, 1.01-1.49 mm by 0.01 step, 0.5-24.5 mm by 0.5 step, 25-100 mm by 25 step	£3,530.00
	516-943-10	1		£2,800.00
	516-944-10	2		£2,370.00
88	516-970-10	0	1.0005 mm, 1.001-1.009 mm by 0.001 step, 1.01-1.49 mm by 0.01 step, 0.5-9.5 mm by 0.5 step, 10-100 mm by 10 step	£2,900.00
	516-971-10	1		£2,340.00
	516-972-10	2		£1,870.00
47	516-962-10	0	1.005 mm, 1.01-1.19 mm by 0.01 step, 1.2-1.9 mm by 0.1 step, 1-9 mm by 1 step, 10-100 mm by 10 step	£1,710.00
	516-963-10	1		£1,430.00
	516-964-10	2		£1,070.00
32	516-966-10	0	1.005 mm, 1.01-1.09 mm by 0.01 step, 1.1-1.9 mm by 0.1 step, 1-9 mm by 1 step, 10-30 mm by 10 step, 60 mm	£1,150.00
	516-967-10	1		£877.00
	516-968-10	2		£730.00
Steel 0.001 mm step block sets				
9	516-982-10	0	1.001-1.009 mm by 0.001 step	£328.00
	516-983-10	1		£254.00
	516-984-10	2		£224.00
CERA 1 mm base block sets				
88	516-370-10	0	1.0005 mm, 1.001-1.009 mm by 0.001 step, 1.01-1.49 mm by 0.01 step, 0.5-9.5 mm by 0.5 step, 10-100 mm by 10 step	£5,020.00
	516-371-10	1		£4,160.00
	516-372-10	2		£3,520.00
47	516-362-10	0	1.005 mm, 1.01-1.19 mm by 0.01 step, 1.2-1.9 mm by 0.1 step, 1-9 mm by 1 step, 10-100 mm by 10 step	£3,210.00
	516-363-10	1		£2,470.00
	516-364-10	2		£2,070.00

Inch

Blocks per set	Code No.	Grade	Set configuration	Price
Steel				
81	516-902-11	0	0.1001-0.1009" by 0.0001 step, 0.101-0.149" by 0.001 step, 0.05-0.95" by 0.05 step, 1-4" by 1 step	£2,720.00
	516-903-11	1		£2,430.00
	516-904-11	2		£1,810.00
49	516-910-11	0	0.1001-0.1009" by 0.0001 step, 0.101-0.109" by 0.001 step, 0.01-0.19" by 0.01 step, 0.2-0.9" by 0.1 step, 1-4" by 1 step	£1,560.00
	516-911-11	1		£1,340.00
	516-912-11	2		£1,160.00
CERA				
81	516-302-11	0	0.1001-0.1009" by 0.0001 step, 0.101-0.149" by 0.001 step, 0.05-0.95" by 0.05 step, 1-4" by 1 step	£8,210.00
	516-303-11	1		£3,880.00
	516-304-11	2		£2,970.00

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Gauge Blocks

SERIES 516 – Micrometer Inspection Gauge Block Set

- Set comprises ten gauge blocks and an optical parallel.
- For adjusting and calibrating outside micrometers.



516-106-10

Specifications

Metric

Blocks per set	Code No.	Grade	Set configuration	Price
Steel				
10	**516-106-10**	0	2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25 mm, optical parallel (t = 12 mm)	**£674.00**

Optional Accessory

Code No.	Description	Price
516-607	Gauge block holder	**£523.00**



516-607
(Gauge blocks not included.)



Sample application.

SERIES 516 – Caliper Inspection Gauge Block Set

- Set includes two gauge blocks and a setting ring.
- For adjusting and calibrating calipers.



516-122-10

Specifications

Metric

Blocks per set	Code No.	Grade	Set configuration	Price
Steel				
2	**516-122-10**	1	41.3, 131.4 mm, setting ring (ø20 mm), glove	**£788.00**

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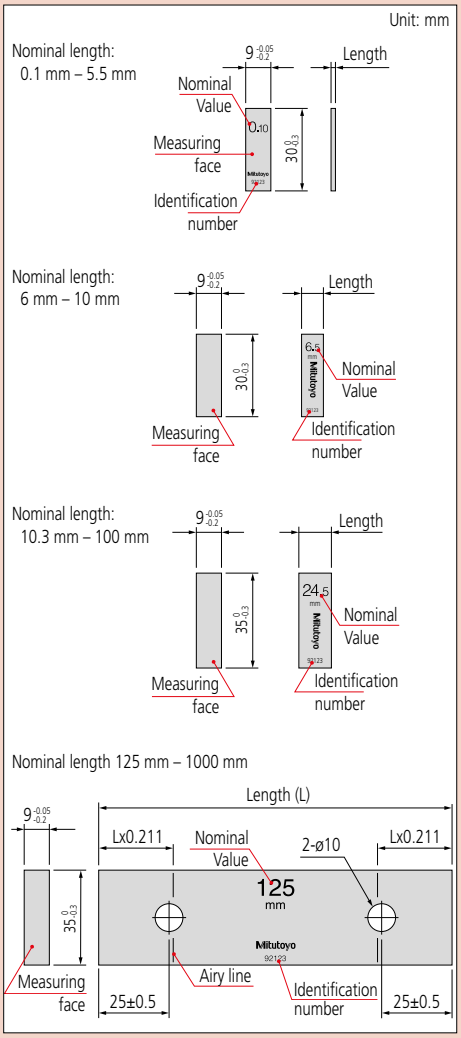
Gauge Blocks

Individual Metric Steel Gauge Blocks Grade 1



611675-031

Dimensions



Specifications

Metric

Length (mm)	Code No.	Price
0.1	611821-031	£146.00
0.11	611860-031	£92.60
0.12	611861-031	£146.00
0.13	611862-031	£146.00
0.14	611863-031	£146.00
0.15	611822-031	£146.00
0.16	611864-031	£146.00
0.17	611865-031	£146.00
0.18	611866-031	£146.00
0.19	611867-031	£146.00
0.2	611823-031	£138.00
0.21	611868-031	£138.00
0.22	611869-031	£138.00
0.23	611870-031	£138.00
0.24	611871-031	£138.00
0.25	611824-031	£138.00
0.26	611872-031	£138.00
0.27	611873-031	£138.00
0.28	611874-031	£138.00
0.29	611875-031	£138.00
0.3	611825-031	£119.00
0.31	611876-031	£119.00
0.32	611877-031	£119.00
0.33	611878-031	£119.00
0.34	611879-031	£119.00
0.35	611826-031	£119.00
0.36	611880-031	£119.00
0.37	611881-031	£119.00
0.38	611882-031	£119.00
0.39	611883-031	£119.00
0.4	611827-031	£96.20
0.41	611884-031	£96.20
0.42	611885-031	£96.20
0.43	611886-031	£96.20
0.44	611887-031	£96.20
0.45	611828-031	£96.20
0.46	611888-031	£96.20
0.47	611889-031	£96.20
0.48	611890-031	£96.20
0.49	611891-031	£96.20
0.5	611506-031	£58.60
0.51	611892-031	£58.60
0.52	611893-031	£58.60
0.53	611894-031	£58.60
0.54	611895-031	£58.60
0.55	611896-031	£58.60
0.56	611897-031	£58.60
0.57	611898-031	£58.60
0.58	611899-031	£58.60
0.59	611900-031	£58.60
0.6	611901-031	£58.60
0.61	611902-031	£58.60
0.62	611903-031	£58.60
0.63	611904-031	£58.60
0.64	611905-031	£58.60
0.65	611906-031	£58.60
0.66	611907-031	£58.60
0.67	611908-031	£58.60
0.68	611909-031	£58.60
0.69	611910-031	£58.60
0.7	611911-031	£51.40
0.71	611912-031	£51.40
0.72	611913-031	£51.40
0.73	611914-031	£51.40
0.74	611915-031	£51.40
0.75	611916-031	£51.40
0.76	611917-031	£51.40
0.77	611918-031	£51.40
0.78	611919-031	£51.40
0.79	611920-031	£51.40
0.8	611921-031	£51.40
0.81	611922-031	£51.40
0.82	611923-031	£51.40
0.83	611924-031	£51.40
0.84	611925-031	£51.40
0.85	611926-031	£51.40
0.86	611927-031	£51.40
0.87	611928-031	£51.40
0.88	611929-031	£51.40
0.89	611930-031	£51.40
0.9	611931-031	£51.40
0.91	611932-031	£51.40
0.92	611933-031	£51.40
0.93	611934-031	£51.40
0.94	611935-031	£51.40
0.95	611936-031	£51.40
0.96	611937-031	£51.40
0.97	611938-031	£51.40
0.98	611939-031	£51.40
0.99	611940-031	£51.40
0.991	611551-031	£34.70
0.992	611552-031	£34.70
0.993	611553-031	£34.70
0.994	611554-031	£34.70
0.995	611555-031	£34.70
0.996	611556-031	£34.70
0.997	611557-031	£34.70
0.998	611558-031	£34.70
0.999	611559-031	£34.70
1	611611-031	£29.60
1.0005	611520-031	£32.50
1.001	611521-031	£32.50
1.002	611522-031	£32.50
1.003	611523-031	£32.50
1.004	611524-031	£32.50
1.005	611525-031	£32.50
1.006	611526-031	£32.50
1.007	611527-031	£32.50
1.008	611528-031	£32.50
1.009	611529-031	£32.50
1.01	611561-031	£32.50
1.02	611562-031	£32.50
1.03	611563-031	£32.50
1.04	611564-031	£32.50

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Gauge Blocks

Individual Metric Steel Gauge Blocks Grade 1

Length (mm)	Code No.	Price
1.05	611565-031	£32.50
1.06	611566-031	£32.50
1.07	611567-031	£32.50
1.08	611568-031	£32.50
1.09	611569-031	£32.50
1.1	611570-031	£26.90
1.11	611571-031	£32.50
1.12	611572-031	£32.50
1.13	611573-031	£32.50
1.14	611574-031	£32.50
1.15	611575-031	£32.50
1.16	611576-031	£32.50
1.17	611577-031	£32.50
1.18	611578-031	£32.50
1.19	611579-031	£32.50
1.2	611580-031	£32.50
1.21	611581-031	£32.50
1.22	611582-031	£32.50
1.23	611583-031	£32.50
1.24	611584-031	£32.50
1.25	611585-031	£32.50
1.26	611586-031	£32.20
1.27	611587-031	£32.50
1.28	611588-031	£32.50
1.29	611589-031	£32.50
1.3	611590-031	£32.50
1.31	611591-031	£32.50
1.32	611592-031	£32.50
1.33	611593-031	£32.50
1.34	611594-031	£32.50
1.35	611595-031	£32.50
1.36	611596-031	£32.50
1.37	611597-031	£32.50
1.38	611598-031	£32.50
1.39	611599-031	£32.50
1.4	611600-031	£32.50
1.41	611601-031	£32.50
1.42	611602-031	£32.50
1.43	611603-031	£32.50
1.44	611604-031	£32.50
1.45	611605-031	£32.50
1.46	611606-031	£32.50
1.47	611607-031	£32.50
1.48	611608-031	£32.50
1.49	611609-031	£32.50
1.5	611641-031	£32.50
1.6	611516-031	£30.40
1.7	611517-031	£30.40
1.8	611518-031	£30.40
1.9	611519-031	£30.40
2	611612-031	£27.50
2.0005	611690-031	£30.40
2.001	611691-031	£30.40
2.002	611692-031	£30.40
2.003	611693-031	£30.40
2.004	611694-031	£30.40
2.005	611695-031	£30.40
2.006	611696-031	£30.40
2.007	611697-031	£30.40
2.008	611698-031	£30.40
2.009	611699-031	£30.40
2.01	611701-031	£30.40
2.02	611702-031	£30.40
2.03	611703-031	£30.40
2.04	611704-031	£30.40
2.05	611705-031	£30.40
2.06	611706-031	£30.40
2.07	611707-031	£30.40
2.08	611708-031	£30.40
2.09	611709-031	£30.40
2.1	611710-031	£26.60
2.11	611711-031	£30.40
2.12	611712-031	£30.40
2.13	611713-031	£30.40
2.14	611714-031	£30.40
2.15	611715-031	£30.40
2.16	611716-031	£30.40
2.17	611717-031	£30.40
2.18	611718-031	£30.40
2.19	611719-031	£30.40
2.2	611720-031	£30.40
2.21	611721-031	£30.40
2.22	611722-031	£30.40
2.23	611723-031	£30.40
2.24	611724-031	£30.40
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2.26	611726-031	£33.70
2.27	611727-031	£33.70
2.28	611728-031	£33.70
2.29	611729-031	£33.70
2.3	611730-031	£33.70
2.31	611731-031	£33.70
2.32	611732-031	£33.70
2.33	611733-031	£33.70
2.34	611734-031	£33.70
2.35	611735-031	£33.70
2.36	611736-031	£33.70
2.37	611737-031	£33.70
2.38	611738-031	£33.70
2.39	611739-031	£33.70
2.4	611740-031	£33.70
2.41	611741-031	£33.70
2.42	611742-031	£33.70
2.43	611743-031	£33.70
2.44	611744-031	£33.70
2.45	611745-031	£33.70
2.46	611746-031	£33.70
2.47	611747-031	£33.70
2.48	611748-031	£33.70
2.49	611749-031	£33.70
2.5	611642-031	£33.70
2.6	611750-031	£33.70
2.7	611751-031	£33.70
2.8	611752-031	£33.70
2.9	611753-031	£33.70
3	611613-031	£33.70
3.5	611643-031	£33.70
4	611614-031	£33.70
4.5	611644-031	£33.70
5	611615-031	£33.70
5.1	611850-031	£33.70
5.5	611645-031	£40.90
6	611616-031	£41.50
6.5	611646-031	£41.50
7	611617-031	£41.50
7.5	611647-031	£41.50
7.7	611851-031	£41.50
8	611618-031	£41.50
8.5	611648-031	£41.50
9	611619-031	£41.50
9.5	611649-031	£41.50
10	611671-031	£41.50
10.3	611852-031	£42.70
10.5	611650-031	£41.50
11	611621-031	£51.00
11.5	611651-031	£51.00
12	611622-031	£51.70
12.5	611652-031	£51.70
12.9	611853-031	£51.70
13	611623-031	£51.70
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15	611625-031	£52.40
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16.5	611656-031	£55.30
17	611627-031	£55.30
17.5	611657-031	£55.30
17.6	611854-031	£55.30
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18.5	611658-031	£55.30
19	611629-031	£55.30
19.5	611659-031	£55.30
20	611672-031	£55.30
20.2	611855-031	£55.30
20.5	611660-031	£55.30
21	611631-031	£60.00
21.5	611661-031	£60.00
22	611632-031	£60.00
22.5	611662-031	£60.00
22.8	611856-031	£60.00
23	611633-031	£60.00
23.5	611663-031	£60.00
24	611634-031	£60.00
24.5	611664-031	£60.00
25	611635-031	£61.20
25.25	611754-031	£50.90
30	611673-031	£68.60
35	611755-031	£57.20
40	611674-031	£76.10
41.3	611857-031	£80.50
45	611756-031	£68.10
50	611675-031	£69.70
60	611676-031	£98.30
70	611677-031	£110.00
75	611801-031	£113.00
80	611678-031	£121.00
90	611679-031	£125.00
100	611681-031	£133.00

Note: larger sizes available on request.

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Gauge Blocks

Individual Inch Steel Gauge Blocks Grade 1



611201-131

Specifications

Inch

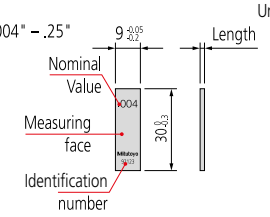
Length (inch)	Code No.	Price
.05	611105-131	£32.20
.0625 (1/16)	611303-131	£31.70
.1	611191-131	£33.60
.10005	611135-131	£33.60
.1001	611121-131	£33.60
.1002	611122-131	£33.60
.1003	611123-131	£33.60
.1004	611124-131	£33.60
.1005	611125-131	£33.60
.1006	611126-131	£33.60
.1007	611127-131	£33.60
.1008	611128-131	£33.60
.1009	611129-131	£33.60
.101	611141-131	£33.60
.102	611142-131	£33.60
.103	611143-131	£33.60
.104	611144-131	£33.60
.105	611145-131	£33.60
.106	611146-131	£33.60
.107	611147-131	£33.60
.108	611148-131	£33.60
.109	611149-131	£33.60
.11	611150-131	£33.60
.111	611151-131	£33.60
.112	611152-131	£33.60
.113	611153-131	£33.60
.114	611154-131	£33.60
.115	611155-131	£33.60
.116	611156-131	£33.60
.117	611157-131	£33.60
.118	611158-131	£33.60
.119	611159-131	£33.60
.12	611160-131	£33.60
.121	611161-131	£33.60
.122	611162-131	£33.60
.123	611163-131	£33.60
.124	611164-131	£33.60
.125	611165-131	£33.60
.126	611166-131	£33.60
.127	611167-131	£33.60
.128	611168-131	£33.80
.129	611169-131	£33.80
.13	611170-131	£33.80
.131	611171-131	£33.80
.132	611172-131	£33.80
.133	611173-131	£33.80
.134	611174-131	£33.80
.135	611175-131	£33.80
.136	611176-131	£33.80
.137	611177-131	£33.80
.138	611178-131	£33.80
.139	611179-131	£33.80
.14	611180-131	£33.80
.141	611181-131	£33.80
.142	611182-131	£33.80
.143	611183-131	£33.80
.144	611184-131	£33.80
.145	611185-131	£33.80
.146	611186-131	£33.80
.147	611187-131	£33.80
.148	611188-131	£33.80
.149	611189-131	£33.80
.15	611115-131	£33.80
.16	611116-131	£33.80
.17	611117-131	£33.80
.18	611118-131	£33.80
.19	611119-131	£34.30
.2	611192-131	£34.30
.21	611221-131	£36.60
.25	611212-131	£42.00
.3	611193-131	£42.70
.315	611209-131	£43.60
.35	611213-131	£43.60
.375 (3/8)	611113-531	£51.90
.4	611194-131	£43.60
.420	611210-131	£43.60
.45	611214-131	£52.80
.5	611195-131	£53.20
.55	611215-131	£53.60
.6	611196-131	£54.40
.605	611211-131	£54.40
.65	611216-131	£56.20
.7	611197-131	£57.00
.710	611220-131	£57.00
.75	611217-131	£57.50
.8	611198-131	£58.00
.815	611226-131	£58.00
.85	611218-131	£59.30
.9	611199-131	£62.00
.920	611227-131	£62.00
.95	611219-131	£62.00
1	611201-131	£62.20
2	611202-131	£86.90
3	611203-131	£93.90
4	611204-131	£138.00

Note: larger sizes available on request.

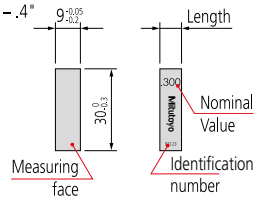
Dimensions

Unit: mm

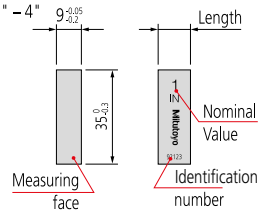
Nominal length: .004" – .25"



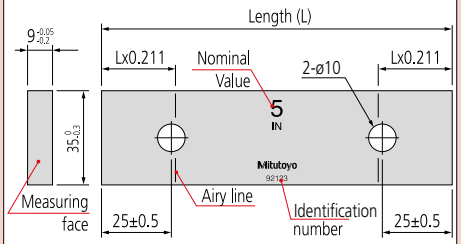
Nominal length: .3" – .4"



Nominal length: .45" – 4"



Nominal length: 5" – 20"



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Gauge Blocks

SERIES 516 – Wear Block Sets

- For protecting the measuring surfaces of the working gauge blocks in a set from excessive wear. Incorporated into a stack at one or both ends, these inexpensive and easily replaced blocks absorb the wear due to contact with abrasive workpieces and so help maintain the condition and accuracy of all the gauge blocks in a set.



516-806-10



516-834-16

Specifications

Metric

Blocks per set	Code No.	Grade	Contents	Nominal size	Price
Carbide					
2	**516-807-10**	0	2 pcs.	1 mm	**£241.00**
	516-806-10	1			**£224.00**
	516-803-10	0		2 mm	**£241.00**
	516-802-10	1			**£224.00**
CERA					
2	**516-832-10**	0	2 pcs.	1 mm	**£135.00**
	516-833-10	1			**£115.00**
	516-830-10	0		2 mm	**£135.00**
	516-831-10	1			**£115.00**

Inch

Blocks per set	Code No.	Grade	Contents	Nominal size	Price
Carbide					
2	**516-809-16**	0	2 pcs.	.05"	**£255.00**
	516-808-16	1			**£242.00**
	516-805-16	0		.1"	**£255.00**
	516-804-16	1			**£242.00**
CERA					
2	**516-836-16**	0	2 pcs.	.05"	**£130.00**
	516-837-16	1			**£130.00**
	516-834-16	0		.1"	**£130.00**
	516-835-16	1			**£130.00**

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Optional Accessories

SERIES 516 – Gauge Block Accessory Sets

- To expand the range of gauge block applications, Mitutoyo offers gauge block accessory sets. By assembling the items in a set, together with gauge blocks, you can easily and quickly build up a custom precision gauge to suit your application.



516-601J
(22 pcs)

Specifications

Item description	Code No.	Set of 22 pcs **516-601J**	Quantity	Price
Holder	**619002**	—	1 pc.	**£260.00**
	619003	✓		**£270.00**
	619004	✓		**£301.00**
	619005	✓		**£314.00**
Base	**619009**	✓		**£400.00**
Half round jaw	**619010**	✓	One pair (2 pcs)	**£283.00**
	619011	✓		**£281.00**
	619012	✓		**£331.00**
	619013	✓		**£400.00**
	619014	✓		**£508.00**
Plain jaw	**619018**	✓		**£305.00**
Scriber point	**619019**	✓	1 pc.	**£106.00**
Centre point	**619020**	✓		**£134.00**
Tram point	**619021**	✓	One pair (2 pcs)	**£459.00**
Triangular straight edge	**619022**	✓	1 pc.	**£268.00**
	619023	✓		**£424.00**

Code No.	Description	Price
516-601J	22 pc set	**£4,890.00**

Application Examples



Gauging a bore using a pair of half round jaws and a holder.



Marking a workpiece using the base, a holder and the scriber point.



Setting a bore gauge using a holder with the pair of Type I half-round jaws arranged as flat contact surfaces.

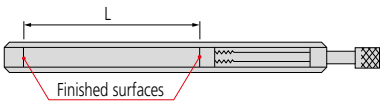
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Optional Accessories

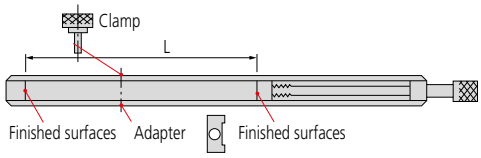
SERIES 516 – Gauge Block Accessory Sets

Holder Dimensions

Thickness = 15 mm, width = 29.5 mm

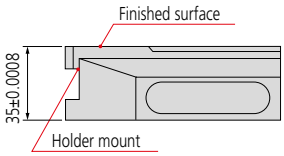


619002 L = 15 - 60 mm
619003 L = 5 - 100 mm



619004 L = 15 - 160 mm
619005 L = 20 - 250 mm
Used to clamp a stack of gauge blocks and jaws (or scriber point, etc.) together to form a gauge

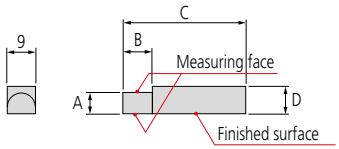
Base Dimensions



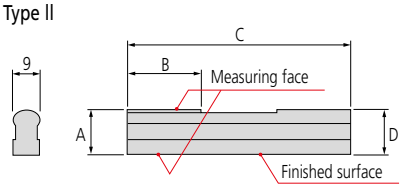
619009
Flatness tolerance of the finished surface: 0.5 µm
Flatness tolerance of the bottom surface: 1 µm

Half Round Jaw Dimensions

Type I



Type II



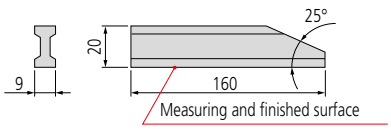
Flatness tolerance of the finished surface: 0.5 µm

Unit: mm

Code No.	Type	Size	A	B	C	D
619010	I	2	2±0.0005	5.5	40	7.5
619011		5	5±0.0005	14	45	7.5
619012		8	8±0.0005	20	50	8.5
619013	II	12	12±0.0005	25	75	13
619014		20	20±0.0005	25	125	20

Plain Jaw (B type) Dimensions

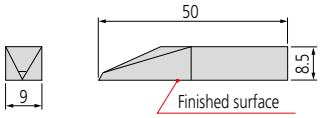
619018



Flatness tolerance of the finished surface: 1 µm

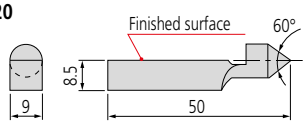
Scriber Point Dimensions

619019



Centre Point Dimensions

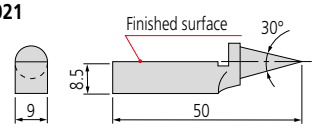
619020



Eccentricity tolerance of the point: ±10 µm
Flatness tolerance of the finished surface: 0.5 µm

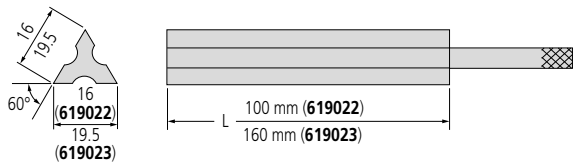
Tram Point Dimensions

619021



Eccentricity tolerance of the point: ±10 µm
Flatness tolerance of the finished surface: 0.5 µm

Triangular Straight Edge Dimensions



Straightness tolerance of the edges: 1.2 µm

E

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Mitutoyo

Optional Accessories

SERIES 516 – Maintenance Kit for Gauge Blocks

- Maintenance kit for gauge blocks includes all the necessary maintenance tools for removing burrs and contamination before use.



516-650E

Specifications

Code No.	Tools and accessories included	Price
516-650E	Ceraston (**601645**): For removing burrs on the measuring surfaces (100 x 25 x 12 mm).	£730.00
	Optical flat (**158-117**): For checking whether burrs exist on the measuring surfaces (ø45 x 12 mm).	
	Tweezers (**600004**): For handling thin blocks.	
	Blower brush (**600005**): For blowing dust off the measuring surfaces.	
	Cleaning paper (**600006**): For wiping off anti-corrosion oil and contamination (500 pcs.).	
	Artificial leather mat (**600007**): For handling blocks on a benchtop to prevent contamination and damage.	
	Reagent bottle (**600008**): Bottle for cleansing solution (100 ml).	
	Gloves (**600009D**): For handling large blocks to prevent expansion due to heat transfer from operator.	



Recommendation for regular calibration

Gauge blocks are often used to define a company's standard of length for manufacturing and as such must be reliable. This means that they need regular calibration to verify accuracy. (The problem of damage or corrosion should be addressed during use and blocks seriously affected must be discarded immediately.) The frequency of calibration depends on the tolerance requirements of the work, the amount of use and conditions under which the gauge blocks are used. The most economical cycle for any particular set of gauge blocks is best determined by studying the calibration history. The list below indicates timings for a typical initial calibration cycle for the various grades of block.

Application	Cycle	Grade
Reference	1 - 2 years	K
Calibration	2 years	K or 0
Inspection	2 years	0 or 1
Shop floor	0.5 - 1 year	1 or 2

As an accredited calibration laboratory, Mitutoyo offers a traceable calibration service for customers' gauge blocks. Our regular calibration service features:

- Gauge blocks manufactured by any maker can be calibrated.
- Cleansing and removal of burrs.
- Central dimension and maximum deviation of each block are measured.
- Calibration results are provided for immediate use and for building a calibration history of each block.

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Optional Accessories

Ceraston – Accessory for Gauge Block Maintenance

- Alumina-ceramic abrasive stone for removing burrs from hard materials such as ceramics that ordinary stones cannot handle.
- Can be used both for steel gauge blocks and CERA blocks.
- Excellent in the ease with which burrs can be removed and for durability compared with Arkansas stones.
- Both sides can be used.



601644



601645

Specifications

Code No.	Dimensions (W x D x H)	Price
601644	150 x 50 x 20 mm	**£419.00**
601645	100 x 25 x 12 mm	**£181.00**



Application example.

Removing burrs

Figure 1

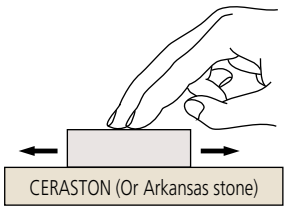
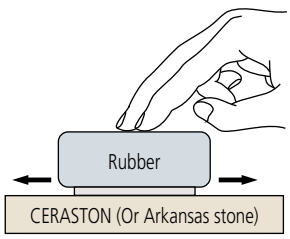


Figure 2



1. Wipe any dust and oil films from the gauge block and the Ceraston (or Arkansas stone) using a solvent.
2. Place the gauge block on the Ceraston so that the measuring face that has burrs is on the abrasive surface of the stone. While applying light pressure, move the gauge block to and fro about ten times (Fig. 1). Use a block rubber for thin gauge blocks to apply even pressure (Fig. 2).
3. Check the measuring face for burrs with an optical flat. If the burrs have not been removed, repeat step (2). If burrs are too large, they may not be removed with an abrasive stone. If so, discard the gauge block.

Note: The abrasive surface of a Ceraston must be made flat by lapping it from time to time. After lapping the Ceraston, the lapping powder must be completely removed from the surface to prevent the surface of the gauge block from being scratched.

Mitutoyo does not offer Arkansas stones.

E

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Reference Gauges

SERIES 515 – Height Master

- For calibrating and setting height gauges.
- A double gauge block height micrometer with integrated counter that makes reading faster, easier and error-free.
- The gauge blocks in the Height Master are arranged in two parallel rows, with a block step of 20 mm or 1" depending on model.
- The Digimatic models are equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.



515-322

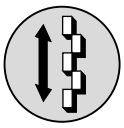


515-374

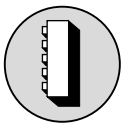
DIGIMATIC

U-WAVE

MeasurLink ENABLED
Data Management Software by Mitutoyo



Staggered 20 mm or 1" blocks (movable)



Vertical orientation



Riser block

Technical Data

Graduation:	0.001 mm (.00001")
Micrometer adjustment:	20 mm (1")
Micrometer feed:	0.5 mm/rev (.025"/rev)

Digimatic models only

Display:	LCD
Battery:	SR44 (2 pcs.), **938882**
Battery life:	Approx. 1.8 years under normal use

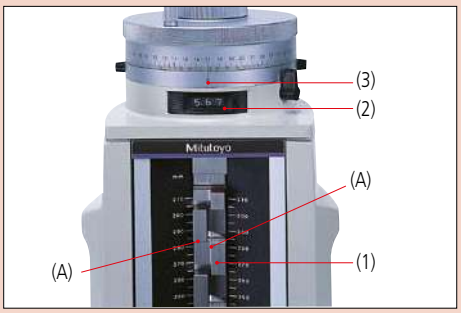
Functions (Digimatic models only)

Zero setting, presetting, ABS/INC switching, data hold, data output, auto power off, inch/mm reading (inch/mm models), alarm: low voltage / counting value / composition error.

Optional Accessories (Digimatic models only)

Code No.	Description	Price
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZD730G	U-WAVE-T transmitter (IP67 type)*	**£242.00**
02AZD790C	U-WAVE-T data cable with pushbutton (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*	**£242.00**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**

* U-WAVE-R Receiver required.



Mechanical height readout of adjacent top and bottom block surfaces (A) relative to base.

(1) Scale	280.
(2) Counter	5.67
(3) Thimble	0.000
	285.670 mm



Digital height readout.

Specifications

Metric

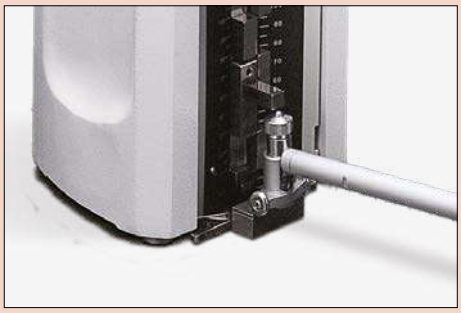
Code No.	Measuring range	Block pitch accuracy	Parallelism of blocks	Feed error	Retrace error	Mass	Price
Height Master							
515-322	5-310 mm	±1.5 µm	1 µm	±1 µm	1 µm	23 kg	**£3,380.00**
Digimatic Height Master							
515-374	10-310 mm	±1.5 µm	2 µm	±2 µm	2 µm	9.5 kg	**£2,820.00**

Inch

Code No.	Range (H)	Block pitch accuracy	Parallelism of blocks	Feed error	Retrace error	Mass	Price
Height Master							
515-311	.2-12.2"	±50 µin	40 µin	±40 µin	40 µin	23 kg	**£3,380.00**
Digimatic Height Master							
515-375	.5-12"	±100 µin	50 µin	±100 µin	100 µin	9.5 kg	**£2,820.00**

Note: The block accuracy and the parallelism of blocks are relative to the main unit reference surfaces.

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Reference Gauges

SERIES 515 – Height Master Auxiliary Block Kit for Bore Gauge Setting

- Used for efficient reference-setting of dial bore gauges and tubular inside micrometers (18-150 mm) on a Height Master.



515-112

Specifications

Metric

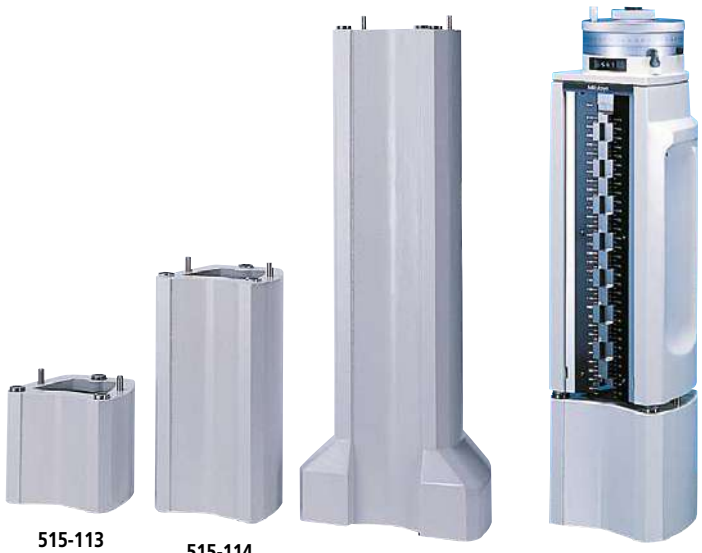
Code No.	Suitable type	Price
515-111	Digimatic Height Master (515-374)	£291.00
515-112	Height Master (515-322)	£291.00

Inch

Code No.	Suitable type	Price
515-120	Digimatic Height Master (515-375)	£291.00
515-121	Height Master (515-311)	£291.00

SERIES 515 – Height Master Riser Blocks

- The measuring range of a Height Master can be extended up to 900 mm by using 150, 300 or 600 mm riser blocks.



515-113 515-114 515-115

Specifications

Metric

Code No.	Height	Accuracy	Variation in length	Mass	Price
515-113	150 mm	±0.6 µm	0.6 µm	5.7 kg	£493.00
515-114	300 mm	±1 µm	0.8 µm	11.8 kg	£699.00
515-115	600 mm	±2 µm	1 µm	26.8 kg	£1,130.00

Inch

Code No.	Height	Accuracy	Variation in length	Mass	Price
515-116	6"	±20 µin	20 µin	5.7 kg	£493.00
515-117	12"	±40 µin	30 µin	11.8 kg	£699.00
515-118	24"	±80 µin	40 µin	27.9 kg	£1,130.00

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Mitutoyo

Reference Gauges

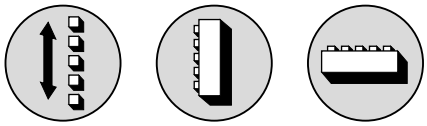
SERIES 515 – Check Master

- This calibration fixture is designed for calibrating the X-, Y- and Z-coordinate axes of precision machine tools and coordinate measuring machines.
- Rigidly clamped 10 mm gauge blocks provide a step of 20 mm.



515-722

515-723



Single-row 10 mm blocks

Vertical orientation

Horizontal orientation

Specifications

Metric

Code No.		515-720	515-721	515-722	515-723
Range (H)		300 mm	450 mm	600 mm	1000 mm
Block pitch accuracy	H ≤ 310 mm	±2.5 µm			
	310 < H ≤ 610 mm	—	±3.5 µm		
	610< H ≤ 1010 mm	—			±5 µm
Parallelism of blocks	H ≤ 310 mm	1.2 µm			
	310< H ≤ 610 mm	—	1.5 µm		
	610< H ≤ 1010 mm	—			2 µm
Mass		7 kg	10 kg	13 kg	22 kg
Price		**£2,380.00**	**£2,470.00**	**£3,010.00**	**£6,290.00**

Note 1: The block accuracy and the parallelism of blocks are relative to the main unit reference surface.
Note 2: Supplied with a wooden storage case as standard.
Note 3: High-accuracy type is available as a special order.

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Reference Gauges

SERIES 528 – Straight Edge

- Designed for testing the straightness of workpiece features.
- Hardened, ground and micro-lapped measuring edge.
- Made of tool steel with heat shield.

Technical Data

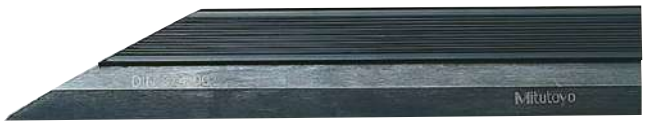
Section: 60° vee



528-101



528-102



528-103

E

Specifications

Metric

Code No.	Length	Remarks	Price
528-100	50 mm	—	**£30.40**
528-101	75 mm	—	**£34.30**
528-102	100 mm	—	**£38.50**
528-103	150 mm	—	**£41.60**
528-104	200 mm	—	**£54.10**
528-105	300 mm	Supplied in a wooden case	**£122.00**
528-106	400 mm	Supplied in a wooden case	**£199.00**
528-107	500 mm	Supplied in a wooden case	**£269.00**

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Mitutoyo

Reference Gauges

SERIES 182 – Steel Rules

- Clear graduations on satin-chrome finish.
- Made of stainless steel, hardened and tempered.



182-131



182-121



182-125



182-225

E

Specifications

Metric

Code No.	Graduations	Range	Width	Price
Wide rigid rules				
182-111	1 mm, 0.5 mm (on both faces)	150 mm	19 mm	**£12.90**
182-131		300 mm	25 mm	**£19.30**
Fully flexible rules				
182-211	1 mm, 0.5 mm (on both faces)	150 mm	12 mm	**£17.00**
182-231		300 mm	12 mm	**£17.60**

Inch

Code No.	Graduations	Range	Width	Price
Wide rigid rules				
182-101	1/8", 1/16", 1/32", 1/64"	6"	.75"	**£12.90**
182-121		12"	.98"	**£19.30**
Fully flexible rules				
182-201	1/8", 1/16", 1/32", 1/64"	6"	.47"	**£12.80**
182-221		12"	.47"	**£17.60**

Inch/Metric

Code No.	Graduations	Range	Width	Price
Wide rigid rules				
182-105	1/32", 1/64", 1 mm, 0.5 mm	6" / 150 mm	.75"	**£13.50**
182-125		12" / 300 mm	.98"	**£28.00**
182-145		18" / 450 mm	1.18"	**£47.40**
182-165		24" / 600 mm	1.18"	**£67.00**
Semi-flexible rules*				
182-309	1/16", 1/32", 1/64", 1 mm, 0.5 mm	40" / 1000 mm	.59"	**£72.40**
Fully flexible rules				
182-205	1/32", 1/64", 1 mm, 0.5 mm	6" / 150 mm	.47"	**£12.80**
182-225		12" / 300 mm	.47"	**£17.60**
182-245		18" / 450 mm	.75"	**£44.50**
182-265		24" / 600 mm	.75"	**£56.30**

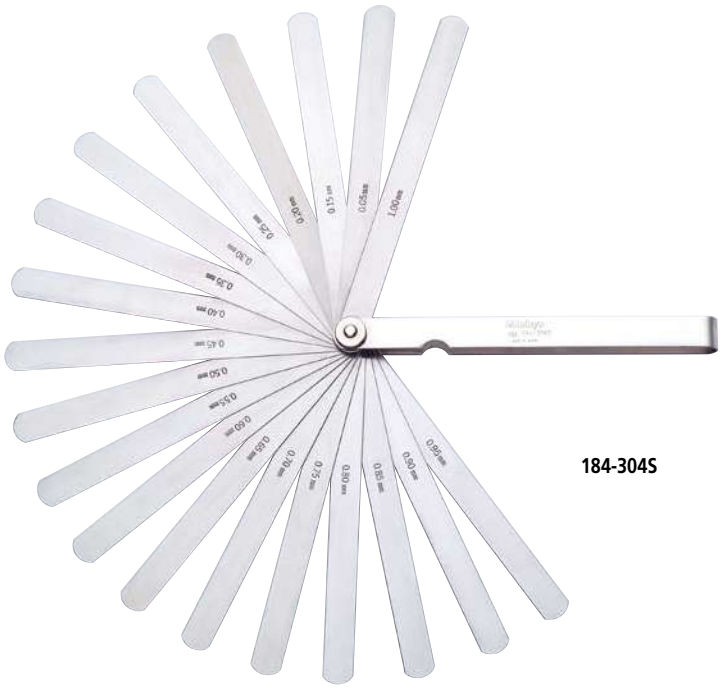
* Graduations engraved on the front side only.

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Reference Gauges

SERIES 184 – Thickness Gauges

- Designed for gauging the width of narrow gaps.
- Each leaf is marked with its thickness.
- Each leaf is detachable if necessary.



184-304S

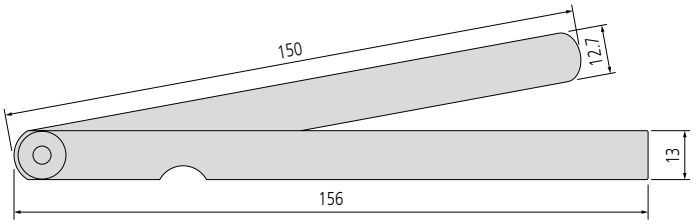
Specifications

Metric

Code No.	Range	Composition of leaves	Remarks	Price
184-301S	0.05 - 1 mm	13 leaves: 0.05 - 0.3 mm by 0.05 mm, 0.4 - 1 mm by 0.1 mm	Long leaf	**£43.40**
184-302S	0.03 - 0.5 mm	13 leaves: 0.03 - 0.1 mm by 0.01 mm, 0.2 - 0.5 mm by 0.1 mm, 0.15 mm		**£27.30**
184-303S	0.05 - 1 mm	28 leaves: 0.05 - 0.15 mm by 0.01 mm, 0.2 - 1 mm by 0.05 mm		**£81.00**
184-304S		20 leaves: 0.05 - 1 mm by 0.05 mm		**£52.50**
184-308S	0.05 - 0.8 mm	10 leaves: 0.05 - 0.2 mm by 0.05 mm, 0.3 - 0.8 mm by 0.1 mm		**£24.70**

Dimensions

Unit: mm



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Reference Gauges

SERIES 186 – Radius Gauges

- Designed for gauging small internal and external radii.
- Each leaf comprises an internal and an external radius gauge of the same size.
- Radius size is stamped on each leaf.
- With locking clamp to enable convenient handling.



186-105



186-110

Specifications

Metric

Code No.	Range	Composition of leaves	Remarks	Price
186-110	0.4 - 6 mm	18 leaves: 0.4, 0.8, 1, 1.2, 1.5, 1.6 mm, 1.75 - 3 mm by 0.25 mm, 3.5 - 6 mm by 0.5 mm	90° arc	**£46.30**
186-902	0.5 - 13 mm	26 leaves: 0.5 - 13 mm by 0.5 mm	90° arc	**£206.00**
186-105	1 - 7 mm	34 leaves: 1 - 3 mm by 0.25 mm 3.5 - 7 mm by 0.5 mm	180° arc	**£41.10**
186-106	7.5 - 15 mm	32 leaves: 7.5 - 15 mm by 0.5 mm	180° arc	**£49.10**
186-107	15.5 - 25 mm	30 leaves: 15.5 - 20 mm by 0.5 mm, 21 - 25 mm by 1 mm	180° arc	**£78.80**

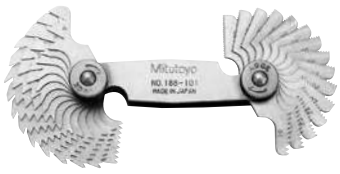
Inch

Code No.	Range	Composition of leaves	Remarks	Price
186-103	1/32" - 17/64"	16 leaves: 1/32" - 17/64" by 64ths	90° arc	**£41.90**
186-101	1/32" - 1/4"	15 leaves: 1/32" - 1/4" by 64ths	180° arc	**£41.60**
186-102	17/64" - 1/2"	16 leaves: 17/64" - 1/2" by 64ths	180° arc	**£48.00**
186-104	9/32" - 33/64"	16 leaves: 9/32" - 33/64" by 64ths	90° arc	**£46.20**
186-901*	1/64" - 1/2"	25 leaves: 1/64" - 17/64" by 64ths, 9/32" - 1/2" by 32nds	—	**£201.00**

* Each gauge has five measuring locations.

SERIES 188 – Thread Pitch Gauges

- Thread pitch is stamped on each gauge.
- Metric, Unified, and Whitworth screw pitch gauges.



188-101

Specifications

Code No.	Range	Composition of leaves	Price
Metric screw pitch gauges			
188-130	0.35 - 6 mm	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, 6 mm and 60° angle gauge	**£43.60**
188-122	0.4 - 7 mm	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, 7 mm	**£43.60**
188-121	0.4 - 7 mm	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, 7 mm	**£43.60**
Unified screw pitch gauges			
188-111	4 - 42 TPI	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	**£48.20**
Metric and Unified screw pitch gauge set			
188-151	0.4 - 7 mm/ 4 - 42 TPI	51 leaves: consisting of sets **188-122** and **188-111**	**£81.50**
Whitworth screw pitch gauges			
188-101	4 - 42 TPI	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	**£45.20**
188-102	4 - 60 TPI	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	**£43.60**

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Reference Gauges

SERIES 187 – Digimatic Universal Protractor

- Universal Bevel Protractor with easy-to-read digital display.
- Automatic turn-off after 10 minutes; fixed reference points for easy adjustment.
- Fine adjustment for precise setting of angles.
- The protractor head slides and clamps at any point along the blade.
- Will mount on Series 192 Height Gauges via holder.
- Data output port that enables incorporation into measurement networking and statistical process control systems.

DIGIMATIC MeasurLink® ENABLED
Data Management Software by Mitutoyo



187-552

Technical Data

Battery: Lithium Battery
Battery life: 2,000 hours

Functions

Presetting

Standard Accessory

Code No.	Description
950749	Holder for mounting on height gauges

Optional Accessories

Code No.	Description	Price
187-103	300 mm / 12" blade	£35.10
187-104	150 mm / 6" blade	£23.20
187-105	Acute angle attachment	£62.10
905338	SPC data cable (1 m)	£42.00
905409	SPC data cable (2 m)	£47.10

Specifications

Inch/Metric

Code No.	Blade length	Measuring range	Accuracy	Resolution	Repeatability	Price
187-551	150 mm / 6"	-360° to +360°	±2′ (±0.03°)	1′ (0.01°)	1′ (0.01°)	£1,020.00
187-552	300 mm / 12"					£1,070.00

SERIES 187 – Universal Bevel Protractor

- High-precision instrument for accurate angle measurement on machines, moulds, and jigs.
- Can be attached to height gauges.



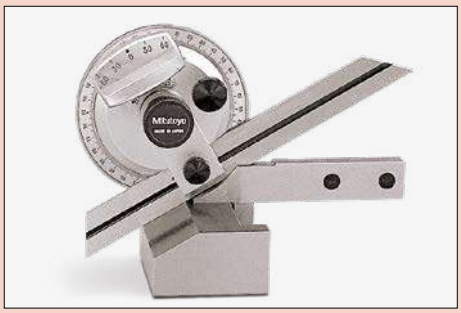
187-908-10

Standard Accessory

Code No.	Description
950750	Holder for mounting on height gauges



Measuring an internal dovetail slide angle.



Measuring an external angle.

Specifications

Metric

Code No.	Blade length	Graduation	Circle division	Remarks	Price
187-907-10	150 mm	5′ (0° - 90° - 0°)	90° x 4 (360°)	w/60°, 45° edges	£258.00
187-908-10	300 mm				£269.00

E

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Reference Gauges

SERIES 950 – Digital Protractor

- Newly developed instrument for measurement of flatness, squareness and angularity.
- Precision support surface in aluminium frame for high rigidity and low weight.
- Data output feature (Model Pro 3600 only).



950-317

Technical Data

Accuracy:	See table
Measuring range:	360° (4 x 90°)
Power supply:	Standard battery (9 V)
Operating temperature:	-5 to 50 °C
Mounting holes:	M3

Optional Accessory (for 950-318 only)

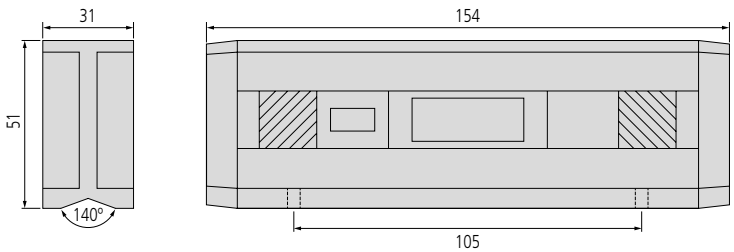
Code No.	Description	Price
50AAA983A	RS-232C cable with footswitch (3 m)	**£309.00**

Specifications

Code No.	Resolution/sensitivity	Accuracy	Repeatability	Mass	Price
Model Pro 360					
950-317	0.1°	0.05 m horizontal ±0.1° vertical ±0.2° m/m	± 0.1°	325 g	**£384.00**
Model Pro 3600					
950-318	0.01° (0° to 9.99°) 0.1° (10° to 90°)	±0.05° (0° to 10°) ±0.2° (10° to 80°) ±0.1° (80° to 90°)	± 0.05°	332 g	**£623.00**

Dimensions

Unit: mm



E

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Reference Gauges

SERIES 517 – Black Granite Surface Plates

- Natural granite is free from deterioration or dimensional change over time.
- Granite surface plates have significant advantages over cast iron surface plates: twice as hard as cast iron; non-magnetic; low thermal expansion.
- 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 workpieces or instruments.
- Free from wringing, so there is no interruption of work.
- Use these plates in a stable temperature environment. Since flatness error occurs when there is a temperature difference between the working surface and the underside, avoid working in direct sunlight. Also, do not place a plate in the vicinity of an air conditioner, etc. (Recommended environment: temperature 20±1°C, humidity 58±2%.)

Technical Data

Grade: Conforms to BS 817 1988

Optional Accessory

Code No.	Description	Price
CM0700	Granite cleaner (1l)	£26.50



Granite surface plate and stand

Specifications

Grade 1

Code No.	Dimensions (L x W x H)	Price
Without stand		
517-901-1	300 x 200 x 65 mm	£163.00
517-902-1	300 x 300 x 65 mm	£207.00
517-903-1	450 x 300 x 75 mm	£244.00
517-904-1	450 x 450 x 75 mm	£325.00
517-905-1	600 x 450 x 75 mm	£475.00
517-906-1	600 x 600 x 75 mm	£599.00
517-907-1	750 x 600 x 100 mm	£737.00
517-908-1	900 x 600 x 100 mm	£897.00
With stand		
517-909-1UK	900 x 600 x 100 mm	£1,580.00
517-910-1UK	900 x 900 x 125 mm	£2,050.00
517-911-1UK	1200 x 600 x 100 mm	£2,070.00
517-912-1UK	1200 x 900 x 125 mm	£2,370.00
517-913-1UK	1200 x 1200 x 150 mm	£3,110.00
517-914-1UK	1500 x 1000 x 150 mm	£3,550.00
517-915-1UK	1500 x 1200 x 150 mm	£3,990.00
517-916-1UK	2000 x 1000 x 150 mm	£4,530.00
517-917-1UK	2000 x 1200 x 150 mm	£4,850.00
517-918-1UK	2400 x 1200 x 200 mm	£7,020.00

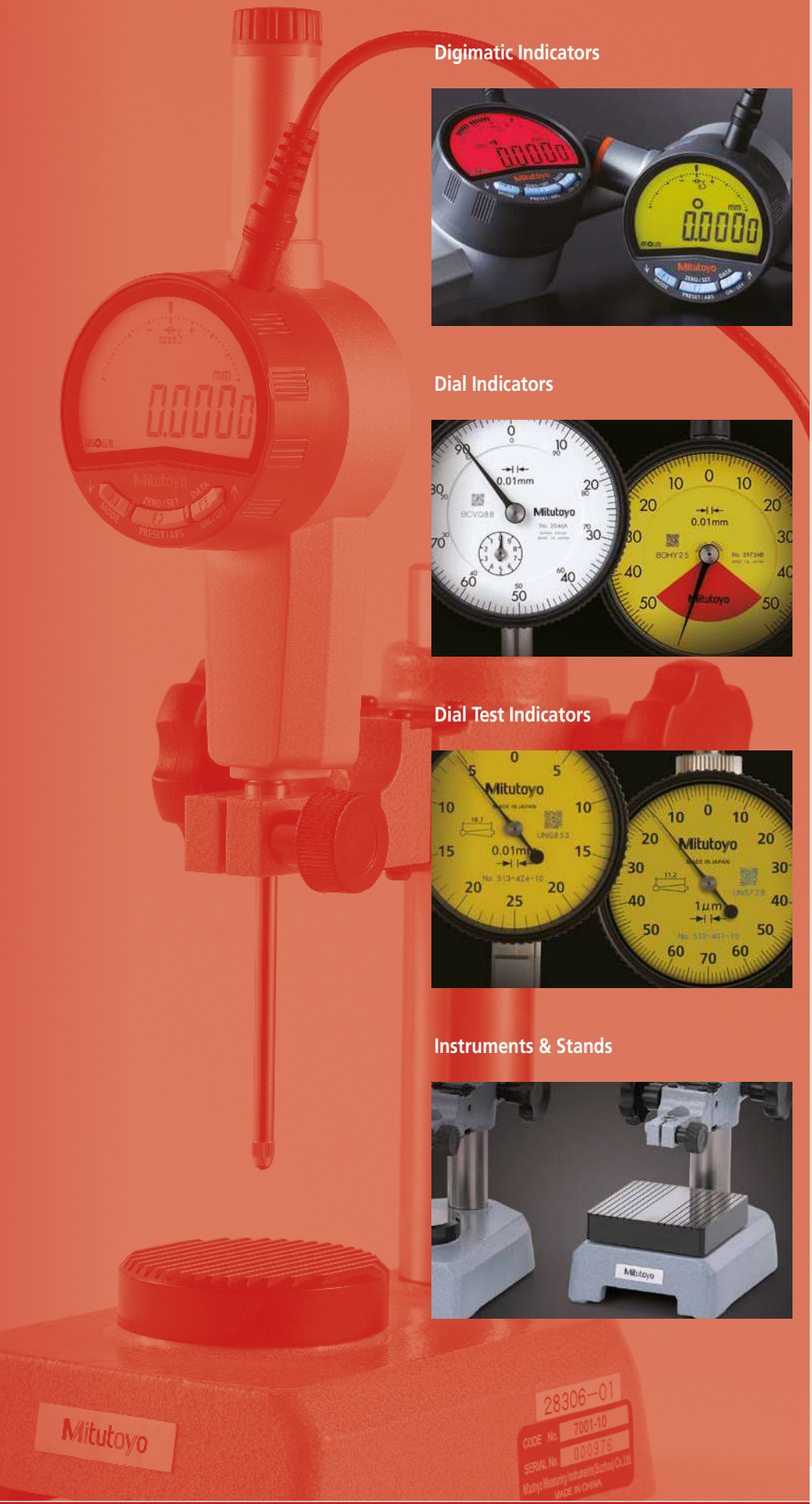
Grade 0

Code No.	Dimensions (L x W x H)	Price
Without stand		
517-901-0	300 x 200 x 65 mm	£189.00
517-902-0	300 x 300 x 65 mm	£233.00
517-903-0	450 x 300 x 75 mm	£269.00
517-904-0	450 x 450 x 75 mm	£364.00
517-905-0	600 x 450 x 75 mm	£537.00
517-906-0	600 x 600 x 75 mm	£687.00
517-907-0	750 x 600 x 100 mm	£836.00
517-908-0	900 x 600 x 100 mm	£985.00
With stand		
517-909-0UK	900 x 600 x 100 mm	£1,700.00
517-910-0UK	900 x 900 x 125 mm	£2,160.00
517-911-0UK	1200 x 600 x 100 mm	£2,200.00
517-912-0UK	1200 x 900 x 125 mm	£2,440.00
517-913-0UK	1200 x 1200 x 150 mm	£3,380.00
517-914-0UK	1500 x 1000 x 150 mm	£3,860.00
517-915-0UK	1500 x 1200 x 150 mm	£4,100.00
517-916-0UK	2000 x 1000 x 150 mm	£4,690.00
517-917-0UK	2000 x 1200 x 150 mm	£5,100.00
517-918-0UK	2400 x 1200 x 200 mm	£7,650.00

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DIGIMATIC INDICATORS
DIAL INDICATORS
DIAL TEST INDICATORS
INSTRUMENTS & STANDS



Digimatic Indicators

Dial Indicators

Dial Test Indicators

Instruments & Stands

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Mitutoyo

Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Indicators ID-N/B

- Our unique ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on.
- Rated to IP66: can be used satisfactorily even in adverse environments where the indicator is subject to splashing by cutting fluid or coolant.
- Slim body design (body width: only 35 mm) is advantageous in multipoint measurement situations where space is restricted.
- A 5 mm-stroke spindle with a higher degree of accuracy has been implemented by adopting a direct reading scale for spindle displacement.
- The chance of overspeed errors has been eliminated thanks to the ABSOLUTE sensor.
- Built-in tolerance judgement function provides OK, +NG, or –NG judgement of measurement with respect to the preset upper and lower limit values, indicating the status of a measurement with the appropriate symbol.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.
- There is a choice of convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals and direct input to cells in off-the-shelf spreadsheet software such as Excel.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP66 U-WAVE

MeasurLink® ENABLED Data Management Software by Mitutoyo



543-576



543-586

Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error			Price
			MPE$_E$*	Hysteresis MPE$_H$	Repeatability MPE$_R$	
Slim type ID-N						
543-571	.5" / 12.7 mm	.0005" / 0.01 mm	±.001" / 0.02 mm	.001" / 0.02 mm	.0005" / 0.01 mm	**£259.00**
543-576		.0005", .00005" / 0.01, 0.001 mm (selectable)	±.0001" / 0.003 mm	.0001" / 0.002 mm		**£362.00**
Back plunger type ID-B						
543-581	.2" / 5 mm	.0005" / 0.01 mm	±.001" / 0.02 mm	.001" / 0.02 mm	.0005" / 0.01 mm	**£285.00**
543-586		.0005", .00005" / 0.01, 0.001 mm (selectable)	±.0001" / 0.003 mm	.0001" / 0.002 mm		**£384.00**

* Error of indication for the total measuring range.

Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic line encoder
Max. response speed:	Unlimited (scanning measurement is not supported)
Measuring force:	2.5 N or less (ID-N), 2.0 N or less (ID-B)
Stem diameter:	3/8"
Standard contact point:	**21BZB005**
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 7,000 hours under normal use

Functions

Zero-setting, presetting, direction switching, tolerance judgement, display hold, data output, inch/mm reading (inch/mm models), LCD readout rotation, alarm (low voltage, counting value, composition error, overflow error, tolerance limit setting error).



LCD readout rotation function.



Rated to IP66 water- and dust-proofing standard and oil resistance improved.



Body width 35 mm.

Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Indicators ID-N/B

Optional Accessories

Code No.	Description	Price
238774	Rubber boot for ID-N, silicone	£17.70
02AZD730G	U-WAVE-T IP67 transmitter*1	£242.00
02AZD790G	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*1	£242.00
02AZE140G	U-WAVE-T data cable with footswitch connection (160/500 mm)	£160.00
06AFM380G	USB input tool direct USB-ITN-C (2 m)	£143.00
21AAB562	Rubber boot for ID-B, NBR	£2.20
21EAA194	SPC data cable (1 m)	£58.60
21EAA190	SPC data cable (2 m)	£66.00
21EAA210	Bifurcated connecting cable with zero-setting terminal (1 m)*2	£153.00
21EAA211	Bifurcated connecting cable with zero-setting terminal (2 m)*2	£170.00
21EAA212	Rubber boot for ID-B, silicone	£12.20
21EAA423	Rubber boot for ID-N, NBR	£4.40
21EZA146	Centre-lug back	£15.60
21EZA150	Spindle lifting knob for ID-N	£16.90

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.

*1 U-WAVE-R Receiver required.

*2 Two of the wires inside the cable are separated for zero setting without touching the SET switch on the main body. Use these cables in combination with commercially available switches. Zero setting is performed by briefly connecting these two wires together (less than a second), and ABS preset & recall by connecting for a second or more.



Spindle can be manually lifted. Remove the spindle cap for ID-N and attach the lifting knob to the spindle. Note that water resistance is not maintained in this configuration.



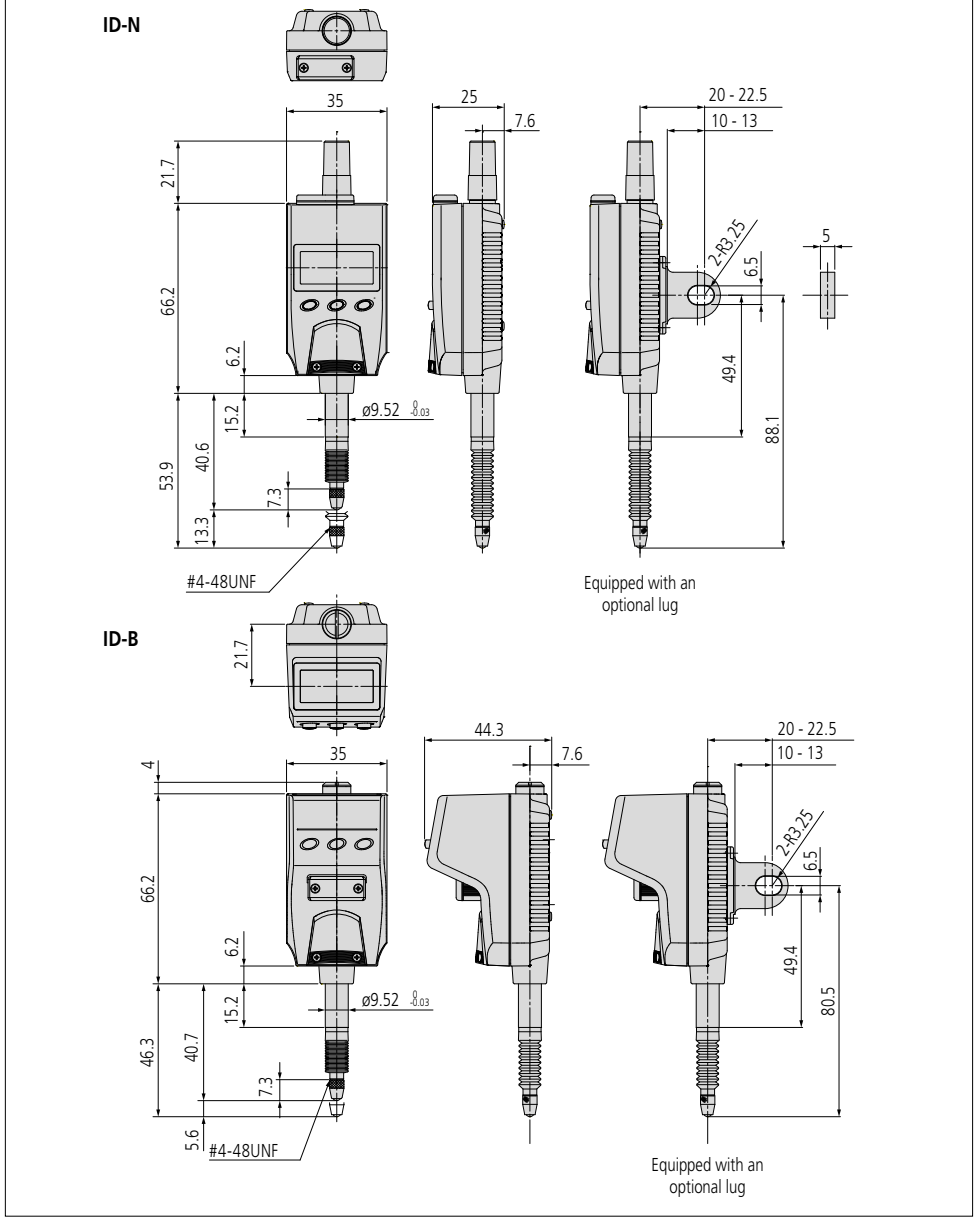
SPC cable.



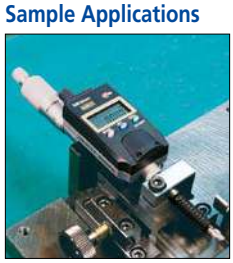
Bifurcated connecting cable with zero-setting terminal.

Dimensions

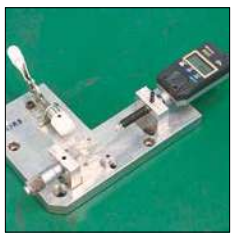
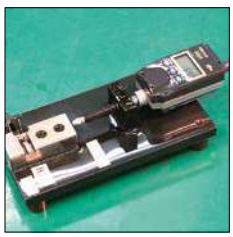
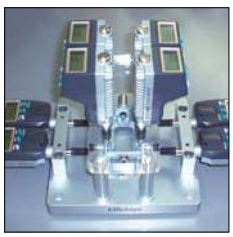
Unit: mm



Sample Applications





F

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Mitutoyo

Digimatic Indicators

SERIES 543 – Digimatic High Accuracy/Functionality Indicator ID-H

- This new-generation digital indicator offers the excellent accuracy and functionality expected from the top class of indicator.
- Take advantage of its high accuracy backed up by 0.5 µm/.00002" resolution, remote control functionality via a handheld controller (or an RS-232C interface) and easy runout measurements with the well-established analogue bar display.
- Functionality meets the needs of diverse measurement applications.
- Measuring maximum value, minimum value and runout (difference between a maximum and a minimum value).
- GO/NO-GO judgement function: If a judgement result shows an out of tolerance condition the display backlighting changes from green to red.
- With the optional remote controller, operations such as zero-setting and presetting can be made without touching the indicator body, thereby avoiding disturbance to the set-up.
- An advanced, remote control system can be implemented with the built-in RS-232 interface and a PC.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

DIGIMATIC U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



543-562E



543-564E

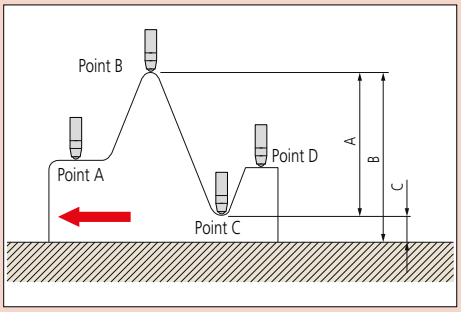
Technical Data

Resolution (selectable):	.00002", .00005", .0001"/ 0.0005, 0.001 mm
Display:	7-digit LCD, sign, and analogue bar with 2-colour backlight
Power supply:	6V DC (via AC adapter)
Positional detection method:	Photoelectric type reflection linear encoder
Max. response speed:	1000 mm/sec
Spindle direction:	Up to direction in which spindle is horizontal
Standard contact point:	**21BZB005**
Lifting lever:	**21EAA426**

Functions

Zero set, preset, GO/±NG judgement, max/min value hold, runout measurement, resolution switching, counting direction switching, data output, data hold, function lock, inch/mm reading (inch/mm models), alarm (over speed error, setting error, overflow error).

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 pushbutton sequence.

Specifications

Inch/Metric

Code No.	Range	Max. permissible error			Measuring force	Price
		MPE$_E$*	Hysteresis MPE$_H$	Repeatability MPE$_R$		
543-562E	1.2"/30.4 mm	±.00006"/ 0.0015 mm	±.00006"/ 0.0015 mm	.00004"/ 0.001 mm	2.0 N or less	**£803.00**
543-564E	2.4"/60.9 mm	±.0001"/ 0.0025 mm	±.0001"/ 0.0025 mm		2.5 N or less	**£924.00**

* Error of indication for the total measuring range.
Note 1: The indicator can output SPC (Digimatic) data consisting of up to 6 digits in full. If the data consists of 7 digits the first digit is not output (example: 123.4565 mm is output as 23.4565 mm).
Note 2: The orientation for use can be from vertical (contact point pointing downward) to horizontal (spindle in horizontal orientation).

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Digimatic Indicators

SERIES 543 – Digimatic High Accuracy/Functionality Indicator ID-H

Optional Accessories

Code No.	Description	Price
101306	Centre-lug back	£4.40
936937	SPC data cable (1 m)	£42.00
965014	SPC data cable (2 m)	£61.60
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790D	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
02AZE140D	U-WAVE-T data cable with footswitch connection (160/500 mm)	£160.00
02AZE200	U-WAVE-T mounting plate	£26.70
06AFM380D	USB input tool direct USB-ITN-D (2 m)	£143.00
21EAA131	Connecting cable for RS-232 (2 m)	£178.00
21EZA099	Remote controller	£85.60
21EZA101	Spindle lifting knob	£23.60
21JZA295	Spindle lifting cable	£37.20

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Measuring stands refer to pages F-67 to F-72 for details.
* U-WAVE-R Receiver required.





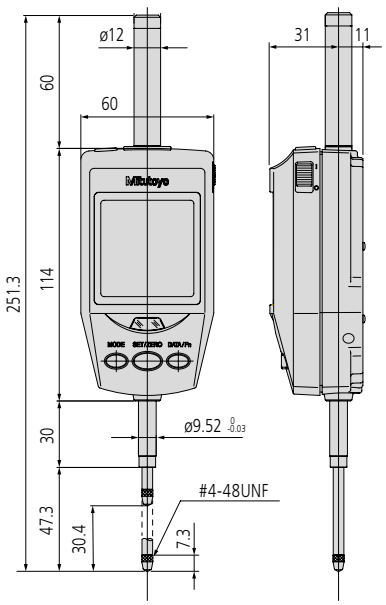


Remote controller (optional).

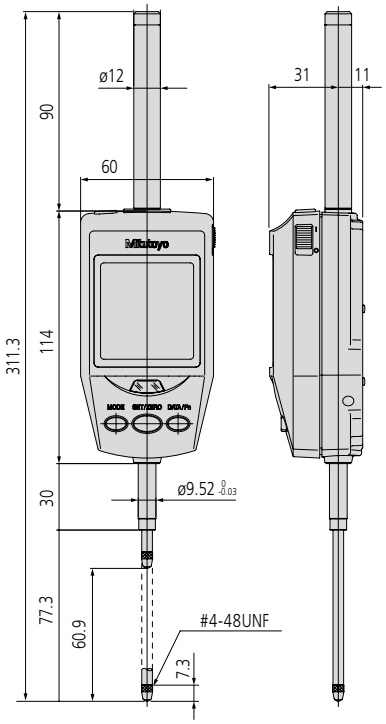
Dimensions

Unit: mm

543-562E



543-564E



Tolerance judgement GO/+NG



Analogue bar display



Maximum value / minimum value measurement



Resolution switching



Difference / runout measurement



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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Indicator ID-C NX

- With the ABSOLUTE Linear Encoder technology, once the measurement reference point has been set it will not be lost when the power is turned off.
- This range includes models with resolution switchable down to 0.5 µm.
- On-screen calibration reminder.
- Easy-to-read large back-lit LCD readout with a character height of 11 mm and an analogue scale.
- A newly designed data port allows for bi-directional communication. With the addition of the appropriate data cable, parameters, remote zeroing, and presetting can all be implemented from a connected PC.

ABSOLUTE DIGIMATIC S1 MeasurLink ENABLED Data Management Software by Mitutoyo



543-701B

U-WAVE fit



543-721B

U-WAVE



543-736B

U-WAVE

Specifications

Inch/Metric

Code No.	Range	Max. permissible error*1 MPEE*2	Max. permissible error*1 Hysteresis MPEH	Max. permissible error*1 Repeatability MPER	Measuring force	Interface	Price
Resolution: .0005" / .0001" / .00005" / .00002" / 0.01 mm / 0.001 mm / 0.0005 mm (selectable)							
543-701B	.5" / 12.7 mm	±.00012" / 0.003 mm	.00008" / 0.002 mm		1.5 N or less	d1 / d2 / S1	**£372.00**
543-706B	.5" / 12.7 mm				0.4 N - 0.7 N*3		**£432.00**
543-721B	1" / 25.4 mm				1.8 N or less		**£534.00**
543-731B	2" / 50.8 mm	±.0002" / 0.005 mm			2.3 N or less		**£580.00**
Resolution: .0005" / 0.01 mm							
543-711B	.5" / 12.7 mm	±.001" / 0.02 mm	.001" / 0.02 mm	.0005" / 0.01 mm	0.9 N or less	d1 / S1	**£292.00**
543-716B	.5" / 12.7 mm				0.2 N - 0.5 N*3		**£352.00**
543-726B	1" / 25.4 mm				1.8 N or less		**£425.00**
543-736B	2" / 50.8 mm	±.0015" / 0.04 mm			2.3 N or less		**£523.00**

*1 These values apply at 20 °C.
*2 Error of indication for the total measuring range.
*3 Low measuring force.

Technical Data

Display:	7-digit LCD and analogue bar (±20 scale)
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited
Stem diameter:	8 mm
Standard contact point:	**901312**
Battery:	CR2032 (1 pc.), **05SAA217**
Battery life:	Approx. 2.5 years under normal use

Functions

Preset, zero-set, peak detection (max, min, TIR), counting direction switching, resolution selecting, tolerance judgement, simplified calculation, analogue bar display ON/OFF, analogue bar scale selecting, key customize, function lock, calibration schedule warning function, data hold, data output, inch/mm reading, auto OFF, reset all settings, alarm (notifications for setting errors, sensor error, and display overflow).

Setting Measuring Force on Low Measuring Force Model

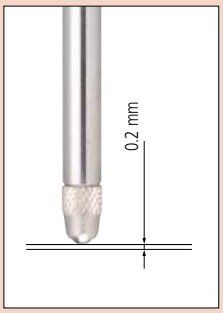
Spindle orientation	Spring	Weight (approx. 0.1 N)	Max. measuring force
Pointing vertically downward	Yes	Yes	0.7 N or less
	Yes	No	0.6 N or less
	No	Yes	0.4 N or less
	No	No	Not guaranteed
Horizontal	Not guaranteed		

Note: Operation using configurations other than shown above is not guaranteed.

Origin Setting of Digimatic Indicators

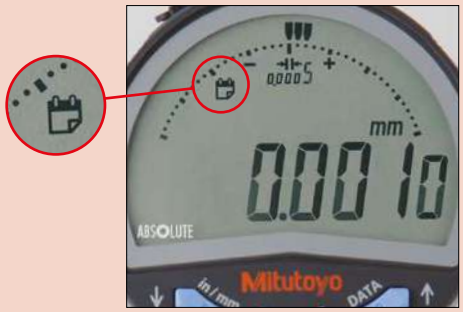
Repeatability in the range of 0.2 mm from the lowest rest point is not guaranteed for Digimatic indicators.

When setting the origin or presetting a specific value, be sure to lift the spindle at least 0.2 mm from the lowest rest point.



Calibration Period Notification Function

The LCD displays an icon to notify the user when the set calibration time approaches. This facilitates the proper precision management of ID-C NX.



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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Indicator ID-C NX

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*1	£242.00
264-623	U-WAVE-TM transmitter*1	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02ACA571	Auxiliary spindle spring (for 25.4 mm/1" type)*2	£8.10
02ACA773	Auxiliary spindle spring (for 50.8 mm/2" type)*2	£8.50
02AZF700	U-WAVE-TM/TMB connection unit (for 12.7 mm/.5" type)	£77.30
02AZG011	U-WAVE-T data cable (160 mm)	£89.00
02AZG021	U-WAVE-T data cable with footswitch connection (160/500 mm)	£203.00
06AGL011	SPC data cable (1 m)	£47.60
06AGL021	SPC data cable (2 m)	£51.20
06AGQ001F	USB input tool direct (2 m)	£132.00
21EZA105	Spindle lifting knob (for 12.7 mm/.5" type)*3	£16.90
21EZA197	Spindle lifting knob (for 25.4 mm/1" type)	£58.10
21EZA198	Spindle lifting lever (for 12.7 mm /.5" type)*3	£8.10
21EZA200	Spindle lifting knob (for 50.8 mm/2" type)	£58.10
21JZA295	Spindle lifting cable (for 12.7 mm/.5" type)*3	£37.20

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details.

*1 U-WAVE-R Receiver required.
*2 Required when orienting the indicator upside down.
*3 Not available for low measuring force models.

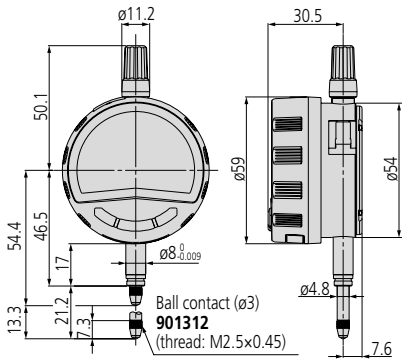


With U-WAVE-TMB transmitter and connector fitted.

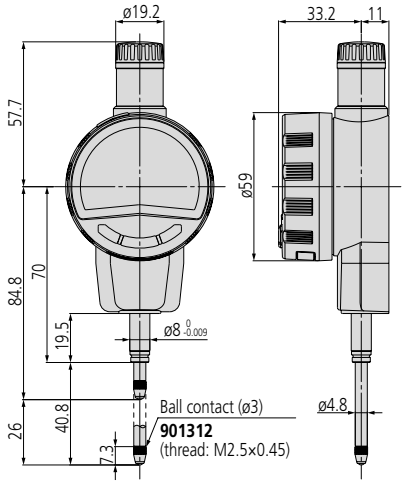
Dimensions

Unit: mm

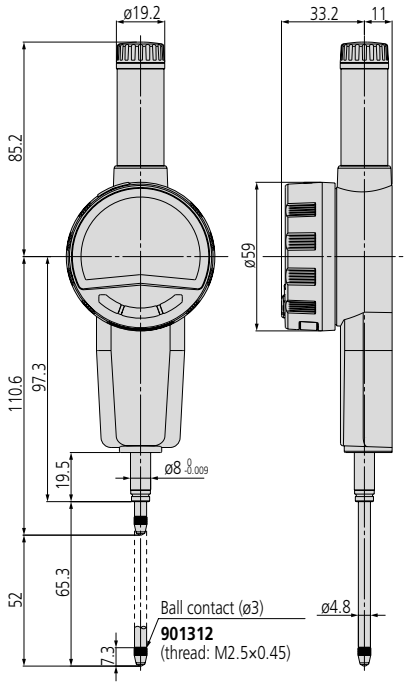
12.7 mm range models



25.4 mm range models

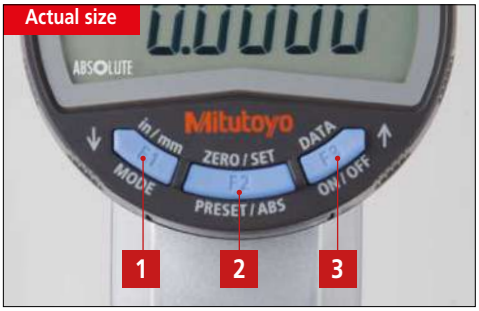


50.8 mm range models



Three large buttons

Ease of use is greatly improved by three large buttons. You can freely set any frequently used functions to these buttons.



1. Parameter setting mode, counting direction switching, tolerance judgement function setting, resolution switching,calculation function setting function lock setting.
2. Switches between the ABS (origin set) and INC (zero set) measurement modes.
3. Power switch, data output (when connected to an external device), data hold (when no external device is connected).

Simple calculation function

The result of the spindle movement value multiplied by the calculation coefficient can be displayed in real time. This reduces the work of measuring with a jig or similar tool.

Calculation: f(x) = Ax
f(x): Displayed value
x: Spindle movement value
A: Selected value

Large LCD

The units have large screens that can display various information in an easy-to-read manner. They also have an analogue bar, convenient for observing subtle movements such as the approach to tolerance.



330° rotary display

The display can be rotated 330°, allowing use at a position where you can easily read the measurement value.



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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Peak Value Hold Indicator ID-C

- The maximum, minimum, or runout value can be measured and displayed during measurement.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on. It also realizes high reliability by eliminating over-speed errors.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.
- User friendly, battery-operated type.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



543-301B-10

F

Specifications

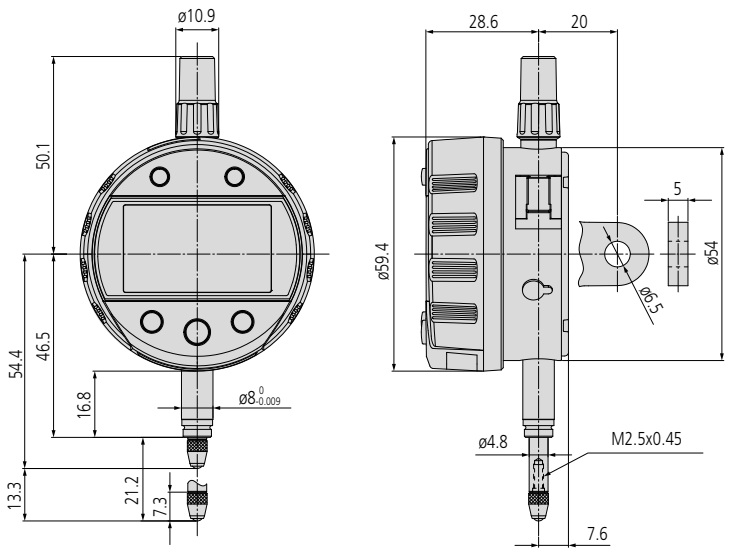
Inch/Metric

Code No.	Range	Resolution (selectable)	Max. permissible error			Price
			MPE*1	Hysteresis MPEH	Repeatability MPER	
543-301B-10	.5" / 12.7 mm	.00005", .0001", .0005" / 0.001, 0.01 mm	±.0001" / 0.003 mm	.0001" / 0.002 mm		£477.00

*1 Error of indication for the total measuring range.

Dimensions

Unit: mm



Technical Data

Measuring force:	1.5 N or less
Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Stem diameter:	8 mm
Standard contact point:	**901312**
Battery:	CR2032 (**05SAA217**)
Battery life:	6 months under normal use*2

*2 Operation time per day: 8 hours

Functions

Preset, zero-set, max/min value hold, runout value hold, GO/±NG judgement, counting direction switching, power ON/OFF, data output, inch/mm reading, alarm (low voltage, counting value composition error, overflow error, tolerance limit setting error).

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	£42.00
905409	SPC data cable (2 m)	£47.10
02AZD730G	U-WAVE-T IP67 transmitter*3	£242.00
02AZD790F	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*3	£242.00
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	£160.00
02AZE200	U-WAVE-T mounting plate	£26.70
06AFM380F	USB input tool direct USB-ITN-F (2 m)	£143.00
21EZA105	Spindle lifting knob	£16.90
21EZA198	Spindle lifting lever	£8.10
21EZA313	Parameter setting kit	£606.00
21JZA295	Spindle lifting cable	£37.20

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details..

*3 U-WAVE-R Receiver required.





Parameter setting software (shown above) is available free-of-charge with the Parameter setting kit (optional accessory).

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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Calculating Indicator ID-C

- This indicator incorporates an internal calculation function that operates from spindle displacement. Using dedicated fixtures, measurements of outside and inside diameter and radius of curvature can easily be made without needing to use conversion tables or manual calculations, and requiring access to only one side of the component to be measured.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on.
- The chance of over-speed error has been avoided thanks to the ABSOLUTE sensor.
- Tolerance judgement is available by presetting upper and lower limit values.
- Large, easy-to-read 7-digit LCD readout with a character height of 8 mm. Can be rotated up to 330° to achieve the optimum reading position.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE DIGIMATIC U-WAVE

MeasurLink® ENABLED
Data Management Software by Mitutoyo



543-341B-10

Calculation function: f(x) = Ax + B + C/x

x = spindle movement
A, B and C are user definable over a wide range

Technical Data

Measuring force: 1.5 N or less
Display: 6-digit LCD and sign
Scale type: ABSOLUTE electrostatic linear encoder
Stem diameter: 8 mm
Standard contact point: **901312**
Battery: CR2032 (**05SAA217**)
Battery life: 1 year under normal use*1

*1 Operation time per day: 8 hours

Functions

Origin-set/preset, zero-set, GO/±NG judgement, power ON/OFF, data output, inch/mm reading (inch/mm models), max/min value holding, function lock, data hold, alarm (low voltage, counting value composition error, overflow error, tolerance limit setting error).

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	**£42.00**
905409	SPC data cable (2 m)	**£47.10**
02AZD730G	U-WAVE-T IP67 transmitter*2	**£242.00**
02AZD790F	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*2	**£242.00**
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£160.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
06AFM380F	USB input tool direct USB-ITN-F (2 m)	**£143.00**
21EZA105	Spindle lifting knob	**£16.90**
21EZA198	Spindle lifting lever*3	**£8.10**
21JZA295	Spindle lifting cable	**£37.20**
Measuring bridges*3		
21FAJ394	Radius: 25-70 mm (outside)	**£692.00**
21FAJ395	Radius: 45-140 mm (outside)/ 65-100 mm (inside)	**£785.00**
K541282	Radius: 100-200 mm (outside)	**£2,180.00**

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details.

*2 U-WAVE-R Receiver required.
*3 The accuracy of a radial measurement using the measuring bridges depends on the size of the radius to be measured and the form error of the workpiece.







Outside diameter measurement using bridge fixtures. Various fixtures suited for individual workpieces can be prepared. Measuring accuracy is subject to fixture accuracy.

Specifications

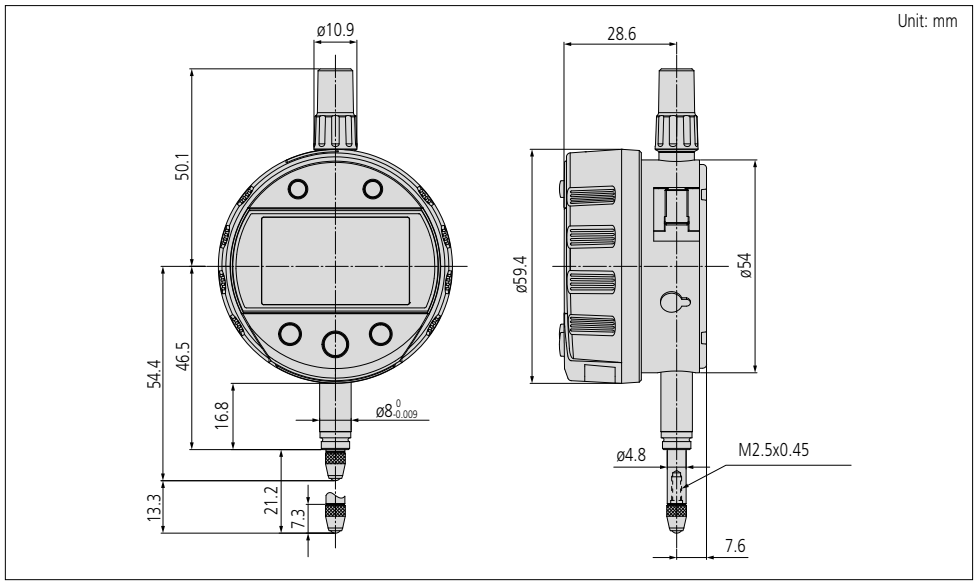
Inch/Metric

Code No.	Range	Resolution (selectable)*4	Max. permissible error			Price
			MPE*5	Hysteresis MPEH	Repeatability MPER	
543-341B-10	.5"/12.7 mm	.00001" - .05", 0.0002 - 1 mm (12 steps)*6	±.0001"/0.003 mm	.0001"/0.002 mm		**£532.00**

*4 Since the calculation resolution is one micrometre (0.001 mm), using sub-micrometre resolution settings may result in the 4th-place digit being unreliable, particularly when B is set to a very low value and C = 0. It does not change at all with certain combinations of calculation coefficient (e.g. A =1, B = C = 0). The 3rd-place digit representing micrometres (if displayed) is always reliable.
*5 Error of indication for the total measuring range.
*6 Applies only if not connected to a data processor.

Dimensions

Unit: mm



F

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Mitutoyo

Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Signal Output Indicator ID-C

- Enables a tolerance judgement to be output to external equipment for a measurement result against user-defined limits. Solid-state switching provides high reliability by avoiding metallic switch contacts.
- Output is enabled by directly connecting to external devices (sequencers etc., for which a logical invert is available if required). The measurement and judgement results are displayed on the LCD. The judgement result is also indicated by two LEDs.
- A peak-detection function is equipped for measuring and judging peak values such as runout.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Provided with a 4 m cable.
- External power 5–24VDC required.

ABSOLUTE DIGIMATIC

IP54



543-351B-10

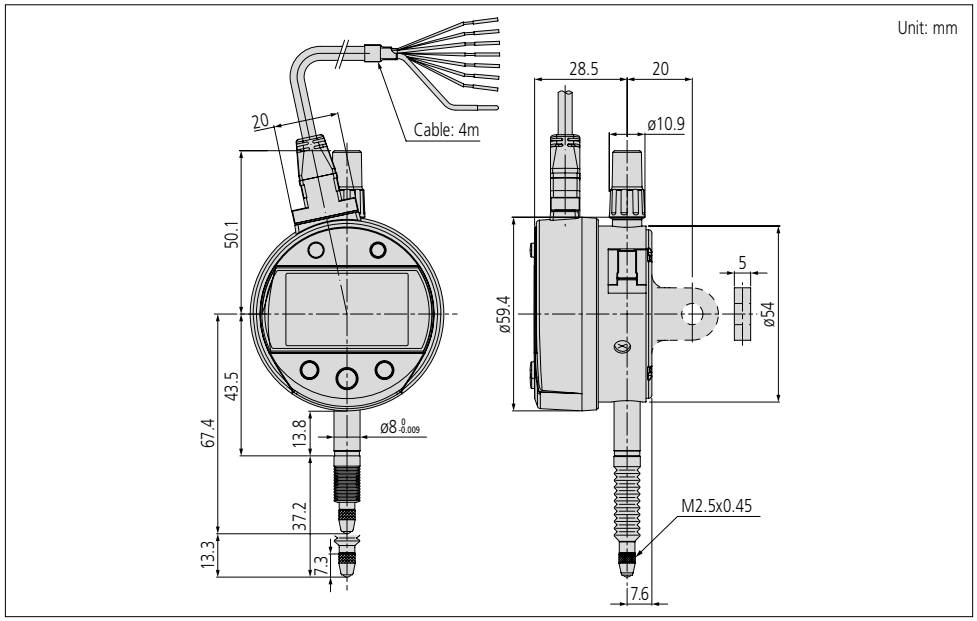
Specifications

Inch/Metric

Code No.	Range	Resolution (selectable)	Max. permissible error			Price
			MPE*1	Hysteresis MPEH	Repeatability MPER	
543-351B-10	.5" / 12.7 mm	.00005", .0001", .005" / 0.001, 0.01 mm	±.0001" / 0.003 mm	.0001" / 0.002 mm		**£683.00**

*1 Error of indication for the total measuring range.
Note 1: LCD readout does not rotate.
Note 2: MAX/MIN holding: sample rate is 100 readings/s; max. rate of change of reading is 100 µm/s or less.

Dimensions



Technical Data

Measuring force:	2.5 N or less
Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Stem diameter:	8 mm
Standard contact point:	**901312**
Dust/water protection level:	IP54

Functions

Signal output (–NG/OK/+NG, N-ch open drain, logical invert is available), remote control (peak start preset/zero-set), peak detection (max./min.), zero-setting (INC system), presetting (ABS system), direction switching, tolerance judgement (3 pairs of ABS, INC memory function), resolution switching, calculation f(x) = Ax, key lock, calibration mode (signal output in Digimatic code format), error alarm display.

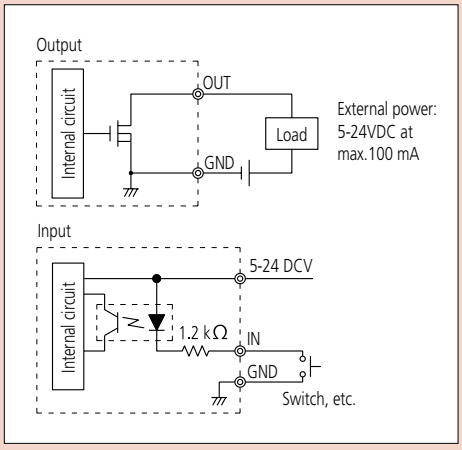
Output Pattern

Wire	– NG	OK	+ NG	Composition error
Orange (– NG)	Low	High	High	High
Green (OK)	High	Low	High	High
Brown (+ NG)	High	High	Low	High
LCD	◀	○	▶	"x.xxE" indication

I/O Specifications

Wire	Signal	I/O	Description
Black	– V (GND)	—	Connected to minus (–) terminal
Red	+ V	I	Power supply (5-24VDC)
Orange	– NG	O	Tolerance judgement result output: Only the terminal corresponding to a judgement result is set to the low level.
Green	OK	O	
Brown	+ NG	O	
Yellow	PRESET_RECALL 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 (earth)

Note: Measurement data cannot be output.



Optional Accessories

Code No.	Description	Price
21EZA105	Spindle lifting knob*2	**£16.90**
21EZA198	Spindle lifting lever*2	**£8.10**

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details.

*2 Dust and water protection not guaranteed.

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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Bore Gauge Indicator ID-C

- Exclusively designed for Bore Gauges: this ID-C series indicator has the minimum value holding and GO/NO-GO judgement functions.
- Employing an ABSOLUTE Linear Encoder, the Bore Gauge ID-C always displays the absolute position of the spindle from the origin at power-on. Also, the reliability has been increased due to elimination of over-speed errors.
- An analogue bar indication is integrated to provide the advantages of analogue display for minimum value measurements.
- Up to three sets of reference diameter and upper/lower tolerance values can be stored to simplify the start-up key operation in repetitive hole inspection of mixed-diameter holes.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



543-311B-10

Technical Data

Measuring force: 1.5 N or less
Display: 6-digit LCD and sign
Scale type: ABSOLUTE electrostatic linear encoder
Stem diameter: 8 mm
Standard contact point: **901312**
Battery: CR2032 (**05SAA217**)
Battery life: 1 year under normal use*1

*1 Operation time per day: 8 hours

Functions

Presetting, power on/off, inch/mm conversion (inch/mm type only), 3 sets of master value and tolerance value memory, GO/±NG tolerance judgement, min value holding, data hold.

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	**£42.00**
905409	SPC data cable (2 m)	**£47.10**
02AZD730G	U-WAVE-T IP67 transmitter*2	**£242.00**
02AZD790F	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*2	**£242.00**
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£160.00**
02AZE200	U-WAVE-T mounting plate	**£26.70**
06AFM380F	USB input tool direct USB-ITN-F (2 m)	**£143.00**
21EZA105	Spindle lifting knob	**£16.90**
21EZA198	Spindle lifting lever	**£8.10**

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details.

*2 U-WAVE-R Receiver required.



ABSOLUTE Digimatic Bore Gauges, which integrate the display with a bore gauge measuring unit, are also available.



Example of bore gauge (optional) equipped with an ID-C Digimatic Indicator.



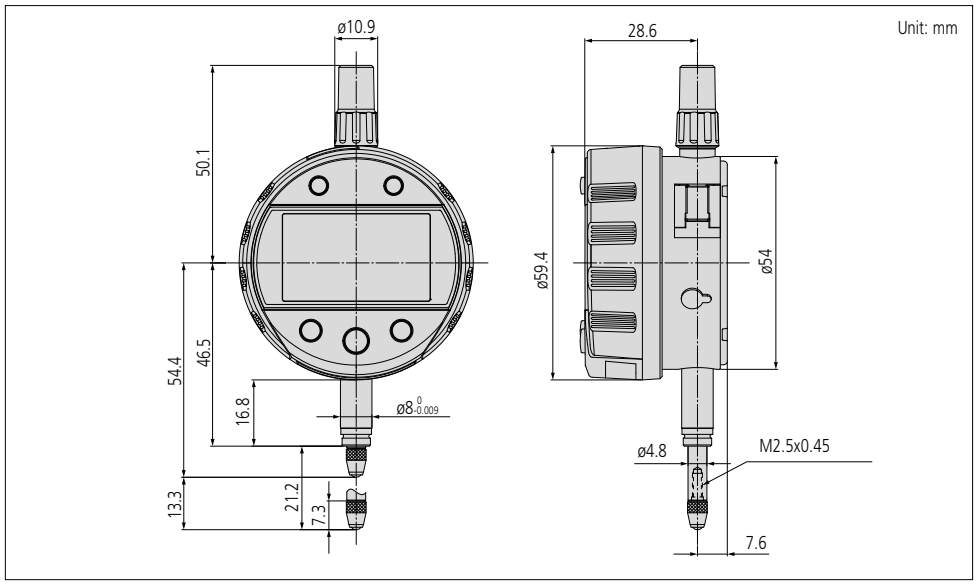
Specifications

Inch/Metric

Code No.	Range	Resolution (selectable)	Max. permissible error			Price
			MPE*3	Hysteresis MPEH	Repeatability MPER	
543-311B-10	.5"/12.7 mm	.00005", .0001", .005"/ 0.001, 0.01 mm	±.0001"/ 0.003 mm	.0001"/0.002 mm		**£516.00**

*3 Error of indication for the total measuring range.

Dimensions



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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Multi-Function Indicator ID-F NX

- With the ABSOLUTE Linear Encoder technology, once the measurement reference point has been set it will not be lost when the power is turned off.
- Improved resolution switchable down to 0.5 µm.
- On-screen calibration reminder.
- Easy-to-read large back-lit LCD readout with a character height of 11 mm and an analogue scale.
- A newly designed data port allows for bi-directional communication. With the addition of the appropriate data cable, parameters, remote zeroing, and presetting can all be implemented from a connected PC.
- External power supply type: battery change is not necessary. Power is supplied via the AC adapter supplied as a standard accessory.

ABSOLUTE DIGIMATIC S1 MeasurLink ENABLED Data Management Software by Mitutoyo



543-856-E

U-WAVE fit



543-852E

U-WAVE



543-854E

U-WAVE

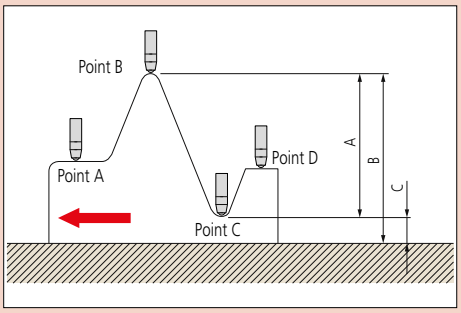
Technical Data

Display:	7-digit LCD (11 mm character height) and analogue bar (±20 scale)
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited
Stem diameter:	3/8"
Standard contact point:	**21BZB005**
Power supply:	5.9V DC (via AC adapter)

Functions

Preset, zero-set, peak detection (max, min, TIR), counting direction switching, resolution selecting, tolerance judgement, simplified calculation, analogue bar display ON/OFF, analogue bar scale selecting, key customize, function lock, calibration schedule warning function, data hold, data output, inch/mm reading, reset all settings, alarm (notifications for setting errors, sensor error, and display overflow).

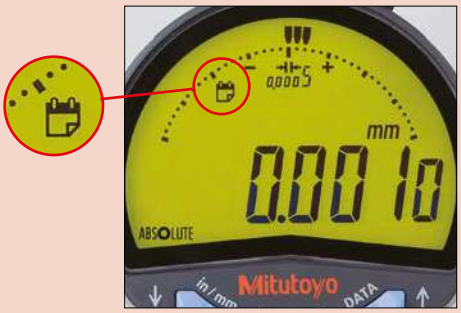
Difference / Runout Measurement



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 pushbutton sequence.

Calibration Period Notification Function

The LCD displays an icon to notify the user when the set calibration time approaches. This facilitates the proper precision management of ID-C NX.



Illuminated Backlighting



Red indication for when tolerance judgement result failure.

Specifications

Inch/Metric

Code No.	Range	Max. permissible error*1			Measuring force	Interface	Price
		MPE$_E$*2	Hysteresis MPE$_H$	Repeatability MPE$_R$			
Resolution: .001" / .0005" / .0001" / .00005" / .00002" / 0.01 mm / 0.001 mm / 0.0005 mm (selectable)							
543-856-E	.5" / 12.7 mm	±.0001" / 0.0025 mm	.00008" / 0.002 mm		1.5 N or less	d1 / d2 / S1	**£612.00**
543-852E	1" / 25.4 mm				1.8 N or less		**£723.00**
543-854E	2" / 50.8 mm	±.00016" / 0.004 mm			2.3 N or less		**£780.00**
543-858E		±.00012" / 0.003 mm					**£855.00**

*1 These values apply at 20 °C.
*2 Error of indication for the total measuring range.

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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Multi-Function Indicator ID-F NX

Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*1	£242.00
264-623	U-WAVE-TM transmitter*1	£242.00
264-626	U-WAVE-TMB IP67 transmitter	£242.00
264-627	U-WAVE-TMB transmitter	£242.00
02ACA571	Auxiliary spindle spring (for 25.4 mm/1" type)*2	£8.10
02ACA773	Auxiliary spindle spring (for 50.8 mm/2" type)*2	£8.50
02AZF670	U-WAVE-TM/TMB mounting plate	£37.20
02AZF700	U-WAVE-TM/TMB connection unit (for 12.7 mm/.5" type)	£77.30
02AZG011	U-WAVE-T data cable (160 mm)	£89.00
02AZG021	U-WAVE-T data cable with footswitch connection (160/500 mm)	£203.00
06AGL011	SPC data cable (1 m)	£47.60
06AGL021	SPC data cable (2 m)	£51.20
06AGQ001F	USB input tool direct (2 m)	£132.00
21EZA197	Spindle lifting knob (for 25.4 mm/1" type)	£58.10
21EZA200	Spindle lifting knob (for 50.8 mm/2" type)	£58.10
21JZA295	Spindle lifting cable	£37.20

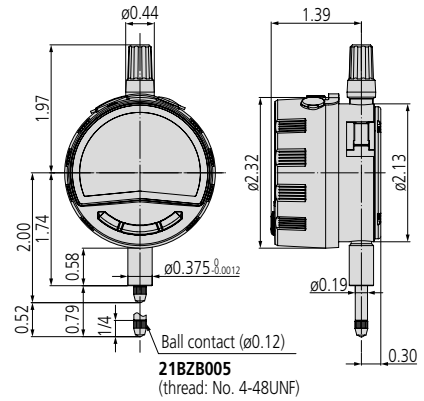
Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details.

*1 U-WAVE-R Receiver required.
*2 Required to maintain the measuring force during inverted orientation (contact point upward).

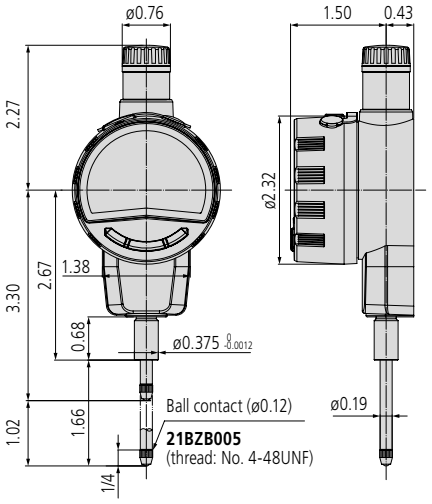
Dimensions

Unit: inch

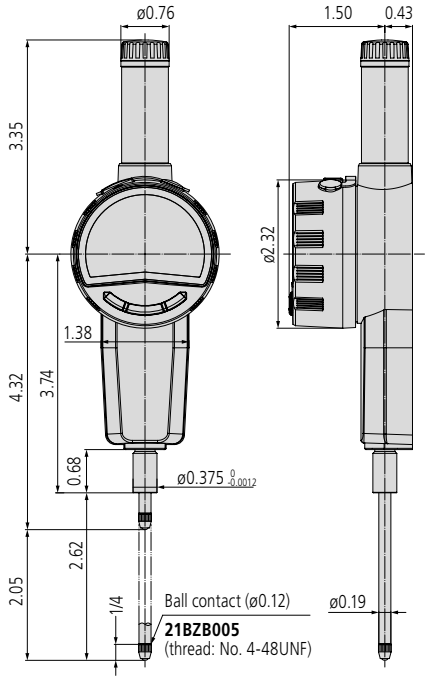
.5" range model



1" range model

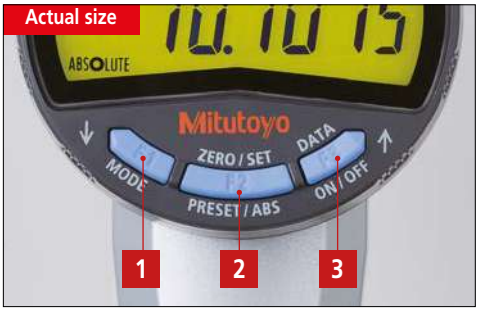


2" range models



Three large buttons

Ease of use is greatly improved by three large buttons. You can freely set any frequently used functions to these buttons.



1 Parameter setting mode, counting direction switching, tolerance judgement function setting, resolution switching,calculation function setting function lock setting.
2 Switches between the ABS (origin set) and INC (zero set) measurement modes.
3 Power switch, data output (when connected to an external device), data hold (when no external device is connected).

Simple calculation function

The result of the spindle movement value multiplied by the calculation coefficient can be displayed in real time. This reduce the work of measuring with a jig or similar tool.

Calculation: f(x) = Ax
f(x): Displayed value
x: Spindle movement value
A: Selected value

Large LCD

The units have large screens that can display various information in an easy-to-read manner. They also have an analogue bar, convenient for observing subtle movements such as the approach to tolerance.



330° rotary display

The display can be rotated 330°, allowing use at a position where you can easily read the measurement value.



F

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Mitutoyo

Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Economical Indicator ID-SX

- Cost-effective and user-friendly type equipped with only the basic functions necessary.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on, and ensures high reliability by eliminating over-speed errors.
- Battery life of 20,000 hours in continuous use.
- Easy-to-read large LCD readout with a character height of 8.5 mm.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



543-782-10

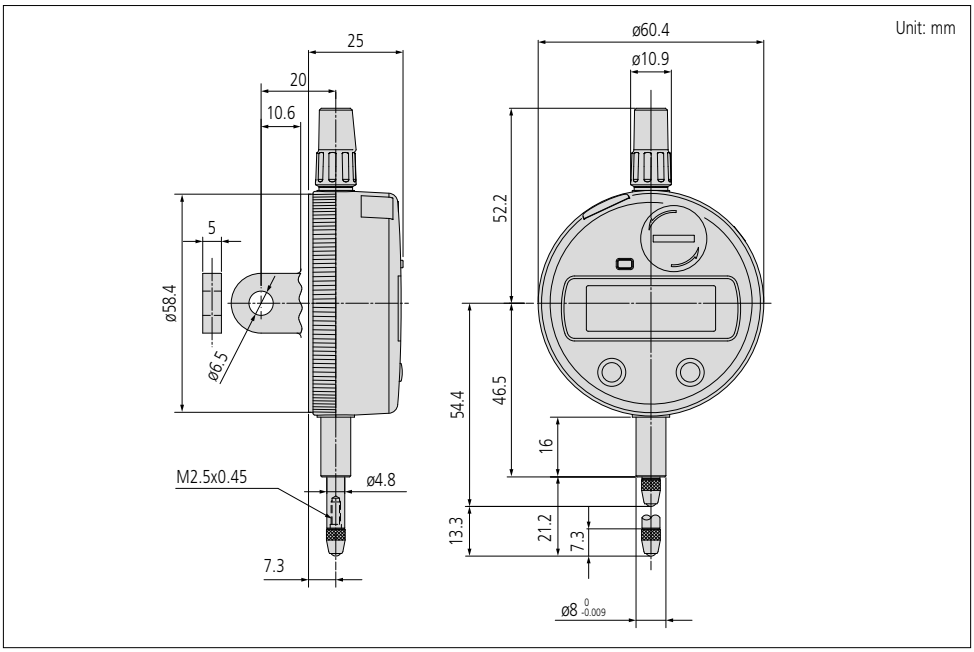
Specifications

Inch/Metric

Code No.	Range	Resolution	Max. permissible error*1			Price
			MPE*2	Hysteresis MPEH	Repeatability MPER	
543-782-10	.5" / 12.7 mm	.0005" / 0.01 mm	±.001" / 0.02 mm	.001" / 0.02 mm	.0005" / 0.01 mm	£166.00

*1 These values apply at 20 °C.
*2 Error of indication for the total measuring range.
Note: Regarding origin setting, refer to "Origin Setting of Digimatic Indicators" on page F-07.

Dimensions



Technical Data

Measuring force:	1.5 N or less
Display:	LCD, 8.5 mm character height
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited (scanning measurement is not supported)
Stem diameter:	8 mm
Standard contact point:	**901312**
Battery:	SR44 (1 pc.) **938882**
Battery life:	Approx. 20,000 hours under normal use

Functions

Origin-set (zero-set), counting direction switching, Power ON/OFF, data output, inch/mm reading, alarm (low voltage, counting value composition error).

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	£42.00
905409	SPC data cable (2 m)	£47.10
02AZD730G	U-WAVE-T IP67 transmitter*3	£242.00
02AZD790F	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*3	£242.00
02AZE140F	U-WAVE-T data cable with footswitch connection (160 / 500 mm)	£160.00
02AZE200	U-WAVE-T mounting plate	£26.70
06AFM380C	USB Input Tool Direct USB-ITN-C (2 m)	£143.00
21EZA105	Spindle lifting knob	£16.90
21EZA198	Spindle lifting lever	£8.10
21JZA295	Spindle lifting cable	£37.20

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Measuring stands refer to pages F-67 to F-72 for details.
*3 U-WAVE-R Receiver required.

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Digimatic Indicators

SERIES 575 – ABSOLUTE Digimatic Slim Body Economical Indicator ID-U

- General purpose indicator with the measuring range of 25.4 mm/ 1".
- Cost-effective and user-friendly type equipped with only the basic functions necessary.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on, and ensures high reliability by eliminating over-speed errors.
- Battery life of 20,000 hours in continuous use.
- Easy-to-read large LCD readout with a character height of 8 mm.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE DIGIMATIC U-WAVE MeasurLink ENABLED Data Management Software by Mitutoyo



575-123

Technical Data

Measuring force:	1.8 N or less
Display:	LCD, 8.5 mm character height
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited (scanning measurement is not supported)
Stem diameter:	3/8"
Standard contact point:	**21BZB005**
Battery:	SR44 (1 pc.) **938882**
Battery life:	Approx. 20,000 hours under normal use
Lifting lever:	**21EAA426**

Functions

Origin-set (zero-set), counting direction switching, power ON/OFF, data output, inch/mm reading, alarm (low voltage, counting value composition error).

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m)	**£42.00**
905409	SPC data cable (2 m)	**£47.10**
02AZD730G	U-WAVE-T IP67 transmitter*1	**£242.00**
02AZD790F	U-WAVE-T data cable (160 mm)	**£77.30**
02AZD880G	U-WAVE-T transmitter*1	**£242.00**
02AZE140F	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£160.00**
06AFM380C	USB input tool direct USB-ITN-C (2 m)	**£143.00**
21JZA295	Spindle lifting cable	**£37.20**

Contact points for Mitutoyo's Digimatic indicators refer to pages F-35 to F-38 for details.
Measuring stands refer to pages F-67 to F-72 for details.

*1 U-WAVE-R Receiver required.

Specifications

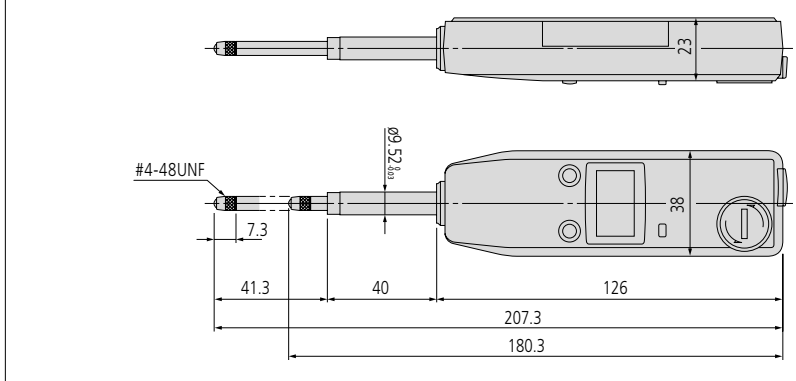
Inch/Metric

Code No.	Range	Resolution	Max. permissible error			Price
			MPE*2	Hysteresis MPEH	Repeatability MPER	
575-123	1" /25.4 mm	.0005" /0.01 mm	±.001" /0.02 mm	.001" /0.02 mm	.0005" /0.01 mm	**£203.00**

*2 Error of indication for the total measuring range.

Dimensions

Unit: mm



F

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Optional Accessory

SERIES 542 – EC Counter, Low-Cost Modular Display Unit

- 3 sets of limiting values can be displayed.
- Can be set to produce either tolerance judgement output or Digimatic measurement data output.
- Small size (96 x 48 mm) which conforms to DIN standards.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



542-007E

Technical Data

Functions:	Preset, GO/±NG judgement, output (selectable)
Tolerance judgement:	-NG, OK, +NG (open collector)
Data:	Digimatic code
External control signal input:	Preset, data hold
Power supply:	Via AC adapter

Optional Accessories

Code No.	Description	Price
214938	DC plug PJ-2	**£6.10**
21HZA222	I/O cable	**£35.30**

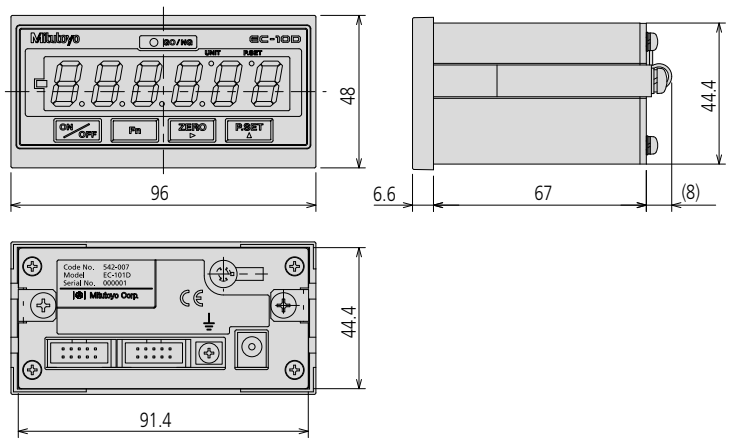
F

Specifications

Code No.	542-007E
Applicable input	Digimatic code (SPC)
Number of gauge inputs	1
Resolution	0.01, 0.001 mm (automatically set depending on the gauge)
Display	6-digit and a negative [-] sign LED (amber, green, red)
Price	**£347.00**

Dimensions

Unit: mm



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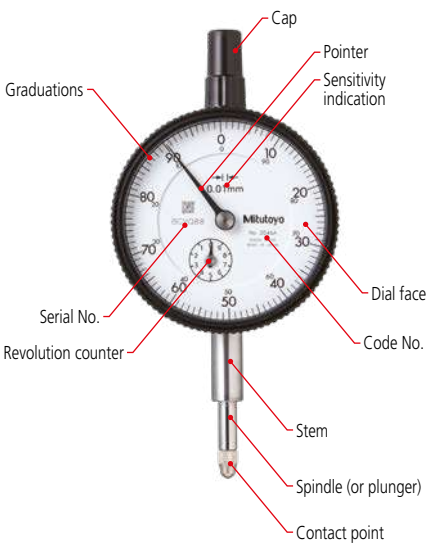
Dial Indicators

Feature Icons

Icon	Feature description
	Continuous scale
	Balanced scale
	Reverse reading, suitable for depth and step measurement
	One revolution type for easy and error-free reading
	Double scale spacing type, easy-on-the-eyes
	Shockproof
	Waterproof (IP63)
	Waterproof (IP64)
	With damper at top rest point
	With damper at lowest rest point
	Jewelled bearing.
	Peak retaining
	Dustproof
	With coaxial revolution counter
	Back plunger
	Adjustable hand

Note: Mitutoyo produces ASME-compatible products.
Contact us for details.

Parts of a Dial Indicator



Mitutoyo's dial indicators have long been used by many of our customers. In full recognition of their needs, we have devoted ourselves to the research and development necessary to produce high-quality and high-accuracy dial indicators. Due to the recent re-acknowledgement of the importance of measurement technologies, the demands on dial indicators are many and varied: installation in measuring jigs, mounting in countless types of precision equipment, etc. We offer numerous models with various dial faces, measuring ranges, graduation styles and environmental resistance ratings. The stems, which ensure the fixture reliability, and the spindles, which are the basis of accuracy, have excellent resistance against hard use thanks to the hardened stainless steel construction. 0.01 mm resolution dial indicators have a grand gear made of stainless steel with high resistance to wear and deformation. 0.001 mm resolution dial indicators employ a sector gear made of a special alloy in order to further increase the resistance to wear.

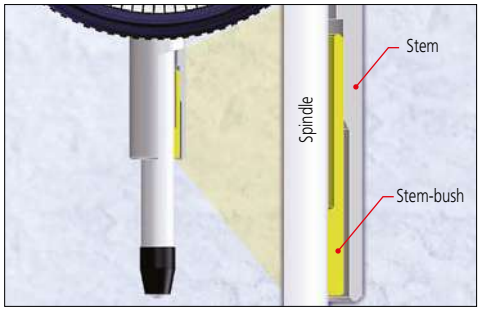
Important factors in choosing a dial indicator: the size (bezel diameter), resolution (graduation) and measuring range. Use the table on the right to help choose a suitable model for your application.

To order an indicator with a flat back fitted add a *B* after the *A* in the Code No.

Features: A Series (Series 2, 3, 4)



- No through screw-holes on the frame for high oil- and dust-resistance. The bezel clamp (optional) can be attached either to the right or left side.
- Improved Impact- and oil-resistant materials are employed in the bezel. Easier reading is due to the improved shape of the crystal face.



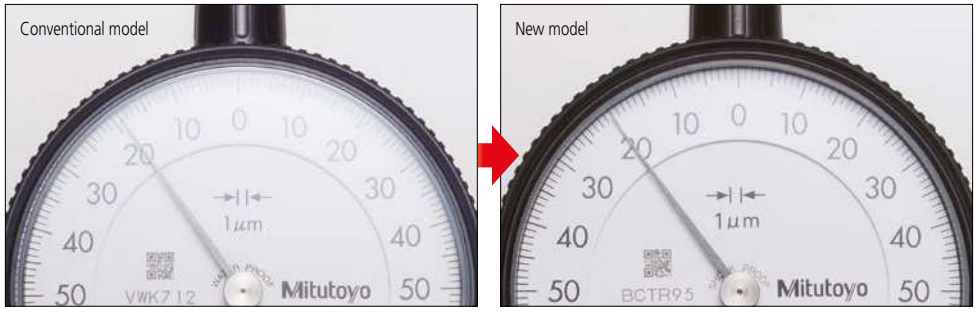
- Revolutionary stem-bush design for trouble-free stem clamping (longer clamping range; maximum tightening torque at the clamping point with M5 screw: 150 N-cm).



- The optional spindle lifting lever can be attached to either the right or left side providing high operability and smooth movement. This lever can be easily installed and removed.



- The optional limit hands ① can be moved without interfering with the optional bezel clamp ②.



- Application of anti-stain and anti-reflective coating improves scale visibility.

F

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Mitutoyo

Dial Indicators

SERIES 1 – Compact Dial Indicators

- Compact dial indicators ideal for restricted-space applications in gauging jigs.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



1109A-10



1044A-60



1013A-10



1040A



1041A



1044A



1045A



1124A

F

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.002 mm										
1013A-10	1 mm (0.2 mm)	2.5 μm	4 μm	5 μm	6 μm	2.5 μm	1 μm	0-100-0	1.5 N or less	**£152.00**
Graduation: 0.01 mm										
1040A	3.5 mm (0.5 mm)	8 μm	10 μm	11 μm	13 μm	4 μm	3 μm	±0-50	1.4 N or less	**£98.40**
1041A								0-25-0		**£87.80**
1044A	5 mm (1 mm)							±0-100		**£61.60**
1044A-15									0.4 N or less*	**£96.20**
1044A-60									2.0 N or less	**£117.00**
1045A								0-50-0	1.4 N or less	**£67.40**
Graduation: 0.001 mm										
1109A-10	1 mm (0.2 mm)	2.5 μm	3.5 μm	4.5 μm	5 μm	2 μm	1 μm	0-100-0	1.5 N or less	**£181.00**
Graduation: 0.005 mm										
1124A	3.5 mm (0.5 mm)	6 μm	9 μm	10 μm	12 μm	3.5 μm	3 μm	±0-50	1.4 N or less	**£112.00**

Inch

Code No.	Range (range/rev)	Accuracy			Scale	Measuring force	Price
		First rev / 2.5 rev / 10 rev	Retrace	Repeatability			
Graduation: .001"							
1410A	.25" (.1")	±.001" / ±.001" / —	.0002"	±.0002"	0-100	1.4 N or less	**£90.20**
1410A-10							**£111.00**
1411A					0-50-0		**£93.50**
1780A	.125" (.05")				0-50		**£90.20**
1781A					0-25-0		**£90.20**
Graduation: .0005"							
1506A	.1" (.04")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-50	1.4 N or less	**£92.80**
1507A					0-25-0		**£92.80**
1670A					0-40		**£107.00**
1671A					0-20-0		**£100.00**
Graduation: .0001"							
1802A-10	.025" (.01")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-10	1.5 N or less	**£188.00**
1803A-10					0-5-0		**£184.00**

* For low measuring force type, use in the vertical orientation.
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

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Dial Indicators

SERIES 1 – Compact Dial Indicators

Features

Metric

Code No.						
1013A-10	—	✓	—	✓	—	✓
1040A	✓	—	✓	—	—	—
1041A	—	✓	✓	—	—	—
1044A	✓	—	—	—	—	—
1044A-15	✓	—	—	✓	—	—
1044A-60	✓	—	—	—	✓	—
1045A	—	✓	—	—	—	—
1109A-10	—	✓	—	✓	—	✓
1124A	✓	—	—	—	—	—

Inch

Code No.						
1410A	✓	—	—	—	—	—
1410A-10	✓	—	—	✓	—	—
1411A	—	✓	—	—	—	—
1506A	✓	—	—	—	—	—
1507A	—	✓	—	—	—	—
1670A	✓	—	—	—	—	—
1671A	—	✓	—	—	—	—
1780A	✓	—	—	—	—	—
1781A	—	✓	—	—	—	—
1802A-10	✓	—	—	✓	—	✓
1803A-10	—	✓	—	✓	—	✓

Optional Accessories

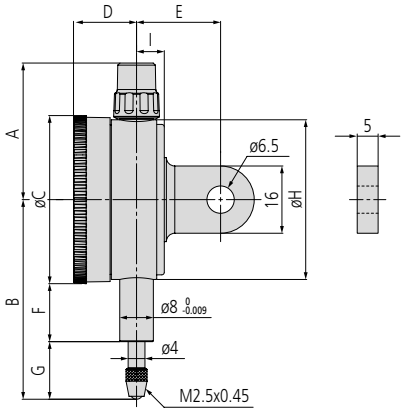
Code No.	Description	Price
21AAB363	Limit hand (2 pcs.)	£1.50
21RZA149	Bezel clamp	£1.60

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.

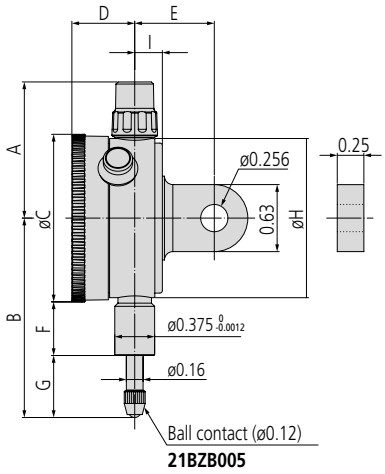
Dimensions

Unit: mm Unit: inch

ISO/JIS type



ANSI/AGD type



21BZB005

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 indicator is provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

Code No.	A	B	C	D	E	F	G	H	I
ISO/JIS type									
1013A-10	32.5	49	40	14.5	20	13.8	15.2	38	6.6
1040A		46					12.2		
1041A									
1044A		47.5					13.7		
1044A-15*									
1044A-60		57				12.2	24.8		
1045A		47.5				13.8	13.7		
1109A-10		49					15.2		
1124A		46					12.2		
ANSI/AGD type									
1410A	1.28	1.87	1.57	.57	3/4	.5	.58	1.5	.26
1410A-10									
1411A									
1780A		1.74					.44		
1781A									
1506A									
1507A									
1670A		1.71					.42		
1671A									
1802A-10		1.63					.33		
1803A-10						.49			

F

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Mitutoyo

Dial Indicators

SERIES 2 – 0.01 mm Graduation Dial Indicators

- Standard 0.01 mm graduation dial gauges have a bezel with an outside diameter of 57 mm.
- The bezel 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.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- A carbide contact point is used.



2046A

Features

Metric

Code No.							
2046A	✓	—	—	—	✓	—	—
2046A-09	✓	—	—	✓	—	—	—
2047A	—	✓	—	—	✓	—	—
2902A	—	—	✓	—	✓	—	—
2310A-10	✓	—	—	—	—	✓	✓
2044A	✓	—	—	—	✓	—	—
2044A-09	✓	—	—	✓	—	—	—
2045A	—	✓	—	—	✓	—	—

Optional Accessories

Code No.	Description	Price
21AZB148	Bezel clamp	**£2.10**
21AZB195	Limit hand (2 pcs.)	**£1.60**

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.



2044A



2045A



2047A



2310A-10



2902A

Specifications

Metric

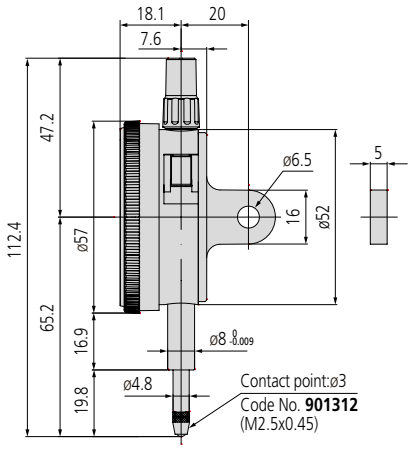
Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
2046A	10 mm (1 mm)	5 µm	9 µm	10 µm	13 µm	3 µm	3 µm	±0-100	1.4 N or less	**£46.30**
2046A-09					15 µm					**£64.90**
2047A					13 µm			0-50-0		**£67.40**
2902A								100-0		**£73.70**
2310A-10					15 µm			±0-100		**£71.90**
2044A	5 mm (1 mm)				12 µm					**£64.90**
2044A-09										**£74.10**
2045A								0-50-0		**£66.00**

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Dimensions

Unit: mm

ISO/JIS type



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Dial Indicators

SERIES 2 – 0.001 mm and 0.005 mm Graduation Dial Indicators

- Standard 0.001 mm and 0.005 mm graduation dial indicators have a bezel with an outside diameter of 57 mm.
- The bezel 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.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- A carbide contact point is used.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A special alloy is used for the sector gears to provide improved wear resistance.
- The indicator uses jewelled bearings, providing excellent indication sensitivity and durability.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



2109A-10

Features

Metric

Code No.						
2109A-10	—	✓	✓	—	✓	—
2110A-10	✓	—	✓	—	✓	✓
2113A-10	—	✓	✓	—	✓	—
2118A-10	✓	—	—	—	✓	—
2119A-10	—	✓	—	—	✓	—
2124A-10	✓	—	—	—	✓	—

Optional Accessories

Code No.	Description	Price
21AZB148	Bezel clamp	£2.10
21AZB195	Limit hand (2 pcs.)	£1.60

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.



2110A-10



2113A-10



2118A-10



2119A-10



2124A-10

Specifications

Metric

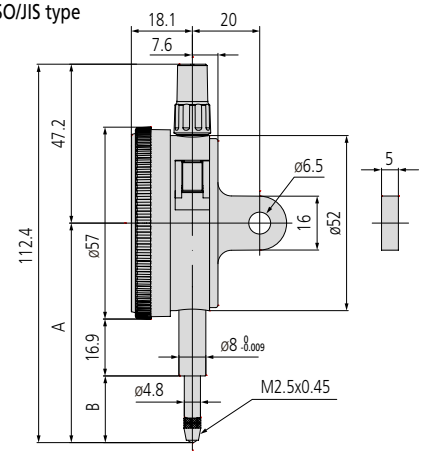
Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.001 mm										
2109A-10	1 mm (0.2 mm)	2 µm	3 µm	4 µm	5 µm	2 µm	0.5 µm	0-100-0	1.5 N or less	£99.00
2110A-10	1 mm (0.1 mm)							±0-100	1.8 N or less	£123.00
2113A-10	2 mm (0.2 mm)		4 µm	5 µm	7 µm			0-100-0	1.5 N or less	£119.00
2118A-10	5 mm (0.2 mm)	3.5 µm	5 µm	6 µm	10 µm	3 µm	1 µm	0-100-100		£139.00
2119A-10								0-100-0		£139.00
Graduation: 0.005 mm										
2124A-10	5 mm (0.5 mm)	5 µm	8 µm	9 µm	12 µm	3 µm	3 µm	±0-50	1.5 N or less	£93.80

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Dimensions

Unit: mm

ISO/JIS type



Code No.	A	B
2109A-10	60.5	15.1
2110A-10	66.5	21.1
2113A-10	61	15.6
2118A-10	60.3	14.9
2119A-10		
2124A-10		

F

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Dial Indicators

SERIES 2 – Inch Reading Dial Indicators

- Standard .001", .0005" and .0001" graduation dial gauges have a bezel with an outside diameter of 2.24".
- The bezel 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.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



2414A

2805A-10

2922A

Features

Inch

Code No.					
2414A	✓	—	—	—	—
2415A	—	✓	—	—	—
2922A	—	✓	—	—	—
2358A-10	✓	—	—	—	✓
2802A-10	✓	—	✓	—	✓
2803A-10	—	✓	✓	—	✓
2804A-10	✓	—	✓	—	✓
2805A-10	—	✓	✓	—	✓
2923A-10	—	✓	✓	—	✓

Optional Accessories

Code No.	Description	Price
21RZA065	Bezel clamp	£2.40
21AZB195	Limit hand (2 pcs.)	£1.60

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.

Inch

Code No.	Range (range/rev)	Accuracy: First rev / 2.5 rev / 10 rev	Accuracy: Retrace	Repeatability	Scale	Measuring force	Price
Graduation: .001"							
2414A	.5" (.1")	±.001" / ±.001" / ±.001"	.0002"	±.0002"	±0-100	1.8 N or less	£86.90
2415A					0-50-0		£86.90
Graduation: .0005"							
2922A	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-25-0	1.8 N or less	£95.10
Graduation: .0001"							
2358A-10	.5" (.01")	±.0002" / .0002" / ±.0003" ±.0004" (first 20 rev) / ±.0008" (over 20 rev)	.00015"	±.00003"	0-10	2.0 N or less	£166.00
2802A-10	.025" (.01")	±.0001" / ±.0001" / —	.0001"				£139.00
2803A-10					0-5-0		£139.00
2804A-10	.05" (.01")	±.0001" / ±.0001" / ±.0002"			0-10		£147.00
2805A-10					0-5-0		£147.00
2923A-10							£139.00

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

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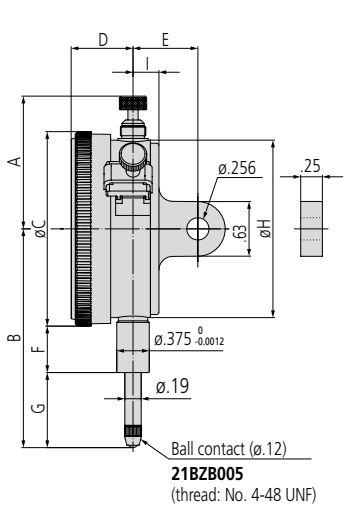
Dial Indicators

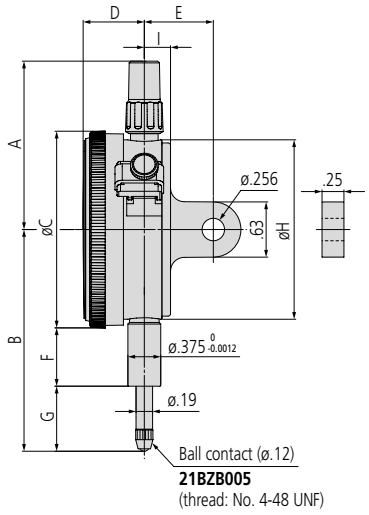
SERIES 2 – Inch Reading Dial Indicators

Dimensions

Unit: inch

ANSI/AGD type





Code No.	A	B	C	D	E	F	G	H	I
2414A	1.53	2.52	2.24	.71	3/4	.54	.87	2.05	.30
2415A									
2922A	1.86	2.14					.48		
2358A-10	1.53	2.50					.85		
2802A-10	1.86	2.02					.37		
2803A-10									
2804A-10		2.04					.38		
2805A-10									
2923A-10									

F

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Mitutoyo

Dial Indicators

SERIES 1 and 2 – One Revolution Dial Indicators

- Compact dial indicators ideal for restricted-space applications in gauging jigs.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- The dead zone in red indicates "*accuracy not guaranteed*".
- One revolution type Back Plunger dial gauges are also available. (Refer to pages F-33 to F-34 for details.)



2901A-10



2928A



2959A



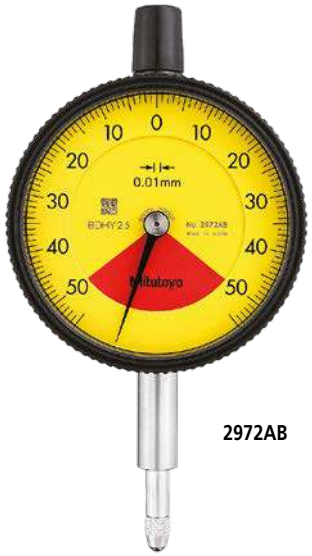
2990A-10



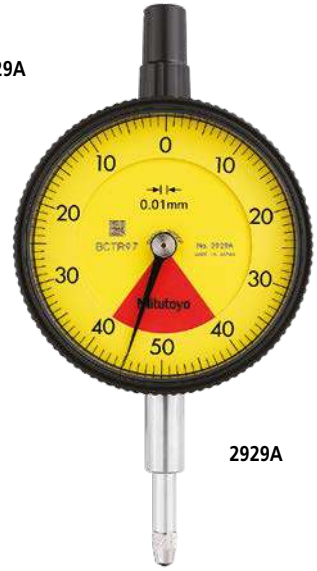
2971AB



1929A



2972AB



2929A

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
1929A	1 mm (1.4 mm)	7 µm	—	—	11 µm	4 µm	3 µm	50-0-50	1.4 N or less	**£102.00**
2929A	0.8 mm (1 mm)	5 µm			8 µm	3 µm		40-0-40		**£95.20**
2929A-62									2.0 N or less	**£139.00**
2971AB	0.5 mm (0.7 mm)							25-0-25	1.4 N or less	**£76.50**
2972AB	1 mm (1.4 mm)							50-0-50		**£64.70**
Graduation: 0.001 mm										
2900A-10	0.08 mm (0.1 mm)	2 µm	—	—	3 µm	2 µm	0.5 µm	40-0-40	1.4 N or less	**£139.00**
2900A-72									2.0 N or less	**£147.00**
2901A-10	0.16 mm (0.2 mm)				4 µm			80-0-80	1.4 N or less	**£129.00**

Inch

Code No.	Range (range/rev)	Accuracy			Scale	Measuring force	Price
		First rev / 2.5 rev / 10 rev	Retrace	Repeatability			
Graduation: .0001"							
2910A-10	.008" (.01")	±.0001" / — / —	.0001"	±.00003"	4-0-4	1.8 N or less	**£135.00**
Graduation: .001"							
2978AB	.06" (.079")	±.001" / — / —	.0002"	±.0002"	30-0-30	1.4 N or less	**£106.00**
Graduation: .0005"							
2976AB	.02" (.028")	±.0005" / — / —	.00016"	±.0001"	10-0-10	1.4 N or less	**£100.00**

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

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Dial Indicators

SERIES 1 and 2 – One Revolution Dial Indicators

Features

Metric

Code No.					
1929A	✓	✓	✓	—	—
2929A	✓	✓	✓	—	—
2929A-62	✓	✓	✓	✓	—
2971AB	✓	✓	✓	—	—
2972AB	✓	✓	✓	—	—
2900A-10	✓	✓	✓	—	✓
2900A-72	✓	✓	✓	✓	✓
2901A-10	✓	✓	✓	—	✓

Inch

Code No.					
2976AB	✓	✓	✓	✓	—
2978AB	✓	✓	✓	✓	—
2910A-10	✓	✓	✓	—	✓

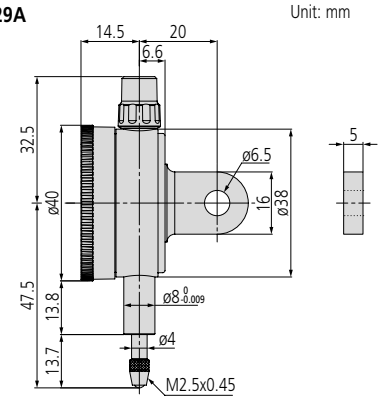
Optional Accessories

Code No.	Description	Price
For **1929A** only		
21AAB363	Limit hand (2 pcs.)	**£1.50**
21RZA149	Bezel clamp	**£1.60**
For Series 2 models only		
21AZB148	Bezel clamp (for metric models)	**£2.10**
21AZB195	Limit hand (2 pcs.)	**£1.60**
21RZA065	Bezel clamp (for inch models)	**£2.40**

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.

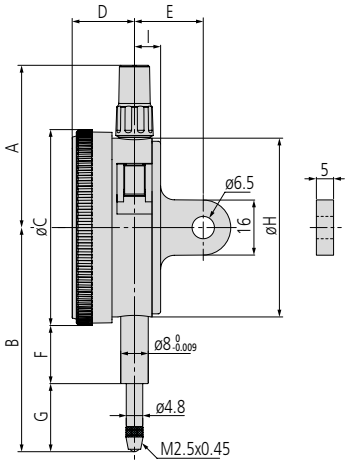
Dimensions

1929A Unit: mm

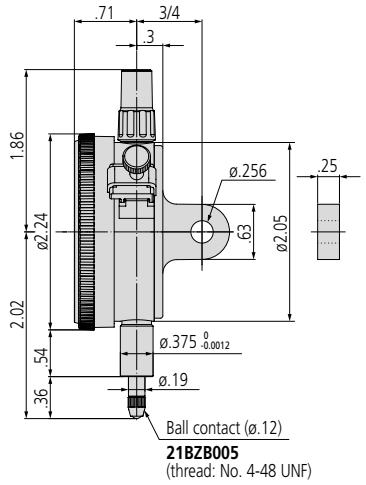


Note 1: Dimensions of the inch (ANSI/AGD type) dial indicator partly differ from those of the metric (ISO/JIS type) indicator.
Note 2: Inch (ANSI/AGD type) dial indicator is provided with a stem of 3/8" dia. and #4-48UNF thread mount for the contact point.

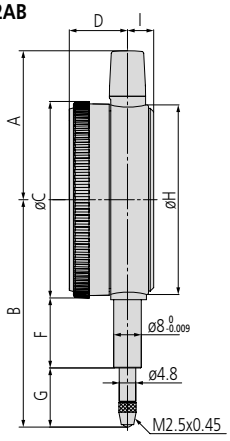
2929A, 2929A-62, 2900A-10, 2900A-72, 2901A-10 Unit: mm



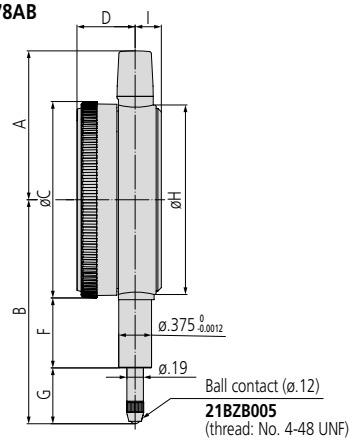
2910A-10 Unit: inch



2971AB, 2972AB Unit: mm



2976AB, 2978AB Unit: inch



Code No.	A	B	C	D	E	F	G	H	I
ISO/JIS type									
2929A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6
2929A-62									
2971AB*	43.2	65.6		16.5	—	21	16.8	55	
2972AB*		66					17.2		
2900A-10	47.2			18.1	20	16.9	20.6	52	
2900A-72									
2901A-10		66.1					20.7		
ANSI/AGD type									
2976AB*	1.70	2.55	2.24	.65	—	.80	.63	2.17	.30
2978AB*		2.57					.65		

* Plain back

F

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Mitutoyo

Dial Indicators

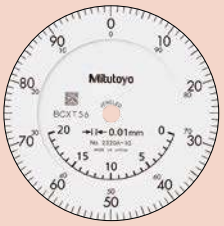
SERIES 2 – Long Stroke Dial Indicators

- Long stroke dial indicators with a ø57 mm bezel.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and the spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is employed.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The bezel clamp and lifting lever* (optional) can be attached to either the right or left side. These parts can be easily installed and removed without any tools.

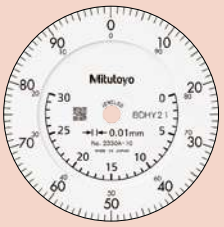
* These cannot be used on waterproof models and models with a measuring range of 30 mm.



2052A



2320A-10



2330A-10



2904A



2050A



2776A

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
2050A	20 mm (1 mm)	8 µm	10 µm	15 µm	20 µm	5 µm	4 µm	±0-100	2.0 N or less	**£89.60**
2320A-10										**£106.00**
2052A	30 mm (1 mm)	10 µm	12 µm		25 µm	7 µm	5 µm		2.5 N or less	**£111.00**
2330A-10										**£130.00**

Inch

Code No.	Range (range/rev)	Accuracy			Scale	Measuring force	Price
		First rev / 2.5 rev / 10 rev	Retrace	Repeatability			
Graduation: .001"							
2416A	1" (.1")	±.001" /±.001" /±.002"	.0002"	±.0002"	±0-100	1.8 N or less	**£86.90**
2416A-10							**£103.00**
2417A					0-50-0		**£86.90**
2424A-19	2" (.1")	±.001" /±.001" /±.002" / ±.003" (first 20 rev)	.00033"		±0-100	2.5 N or less	**£237.00**
2904A	1" (.1")	±.001" /±.001" /±.002"	.0002"		100-0	1.8 N or less	**£90.20**
Graduation: .0005"							
2776A	1" (.05")	±.0005" /±.0005" /±.0015"	.0002"	±.0001"	±0-50	2.5 N or less	**£122.00**

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

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Dial Indicators

SERIES 2 – Long Stroke Dial Indicators

Features

Metric

Code No.							
2050A	✓	—	—	✓	—	—	—
2320A-10	✓	—	—	✓	✓	✓	—
2052A	✓	—	—	✓	—	—	—
2330A-10	✓	—	—	✓	✓	✓	—

Inch

Code No.							
2416A	✓	—	—	—	—	—	—
2416A-10	✓	—	—	—	✓	—	—
2417A	—	✓	—	—	—	—	—
2424A-19	✓	—	✓	—	✓	✓	—
2904A	—	—	—	—	—	—	✓
2776A	✓	—	—	—	—	—	—

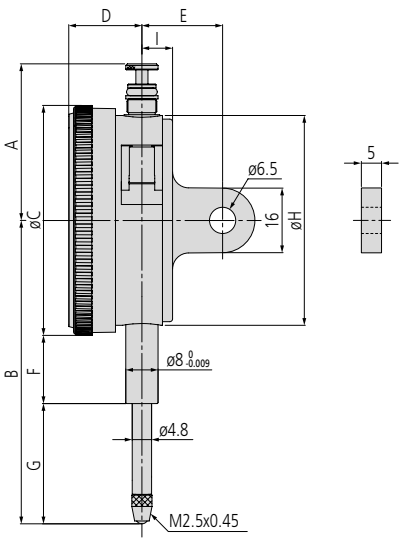
Optional Accessories

Code No.	Description	Price
21AZB148	Bezel clamp (for metric models)	**£2.10**
21AZB195	Limit hand (2 pcs.)	**£1.60**
21RZA065	Bezel clamp (for inch models)	**£2.40**

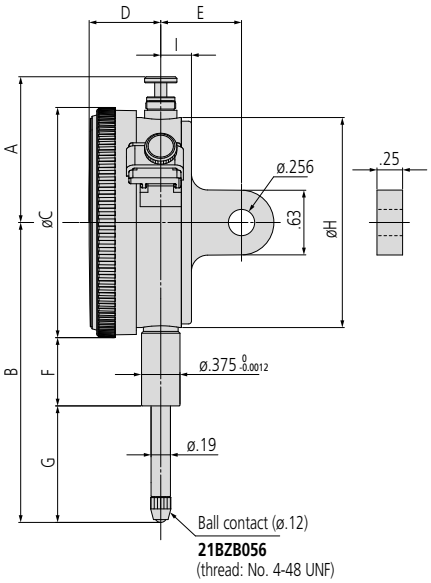
Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.

Dimensions

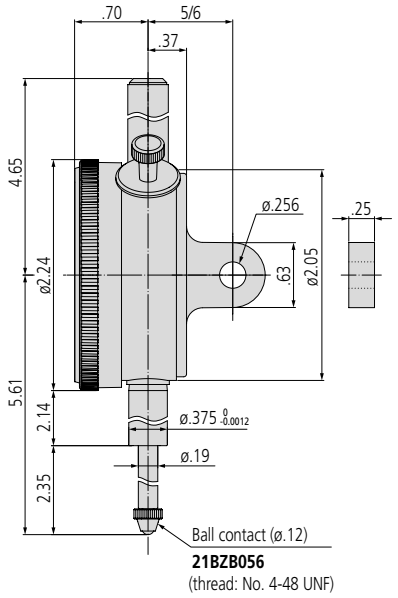
ISO/JIS type — Unit: mm



ANSI/AGD type — Unit: inch



2424A-19 — Unit: inch



Code No.	A	B	C	D	E	F	G	H	I
ISO/JIS type									
2050A	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6
2320A-10									
2052A		88.7					43.3		
2330A-10									
ANSI/AGD type									
2416A	1.53	3.02	2.24	.70	3/4	.54	1.37	2.05	.30
2416A-10									
2417A									
2904A									
2776A									

F

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Dial Indicators

SERIES 3 – Large Dial Indicators

- Dial indicators with a large-diameter dial face for easy reading.
- Models with longer measuring ranges are also available.
- All types are supplied with limit markers and a bezel clamp as standard.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- The bezel clamp and lifting lever*1 (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.

*1 Can be attached only to **3046A**, **3047A**, **3050A**, and **3109A-10**.



3109A-10



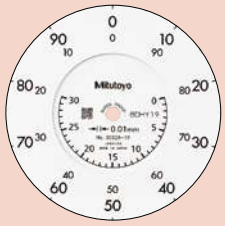
3046A



3047A



3050A



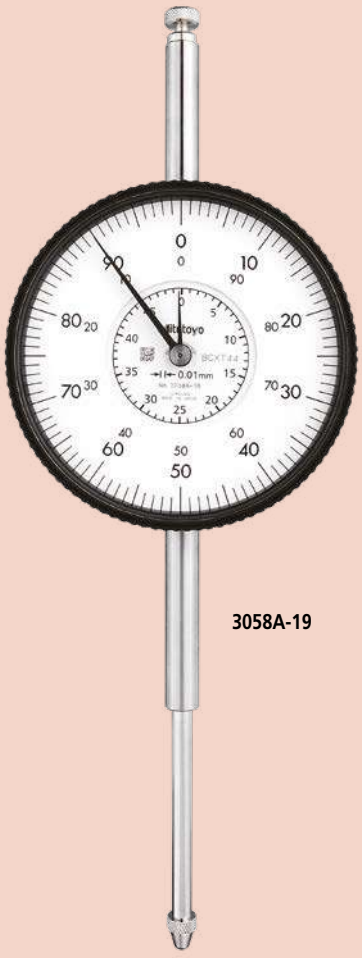
3052A-19



3060A-19



3062A-19



3058A-19

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error				Hysteresis	Repeat-ability	Scale	Measuring force	Price
		Indication error								
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
3046A	10 mm (1 mm)	5 µm	9 µm	10 µm	15 µm	3 µm	3 µm	±0-100	1.4 N or less	**£140.00**
3047A								0-50-0		**£140.00**
3050A	20 mm (1 mm)	8 µm	10 µm	15 µm	20 µm	5 µm	4 µm	±0-100	2.0 N or less	**£184.00**
3052A-19	30 mm (1 mm)	10 µm	12 µm		25 µm	7 µm	5 µm		2.5 N or less	**£205.00**
3058A-19	50 mm (1 mm)				30 µm	8 µm			3.0 N or less	**£212.00**
3060A-19*2	80 mm (1 mm)	12 µm	17 µm	20 µm	45 µm	9 µm				**£290.00**
3062A-19*2	100 mm (1 mm)				50 µm				3.2 N or less	**£439.00**
Graduation: 0.001 mm										
3109A-10	1 mm (0.2 mm)	2 µm	3.5 µm	4 µm	5 µm	2 µm	0.5 µm	0-100-0	1.5 N or less	**£173.00**

Inch

Code No.	Range (range/rev)	Accuracy*3			Scale	Measuring force	Price
		First rev/2.5 rev/10 rev	Retrace	Repeatability			
Graduation: .001"							
3414A	.5" (.1")	±.001"/±.001"/±.001"	.0002"	±.0002"	±0-100	1.8 N or less	**£163.00**
3415A					0-50-0		**£163.00**
3416A	1" (.1")	±.001"/±.001"/±.002"			±0-100		**£160.00**
3417A					0-50-0		**£160.00**
3424A-19	2" (.1")	±.001"/±.001"/±.002"/±.003" (20 rev)	.00033"		±0-100	3.0 N or less	**£267.00**
3426A-19*2	3" (.1")	±.001"/±.001"/±.002"/±.003" (20 rev)/±.005" (over 20 rev)					**£318.00**
3428A-19*2	4" (.1")					3.2 N or less	**£377.00**
Graduation: .0001"							
3802A-10	.025" (.01")	±.0001"/±.0001"/—	.0001"	±.00003"	0-10	2.0 N or less	**£201.00**
3803A-10					0-5-0		**£205.00**

*2 Use in a vertical orientation only (contact point downward).
*3 Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

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Dial Indicators

SERIES 3 – Large Dial Indicators

Features

Metric

Code No.						
3046A	✓	—	—	—	—	—
3047A	—	✓	—	—	—	—
3050A	✓	—	—	✓	—	—
3052A-19	✓	—	✓	—	✓	✓
3058A-19	✓	—	✓	—	✓	✓
3060A-19	✓	—	✓	—	✓	✓
3062A-19	✓	—	✓	—	✓	✓
3109A-10	—	✓	✓	—	✓	—

Inch

Code No.						
3414A	✓	—	—	—	—	—
3415A	—	✓	—	—	—	—
3416A	✓	—	—	—	—	—
3417A	—	✓	—	—	—	—
3424A-19	✓	—	✓	—	✓	✓
3426A-19	✓	—	✓	—	✓	✓
3428A-19	✓	—	✓	—	✓	✓
3802A-10	✓	—	✓	—	✓	—
3803A-10	—	✓	✓	—	✓	—

Optional Accessories

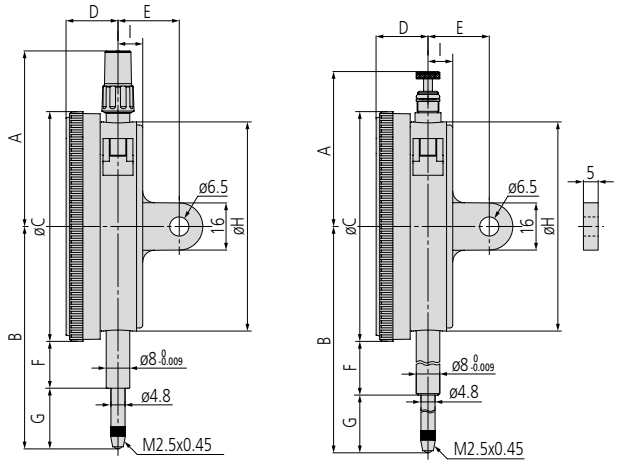
Code No.	Description	Price
21AZB148	Bezel clamp (for metric models)	£2.10
21AZB195	Limit hand (2 pcs.)	£1.60
21RZA065	Bezel clamp (for inch models)	£2.40

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.

Dimensions

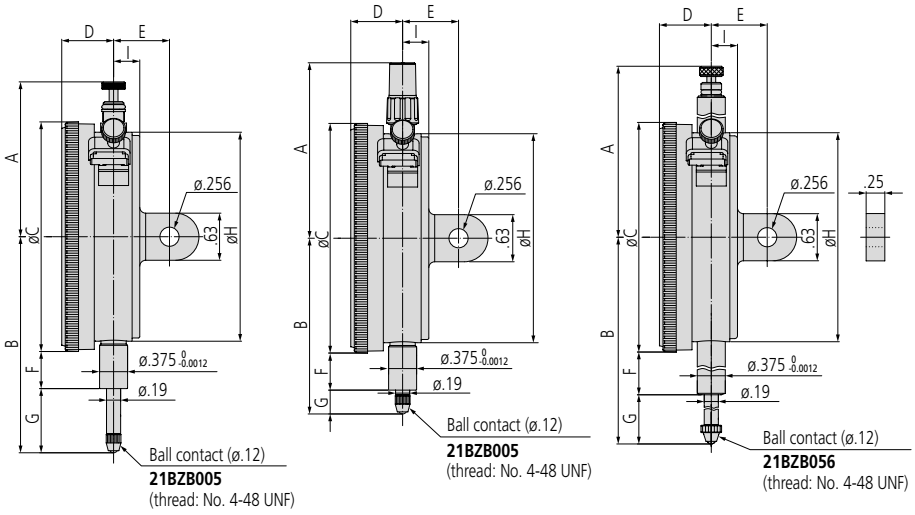
ISO/JIS type

Unit: mm



ANSI/AGD type

Unit: inch



Code No.	A	B	C	D	E	F	G	H	I
ISO/JIS type									
3046A	61.2	75.5	78	17.7	21	15.9	20.6	71	9
3047A									
3050A	52.6	94				25.9	29.1		
3052A-19	72.9	104.3					39.4		
3058A-19	81.9	142.3				43.9	59.4		
3060A-19	120.9	202.3				73.9	89.4		
3062A-19	141.9	243.3				94.9	109.4		
3109A-10	61.2	79				25.9	14.1		
ANSI/AGD type									
3414A	2.07	2.89	3.07	.70	3/4	.50	.86	2.80	.35
3415A									
3416A		3.39					1.36		
3417A									
3424A-19	3.31	5.88				1.99	2.35		
3426A-19	4.84	7.80				2.91	3.35		
3428A-19	5.67	9.63				3.74	4.35		
3802A-10	2.41	2.35				.50	.32		
3803A-10									

F

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Dial Indicators

SERIES 4 – Large Dial Indicators

- Dial indicators with a large-diameter dial face for easy reading.
- Models with longer measuring ranges are also available.
- All types are supplied with limit markers and a bezel clamp as standard.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- The bezel clamp and lifting lever*1 (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.

*1 Can be attached only to **4046A**.



4046A

Features

Metric

Code No.						
4046A	✓	—	—	—	—	—

Inch

Code No.						
4887A-19	✓	—	✓	—	✓	✓

Optional Accessories

Code No.	Description	Price
21AZB148	Bezel clamp (for metric models)	**£2.10**
21AZB195	Limit hand (2 pcs.)	**£1.60**
21RZA065	Bezel clamp (for inch models)	**£2.40**

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
4046A	10 mm (1 mm)	5 µm	9 µm	10 µm	15 µm	3 µm	3 µm	±0-100	1.4 N or less	**£212.00**

Inch

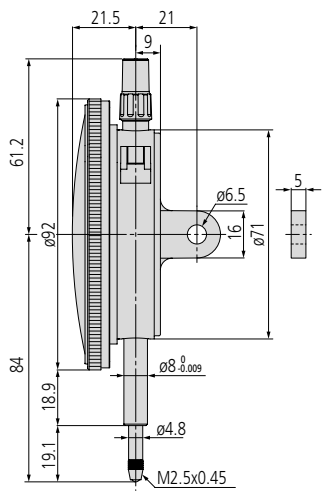
Code No.	Range (range/rev)	Accuracy*3			Scale	Measuring force	Price
		First rev/2.5 rev/10 rev	Retrace	Repeatability			
Graduation: .001"							
4887A-19*2	3" (.1")	±.001"/±.001"/±.002"/±.003" (20 rev)/±.005" (over 20 rev)	.00033"	±.0002"	±0-100	3.0 N or less	**£483.00**

*2 Use in a vertical orientation only (contact point downward).
*3 Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Dimensions

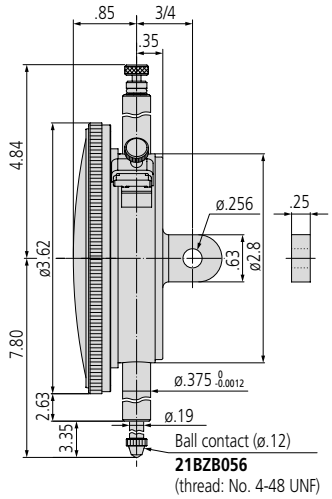
Unit: mm

4046A



Unit: inch

4887A-19



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Dial Indicators

SERIES 2 – Special Purpose Dial Indicators

Features

Metric

Code No.						
2046A-80	✓	—	—	✓	—	—
2048A-10	✓	—	✓	—	✓	✓

Adjustable-hand dial gauge

- The hand position can be adjusted independently of the position of the spindle by rotating the top knob.

Peak-hold dial gauge

- A mechanism holds the pointer and the spindle at the position of maximum depression and hence displays the maximum value.*

* Clearance of peak hold: push the nut in the direction of the arrow indicated in the dimensions diagram for **2046A-80**.

Optional Accessories

Code No.	Description	Price
21AZB148	Bezel clamp (for metric models)	**£2.10**
21AZB195	Limit hand (2 pcs.)	**£1.60**
21RZA065	Bezel clamp (for inch models)	**£2.40**

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Interchangeable backs refer to page F-39 for details.
Spindle lifting aids refer to page F-40 for details.
Measuring stands refer to pages F-67 to F-72 for details.



2048A-10



2046A-80

Specifications

Metric

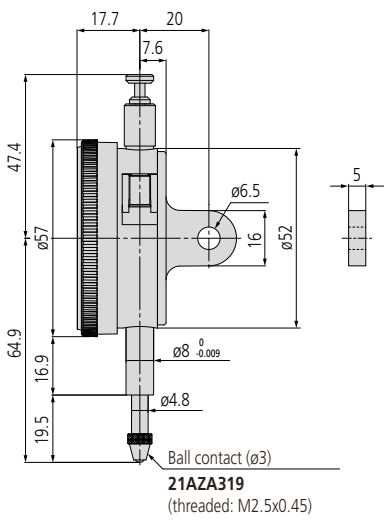
Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
2048A-10	10 mm (1 mm)	5 µm	9 µm	10 µm	15 µm	3 µm	3 µm	0-100	1.4 N or less	**£115.00**
2046A-80						—	—		5.0 N or less	**£140.00**

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Dimensions

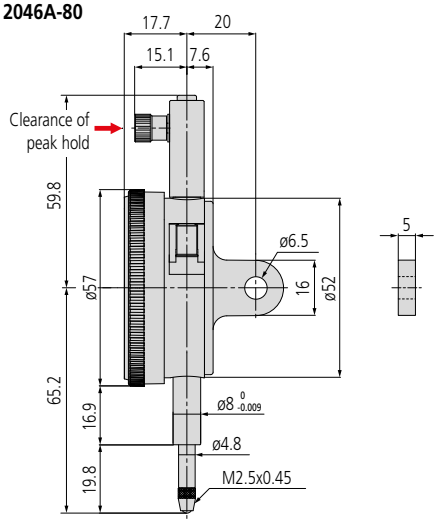
Unit: mm

2048A-10



21AZA319
(threaded: M2.5x0.45)

2046A-80



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Dial Indicators

SERIES 1 – Back Plunger Dial Indicators

- Back plunger type dial gauges are suitable for mounting onto levelling machine tool tables or inspection jigs, and for use in situations where standard dial gauges are difficult to read.
- Model **1960A**, which use Mitutoyo's proprietary shock-proofing mechanism, has excellent durability and shock resistance.



1160A
Shown with holding bar
(optional accessory)

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error				Repeat-ability	Scale	Measuring force	Price
		Indication error				Hysteresis			
		1/10 rev	1/2 rev	1 rev	Overall				
Graduation: 0.01 mm									
1960A	1 mm (1.27 mm)	8 µm	—	—	14 µm	4 µm	3 µm	50-0-50	1.4 N or less	**£139.00**
1160A	5 mm (1 mm)		12 µm	14 µm	16 µm		—	±0-100		**£132.00**

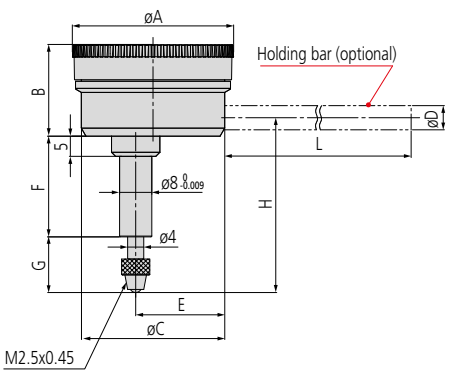
Inch

Code No.	Range (range/rev)	Accuracy		Repeatability	Scale	Measuring force	Price
		First rev / 2.5 rev / 10 rev	Retrace				
Graduation: .001"							
1166A	.2" (.05")	±.001" / ±.001" / ±.001"	.00033"	±.0002"	±0-50	1.4 N or less	**£148.00**
1167A					0-25-0		**£148.00**
1168A					50-0		**£148.00**

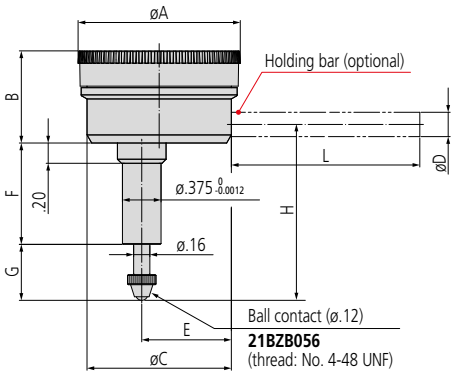
Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.
Note 2: The bezel clamp cannot be used.

Dimensions

ISO/JIS type — Unit: mm



ANSI/AGD type — Unit: inch



Code No.	A	B	C	E	F	G	H
ISO/JIS type							
1960A	40	22.1	35.6	22.2	28.7	12.8	46.0
1160A					13.8	13.8	43.3
ANSI/AGD type							
1166A	1.57	.87	1.40	7/8	.98	.43	1.67
1167A							
1168A							

Features

Metric

Code No.						
1960A	—	✓	✓	✓	—	✓
1160A	✓	—	—	—	—	✓

Inch

Code No.						
1166A	✓	—	—	—	—	✓
1167A	—	✓	—	—	—	✓
1168A	—	—	—	—	✓	✓

Optional Accessories

Code No.	Description	Price
21AAB363	Limit hand (2 pcs.)	**£1.50**
Holding bars		
124625	øD: 6.35 mm, L: 81 mm	**£3.60**
136567	øD: 6 mm, L: 81 mm	**£3.60**
136568	øD: 8 mm, L: 81 mm	**£3.60**
21AAA166	øD: 6 mm, L: 42 mm	**£3.60**
21AAA168	øD: 8 mm, L: 42 mm	**£3.60**
21AAB718A	øD: 6.35 mm, L: 42 mm	**£6.80**

Note: øD and L are as in diagram below right.

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Measuring stands refer to pages F-67 to F-72 for details.



1960A

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Dial Indicators

SERIES 2 – Back Plunger Dial Indicators

- Back plunger type dial gauges are suitable for mounting onto levelling machine tool tables or inspection jigs, and for use in situations where standard dial gauges are difficult to read.
- Model **2960A**, which use Mitutoyo's proprietary shock-proofing mechanism, has excellent durability and shock resistance.



2960A
Shown with holding bar (optional accessory)

Features

Metric

Code No.						
2960A	—	✓	✓	✓	—	✓

Inch

Code No.						
2961A	—	✓	✓	✓	—	✓

Optional Accessories

Code No.	Description	Price
21AZB195	Limit hand (2 pcs.)	**£1.60**
Holding bars		
124625	øD: 6.35 mm, L: 81 mm	**£3.60**
136567	øD: 6 mm, L: 81 mm	**£3.60**
136568	øD: 8 mm, L: 81 mm	**£3.60**
21AAA166	øD: 6 mm, L: 42 mm	**£3.60**
21AAA168	øD: 8 mm, L: 42 mm	**£3.60**
21AAB718A	øD: 6.35 mm, L: 42 mm	**£6.80**

Note: øD and L are as in diagram below left.

Contact points for Mitutoyo's dial indicators refer to pages F-35 to F-38 for details.
Measuring stands refer to pages F-67 to F-72 for details.

Specifications

Metric

Code No.	Range (range/rev)	Max. permissible error						Scale	Measuring force	Price
		Indication error				Hysteresis	Repeat-ability			
		1/10 rev	1/2 rev	1 rev	Overall					
Graduation: 0.01 mm										
2960A	1 mm (1.27 mm)	8 µm	—	—	14 µm	4 µm	3 µm	50-0-50	1.4 N or less	**£171.00**

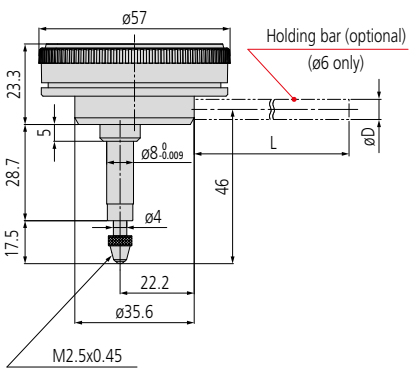
Inch

Code No.	Range (range/rev)	Accuracy			Scale	Measuring force	Price
		First rev / 2.5 rev / 10 rev	Retrace	Repeatability			
Graduation: .0005"							
2961A	.04" (.05")	±.0005" / — / —	.00016"	±.0001"	20-0-20	1.4 N or less	**£219.00**

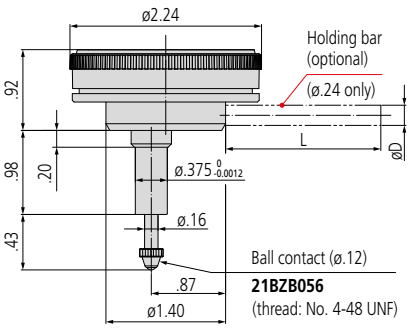
Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.
Note 2: The bezel clamp cannot be used.

Dimensions

2960A Unit: mm



2961A Unit: inch



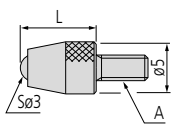
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Optional Accessories

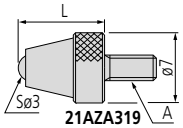
Contact Points for Digimatic and Dial Indicators and Linear Gauges

Ball Point

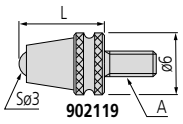
Unit: mm



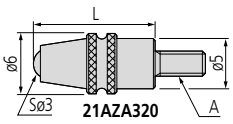
Standard contact point



21AZA319

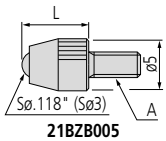


902119



21AZA320

For waterproof models (with groove for rubber boot)

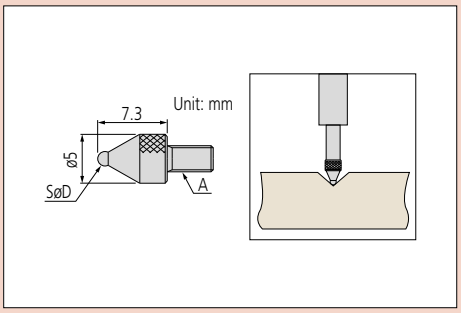


21BZB005

Code No.	Material	L	Price
A: M2.5x0.45			
901312	Carbide without groove	7.3	**£8.10**
120047D	Ruby without groove		**£15.30**
901994	Plastic without groove		**£13.20**
21AZA319	Carbide without groove	8.3	**£4.30**
902119	Carbide with groove (waterproof type)		**£17.40**
21AZA320	Carbide with groove (waterproof type)	12.1	**£10.30**
21JAA225	Carbide without groove	14	**£4.80**
120049D		15	**£15.60**
120051D	Ruby without groove		**£9.00**
21JAA224	Carbide without groove	17	**£6.20**
120053D		25	**£24.30**
120055D	Ruby without groove		**£19.90**
A: 4-48UNF			
21BZB005	Carbide	1/4"	**£9.00**

Ball Point

Optimal for workpieces with deep indentations.

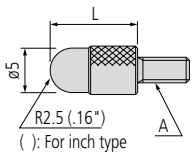


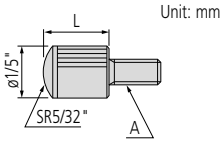
Code No.	SøD	Price
A: M2.5x0.45		
21AAA349	1 mm, carbide	**£59.10**
21AAA350	1.5 mm, carbide	**£49.80**
101122	1.8 mm, steel	**£15.10**
21AAA351	2.5 mm, carbide	**£49.80**
21AAA352	4 mm, carbide	**£59.60**

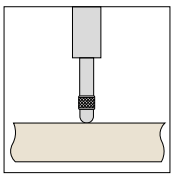
Shell Type Point

Contact point with a large radius. Optimal for use on flat surfaces.

Unit: mm





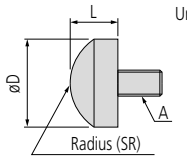


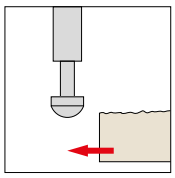
Code No.	L	Price
A: M2.5x0.45		
101386	5	**£6.50**
101118	10	**£12.90**
137393	15	**£15.10**
101387	20	**£15.10**
101388	25	**£15.10**
A: 4-48UNF		
101184	5/32"	**£6.20**
21AAA031	1/4"	**£5.60**
101185	1/2"	**£6.20**
101186	3/4"	**£6.20**
21AAA034	7/8"	**£5.60**
101187	1"	**£6.20**

Spherical Point

A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.

Unit: mm

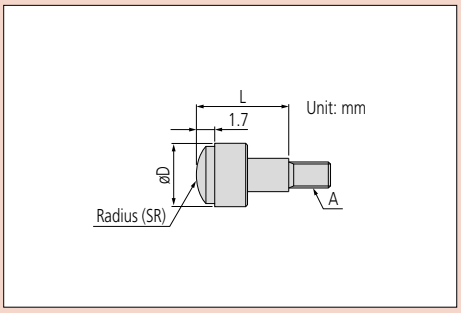




Code No.	D	L	SR	Price
A: M2.5x0.45				
111460	5.5	3	5	**£15.10**
125258	7.9	5	5	**£15.10**
101119	10	5	7	**£15.10**
A: 4-48UNF				
101205	1/2"	1/8"	.35"	**£6.50**
101204	3/8"	3/32"	.28"	**£6.20**

Spherical Point (Carbide)

A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.



Code No.	D	L	SR	Price
A: M2.5x0.45				
120058D	5.2	5	5	**£44.00**
120059D	7.5	10	7	**£28.10**
120060	10.5	10	10	**£31.20**

F

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Optional Accessories

Contact Points for Digimatic and Dial Indicators and Linear Gauges


101120


101385


120057


120068


120067

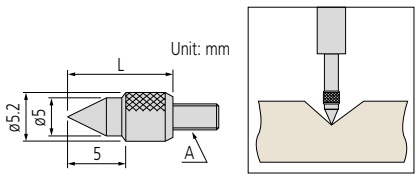

131365


120059

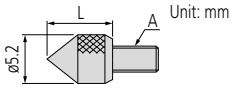

101117

Conical Point

Used for positioning the measurement point. Since it can damage a workpiece easily, it is not suitable for use on soft materials.



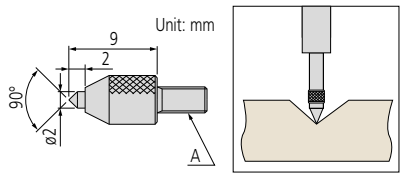
Code No.	Tip angle	L	Price
A: M2.5x0.45			
101120	60°	10	**£13.50**
A: 4-48UNF			
101190	60°	1/2"	**£6.20**



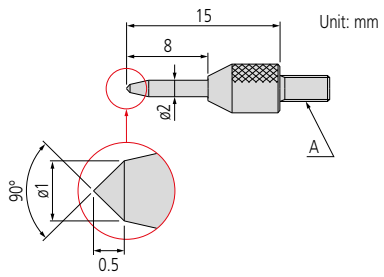
Code No.	Tip angle	L	Price
A: M2.5x0.45			
101385	90°	5	**£15.10**
A: 4-48UNF			
101191	90°	1/4"	**£6.20**

Conical Point (Carbide)

Used for positioning the measurement point. Since it can damage a workpiece easily, it is not suitable for use on soft materials.



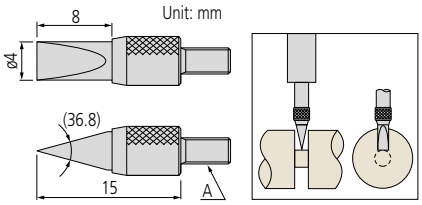
Code No.	Price
A: M2.5x0.45	
120057	**£44.40**



Code No.	Price
A: M2.5x0.45	
120068D	**£36.40**

Knife Edge Point (Carbide)

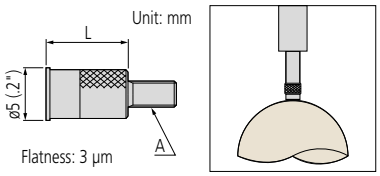
Suitable for measuring narrow groove diameter, etc.



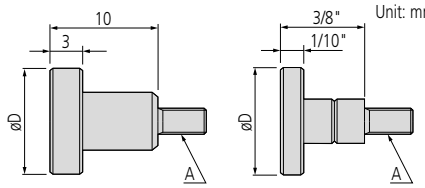
Code No.	Price
A: M2.5x0.45	
120067D	**£82.50**

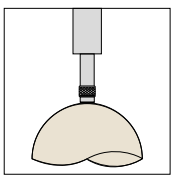
Flat Point

Optimal for use on convex surfaces.



Code No.	L	Price
A: M2.5x0.45		
131365	8	**£23.70**
21AAB715	10	**£31.20**
A: 4-48UNF		
133017	5/16"	**£9.10**
21AAA043	1/2"	**£8.30**
21AAA044	3/4"	**£9.80**
21AAA045	1"	**£9.80**





Code No.	D	Price
A: M2.5x0.45		
101117	10	**£32.20**
21AAB711	15	**£37.60**
21AAB712	20	**£45.10**
21AAB713	25	**£52.00**
21AAB714	30	**£64.30**
A: 4-48UNF		
101188	1/2"	**£11.00**
101189	3/8"	**£11.00**

F

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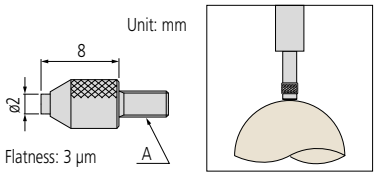
Mitutoyo

Optional Accessories

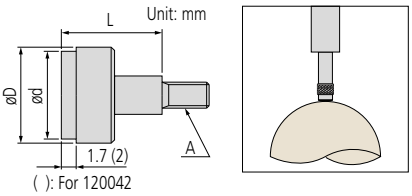
Contact Points for Digimatic and Dial Indicators and Linear Gauges

Flat Point

Optimal for use on convex surfaces.

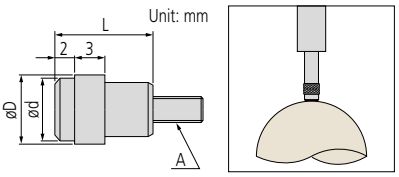


Code No.	Price
A: M2.5x0.45	
120056D	**£18.50**



Code No.	D	d	L	Price
A: M2.5x0.45				
120041D	5.2	4.3*	5	**£19.30**
120042D	7	6.5*	10	**£26.00**
120043D	10.5	9.5*	10	**£31.20**
21AZB760	17	15**	10	**£193.00**
21AZB761	22	20**	10	**£208.00**

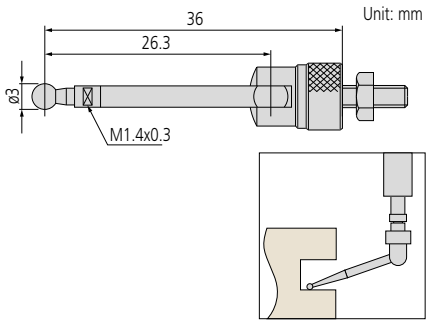
Flatness: *3 µm, **5 µm



Code No.	D	d	L	Price
A: M2.5x0.45				
21AZB754	7	6.4	10	**£130.00**
21AZB755	9	8	10	**£130.00**

Lever Point

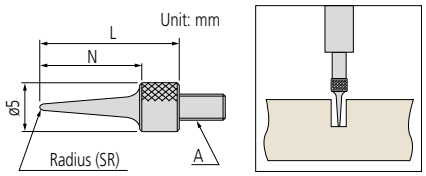
Suitable for use on perpendicular faces, such as those within mould cavities. Lever can be adjusted to the required angle.



Code No.	Price
A: M2.5x0.45	
900391	**£16.50**
A: 4-48UNF	
900393	**£23.70**

Needle Point

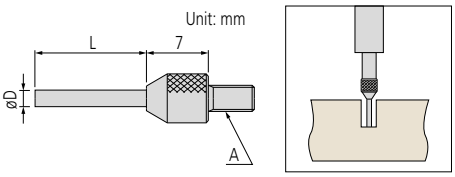
Suitable for probing the bottom of a groove or hole.



Code No.	N	L	SR	Price
A: M2.5x0.45				
101121	11	15	0.4	**£12.90**
137413	13	17	0.2	**£12.40**
21AAA255	21	25	0.4	**£15.10**
21AAA256	31	35	0.4	**£17.20**
A: 4-48UNF				
21AAA030	.27"	.6"	.016"	**£6.70**
21AAA046	.52"	1"	.016"	**£7.40**

Needle Point (Carbide)

Suitable for probing the bottom of a groove or hole.



Code No.	D	L	Price
A: M2.5x0.45			
120066D	0.45	3	**£38.80**
21AAA329	0.45	5	**£156.00**
120065D	1	3	**£16.20**
21AAA330	1	5	**£111.00**
21AAA331	1	8	**£116.00**
21AAA332	1	10	**£127.00**
21AAA335	1.5	5	**£104.00**
21AAA336	1.5	10	**£156.00**
120064D	1.5	13	**£14.10**
21AAA337	1.5	20	**£119.00**
21AAA338	1.5	40	**£141.00**
137257	2	8	**£45.00**
21AAA257	2	18	**£70.70**
21AAA258	2	28	**£74.90**
21AAA339	2	40	**£153.00**


120056


120043


137255


101121


137257


900391

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Optional Accessories

Contact Points for Digimatic and Dial Indicators and Linear Gauges



120062



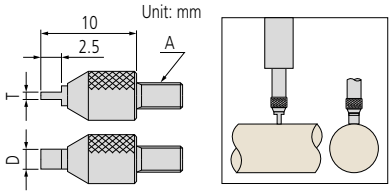
901954



303613

Blade Point (Carbide)

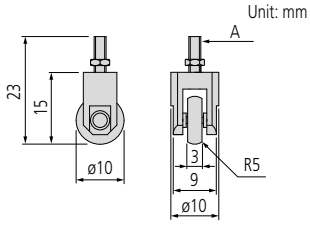
Suitable for use on convex surfaces, especially those with shallow grooves.



Code No.	T	W	Price
A: M2.5x0.45			
120061D	0.4	2	**£54.20**
120062D	0.6	2	**£54.20**
120063D	1	4	**£61.20**

Roller Point

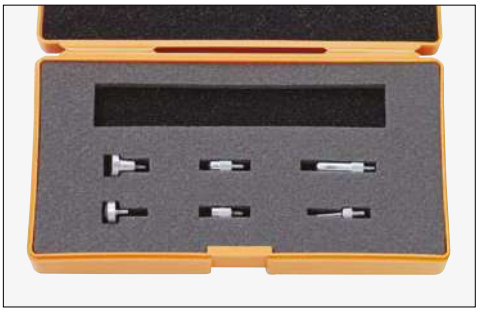
Suitable for use on a moving workpiece surface, or where the workpiece needs to slide from the side.



Code No.	Price
A: M2.5x0.45	
901954	**£45.00**
A: 4-48UNF	
901991	**£45.00**

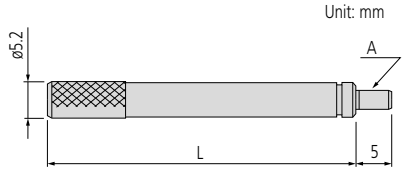
Interchangeable Contact Point Set

This set consists of six types of popular contact point for extending the use of an indicator to many applications.

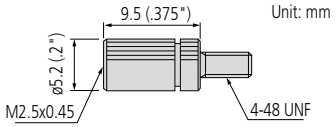


Code No.	Contact points included	Price
A: M2.5x0.45		
7822	Flat point (**131365**, ø5 mm) Flat point (**101117**, ø10 mm) Needle point (**101121**) Spherical point (**101119**) Shell type point (**101118**) Shell type point (**101387**)	**£37.80**

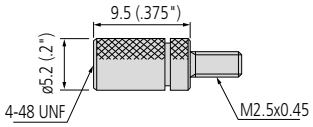
Extension Rod



Code No.	L	Price
A: M2.5x0.45		
303611	10	**£1.70**
21AAA259A	15	**£3.40**
303612	20	**£3.50**
21AAA259B	25	**£3.50**
303613	30	**£4.40**
21AAA259C	35	**£3.80**
21AAA259F	50	**£8.50**
304146	60	**£9.10**
21AAA259J	70	**£7.80**
21AAA259L	75	**£9.20**
21AAA259M	80	**£9.70**
304147	90	**£13.50**
303614	100	**£14.10**
A: 4-48UNF		
139167	1/2"	**£8.50**
301655	1"	**£4.00**
301657	2"	**£7.30**
301659	4"	**£14.10**



Code No.	Price
21AAA011	**£10.40**



Code No.	Price
21AAA012	**£11.60**

F

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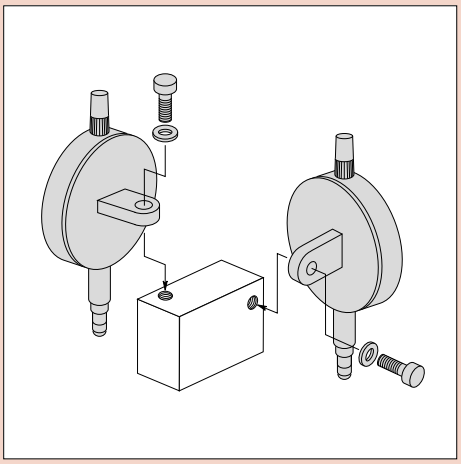
Mitutoyo

Optional Accessories

Interchangeable Backs for Digimatic and Dial Indicators

A dial or Digimatic indicator may be held in position by clamping on either the stem or the lug on the back of the indicator. The back of the indicator may need to be interchanged with another type for special applications. A wide variety of backs is available for Mitutoyo Digimatic and dial indicators.

Note: When requiring optional backs for indicators not featured in this catalogue, please your local Mitutoyo Sales Office.



Alternative mounting arrangements for an indicator using the lug-on-centre back.

Flat Back



Unit: mm

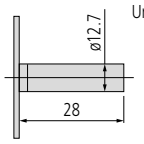


Code No.	Series	Remarks	Price
101211	1 (ø41 mm)	a = 2.2	£2.00
136872		(Waterproof A type)	£8.50
101039	2 (ø57 mm)	a = 2.5	£2.00
192910		(Waterproof F type)	£4.80
100836	3, 4 (ø78, 91 mm)	a = 3.0	£3.00

Back with Post



Unit: mm

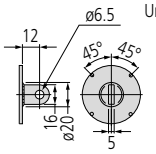


Code No.	Series	Remarks	Price
193172	1 (ø41 mm)	Custom made	£30.10
101169	2 (ø57 mm)	—	£10.80

Lug-On-Centre Back



Unit: mm

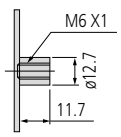


Code No.	Series	Remarks	Price
101210	1 (ø41 mm)	metric type	£5.70
101040	2 (ø57 mm)	metric type	£5.70
101306		inch type	£4.40
100691	3, 4 (ø78, 91 mm)	metric type	£7.30
100797		inch type	£7.30

Back with Screw Mount



Unit: mm

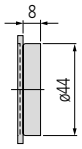


Code No.	Series	Remarks	Price
193173	1 (ø41 mm)	M6x1	£29.30
136023	2 (ø57 mm)	M6x1	£10.80
101170		1/4-28UNF	£10.80

Magnetic Back



Unit: mm

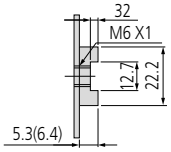


Code No.	Series	Remarks	Price
900928	2 (ø57 mm)	—	£33.60
900929	3, 4 (ø78, 91 mm)	—	£53.60

Flat Adjustable Back



Unit: mm

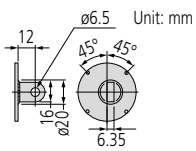


Code No.	Series	Remarks	Price
136025	1 (ø41 mm)	M6x1	£19.60
136026	2 (ø57 mm)	M6x1	£10.80
101168		1/4-20UNF	£10.80

Back with Offset Lug



Unit: mm

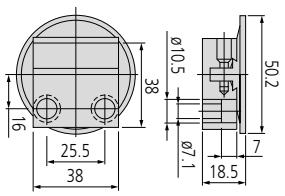


Code No.	Series	Remarks	Price
101167	2 (ø57 mm)	—	£10.80

Back with Adjustable Bracket

Unit: mm





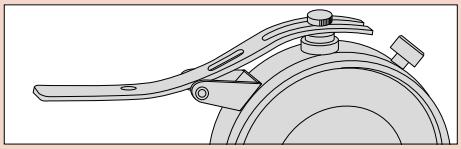
Code No.	Series	Remarks	Price
901963	2 (ø57 mm)	—	£63.10

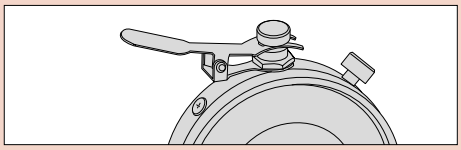
F

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Optional Accessories

Spindle Lifting Aids for Digimatic and Dial Indicators





Spindle lifting levers are available for attachment to the threaded fixing point provided or directly to the top spindle bearing.

Spindle Lifting Lever

The Spindle Lifting Lever is designed to enable smooth lifting of the spindle for operator convenience and contact point safety when using a dial indicator mounted on a stand.



902100



21AZB149



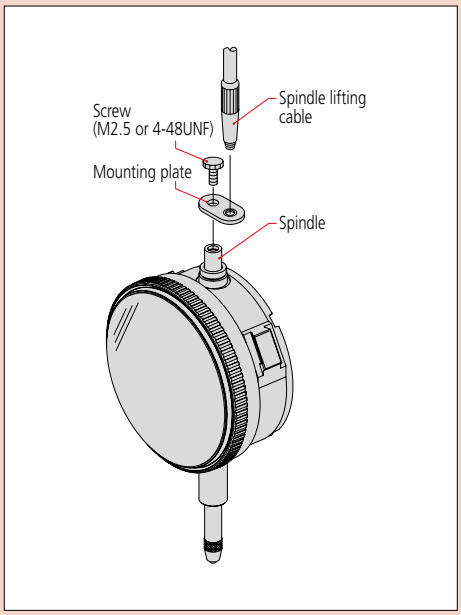
21EZA198
(**21AZB149**: Lever, **101171**: Stop screw)



21AZB150

Code No.	Remarks	Price
For dial indicators		
902100	Use for A and S type SERIES 1 dial indicators *1	**£8.60**
21EZA198	Use for A type Series 2, 3, and 4 dial indicators (up to 10 mm/.4") *2	**£8.10**
21AZB149	Use for S type Series 2, 3, and 4 dial indicators (up to 10 mm/.4") *2	**£4.10**
21AZB150	Use for A and S type Series 2 and 3 dial indicators (from 10 mm/.4" up to 20 mm/.8") *2	**£4.60**
For Digimatic indicators		
21EZA198	Use for ID-SS, ID-SX, ID-CX (up to 12.7 mm/.0.5") *1	**£8.10**

*1 Before use, replace the stop screw with the standard accessory.
*2 Use the stop screw already fixed to the dial indicator body.
Note: When requiring levers for indicators not featured in this catalogue, please contact your local Mitutoyo Sales Office.



The spindle lifting cable is attached to the threaded top of the spindle by means of a mounting plate as shown.

Spindle Lifting Cable

With auto-stop function.



Code No.	Remarks	Price
21JZA301	For Series 2 indicators having a range less than 20mm	**£43.40**

Spindle Lifting Handle

Suitable for 4.8 mm spindle diameter.



Code No.	Price
21EAA426	**£1.60**

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Optional Accessories

Limit Stickers

- These are intended to be cut as appropriate and then are stuck onto the dial face or crystal of a Series 2 dial indicator (55.6 mm or 57 mm bezel diameter) to indicate dimensional tolerance limits.
- 10 pieces per set.







Code No.	Remarks	Price
136420	Red (10 sheets)	**£8.60**
136421	Green (10 sheets)	**£8.60**
136422	Yellow (10 sheets)	**£8.60**



Limit sticker indicating dimension tolerance limits of ±0.20 mm. If the pointer comes to rest outside the red area during measurement then the dimension is judged to be within tolerance.

Limit Hands

Limit hands are now available as an optional accessory.



Code No.	Remarks	Price
21AAB363	For Series 1 (2 pcs.)	**£1.50**
21AZB195	For Series 2, 3 and 4 (2 pcs.)	**£1.60**

Bezel Clamp

Bezel clamps are now available as an optional accessory.



Code No.	Remarks	Price
For Series 1		
21RZA149	Metric/inch type	**£1.60**
For Series 2		
21AZB148	Metric type	**£2.10**
21RZA065	Inch type	**£2.40**
21RZA067	For **2424A**(**B**)-**19** only	**£4.30**

Spindle Cap

- Spindle caps are available for dial indicators with a range of 10 mm or less.
- Spindle caps are useful for protecting the top of the spindle from dust and other contamination.





Code No.	Remarks	Price
21AAB675	Standard	**£1.00**
21AAB676	Waterproof	**£1.00**

Note 1: These caps are not applicable to **1003**, **1911-10**, **1913-10**, **1921-10**, **1923-10**, **1925-10**, **2971**, **2972**, **2973**, **2976**, **2977**, and **2978**.
Note 2: When attaching to small dial indicators, the overall height will be 8 mm greater.

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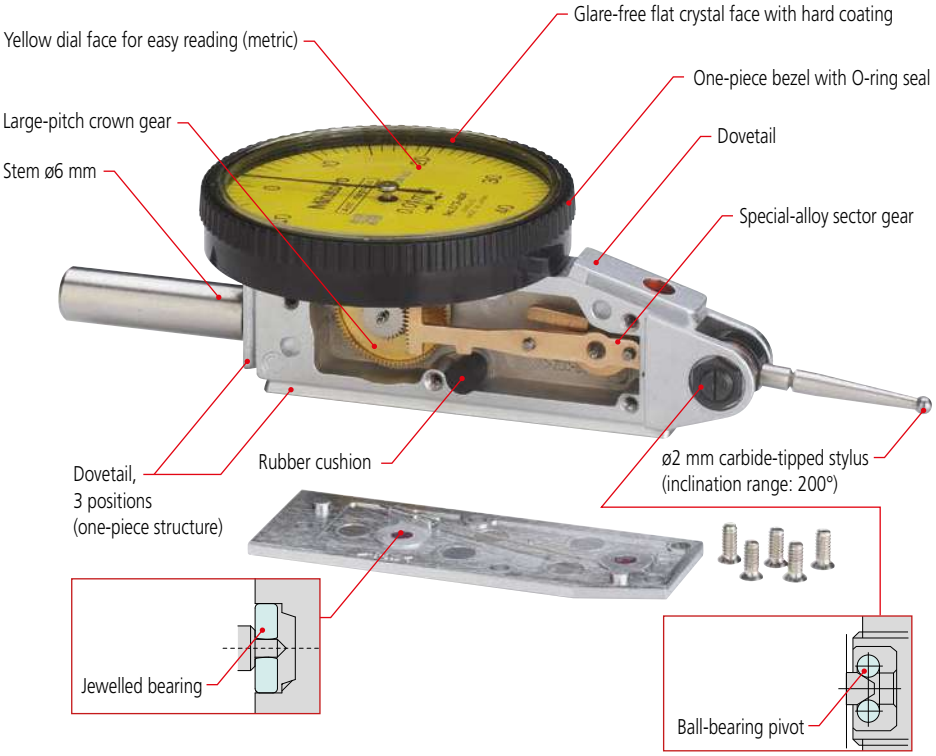
Dial Test Indicators

SERIES 513 – Lever Dial Test Indicators

Feature Icons

Icon	Feature description
	With revolution counter type.
	Long stylus type.
	Jewelled bearing type.
	Double scale spacing type, easy-on-the-eyes.
	Compact type.
	High-accuracy type.
	Anti-magnetic type – carbide contact point.

- Designed to probe surfaces that cannot be reached with a normal dial gauge. Useful both for alignment and for measurement purposes.
- Mitutoyo's proprietary design permits smooth pointer operation.
- Strong frame provides excellent rigidity and durability.
- Non-magnetic pointer and contact point permit reliable operation even in magnetic environments.
- Clear and concise wide dial face allows excellent visibility.
- Flat crystal makes graduations easy to read. Moreover, the O-ring sealing method used for the bezel prevents water or oil penetration. (Note that this type of indicator is NOT waterproof.)
- The surface of the crystal is hard-coated for excellent scratch resistance.
- Five types are available: horizontal, vertical, parallel, universal, and pocket, allowing users to select the model most suited to their needs. Each type is supplied as a set that includes several accessories and there is a choice of the set contents, which provides an opportunity for the user to match the indicator to the target application in a cost-effective manner.
  Horizontal: The standard configuration.
  Vertical: Best suited for centering a hole under the spindle of a machine tool.
  Parallel: The scale can be read from the front, with the stylus pivoting in a plane parallel to that of the dial face.
  Universal: The direction of the stylus movement can be freely changed.
  Pocket: Compact type.



Features of Dial Test Indicators with a Ruby Contact Point

- Dial test indicators with a ruby contact point are available in the horizontal (standard) type.
- Benefits of ruby contact points:
  · Several times more resistant to wear than carbide.
  · Can be used on electrical discharge machines without special precautions.
  · Will not pick up ferrous swarf.



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Dial Test Indicators

SERIES 513 – Horizontal Dial Test Indicator

- Provides easy access to shrouded surfaces that cannot be reached with conventional dial indicators.
- No-clutch structure for automatic reversal of measuring direction.
- Resistant to water and dust thanks to the one piece bezel and O-ring seal for the crystal.
- The glare-free flat crystal face has a scratch resistant coating.
- High sensitivity and quick response due to low-friction jewelled bearings.

513-474-10E:

- Ruby contact point model.
- Higher resistance to wear.
- Non-magnetic, non-conductive tip allows use in EDM processes.



513-415-10E



513-404-10E



513-402-10E

Features

Metric

Code No.					
513-401-10E	✓	—	—	✓	—
513-404-10E	✓	—	—	✓	—
513-405-10E	✓	—	—	✓	—
513-414-10E	✓	✓	✓	✓	—
513-415-10E	✓	—	✓	✓	—
513-424-10E	✓	✓	—	✓	—
513-425-10E	✓	—	—	✓	✓
513-426-10E	✓	✓	—	✓	✓
513-474-10E	✓	—	—	✓	—

Inch

Code No.					
513-402-10E	✓	—	—	✓	—
513-403-10E	✓	—	—	✓	—
513-412-10E	✓	—	✓	✓	—

Metric/inch

Code No.					
513-409-10T	✓	—	—	✓	—

Inch/metric

Code No.					
513-406-10T	✓	—	—	✓	—



513-401-10E



513-405-10E



513-414-10E



513-424-10E



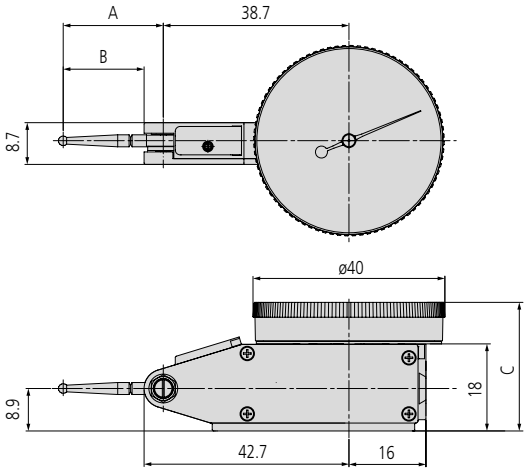
513-425-10E



513-403-10E

Dimensions

Unit: mm



Code No.	A	B	C
513-401-10E	14.7	11.2	27
513-404-10E	20.9	17.4	
513-405-10E	18.7	15.2	
513-409-10E			
513-414-10E	37.4	33.9	
513-415-10E	44.5	41.0	
513-424-10E	22.2	18.7	
513-426-10E			28
513-425-10E	18.7	15.2	
513-474-10E	20.9	17.4	27

Optional Accessories

Swivel clamps, holding bars, stems and styli refer to pages F-50 to F-52 for details.

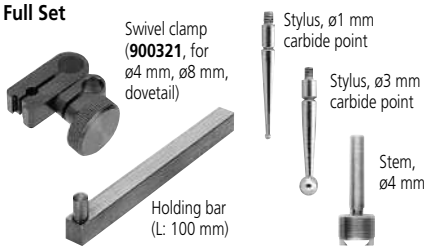
Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances.
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Dial Test Indicators

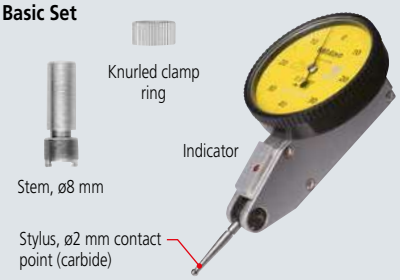
SERIES 513 – Horizontal Dial Test Indicator

Set Configuration: Metric and Metric/Inch

Full Set

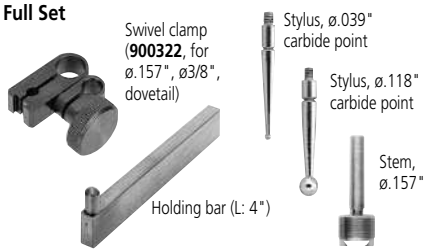


Basic Set

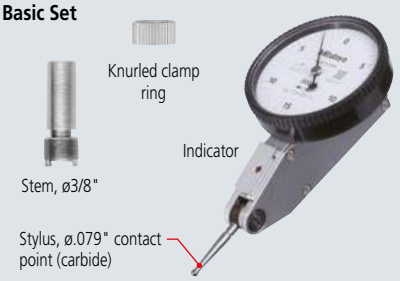


Set Configuration: Inch and Inch/Metric

Full Set



Basic Set





513-908-10E

Set Configuration: Metric

Special Set



Special Set



Specifications

Metric

Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Basic set						
513-424-10E	0.01 mm	0.5 mm	5 µm	0-25-0	0.3 N or less	**£120.00**
513-414-10E			10 µm		0.2 N or less	**£132.00**
513-404-10E		0.8 mm	8 µm	0-40-0	0.3 N or less	**£107.00**
513-474-10E*						**£125.00**
513-415-10E		1 mm	10 µm	0-50-0	0.2 N or less	**£134.00**
513-426-10E		1.5 mm	8 µm	0-25-0	0.4 N or less	**£123.00**
513-405-10E	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	**£132.00**
513-425-10E		0.6 mm	6 µm		0.4 N or less	**£153.00**
513-401-10E	0.001 mm	0.14 mm	3 µm	0-70-0	0.3 N or less	**£138.00**
Full set						
513-424-10T	0.01 mm	0.5 mm	5 µm	0-25-0	0.3 N or less	**£148.00**
513-414-10T			10 µm		0.2 N or less	**£173.00**
513-404-10T		0.8 mm	8 µm	0-40-0	0.3 N or less	**£132.00**
513-415-10T		1 mm	10 µm	0-50-0	0.2 N or less	**£162.00**
513-405-10T	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	**£158.00**
Special set						
513-908-10E	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	**£188.00**

Inch

Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Basic set						
513-402-10E	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	**£117.00**
513-412-10E					0.2 N or less	**£150.00**
513-403-10E	.0001"	.008"	±.0001"	0-4-0	0.3 N or less	**£141.00**
Full set						
513-402-10T	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	**£153.00**
513-412-10T					0.2 N or less	**£180.00**
513-403-10T	.0001"	.008"	±.0001"	0-4-0	0.3 N or less	**£187.00**
Special set						
513-907-10E	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	**£188.00**

Metric/inch

Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Full set						
513-409-10T	0.002 mm/.0001"	0.2 mm/.0075"	3 µm	0-10-0/0-3.8-0	0.3 N or less	**£187.00**

Inch/metric

Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Full set						
513-406-10T	.0005"/0.01 mm	.03"/0.7 mm	±.0005"	0-15-0/0-35-0	0.3 N or less	**£162.00**

* Provided with a ø2 mm ruby contact point as a substitute for ø2 mm carbide contact point.

F

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Dial Test Indicators

SERIES 513 – Vertical and Parallel Face Dial Test Indicators

- The vertical face indicator is useful for centering holes under a machine tool spindle using the universal holder mounted in the spindle chuck. (See page F-52.)
- The parallel face indicator is convenient to use when the application calls for stylus movement in a plane parallel to that of the dial face.



513-454-10E



513-452-10E



513-484-10E

Features

Metric

Code No.		
513-454-10E	✓	✓
513-455-10E	✓	✓
513-484-10E	—	✓

Inch

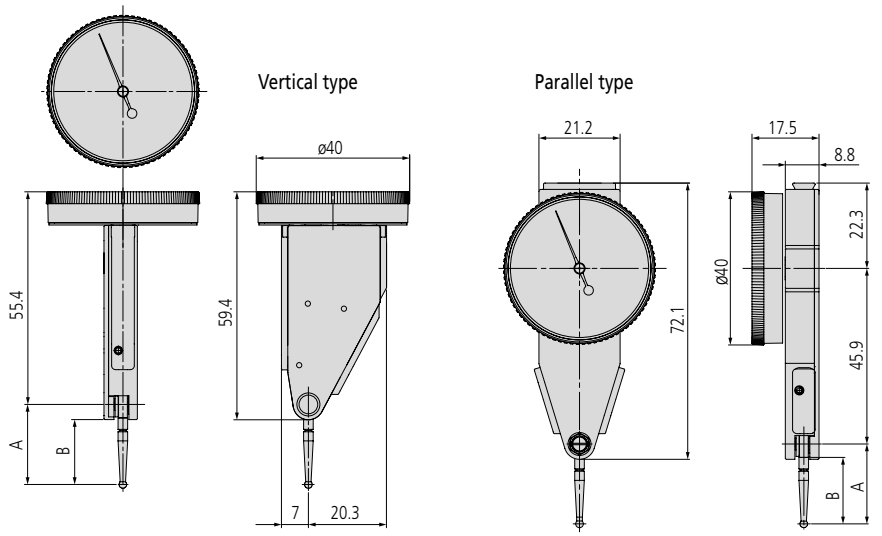
Code No.		
513-452-10E	✓	✓
513-453-10E	✓	✓
513-482-10E	—	✓

Optional Accessories

Swivel clamps, holding bars, stems and styli refer to pages F-50 to F-52 for details.

Dimensions

Unit: mm



Code No.	A	B
513-452-10E	19.9	16.4
513-453-10E	19.0	15.5
513-454-10E	20.9	17.4
513-455-10E	18.7	15.2

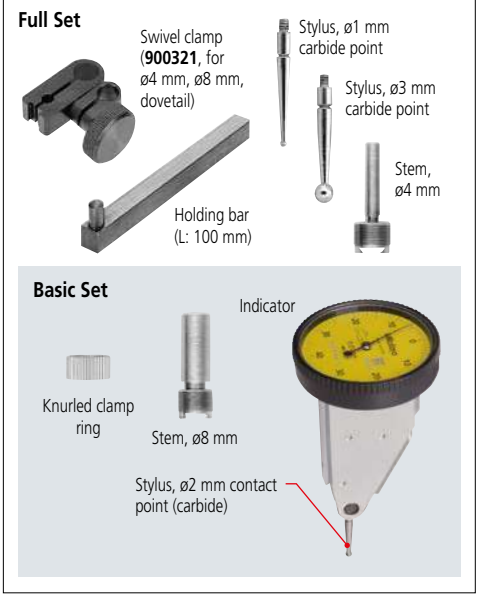
Code No.	A	B
513-482-10T	19.9	16.4
513-484-10E	18.7	15.2

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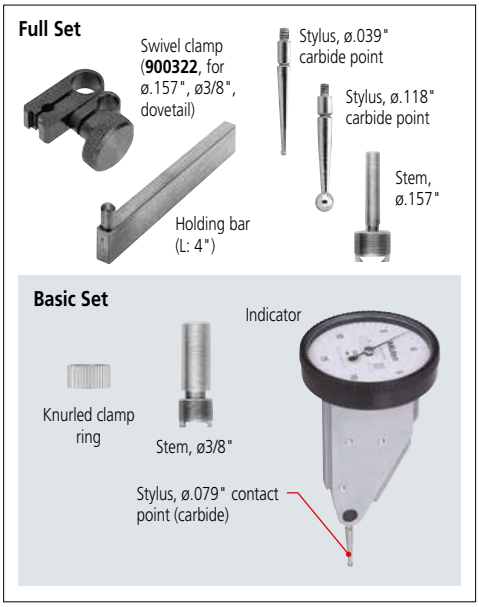
Dial Test Indicators

SERIES 513 – Vertical and Parallel Face Dial Test Indicators

Set Configuration: Metric



Set Configuration: Inch



Specifications

Metric

Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Vertical type, basic set						
513-454-10E	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	**£112.00**
513-455-10E	0.002 mm	0.2 mm	3 µm	0-100-0		**£174.00**
Vertical type, full set						
513-454-10T	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	**£167.00**
513-455-10T	0.002 mm	0.2 mm	3 µm	0-100-0		**£188.00**
Parallel type, basic set						
513-484-10E	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	**£120.00**
Parallel type, full set						
513-484-10T	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	**£139.00**

Inch

Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Vertical type, basic set						
513-452-10E	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	**£129.00**
513-453-10E	.0001"	.008"	±.0001"	0-4-0		**£163.00**
Vertical type, full set						
513-452-10T	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	**£139.00**
513-453-10T	.0001"	.008"	±.0001"	0-4-0		**£188.00**
Parallel type, full set						
513-482-10T	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	**£156.00**

F

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Mitutoyo

Dial Test Indicators

SERIES 513 – Pocket Dial Test Indicator

- Carbide contact points.
- Reversible measuring direction.
- Two holding bars are supplied.
- Fully adjustable bezel/dial face.
- Stylus is adjustable within 190°.
- Bezel is sealed with on O-ring to keep out water and oil.





513-517-10T



513-503-10T



513-518-10T



513-515-10T

Specifications

Metric

Code No.	Range	Max. permissible error*				Scale	Measuring force	Price
		1/10 rev	Overall	Hysteresis	Repeatability			
Full set, graduation: 0.01 mm								
513-517-10T	0.8 mm	5 µm	9 µm	4 µm	3 µm	0-40-0	0.3 N or less	**£143.00**
513-514-10T	0.5 mm		10 µm	5 µm		0-25-0		**£171.00**
513-515-10T	1.0 mm					0-50-0		**£171.00**
Full set, graduation: 0.002 mm								
513-503-10T	0.2 mm	2 µm	4 µm	3 µm	1 µm	0-100-0	0.4 N or less	**£171.00**
Full set, graduation: 0.001 mm								
513-501-10T	0.14 mm	2 µm	4 µm	3 µm	1 µm	0-70-0	0.5 N or less	**£194.00**

Inch

Code No.	Range	Max. permissible error*			Scale	Measuring force	Price
		1 rev	Hysteresis	Repeatability			
Full set, graduation: .001"							
513-518-10T	.04"	±.001"	.0002"	±.0004"	0-20-0	0.3 N or less	**£143.00**
Full set, graduation: .0005"							
513-512-10T	.02"	±.0005"	.0002"	±.0002"	0-10-0	0.3 N or less	**£171.00**
Full set, graduation: .0001"							
513-504-10T	.01"	±.0002"	.0001"	±.00004"	0-5-0	0.3 N or less	**£171.00**

* We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.
Note: Be sure to perform calibration with reference gauge, etc. after exchanging the contact point. The inside parts may be damaged when the contact point is exchanged due to the breakage. In the case the of the significant deterioration in the operation, repair is required.

Features

Metric

Code No.	H				
513-517-10T	—	—	—	✓	✓
513-514-10T	—	✓	✓	✓	✓
513-515-10T	—	✓	—	✓	✓
513-503-10T	—	—	—	✓	✓
513-501-10T	✓	—	—	✓	✓

Inch

Code No.	H				
513-518-10T	—	—	—	✓	✓
513-512-10T	—	✓	✓	✓	✓
513-504-10T	—	—	—	✓	✓

Optional Accessories

Swivel clamps, **holding bars**, **stems** and **styli** refer to pages F-50 to F-52 for details.



513-514-10T



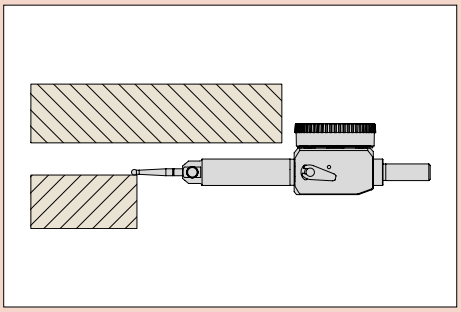
513-501-10T



513-512-10T



513-504-10T



The slim body allows measurements in shallow space.

F

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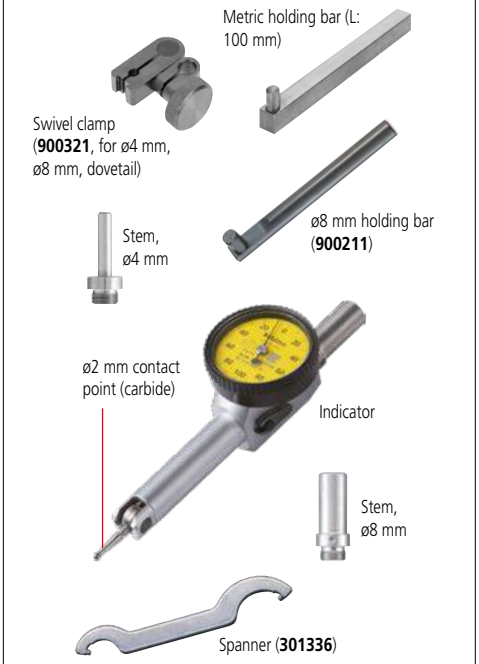
Dial Test Indicators

SERIES 513 – Pocket Dial Test Indicator

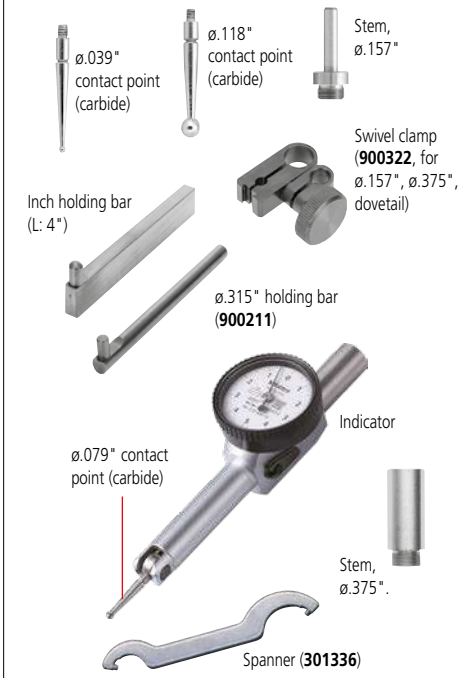


Pocket type can be fixed at the body (at ø9.52).

Set Configuration: Metric

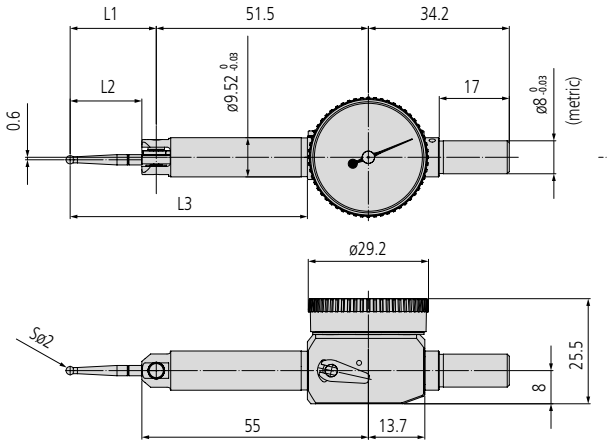


Set Configuration: Inch



Dimensions

Unit: mm



Note: A slight difference may occur depending on the centre of the contact point, graduation plate, and stem fixing position, etc.

Code No.	L1	L2	L3
513-517-10T	20.9	17.4	57.6
513-514-10T	36.8	33.3	73.5
513-515-10T	44.5	41.0	81.2
513-503-10T	14.7	11.2	51.4
513-501-10T	12.1	8.6	48.7

F

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Dial Test Indicators

SERIES 513 – Universal Dial Test Indicator

- Universal application to all directions. (Not only the direction of the contact point, but also the direction of measurement itself can be adjusted 360 degrees without moving the indicator.)
- Carbide contact points.



513-304-10T



513-302-10T

F

Specifications

Metric

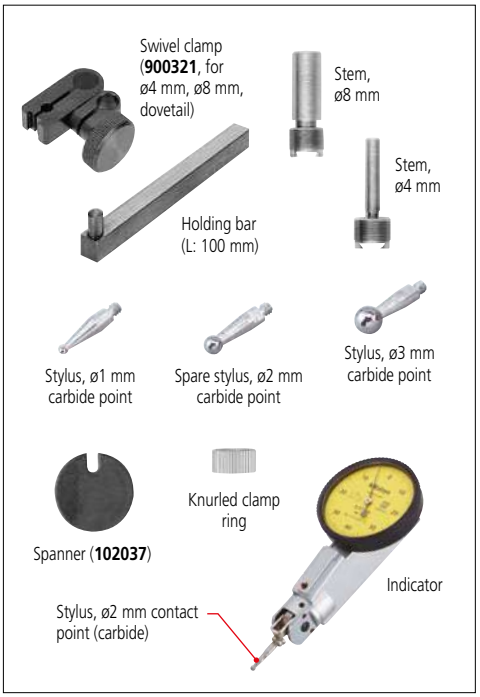
Code No.	Range	Max. permissible error*				Scale	Measuring force	Price
		1/10 rev	Overall	Hysteresis	Repeatability			
Full set, graduation: 0.01 mm								
513-304-10T	0.8 mm	5 µm	9 µm	4 µm	3 µm	0-40-0	0.3 N or less	**£458.00**

Inch

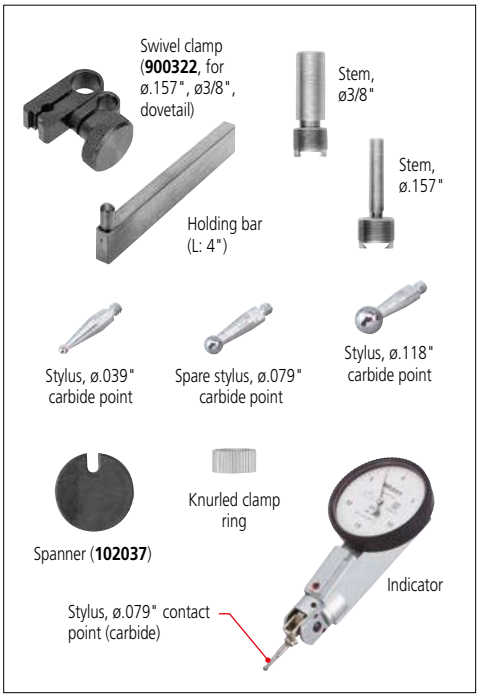
Code No.	Range	Max. permissible error*			Scale	Measuring force	Price
		1 rev	Hysteresis	Repeatability			
Full set, graduation: .0005"							
513-302-10T	.03"	±.0005"	.0003"	±.0003"	0-15-0	0.3 N or less	**£444.00**

* The accuracy is guaranteed when used with the dial face facing upward and the contact point oriented as shown in the figure.

Set Configuration: Metric



Set Configuration: Inch



Features

Metric

Code No.	
513-304-10T	✓

Inch

Code No.	
513-302-10T	✓

Optional Accessories

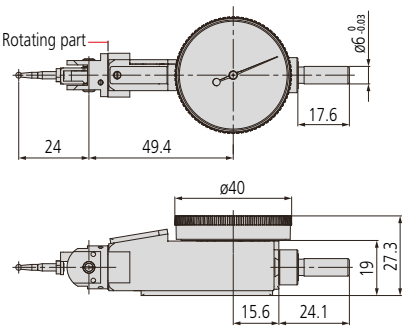
Code No.	Description	Price
102824	Stylus, ø1 mm ball contact (carbide)	**£6.50**
102825	Stylus, ø2 mm ball contact (carbide)	**£10.80**
102826	Stylus, ø3 mm ball contact (carbide)	**£6.50**

Swivel clamps, **holding bars**, **stems** and **styli** refer to pages F-50 to F-52 for details.

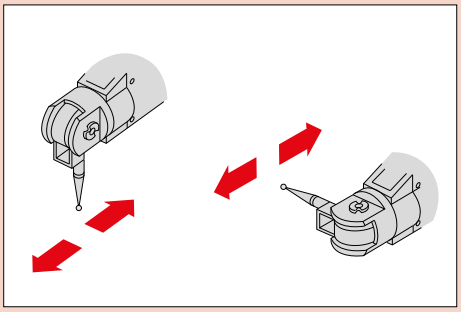
Dimensions

Unit: mm

513-304-10T



Note: A slight difference may occur depending on the centre of the contact point, graduation plate, and stem fixing position, etc.



The direction of the probe movement can be freely changed by rotating the contact point section of the indicator.

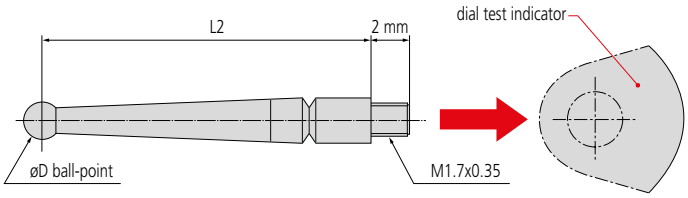
Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances. Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Optional Accessories

Styli for Dial Test Indicators*

- Shoulder to ball centre dimension is critical for correct operation. Recent models having part numbers ending in -10 will show this dimension on the clock face. Please ensure the selected stylus has the same length as shown on your clock face. If your particular indicator does not show this dimension on the clock face or if you have any doubts then please call Mitutoyo with the gauge part number for advice before changing the contact point.

* Excludes Universal type.





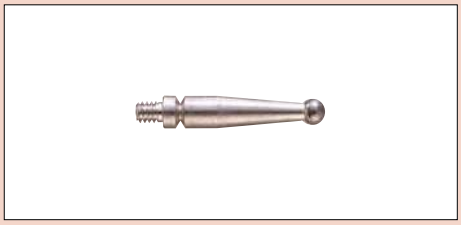
ø0.5 mm ball-point.



ø0.7 mm ball-point.



ø1 mm ball-point (carbide).



ø2 mm ball-point (carbide).



ø2 mm ball-point (ruby).



ø3 mm ball-point (carbide).

Specifications

Metric

Code No.	L2	Price
ø0.5 mm ball-point		
190547	11.2 mm	**£19.60**
190549	17.4 mm	**£19.60**
190654	18.7 mm	**£13.40**
190656	41.0 mm	**£13.50**
ø0.7 mm ball-point		
190548	11.2 mm	**£17.00**
190550	17.4 mm	**£17.00**
190653	18.7 mm	**£13.50**
190655	41.0 mm	**£12.70**
ø1 mm ball-point (carbide)		
103017	11.2 mm	**£6.50**
131314	15.2 mm	**£7.00**
103013	17.4 mm	**£6.50**
137558	18.7 mm	**£6.50**
131316	33.9 mm	**£6.50**
136235	41.0 mm	**£4.40**
ø2 mm ball-point (carbide)		
103010	11.2 mm	**£10.80**
103011	15.2 mm	**£10.80**
103006	17.4 mm	**£10.80**
137557	18.7 mm	**£10.80**
131324	33.9 mm	**£6.50**
136013	41.0 mm	**£11.80**
ø2 mm ball-point (ruby)		
21CZA209	11.2 mm	**£15.60**
21CZB068	15.2 mm	**£18.10**
21CZA201	17.4 mm	**£23.60**
21CZA210	18.7 mm	**£15.60**
21CZA211	41.0 mm	**£16.30**
ø3 mm ball-point (carbide)		
103018	11.2 mm	**£6.50**
131315	15.2 mm	**£7.00**
103014	17.4 mm	**£6.50**
137559	18.7 mm	**£6.50**
131317	33.9 mm	**£6.20**
136236	41.0 mm	**£4.40**

Inch

Code No.	L2	Price
Ø0.04" ball point (carbide)		
21CZB065	15.5 mm	**£2.30**
133196	16.4 mm	**£6.50**
136291	30.4 mm	**£4.40**
Ø0.08" ball point (carbide)		
21CZB064	15.5 mm	**£2.60**
133195	16.4 mm	**£10.40**
136290	30.4 mm	**£7.00**
Ø0.08" ball point (ruby)		
21CZB112	15.5 mm	**£17.70**
21CZA204	16.4 mm	**£16.80**
21CZA214	30.4 mm	**£16.80**
Ø0.12" ball point (carbide)		
21CZB066	15.5 mm	**£3.10**
133197	16.4 mm	**£6.50**
136292	30.4 mm	**£4.30**

F

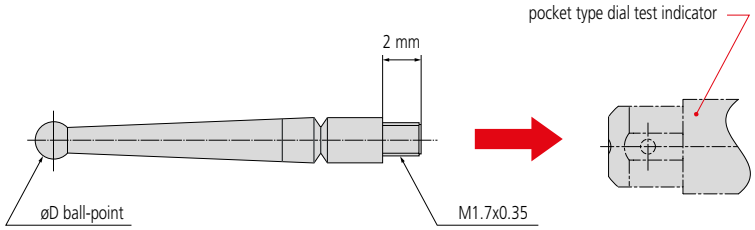
Mitutoyo operates a policy of continuous improvement that aims to provide the customer with the benefit of the latest technological advances.
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Optional Accessories

Styli for Pocket Dial Test Indicators

- Stylus length can only be the same as that originally fitted.



Specifications

Code No.	Description	Price
For model **513-501-10**		
136756	ø1 mm ball-point (carbide)	**£4.30**
136104	ø2 mm ball-point (carbide)	**£7.30**
136758	ø3 mm ball-point (carbide)	**£4.30**
For models **513-503-10**		
190547	ø0.5 mm ball-point	**£19.60**
190548	ø0.7 mm ball-point	**£17.00**
103017	ø1 mm ball-point (carbide)	**£6.50**
103010	ø2 mm ball-point (carbide)	**£10.80**
103018	ø3 mm ball-point (carbide)	**£6.50**
For models **513-504-10**		
131314	ø1 mm ball-point (carbide)	**£7.00**
103011	ø2 mm ball-point (carbide)	**£10.80**
131315	ø3 mm ball-point (carbide)	**£7.00**
For model **513-512-10**		
131316	ø1 mm ball-point (carbide)	**£6.50**
131324	ø2 mm ball-point (carbide)	**£6.50**
131317	ø3 mm ball-point (carbide)	**£6.20**
For model **513-514-10**		
137746	ø1 mm ball-point (carbide)	**£6.50**
129949	ø2 mm ball-point (carbide)	**£11.80**
137747	ø3 mm ball-point (carbide)	**£6.50**

Code No.	Description	Price
For model **513-515-10**		
190656	ø0.5 mm ball-point	**£13.50**
190655	ø0.7 mm ball-point	**£12.70**
136235	ø1 mm ball-point (carbide)	**£4.40**
136013	ø2 mm ball-point (carbide)	**£11.80**
136236	ø3 mm ball-point (carbide)	**£4.40**
For model **513-517-10**		
190549	ø0.5 mm ball-point	**£19.60**
190550	ø0.7 mm ball-point	**£17.00**
103013	ø1 mm ball-point (carbide)	**£6.50**
103006	ø2 mm ball-point (carbide)	**£10.80**
103014	ø3 mm ball-point (carbide)	**£6.50**
For model **513-518-10**		
103008	ø1 mm ball-point (carbide)	**£6.50**
103007	ø2 mm ball-point (carbide)	**£6.50**
103009	ø3 mm ball-point (carbide)	**£6.20**



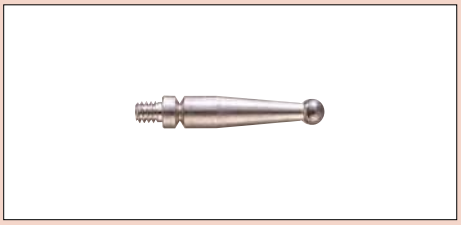
ø0.5 mm ball-point.



ø0.7 mm ball-point.



ø1 mm ball-point (carbide).



ø2 mm ball-point (carbide).



ø3 mm ball-point (carbide).

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Optional Accessories

For Dial Test Indicators

Spanner



102037



301336

Code No.	Remarks	Price
102037	For Dial Test Indicators	£1.70
301336	For Pocket Dial Test Indicators	£2.10

Swivel Clamps

- Can be used with Holding Bars.



900321



900322

Code No.	Remarks	Price
900321	For ø4 mm stem, ø8 mm stem, and dovetail	£19.10
900322	For ø.157" stem, ø3/8" stem (or body) and dovetail	£19.10

Holding Bars

953638 (9 x 9 mm)
900209 (9 x 9 mm)



900211 (ø8 mm, ø.315")



953639 (.25" x .5")
900306 (.25" x .5")



Code No.	Stem	Length	Price
953638	ø6 mm	50 mm	£14.10
900209		100 mm	£12.30
900211		115 mm	£12.30
953639	ø.236"	2"	£14.30
900306		4"	£12.30

Stems with Knurled Clamp Ring

21CZB131



21CZB129



21CZB130



Code No.	Diameter	Price
21CZB129	8 mm	£4.30
21CZB130	3/8"	£10.20
21CZB131	4 mm / .157"	£11.50

Stems for Pocket Types

102389



102822



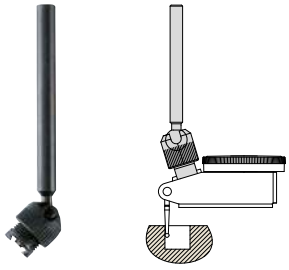
102081



Code No.	Diameter	Price
102081	3/8"	£4.30
102389	4 mm / .157"	£4.40
102822	8 mm	£4.40

Universal Holder

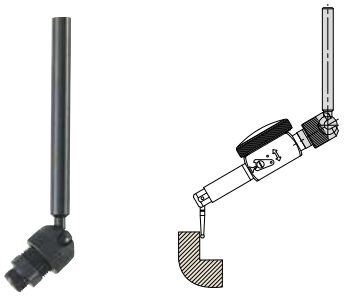
- Allows the indicator to be set at the desired attitude to the workpiece. (Not for Pocket type - see below.)



Code No.	Stem	Price
21CZA229	ø6 mm	£34.90
21CZA231	ø.25"	£34.90
21CZA233	ø8 mm	£30.40

Universal Holder for Pocket Type

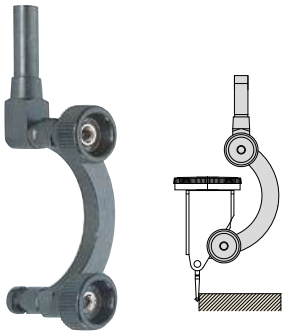
- Allows the indicator to be set at the desired attitude to the workpiece.



Code No.	Stem	Price
21CZA230	ø6 mm	£34.90
21CZA232	ø.25"	£34.90
21CZA234	ø8 mm	£47.60

Centering Holder

- Allows large diameter cylinders or holes to be centered on a machine tool.



Code No.	Stem	Price
901959	ø8 mm	£111.00
901997	ø.25"	£110.00

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Instruments

SERIES 547 – ABSOLUTE Digimatic Thickness Gauges

- Dial thickness gauges can quickly measure the thickness of thin products such as paper and felt.
- Integrated moulding of the bezel and crystal ensures protection against water and oil penetration via the front face.
- Data output port that enables incorporation into measurement networking and statistical process control systems.

Tube thickness measurement type

- Pipe wall thickness and the thickness of curved boards can be measured.

Lens thickness measurement type

- Thickness of concave-convex lenses and surfaces can be measured.
- Anvils and contact points are interchangeable to enable concave surfaces to be measured.
- Provided with a ball point.

Groove depth measurement type

- Suitable for measuring narrow grooves.
- Measuring face of the contact point and anvil are blade-shaped (thickness: 1 mm).

ABSOLUTE DIGIMATIC S1 U-WAVE fit MeasurLink ENABLED Data Management Software by Mitutoyo



547-300A



547-320A



547-401A



547-361A



547-312A



547-316A

Technical Data

Battery:	CR2032 (1 pc.), **05SAA217**
Battery life:	Approx. 2.5 years under normal use

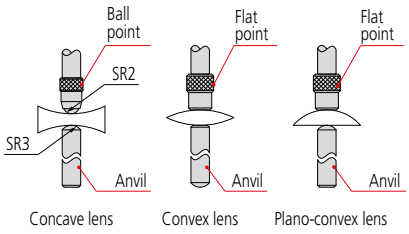
Optional Accessories

Code No.	Description	Price
264-622	U-WAVE-TM IP67 transmitter*[1]	**£242.00**
264-623	U-WAVE-TM transmitter*[1]	**£242.00**
264-626	U-WAVE-TMB IP67 transmitter	**£242.00**
264-627	U-WAVE-TMB transmitter	**£242.00**
02AZF700	U-WAVE-TM/TMB connection unit	**£77.30**
02AZG021	U-WAVE-T data cable with footswitch connection (160/500 mm)	**£203.00**
06AGL011	SPC data cable (1 m)	**£47.60**
06AGL021	SPC data cable (2 m)	**£51.20**
06AGQ001F	USB input tool direct (2 m)	**£132.00**

Convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals and directly input them to cells in off-the-shelf spreadsheet software such as Excel are also available.*[2]

*[1] U-WAVE-R Receiver required.
*[2] Consult your local Mitutoyo Sales Office for advice on your particular application.

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Lens thickness measurement application examples.
Note: Parallelism between the flat point and anvil is 10 µm.

Instruments

SERIES 547 – ABSOLUTE Digimatic Thickness Gauges

Specifications

Metric

Code No.	Range	Resolution	Accuracy	Measuring force	Price
High accuracy, carbide spindle/anvil					
547-401A	0 - 12 mm	0.001 mm	±3 µm	3.5 N or less	**£761.00**

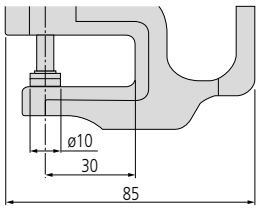
Inch/Metric

Code No.	Range	Resolution	Accuracy	Measuring force	Price
High accuracy, carbide spindle/anvil					
547-400A	0 - 12 mm / 0 - .47"	.00005" / 0.001 mm	±.0001" / ±3 µm	3.5 N or less	**£761.00**
Standard, ceramic spindle/anvil					
547-300A	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	**£482.00**
Deep throat, ceramic spindle/anvil					
547-320A	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	**£493.00**
Lens thickness					
547-312A	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	**£482.00**
Groove depth					
547-316A	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	**£493.00**
Tube thickness					
547-361A	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	**£457.00**

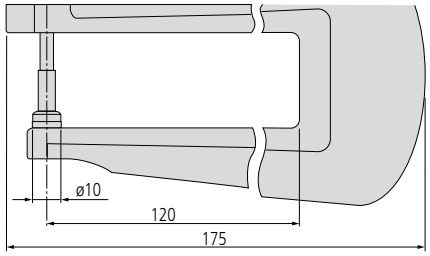
Dimensions

Unit: mm

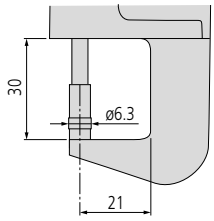
547-300A



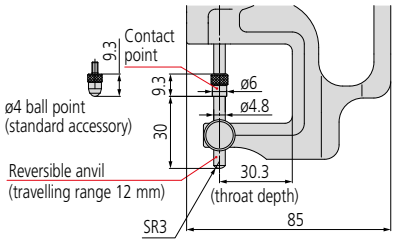
547-320A



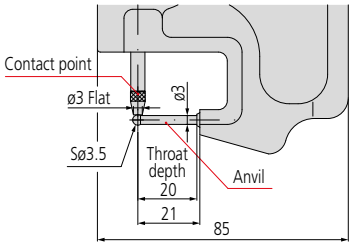
547-401A
547-400A



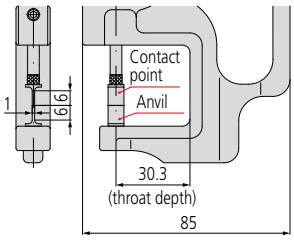
547-312A



547-361A



547-316A



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Instruments

SERIES 7 – Dial Thickness Gauges

- Dial thickness gauges can quickly measure the thickness of thin products such as paper and felt.
- Integrated moulding of the bezel and crystal ensures protection against water and oil penetration via the front face.

Tube thickness measurement type

- Pipe wall thickness and the thickness of curved boards can be measured.

Lens thickness measurement type

- Thickness of concave-convex lenses and surfaces can be measured.
- Anvils and contact points are interchangeable to enable concave surfaces to be measured.
- Provided with a ball point.

Groove depth measurement type

- Suitable for measuring narrow grooves.
- Measuring face of the contact point and anvil are blade-shaped (thickness: 1 mm).



7301A



7313A



7321A

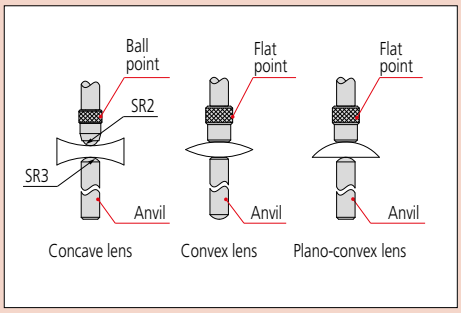


7315A



7360A

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Lens thickness measurement application examples.
Note: Parallelism between the flat point and anvil is 5 µm.

Instruments

SERIES 7 – Dial Thickness Gauges

Specifications

Metric

Code No.	Range	Graduation	Accuracy	Measuring force	Price
Fine dial reading, ceramic spindle/anvil					
7327A	0 - 1 mm	0.01 mm	±5 µm	1.5 N or less	**£207.00**
Standard, ceramic spindle/anvil					
7301A	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	**£116.00**
7305A	0 - 20 mm		±20 µm	2.0 N or less	**£143.00**
Deep throat, ceramic spindle/anvil					
7321A	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	**£150.00**
7323A	0 - 20 mm		±22 µm	2.0 N or less	**£163.00**
Lens thickness					
7313A	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	**£138.00**
Groove depth					
7315A	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	**£168.00**
Tube thickness					
7360A	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	**£119.00**

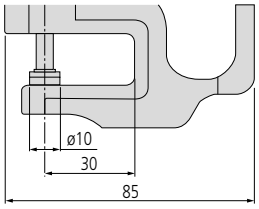
Inch

Code No.	Range	Graduation	Accuracy	Measuring force	Price
Fine dial reading, ceramic spindle/anvil					
7326A	0 - .05"	.0001"	±.0002"	1.4 N or less	**£174.00**
Standard, ceramic spindle/anvil					
7300A	0 - .5"	.001"	±.001"	1.4 N or less	**£123.00**
7304A	0 - 1"		±.002"	2.0 N or less	**£143.00**
Deep throat, ceramic spindle/anvil					
7322A	0 - 1"	.001"	±.002"	2.0 N or less	**£163.00**
Lens thickness					
7312A	0 - .5"	.001"	±.001"	1.8 N or less	**£151.00**
Groove depth					
7316A	0 - .5"	.001"	±.001"	1.4 N or less	**£168.00**
Tube thickness					
7361A	0 - .5"	.001"	±.001"	1.4 N or less	**£166.00**

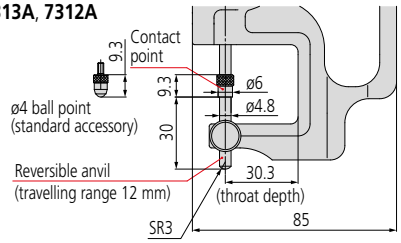
Dimensions

Unit: mm

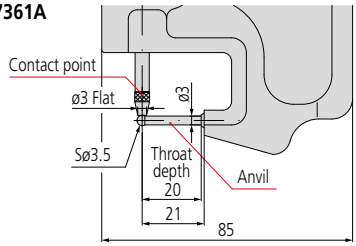
7327A, 7301A, 7305A, 7326A, 7300A, 7304A



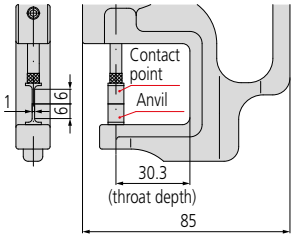
7313A, 7312A



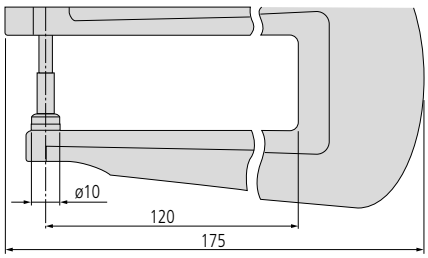
7360A, 7361A



7315A, 7316A



7321A, 7323A, 7322A



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Instruments

SERIES 201 – Dial Snap Gauges

- Designed for quick GO/NO-GO judgement of diameters of cylinders and shafts in machining processes.
- Wide (13.5 x 12 mm/1.53 x 47"), flat carbide anvils.
- Indicator-anvil retraction stroke: 2 mm/.080".
- Anvil positioning range: 25 mm/1".
- Adjustment nut: adjusts the setting anvil to the nominal size required within the measuring range.
- Clamp: clamps the setting anvil at the required position.
- Flatness of measuring face: 1 µm.
- Repeatability of indication: 2 µm or less (repeatability of indicators is not included).
- The dial indicator and protection cover are optional. Also, some dial indicators and protection covers cannot be used with the dial snap gauge. Consult Mitutoyo before using dial indicators which are not recommended.



201-101

Note: The dial indicator and protection cover are optional.

Specifications

Metric

Code No.	Range	Parallelism	Measuring force	Recommended indicator (optional)	Price
201-101	0 - 25 mm	5 µm	15 N ±3 N	**543-700B** (0.0005mm reading), **2109AB-10** (0.001 mm reading), **2046AB** (0.01 mm reading)	**£420.00**
201-102	25 - 50 mm				**£435.00**
201-103	50 - 75 mm				**£455.00**
201-104	75 - 100 mm				**£467.00**
201-105	100 - 125 mm				**£487.00**
201-106	125 - 150 mm				**£508.00**
201-107	150 - 175 mm				**£534.00**
201-108	175 - 200 mm				**£556.00**
201-109	200 - 225 mm				**£584.00**
201-110	225 - 250 mm				**£612.00**
201-111	250 - 275 mm				**£627.00**
201-112	275 - 300 mm				**£654.00**

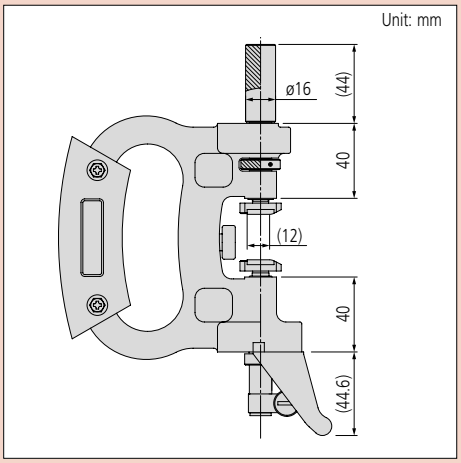
Inch

Code No.	Range	Parallelism	Measuring force	Recommended indicator (optional)	Price
201-151	0 - 1"	.0002"	15 N ±3 N	**543-702B** (.00002" reading), **2803AB-10** (.0001" reading), **2414AB** (.001" reading)	**£420.00**
201-152	1 - 2"				**£435.00**
201-153	2 - 3"				**£455.00**
201-154	3 - 4"				**£467.00**
201-155	4 - 5"				**£487.00**
201-156	5 - 6"				**£508.00**
201-157	6 - 7"				**£534.00**
201-158	7 - 8"				**£556.00**
201-159	8 - 9"				**£584.00**
201-160	9 - 10"				**£612.00**
201-161	10 - 11"				**£627.00**
201-162	11 - 12"				**£654.00**

Optional Accessories

Code No.	Description	Price
543-700B	Digimatic Indicator (resolution: 0.0005 mm)	**£372.00**
543-702B	Digimatic Indicator (resolution: .00002")	**£372.00**
2046AB	Dial indicator (graduation: 0.01 mm)	**£46.30**
2109AB-10	Dial indicator (graduation: 0.001 mm)	**£99.00**
2414AB	Dial indicator (graduation: .001")	**£86.90**
2803AB-10	Dial indicator (graduation: .0001")	**£139.00**
21DZA000	Dial protection cover	**£11.40**

Dimensions



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Instruments

SERIES 209 – Wireless Charging Digimatic Coolant Proof Outside/Inside Caliper Gauge

- Versatile gauge with a choice of arm configurations suitable for measuring grooves and other hard-to-measure features.
- IP67 rating provides maximum confidence for use in adverse environments where the gauge is subject to splashing by cutting fluid or coolant.
- Bargraph provides a quick analogue view of the result of measurement.
- GO/NO-GO judgement function: an in-tolerance judgement result is indicated by the green LED and an out-of-tolerance judgement by the red.
- Data output port that enables incorporation into measurement networking and statistical process control systems.

DIGIMATIC COOLANT PROOF™ IP67 U-WAVE

Technical Data

Digital step: 0.001/0.002/0.005/0.01 mm
Power supply: Lithium-Polymer power pack

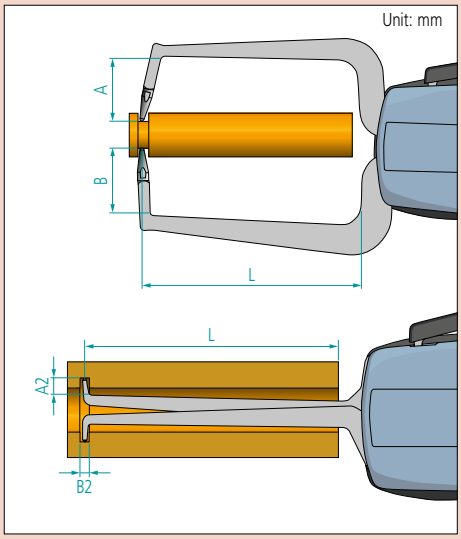
Functions

Analogue bar resolution switchable, auto power OFF after (1/5/10 min.) non use, OFFSET, mm/inch conversion, HOLD, SET key, DATA key, DATA-logger (100 measured values), ABS/INC switchable, max. reading, min. reading, tolerance LED (green/red), tolerance judgement.

Optional Accessories

Code No.	Description	Price
011551	Interface adaptor	£124.00
937387	SPC data cable (1 m)	£48.40
965013	SPC data cable (2 m)	£61.60
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790E	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
06AFM380E	USB input tool direct USB-ITN-E (2 m)	£143.00

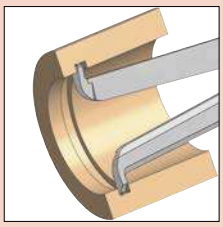
* U-WAVE-R Receiver required.

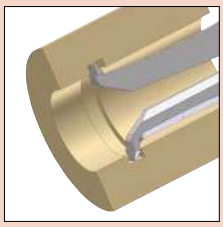


L : Maximum reach of contact arms over or inside workpiece.
A : Maximum penetration depth of upper contact.
A2: Maximum groove depth.
B : Maximum penetration depth of lower contact.
B2: Minimum groove width.


Figure 1


Figure 2


Figure 3

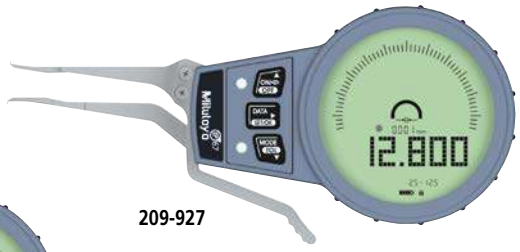

Figure 4



209-925



209-926



209-927



209-928



209-929

Specifications

Inch/Metric

Code No.	Range	Accuracy	Measuring force	A	B	L	Type	Price
Measuring contacts: carbide ball ø1.5 mm								
209-925	0-15 mm	0.01 mm	1.3-1.5N	17	17	45	Fig. 2	£656.00
Measuring contacts: carbide bevel, radius 0.4 mm								
209-926	0-15 mm	0.015 mm	1.3-1.5N	12	12	45	Fig. 1	£656.00
Measuring contacts: carbide bevel, radius 0.12 mm								
209-927	2.5-12.5 mm	0.01 mm	0.8-1.3N	0.7	0.6	12	Fig. 4	£656.00
Measuring contacts: carbide ball ø0.6 mm								
209-928	5-20 mm	0.01 mm	0.8-1.3N	0.8	0.8	44	Fig. 3	£656.00
Measuring contacts: carbide ball ø1 mm								
209-929	10-25 mm	0.01 mm	0.8-1.3N	1.5	1.5	46	Fig. 3	£656.00

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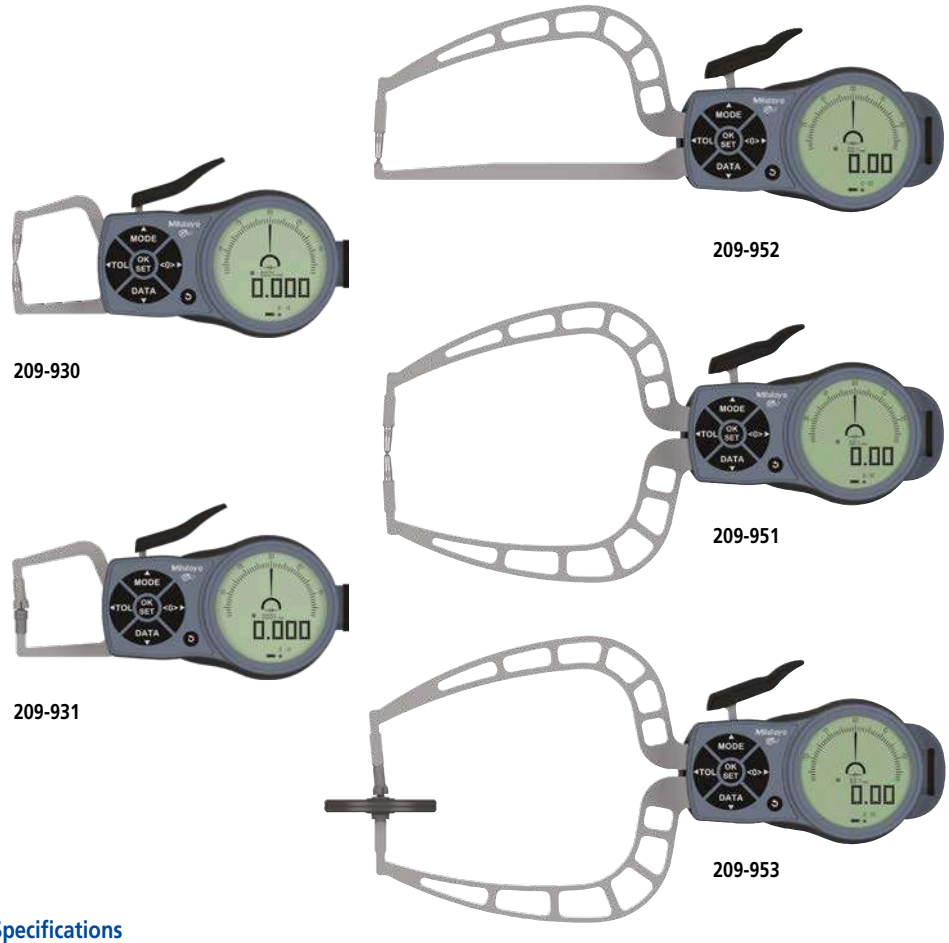
Mitutoyo

Instruments

SERIES 209 – Digimatic Coolant Proof Outside Caliper Gauge

- Versatile gauge with a choice of arm configurations suitable for measuring grooves and other hard-to-measure features in addition to rapid measurement of flat stock at some distance from an edge.
- IP67 rating provides maximum confidence for use in adverse environments where the gauge is subject to splashing by cutting fluid or coolant.
- Bargraph provides a quick analogue view of the result of measurement.
- GO/NO-GO judgement function: an in-tolerance judgement result is indicated by the green LED and an out-of-tolerance judgement by the red.
- Data output port that enables incorporation into measurement networking and statistical process control systems.

DIGIMATIC COOLANT PROOF™ IP67 U-WAVE



Technical Data

Digital step:	0.001 / 0.002 / 0.005 / 0.01 / 0.02 / 0.05 mm
Power supply:	2x AAA batteries LR3

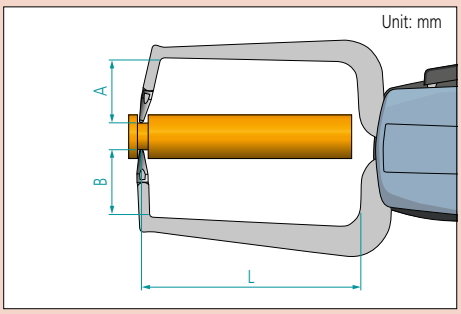
Functions

Analogue bar resolution switchable, auto power OFF after (1/5/10 min.) non use, OFFSET, mm/inch conversion, HOLD, SET key, DATA key, DATA-logger (100 measured values), ABS/INC switchable, max. reading, min. reading, tolerance LED (green/red), tolerance judgement.

Optional Accessories

Code No.	Description	Price
011551	Interface adaptor	£124.00
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02AZD790E	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
06AFM380E	USB input tool direct USB-ITN-E (2 m)	£143.00

* U-WAVE-R Receiver required.



L : Max. reach of contact arms over workpiece.
A : Max. penetration depth of upper contact.
B : Max. penetration depth of lower contact.


Figure 1

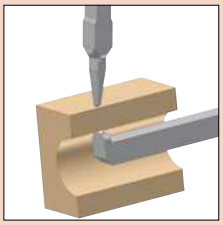

Figure 2


Figure 3

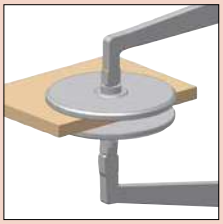

Figure 4


Figure 5


Figure 6

Specifications

Inch/Metric

Code No.	Range	Accuracy	Measuring force	A	B	L	Type	Price
Measuring contacts: Bevel radius 0.75 mm/carbide ball ø3 mm and bevel radius 0.75 mm								
209-957	0 - 50 mm	0.06 mm	0.8 - 1.7 N	30	30	167	Fig. 5	£926.00
209-958					4.3	169	Fig. 6	£926.00
Measuring contacts: carbide ball ø1.5 mm								
209-930	0 - 10 mm	0.015 mm	0.8 - 1.2 N	19.1	18.6	36	Fig. 1	£666.00
209-932	0 - 20 mm	0.030 mm	1.1 - 1.6 N	24.7	24.6	81		£666.00
209-943	0 - 10 mm	0.015 mm	0.8 - 1.2 N	19.1	9.0	36	Fig. 2	£666.00
209-933	0 - 20 mm	0.030 mm	1.1 - 1.6 N	24.7	2.5	86		£666.00
Measuring contacts: carbide ball ø3 mm								
209-951	0 - 30 mm	0.04 mm	0.9 - 1.6 N	30	30	114	Fig. 1	£671.00
209-952					4	116	Fig. 2	£671.00
209-954	0 - 50 mm	0.05 mm	0.8 - 1.7 N		30	167	Fig. 1	£926.00
209-955					4.3	169	Fig. 2	£926.00
Measuring contacts: disc measuring face ø50 mm								
209-953	0 - 30 mm	0.06 mm	0.9 - 1.6 N	36	24	116	Fig. 4	£671.00
209-956	0 - 50 mm		0.8 - 1.7 N			167		£926.00
Measuring contacts: disc measuring face ø6 mm								
209-931	0 - 10 mm	0.02 mm	0.8 - 1.2 N	21.7	14.8	36	Fig. 3	£666.00

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Instruments

SERIES 209 – Coolant Proof Outside Dial Caliper Gauge

- Versatile gauge with a choice of arm configurations suitable for measuring external groove diameter and other hard-to-measure features in addition to rapid measurement of flat stock thickness at some distance from an edge.
- IP65 rating provides good protection in adverse environments where the gauge is subject to splashing by cutting fluid or coolant.

COOLANT PROOF™ IP65



209-405



209-401



209-402



209-406



209-403

Specifications

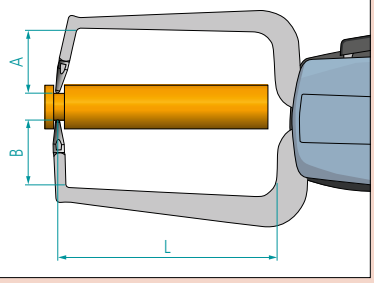
Metric

Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price
Measuring contacts: carbide bevel, radius 0.4 mm									
209-405	0 - 20 mm	1.1 - 1.6 N	0.01 mm	0.03 mm	24.6	24.6	85	Fig. 1	**£635.00**
Measuring contacts: carbide bevel, radius 0.75 mm									
209-921	0 - 50 mm	0.8 - 1.7 N	0.05 mm	0.05 mm	30	30	167	Fig. 1	**£723.00**
Measuring contacts: carbide ball ø1.5 mm									
209-400	0 - 10 mm	0.8 - 1.2 N	0.005 mm	0.015 mm	19.1	0.9	35	Fig. 4	**£635.00**
209-402	0 - 10 mm	0.8 - 1.2 N	0.005 mm	0.015 mm	19.1	18.6	35	Fig. 2	**£635.00**
209-404	0 - 20 mm	1.1 - 1.6 N	0.01 mm	0.03 mm	24.7	24.6	85		**£635.00**
209-407	0 - 20 mm	1.1 - 1.6 N	0.01 mm	0.03 mm	24.7	2.5	85	Fig. 4	**£635.00**
Measuring contacts: carbide ball ø3 mm									
209-911	0 - 50 mm	0.8 - 1.7 N	0.05 mm	0.05 mm	30	30	167	Fig. 2	**£723.00**
Measuring contacts: carbide ball ø1.5 mm / bevel, radius 0.4 mm									
209-401	0 - 10 mm	0.8 - 1.2 N	0.005 mm	0.015 mm	18.8	0.9	35	Fig. 6	**£635.00**
209-406	0 - 20 mm	1.1 - 1.6 N	0.01 mm	0.03 mm	24.7	2.5	80	Fig. 3	**£635.00**
Measuring contacts: carbide ball ø3 mm									
209-912	0 - 50 mm	0.8 - 1.7 N	0.05 mm	0.05 mm	30	4.6	169	Fig. 4	**£723.00**
Measuring contacts: carbide ball ø3 mm / bevel, radius 0.75 mm									
209-922	0 - 50 mm	0.8 - 1.7 N	0.05 mm	0.05 mm	30	4.6	169	Fig. 3	**£723.00**
Measuring contacts: disc measuring face ø6 mm									
209-403	0 - 10 mm	0.8 - 1.2 N	0.005 mm	0.02 mm	21.7	14.8	36	Fig. 5	**£635.00**

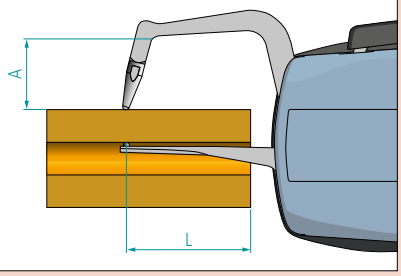
Inch

Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price
Measuring contacts: carbide ball ø.059"									
209-456	0 - .8"	1.1 - 1.6 N	.0005"	.0015"	24.7	—	84	Fig. 3	**£730.00**
209-450	0 - .4"	1.2 - 1.6 N	.0002"	.0008"	8.9	19	35	Fig. 2	**£730.00**
209-455	0 - .8"	1.1 - 1.6 N	.0005"	.0015"	24.7	24.6	81		**£635.00**
Measuring contacts: carbide ball ø.118"									
209-916	0 - 2"	0.8 - 1.7 N	.001"	.002"	30	30	167	Fig. 2	**£723.00**
209-917						—	169	Fig. 4	**£723.00**

Figures 1/2/5 Unit: mm



Figures 3/4/6 Unit: mm



L : Max. reach of contact arms over workpiece.
A : Max. penetration depth of upper contact.
B : Max. penetration depth of lower contact.



Figure 1



Figure 2

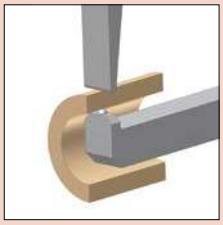


Figure 3

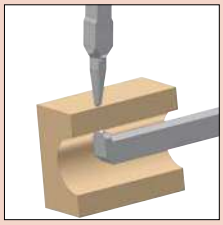


Figure 4



Figure 5



Figure 6

F

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Mitutoyo

Instruments

SERIES 209 – Digimatic Coolant Proof Inside Caliper Gauge

- Versatile gauge for measuring internal groove diameter.
- IP67 rating provides maximum confidence for use in adverse environments where the gauge is subject to splashing by cutting fluid or coolant.
- Bargraph provides a quick analogue view of the result of measurement.
- GO/NO-GO judgement function: an in-tolerance judgement result is indicated by the green LED and an out-of-tolerance judgement by the red.
- Data output port that enables incorporation into measurement networking and statistical process control systems.

DIGIMATIC COOLANT PROOF™ IP67 U-WAVE



209-935



209-945

Technical Data

Digital step:	0.001 / 0.002 / 0.005 / 0.01 / 0.02 / 0.05 mm
Power supply:	2x AAA batteries LR3

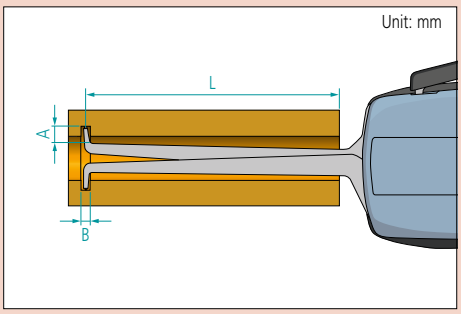
Functions

Analogue bar resolution switchable, auto power OFF after (1/5/10 min.) non use, OFFSET, mm/inch conversion, HOLD, SET key, DATA key, DATA-logger (100 measured values), ABS/INC switchable, max. reading, min. reading, tolerance LED (green/red), tolerance judgement.

Optional Accessories

Code No.	Description	Price
011551	Interface adaptor	£124.00
937387	SPC data cable (1 m)	£48.40
965013	SPC data cable (2 m)	£61.60
02AZD730G	U-WAVE-T IP67 transmitter*	£242.00
02AZD790E	U-WAVE-T data cable (160 mm)	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
06AFM380E	USB input tool direct USB-ITN-E (2 m)	£143.00

* U-WAVE-R Receiver required.



L : Max. reach of contact arms inside workpiece.
A : Max. groove depth.
B : Min. groove width.

Specifications

Inch/Metric

Code No.	Range	Measuring force	Accuracy	A	B	L	Type	Price
Measuring contacts: carbide ball ø0.6 mm								
209-935	5 - 15 mm	0.8 - 1.2 N	0.015 mm	2.3	0.8	35	Fig. 4	£666.00
Measuring contacts: carbide ball ø1.5 mm								
209-945	15 - 65 mm	1.0 - 1.8 N	0.05 mm	5.5	1.9	188	Fig. 2	£926.00
209-946	30 - 60 mm	1.2 - 1.7 N	0.04 mm	6.2	1.8	132	Fig. 3	£671.00
Measuring contacts: carbide ball ø1 mm								
209-936	10 - 30 mm	1.1 - 1.6 N	0.03 mm	5.2	1.2	85	Fig. 4	£666.00
209-937	20 - 40 mm			7.0			Fig. 2	£666.00
209-938	30 - 50 mm							£666.00
209-939	40 - 60 mm			8.3			Fig. 3	£666.00
209-940	50 - 70 mm							£666.00
209-941	60 - 80 mm							£666.00
209-942	70 - 90 mm							£666.00
Measuring contacts: carbide ball ø2 mm								
209-947	50 - 80 mm	1.2 - 1.7 N	0.04 mm	8.3	2.4	132	Fig. 3	£666.00
209-948	70 - 100 mm							£671.00
209-949	90 - 120 mm							£671.00
209-950	40 - 90 mm	1.0 - 1.8 N	0.05 mm			192		£926.00
Measuring contacts: carbide bevel, radius 0.1 mm								
209-934	2.5 - 12.5 mm	0.8 - 1.2 N	0.03 mm	0.7	0.4	12	Fig. 1	£666.00

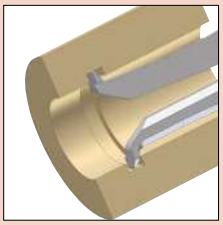


Figure 1

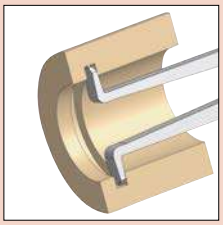


Figure 2

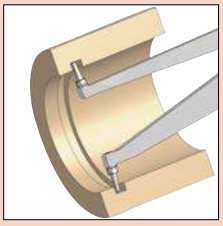


Figure 3

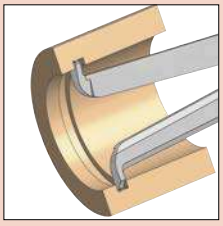


Figure 4

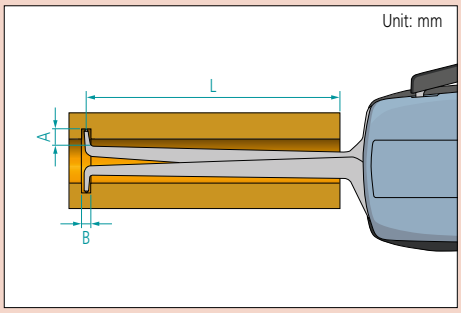
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Instruments

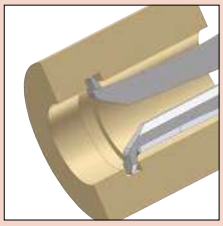
SERIES 209 – Coolant Proof Inside Dial Caliper Gauge

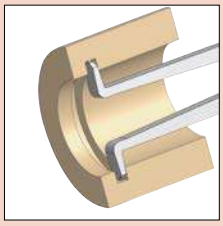
- Versatile gauge for measuring internal groove diameter.
- IP65 rating provides good protection in adverse environments where the gauge is subject to splashing by cutting fluid or coolant.

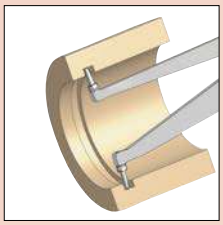
COOLANT PROOF™ IP65



L : Max. reach of contact arms inside workpiece.
A : Max. groove depth.
B : Min. groove width.


Figure 1


Figure 2


Figure 3

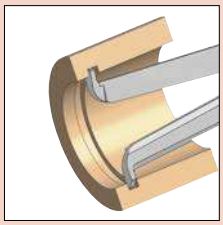
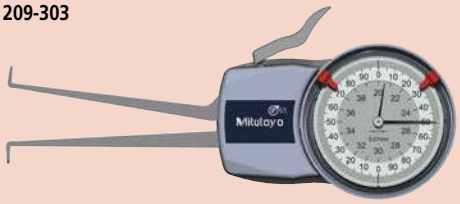

Figure 4


Figure 5

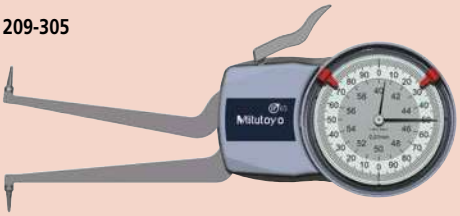
209-301

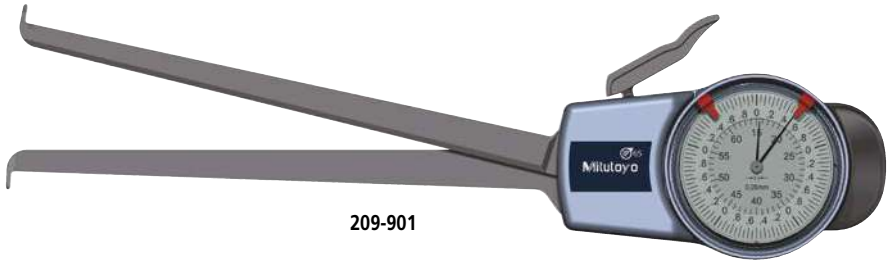


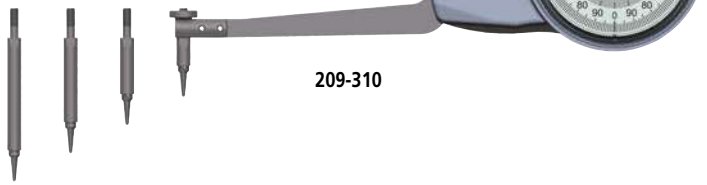
209-303



209-305




209-901



209-310

F

Specifications

Metric

Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price
Measuring contacts: carbide ball ø0.6 mm									
209-301	5 - 15 mm	0.8 - 1.2 N	0.005 mm	0.015 mm	2.3	0.8	35	Fig. 4	**£635.00**
Measuring contacts: carbide ball ø1.5 mm									
209-901	15 - 65 mm	0.9 - 1.9 N	0.05 mm	0.05 mm	5.5	1.9	188	Fig. 4	**£723.00**
Measuring contacts: carbide ball ø1 mm									
209-302	10 - 30 mm	1.1 - 1.6 N	0.01 mm	0.03 mm	5.2	1.2	85	Fig. 4	**£635.00**
209-303	20 - 40 mm				7			Fig. 2	**£635.00**
209-304	30 - 50 mm								**£635.00**
209-305	40 - 60 mm				8.3			Fig. 3	**£635.00**
209-306	50 - 70 mm								**£635.00**
209-307	60 - 80 mm								**£635.00**
209-308	70 - 90 mm								**£635.00**
209-309	80 - 100 mm								**£635.00**
Measuring contacts: carbide ball ø2 mm									
209-902	40 - 90 mm	0.9 - 1.9 N	0.05 mm	0.05 mm	8.3	2.4	192	Fig. 3	**£723.00**
209-903	70 - 120 mm								**£838.00**
Measuring contacts: carbide bevel, radius 0.1 mm									
209-300	2.5 - 12.5 mm	0.8 - 1.2 N	0.005 mm	0.015 mm	0.7	0.4	12	Fig. 1	**£635.00**
Measuring contacts: interchangeable, carbide ball ø1 mm									
209-310	50 - 100 mm	1.1 - 1.6 N	0.01 mm	0.03 mm	8.3	1.2	85	Fig. 5	**£988.00**
209-311	90 - 140 mm								**£988.00**
209-312	130 - 180 mm								**£1,040.00**

Inch

Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price
Measuring contacts: carbide bevel									
209-350	.1 - .5"	0.8 - 1.2 N	.0002"	.0008"	0.9	0.5	35	Fig. 1	**£635.00**
209-351	.2 - .6"				4.6	0.8			**£635.00**
Measuring contacts: carbide ball ø.0394"									
209-352	.4 - 1.2"	1.1 - 1.6 N	.0005"	.0015"	5.3	1.8	84	Fig. 1	**£635.00**
209-354	.8 - 1.6"				7.4	3.3		Fig. 2	**£730.00**
209-356	1.6 - 2.4"				12.2	1.8		Fig. 3	**£635.00**

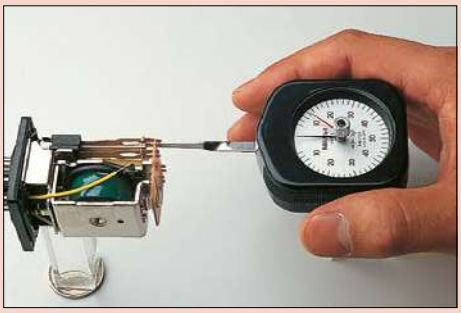
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Mitutoyo

Instruments

SERIES 546 – Contact Force Gauge

- Contact force gauges are widely used to determine the measuring force applied by an instrument to a workpiece, as well as contact forces of electrical relays, micro-switches, valves and precision springs.
- Thanks to the miniature anti-friction bearing in the fulcrum, stable measurement is guaranteed.
- Two types are available: standard and peak hold.



Measuring contact force on a relay.

546-114



546-138



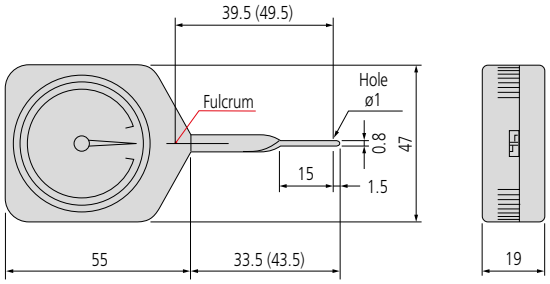
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Specifications

Code No.	Graduation	Range	Accuracy	Price
Standard type				
546-112	2 mN	6 mN - 50 mN	±0.5 (division)	**£237.00**
546-113	5 mN	10 mN - 100 mN		**£153.00**
546-114	10 mN	30 mN - 300 mN		**£146.00**
546-115	0.02 N	0.06 N - 0.5 N		**£146.00**
546-116	0.05 N	0.1 N - 1 N		**£146.00**
546-118	0.1 N	0.3 N - 3 N		**£135.00**
546-119	0.2 N	0.6 N - 5 N		**£230.00**
Peak hold type				
546-133	5 mN	10 mN - 100 mN	±0.5 (division)	**£193.00**
546-134	10 mN	30 mN - 300 mN		**£190.00**
546-135	0.02 N	0.06 N - 0.5 N		**£185.00**
546-136	0.05 N	0.1 N - 1 N		**£185.00**
546-138	0.1 N	0.3 N - 3 N		**£223.00**
546-139	0.2 N	0.6 N - 5 N		**£273.00**

Dimensions

Unit: mm



( ) : **546-112**, **546-113**, **546-133**

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Instruments

SERIES 170 – i-Checker IC2000

- The i-Checker is specially designed to calibrate all types of indicators and electronic gauges.
- Indication accuracy (0.1+0.4L/100)*3 µm, the highest level in the world, is achieved.
- Directly inspects an indicator with a stroke of up to 100 mm (4"). Dial test indicators, bore gauges and lever-type inductive heads can be inspected with optional accessories, such as the test indicator attachment set (**02ASK000**).
- Digital indicators equipped with data output function are checked very efficiently due to spindle positioning at the inspection points and recording of measurement results being under fully automatic control.
- Adjustment of the measurement position is very easily accomplished because of 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.

*3 L = indicator stroke (mm)

Technical Data

Measuring range:	100 mm/4"
Resolution:	0.01 µm
Accuracy (at 20°C)	
Vertical position:	±(0.2+L/100) µm*1
Lateral position:	±(0.3+2L/100) µm*1
Drive method:	Electric motor
Measuring unit:	Separate type linear encoder
Measurement method:	Automatic/semi-automatic*2
Operating temperature range:	20°C ± 0.5°C
Mass:	20 kg

*1 L = arbitrary length (mm)
*2 Consult your local Mitutoyo Sales Office for advice on your particular application.



i-Checker IC2000

Optional Accessories

Code No.	Description	Price
937179T	Footswitch	**£57.90**
02ASJ856	Stem bush ø8 mm	**£207.00**
02ASK000	Test indicator attachment set (ø6 mm stem)	**£1,600.00**
02ASK040	Stem bush ø6 mm	**£206.00**
02ASK050	Bush ø9.5 (requires **02ASK070**)	**£123.00**
02ASK060	Stem bush ø12 mm	**£207.00**
02ASK070	Stem bush ø15 mm	**£207.00**
02ASK080	Stem bush ø20 mm	**£207.00**
02ASK090	Stem bush 3/8"	**£207.00**
02ASK150	Stem bush ø8 mm, short	**£207.00**
02ASK180	Test indicator attachment set (ø8 mm stem)	**£1,600.00**
02ASK370	Test indicator holder (ø6 mm stem)	**£350.00**
02ASK380	Test indicator holder (ø8 mm stem)	**£350.00**
02ASK710	Stem bush ø28 mm	**£184.00**
02ASK730	Reflector	**£138.00**
02ASL150	Stem bush ø10 mm, short	**£184.00**
21CZB128	ø6 mm dovetail grooved stem	**£4.30**
21CZB129	ø8 mm dovetail grooved stem	**£4.30**

Specifications

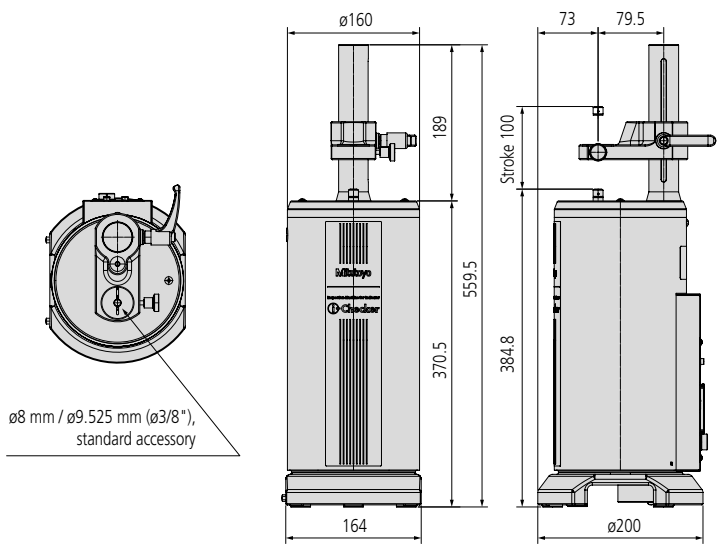
Code No.	Remarks	Price
170-402	With ø8 mm bush	**£14,890.00**
170-403	With ø3/8" bush	**£14,890.00**

Application Examples



Dimensions

Unit: mm



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Instruments

SERIES 170 – UDT-2 Dial Indicator Tester

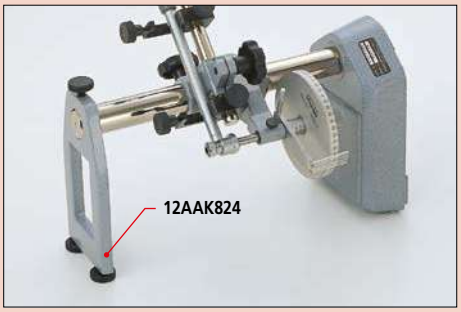
- UDT-2 is an accuracy tester for 0.01 mm resolution dial indicators, dial test indicators and bore gauges.
- Accepts ø6 mm, ø8 mm, 1/4" and 3/8" indicator stems.



170-102-12

Optional Accessory

Code No.	Description	Price
12AAK824	Stand for bore gauge inspection	£233.00



Can be used for the inspection of bore gauges 511 series standard type and micrometer heads up to 400 mm.

Specifications

Metric

Code No.	Range	Graduation	Accuracy	Price
170-102-12	0 - 25 mm	0.001 mm	±2 µm	£1,640.00

Inch

Code No.	Range	Graduation	Accuracy	Price
170-101-10	0 - 1"	.0001"	±.0001"	£1,640.00



Calibrating a bore gauge.



Calibrating a lever indicator.

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Instruments

SERIES 521 – Calibration Tester

- The Calibration Tester is specially designed to calibrate short range dial indicators, dial test indicators, and electronic gauge heads.
- Universal bracket accepts any dial indicator, dial test indicator or electronic gauge without any additional accessory.
- Clamping capacity: ø4 mm to ø10 mm.



521-105

F

Specifications

Metric

Code No.	Range	Graduation	Accuracy	Price
521-103	0 - 1 mm	0.0002 mm	±0.2 µm	£4,860.00
521-105	0 - 5 mm		±0.8 µm	£5,140.00

Inch

Code No.	Range	Graduation	Accuracy	Price
521-104	0 - .05"	.00001"	±.00001"	£4,860.00
521-106	0 - .2"		±.00003"	£5,140.00



Calibrating a lever indicator (dial test indicator).



Calibrating a probe head.



Calibrating a lever probe head.

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Mitutoyo

Stands

SERIES 7 – Magnetic Stands

- Mitutoyo's magnetic stands clamp to iron or steel surfaces with a strong force and are indispensable for temporarily mounting a dial test indicator (or dial indicator) onto a machine tool or fixture for general alignment applications.
- A V-grooved base on most models allows the stand to mount securely on cylindrical as well as flat surfaces.
- The magnetic clamping effect is conveniently switched on or off by a quarter turn of a lever (not available on **7014-10**).



7014-10



7015-10



7010S-10



7012-10



7031-10



7032-10



7033-10

Specifications

Code No.	Description	Acceptable stem sizes	Dovetail groove	Remarks	Price
7010S-10 *1	Magnetic stand	ø4 mm, ø8 mm, ø9.53 mm (3/8")	—	—	**£74.50**
7015-10 *1				With fine adjustment	**£102.00**
7012-10 *2	Flexible column stand	ø6 mm, ø8 mm, ø9.53 mm (3/8")		—	**£187.00**
7014-10 *2	Mini magnetic stand	ø6 mm, ø8 mm	Provided	Without magnet ON/OFF	**£78.50**
7031-10	Universal magnetic stand	ø6 mm, ø8 mm, ø9.53 mm (3/8")		With mechanical locking system	**£414.00**
7032-10					**£434.00**
7033-10					**£463.00**

*1 Back plunger type (**1160A**, etc.) cannot be attached.
*2 Use with a dial test indicator or SERIES 1 dial indicator (compact or lightweight type) is recommended.

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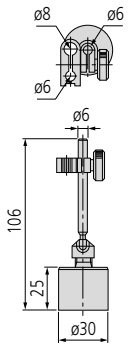
Stands

SERIES 7 – Magnetic Stands

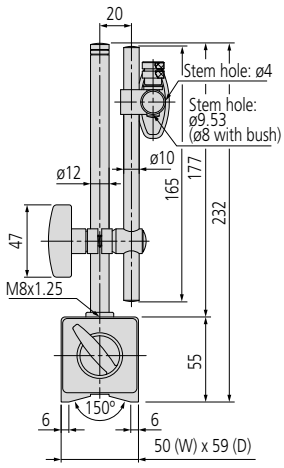
Dimensions

Unit: mm

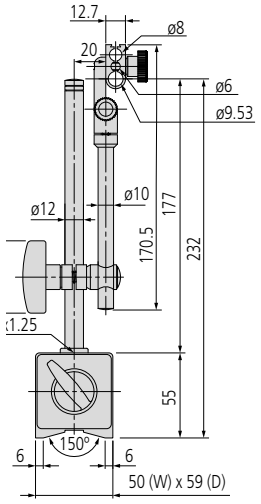
7014-10



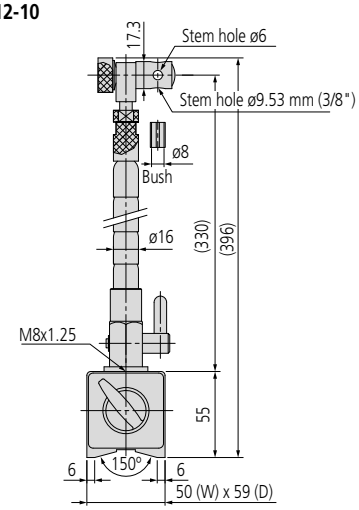
7010S-10



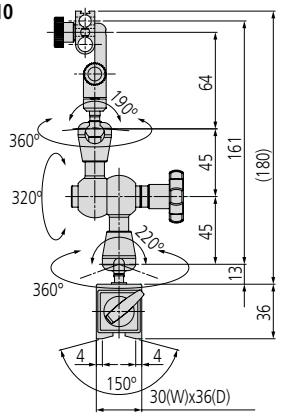
7015-10



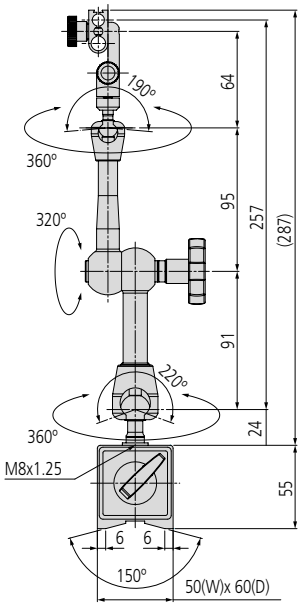
7012-10



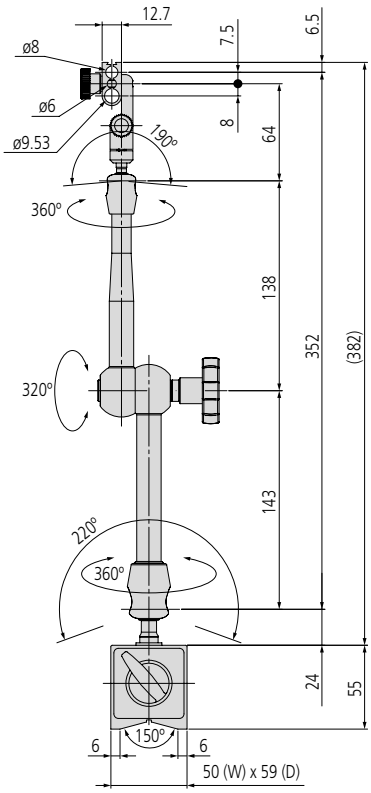
7031-10



7032-10



7033-10



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Mitutoyo

Stands

SERIES 7 – Dial Gauge Stands

- Dial gauge stands are designed for comparison measurements of size using a Dial Indicator or Digimatic Indicator.
- Vertical fine adjustment is available with one-touch control thanks to the parallel spring suspension.



7001-10



7002-10



7007-10

F

Specifications

Metric

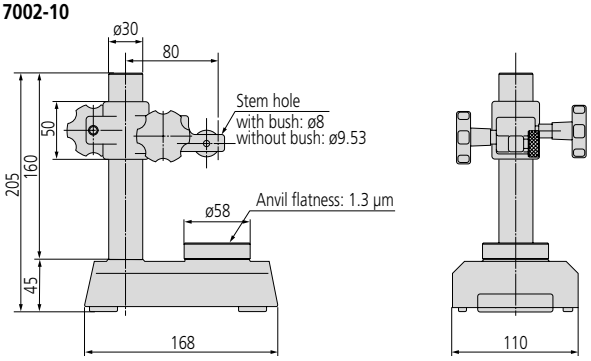
Code No.	Column travel	Acceptable stem sizes	Remarks	Price
7001-10	0 - 95 mm	ø8 mm, ø9.53 mm	With ø58 mm serrated anvil	**£571.00**
7002-10			With ø58 mm flat anvil	**£534.00**
7007-10	0 - 90 mm		With 90 mm square anvil	**£585.00**

Note: perpendicularity of the mounting hole to the anvil: less than 0.4 mm / 100 mm.
Consult us when mounting Mitutoyo's linear gauge on this stand. We will check the operation of the stand and linear gauge before shipment (made-to-order).

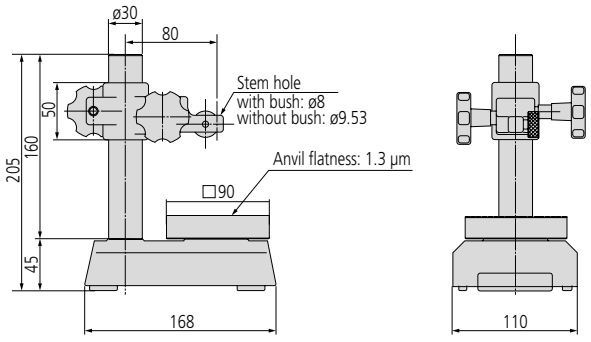
Dimensions

Unit: mm

7001-10, 7002-10



7007-10



Optional Accessories

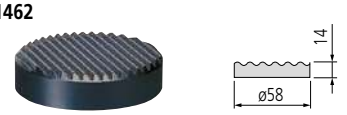
Code No.	Description	Price
101461	Hardened steel flat anvil	**£56.20**
101462	Hardened steel serrated anvil	**£61.50**
101463	Hardened steel domed anvil*	**£86.20**

* Not available for **7007-10**.

101461



101462



101463



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Stands

SERIES 215 – Comparator Stands

- Comparator stands have a very stable, cast iron base which enables precise measurement.
- The partially serrated anvil prevents very flat workpieces from wringing to it and the 2.3 µm flatness (or better) promotes accurate measurement.
- The **215-505-10** model has a threaded column which enables easy and precise coarse adjustment.
- Serrated anvils 110 x 110 mm are supplied with **215-405-10**, and 150 x 150 mm with **215-505-10** models.



215-405-10



215-505-10

Optional Accessories

Code No.	Description	Price
21JAA329	ø8 mm bush*	**£31.00**
21JAA330	ø9.53 mm (3/8") bush*	**£31.00**
21JAA331	ø15 mm bush*	**£34.90**

* Only available for **215-505-10**.



Specifications

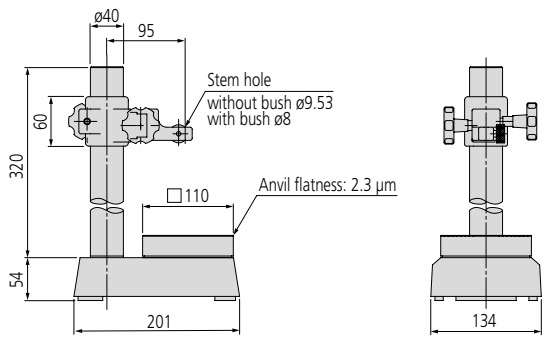
Code No.	Column travel	Acceptable stem sizes	Remarks	Price
215-405-10	0 - 235 mm	ø8 mm, ø9.53 mm	With fine adjustment of 1 mm range	**£733.00**
215-505-10	0 - 275 mm	ø8 mm, ø9.53 mm, ø20 mm	With fine adjustment over the entire travel	**£960.00**

Note: perpendicularity of the mounting hole to the anvil: less than 0.4/100 mm.

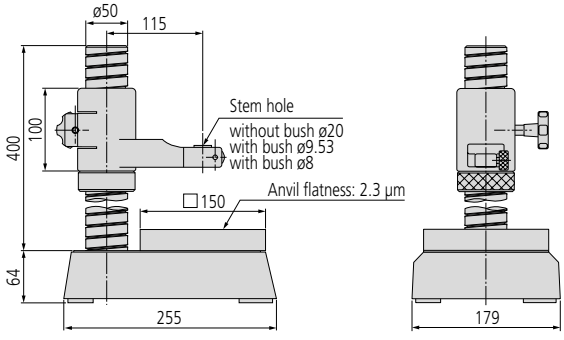
Dimensions

Unit: mm

215-405-10



215-505-10



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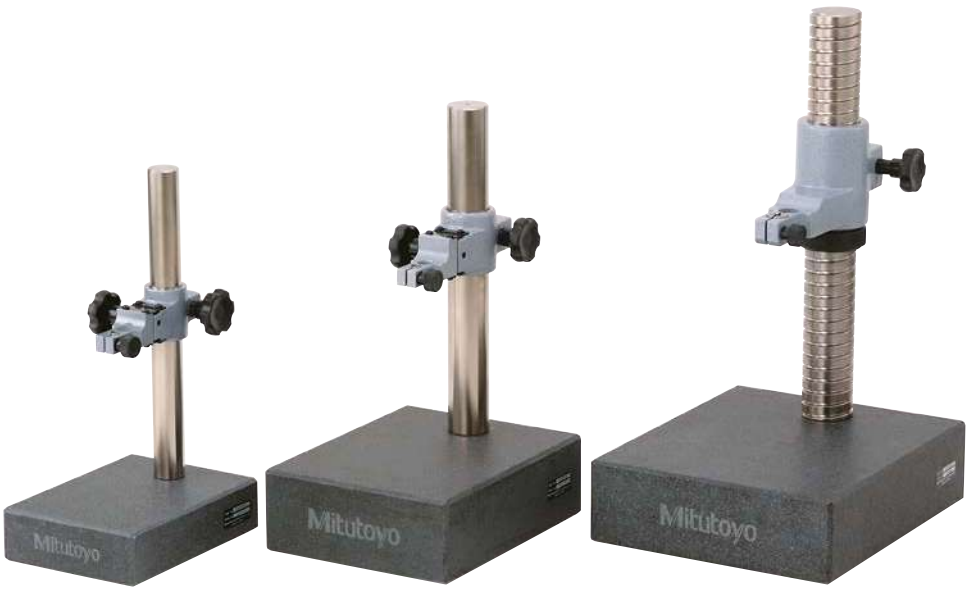
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Mitutoyo

Stands

SERIES 215 – Granite Comparator Stands

- The rigid granite base is free from burrs, pileups, rust and deterioration over time.
- The **215-156-10** model has a threaded column which enables easy and precise coarse adjustment.



215-151-10 **215-153-10** **215-156-10**

F

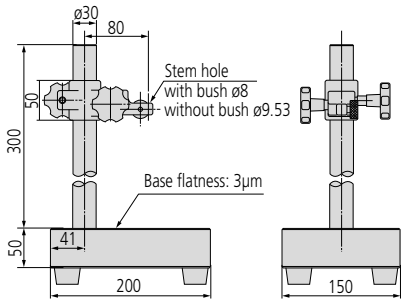
Specifications

Code No.	Column travel	Acceptable stem sizes	Remarks	Price
215-151-10	0 - 250 mm	ø8 mm, ø9.53 mm	With fine adjustment of 1 mm range	**£606.00**
215-153-10	0 - 260 mm			**£658.00**
215-156-10	0 - 275 mm	ø8 mm, ø9.53 mm, ø20 mm	With fine adjustment over the entire travel	**£814.00**

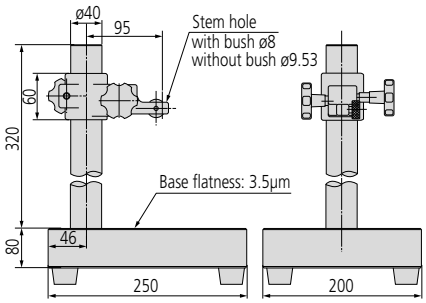
Dimensions

Unit: mm

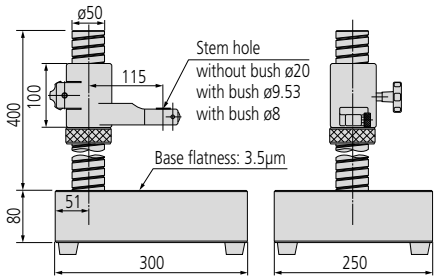
215-151-10



215-153-10



215-156-10



Optional Accessories

Code No.	Description	Price
21JAA329	ø8 mm bush*	**£31.00**
21JAA330	ø9.53 mm (3/8") bush*	**£31.00**
21JAA331	ø15 mm bush*	**£34.90**

* Only available for **215-156-10**.

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Stands

SERIES 519 – Transfer Stand

- Transfer Stands are designed for comparison measurements of size using a Dial Indicator or Digimatic Indicator.



519-109-10
(with a serrated anvil)

Optional Accessories

Code No.	Description	Price
101461	Hardened steel flat anvil	£56.20
101462	Hardened steel serrated anvil	£61.50
101463	Hardened steel domed anvil	£86.20

101461



101462



101463



Specifications

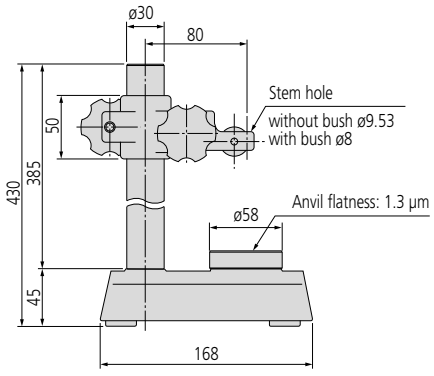
Metric

Code No.	Column travel	Acceptable stem sizes	Remarks	Price
519-109-10	0 - 320 mm	ø8 mm, ø9.53 mm	With serrated anvil	£750.00

Note: perpendicularity of the mounting hole to the anvil: less than 0.4 mm / 100 mm.

Dimensions

Unit: mm



F

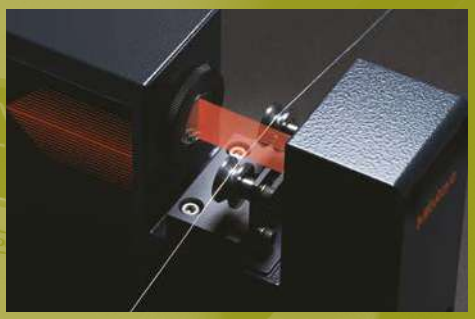
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LINEAR GAUGES
LASER SCAN MICROMETERS

Linear Gauges



Laser Scan Micrometers



Non-Contact Line-Laser Sensor



Contents

Linear Gauges	
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Linear Gauges

Example of Linear Gauge and Display Unit System Design

Gauge Heads → **Conversion Plug**

Coolant proof

LG100 see page **G-05**

IP67 G



Measuring range: 10/25/50 mm
Resolution: 1/0.5/0.1 µm

Slim coolant proof

LG200* see page **G-07**

IP67 G



Measuring range: 10 mm
Resolution: 1/0.5/0.1 µm

* Function of reference point detection on counter is disabled.

Conversion plug
(optional accessory)

Conversion plug
(optional accessory)

ABSOLUTE Digimatic coolant proof

LGS see page **G-10**

ABSOLUTE IP66



Measuring range: 12.7 mm
Resolution: 10 µm

High-accuracy/resolution

LGH see page **G-08**



Measuring range: 10 mm
Resolution: 0.01/0.005 µm

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Linear Gauges

Example of Linear Gauge and Display Unit System Design

Display Unit

DIN rail-mounted

EJ-102N see page **G-13**



2-axis input
Subtraction calculations
8 units can be connected

Panel mounted

EH-102Z see page **G-12**



2-axis input,
Subtraction calculations
Multifunction

EH-101P (1 axis), **EJ-102P** (2 axes) see page **G-12**



Multifunction

EH-102D see page **G-12**



2-axis input,
Subtraction calculations
Multifunction

EC-101D see page **G-11**



1-axis input

Interface Unit/Software

Interface unit

CC-Link
see page **G-14**



PROFINET
see page **G-14**



EtherNet/IP
see page **G-14**



EtherCAT
see page **G-14**



USB
see page **G-14**



Setup tool for EJ counters

LG QuickSetupTool see page **G-13**



Measurement data acquisition software

SENSORPAK see page **G-15**



G

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Linear Gauges

SERIES 542 – LG100 Coolant Proof Linear Gauge

- High-accuracy gauge head suitable for in-line and in-laboratory use.
- Assures the expected repeatability (2σ) in the full measurement range and the narrow-range precision.
- Protection grade IP67G with sliding durability of 50 million times and more*1 and adoption of highly oil-resistant materials.
- All models have the origin point signal output function to restore the origin point position after recovery from problems such as overspeed.
- It can be connected to a compact counter (EJ counter) suitable for in-line use or building into a device or a multifunctional counter (EH counter)*2 suitable for use in measurement rooms.

*1 10 mm range models (actual value from in-house tests).
*2 A conversion plug is required.

COOLANT PROOF™ IP67 G

542-190



542-193



542-196



Specifications

Code No.	542-190	542-191	542-192
Range	10 mm		
Resolution	1 µm	0.5 µm	0.1 µm
Accuracy*3 (20°C)	(1.5+L/50) µm		(0.8+L/50) µm
Small range accuracy	0.5 µm (effective range: 20 µm)		
Measuring force*4	1.4/1.3/1.2 N		
Max. response speed	1500 mm/s		400 mm/s
Output signal pitch	4 µm	2 µm	0.4 µm
Stem	ø8 mm		
Mass	Approx. 260 g		
Price	**£766.00**	**£766.00**	**£815.00**

Code No.	542-193	542-194	542-195
Range	25 mm		
Resolution	1 µm	0.5 µm	0.1 µm
Accuracy*3 (20°C)	(1.5+L/50) µm		(0.8+L/50) µm
Small range accuracy	0.5 µm (effective range: 20 µm)		
Measuring force*4	4.6/4.3/4.0 N		
Max. response speed	1500 mm/s		400 mm/s
Output signal pitch	4 µm	2 µm	0.4 µm
Stem	ø15 mm		
Mass	Approx. 300 g		
Price	**£926.00**	**£926.00**	**£987.00**

Code No.	542-196	542-197
Range	50 mm	
Resolution	1 µm	0.5 µm
Accuracy*3 (20°C)	(1.5+L/50) µm	
Small range accuracy	0.5 µm (effective range: 20 µm)	
Measuring force*4	5.7/5.3/4.9 N	
Max. response speed	1500 mm/s	
Output signal pitch	4 µm	2 µm
Stem	ø15 mm	
Mass	Approx. 400 g	
Price	**£1,120.00**	**£1,120.00**

*3 L = Effective range (mm).
*4 Orientation of gauge: Spindle down/horizontal/up.

Technical Data

Scale type:	Optical transmission-type linear encoder
Contact point:	ø3 mm carbide
Bearing type:	Linear ball bearing
Output signal:	90° phase difference, differential square wave (RS-422A equivalent)
Output cable length:	2 m (directly from casing)
Dust/water protection level:	IP67

Standard Accessories

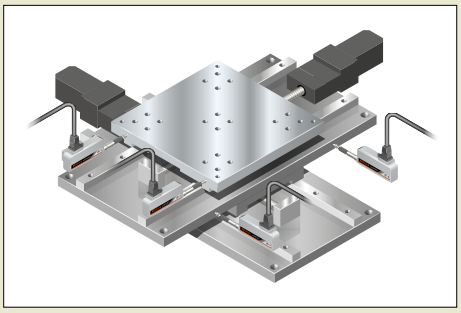
Code No.	Description
210187	Wrench for contact point (25/50 mm range models only)
538610	Wrench for contact point (10 mm range models only)

Optional Accessories

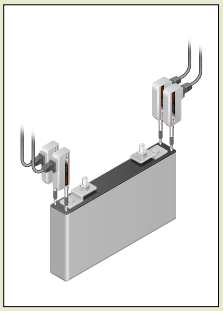
Code No.	Description	Price
02ADB680	Thrust stem set (for 10 mm range models	**£15.40**
02ADB683	Thrust stem wrench (for 10 mm range models	**£10.20**
02ADB693	Thrust stem wrench (for 25/50 mm range models	**£9.30**
02ADN370	Thrust stem set (for 25/50 mm range models	**£20.10**
21HZA195	Conversion plug*5	**£58.20**
21HZA196	Conversion plug*6	**£67.00**
21HZA197	Extension cable (5 m)	**£150.00**
21HZA198	Extension cable (10 m)	**£201.00**
21HZA199	Extension cable (20 m)	**£335.00**

*5 For connecting to EH-101P/EH-102P display units.
*6 For connecting to EH-102Z display unit.
Note: If required, a thrust stem wrench is used for tightening. If using multiple gauges, a thrust stem set is required for each gauge and one thrust stem wrench.

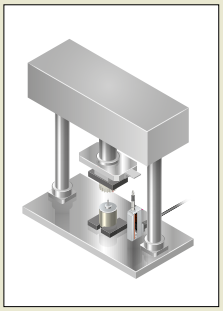
Application Examples



Stage positioning.



Battery flatness measurement.



Insertion depth check.

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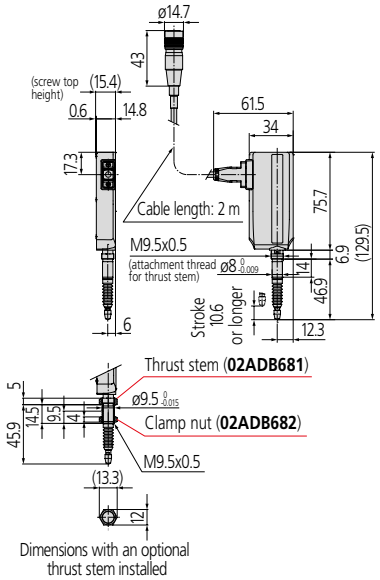
Linear Gauges

SERIES 542 – LG100 Coolant Proof Linear Gauge

Dimensions

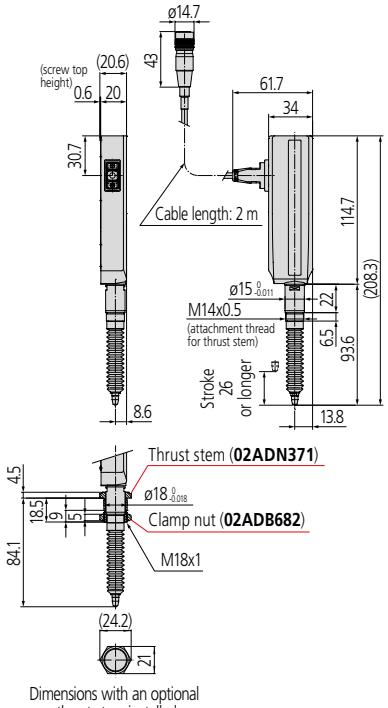
Unit: mm

Models with a 10 mm range



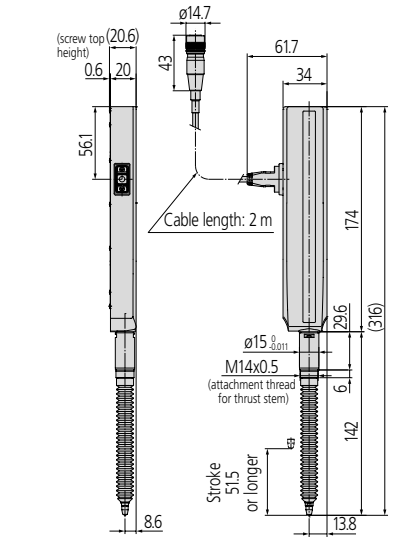
Dimensions with an optional thrust stem installed

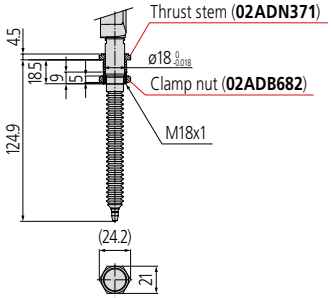
Models with a 25 mm range



Dimensions with an optional thrust stem installed

Models with a 50 mm range





Dimensions with an optional thrust stem installed

G

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Linear Gauges

SERIES 542 – LG200 Slim Type Coolant Proof Linear Gauge

- Slimmer body with approx. 1/5 cross section compared with **542-190** (**LG100**).
- High-accuracy gauge head suitable for in-line and in-laboratory use.
- Assures the expected repeatability (2σ) in the full measurement range and the narrow-range precision.
- Protection grade IP67G with sliding durability of 100 million times and more*1 and adoption of highly oil-resistant materials.
- It can be connected to a compact counter (EJ counter) suitable for in-line use or building into a device or a multifunctional counter (EH counter)*2 suitable for use in measurement rooms.

*1 Actual value from in-house tests.
*2 A conversion plug is required.

COOLANT PROOF™ IP67 G



542-186 / 542-187 / 542-188

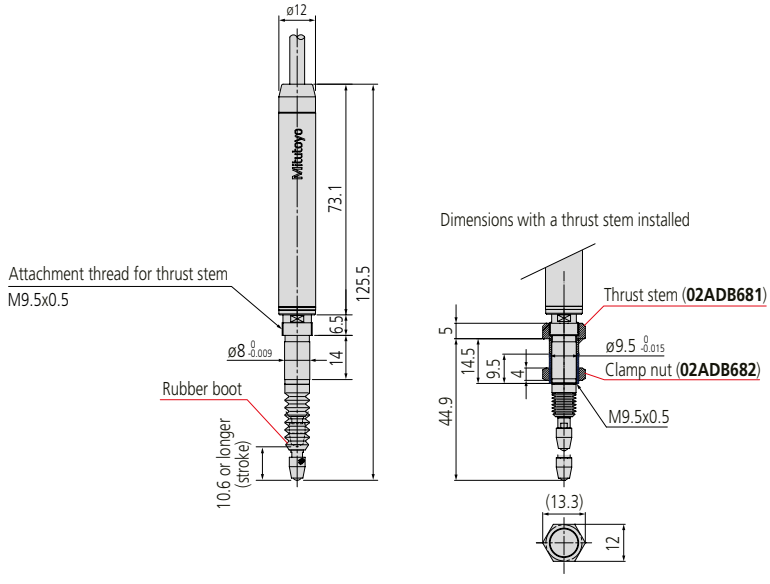
Specifications

Code No.	542-186	542-187	542-188
Range	10 mm		
Resolution	1 µm	0.5 µm	0.1 µm
Accuracy*3 (20°C)	(1.5+L/50) µm		(0.8+L/50) µm
Small range accuracy	0.5 µm (effective range: 20 µm)		
Measuring force*4	0.8 / 0.75 / 0.7 N		
Max. response speed	1500 mm/s		400 mm/s
Output signal pitch	4 µm	2 µm	0.4 µm
Stem	ø8 mm		
Mass	Approx. 210 g		
Price	**£865.00**	**£865.00**	**£999.00**

*3 L = Effective range (mm).
*4 Orientation of gauge: Spindle down / horizontal / up.

Dimensions

Unit: mm



Technical Data

Scale type:	Optical transmission-type linear encoder
Contact point:	ø3 mm carbide
Bearing type:	Linear ball bearing
Output signal:	90° phase difference, differential square wave (RS-422A equivalent)
Output cable length:	2.5 m (directly from casing)
Dust/water protection level:	IP67

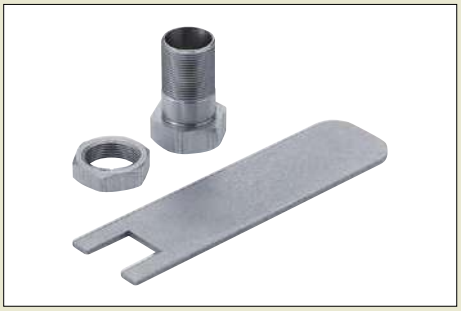
Standard Accessory

Code No.	Description
538610	Wrench for contact point

Optional Accessories

Code No.	Description	Price
02ADB680	Thrust stem set	**£15.40**
02ADB683	Thrust stem wrench	**£10.20**
21HZA195	Conversion plug*5	**£58.20**
21HZA196	Conversion plug*6	**£67.00**
21HZA197	Extension cable (5 m)	**£150.00**
21HZA198	Extension cable (10 m)	**£201.00**
21HZA199	Extension cable (20 m)	**£335.00**

*5 For connecting to EH-101P/EH-102P display units.
*6 For connecting to EH-102Z display unit (the function of reference point detection is disabled).
Note: If required, a thrust stem wrench is used for tightening. If using multiple gauges, a thrust stem set is required for each gauge and one thrust stem wrench.



Thrust stem set and thrust stem wrench (optional accessories).

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Linear Gauges

SERIES 542 – LGH High-Accuracy/Resolution Linear Gauge

- This series has achieved very high accuracy combined with a resolution of 0.01/0.005 µm (according to model), practically equivalent to that of a laser interferometer, and a wide measuring range of 10 mm.
- A compact body design makes a significant contribution to a downsizing of this gauge itself, which is best suited for calibration/evaluation of master gauges as well as measurement of high-precision parts and as a length measuring sensor incorporated into high-precision positioning/control units.
- A low measuring force model is available for those applications where measurement of easily deformed or damaged workpieces is required.
- Every LGH Series gauge is bundled with a dedicated counter.

LGH-1010(C)-B-EH:

- This model is equipped with a newly developed optical reflection-type linear encoder, achieving an excellent resolution of 0.01 µm, a measuring accuracy of 0.2 µm and a measuring range of 10 mm at a low price.
- Maximum operating speed has been improved by a factor of 2.8 times (250 → 700 mm/s) while maintaining very high accuracy.

LGH-0510(C)-B-EH:

- This model is equipped with a newly developed ultra-high precision transmission-type linear encoder, achieving the outstanding resolution of 0.005 µm (5 nm).
- Exceptional measuring accuracy of 0.1 µm has been attained over the wide measuring range of 10 mm.
- This series is most suited for calibration/evaluation of master gauges where its wide measuring range is a great advantage.

Technical Data

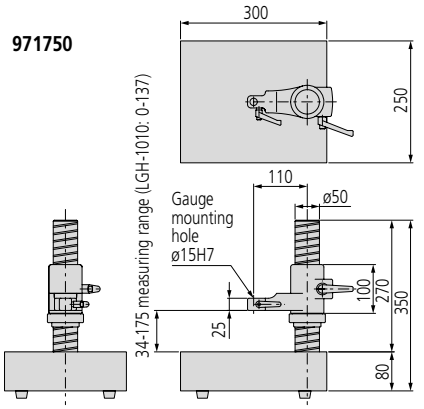
Bearing type:	Linear ball bearing
Output signal:	90° phase difference, differential square wave (RS-422A equivalent)
Output cable length:	Approx. 2 m

Optional Accessories

Code No.	Description	Price
971750	Measuring stand	£4,410.00
971753	Release with damper	£225.00
02ADB440	I/O output connector	£24.70

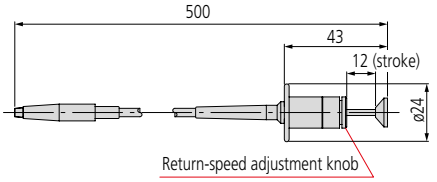
Unit: mm

971750



Unit: mm

971753



LGH-1010(C)-B-EH



LGH-0510(C)-B-EH





Master gauge calibration/evaluation.



Inspection of high-precision parts.



LGH Series' dedicated counter (standard accessory).

G

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Linear Gauges

SERIES 542 – LGH High-Accuracy/Resolution Linear Gauge

Specifications

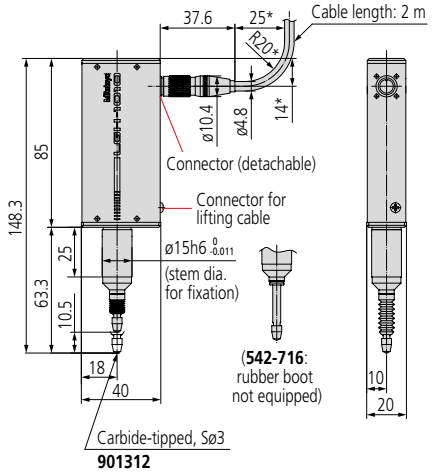
Model		LGH-1010-B-EH	LGH-1010C-B-EH	LGH-0510-B-EH	LGH-0510C-B-EH
Code No.		**542-715D**	**542-716D**	**542-720D**	**542-721D**
Type		Standard	Low measuring force	Standard	Low measuring force
Range		10 mm			
Resolution		0.01 µm (0.05 µm, 0.1 µm, 0.5 µm, 1 µm can be selected from the counter)		0.005 µm (0.01 µm, 0.05 µm, 0.1 µm can be selected from the counter)	
Accuracy*1 (20ºC)		0.2 µm		0.1 µm	
Repeatability*1 (20ºC)		0.1 µm (σ)		0.02 µm (σ)	
Retrace error*1 (20ºC)		0.1 µm		0.05 µm	
Measuring force	Spindle down	0.65 N or less	Approx. 0.12 N	0.65 N or less	Approx. 0.1 N
	Spindle horizontal	0.55 N or less	—	0.55 N or less	—
	Spindle up	0.45 N or less	—	0.45 N or less	—
Scale type		Optical reflection-type linear encoder		Ultra-high accuracy transmission-type linear encoder	
Max. operation speed		In normal measurement: 700 mm/sec; for peak detection: 120 mm/sec		In normal measurement: 250 mm	
Contact point		4 µm		2 µm	
Stem		ø15 mm			
Mass		Approx. 370 g			
Price		**£7,100.00**	**£7,100.00**	**£14,690.00**	**£14,690.00**

*1 Applies when used with counter.

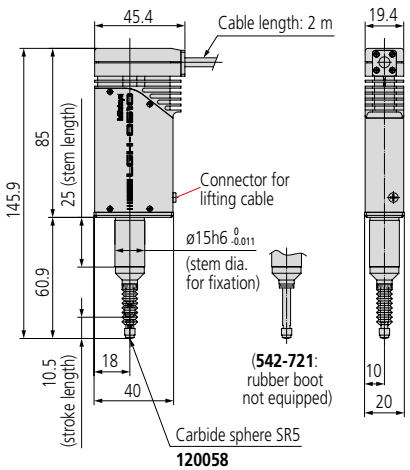
Dimensions

Unit: mm

LGH-1010(C)-B-EH



LGH-0510(C)-B-EH



* Minimum bending radius or minimum dressed dimension

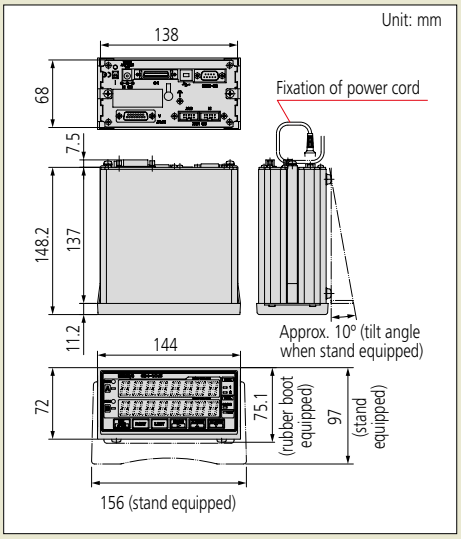
Counter Specifications

Applicable gauge	LGH-1010(C)-B-EH	LGH-0510(C)-B-EH
Display range	±999.99999 mm	±99.999995 mm
Functions	Zero-setting, presetting, direction changeover, tolerance judgement (3/5 steps), RS-RINK	
Peak hold function	✓	—
Interface	RS-232C, USB (only for SENSORPAK), Digimatic (printer: DP-1VA LOGGER)*2, I/O connector	
External output	RS-232C: counting data Digimatic output: counting data*2 I/O connector: counting data (simplified BCD), tolerance judgement result, simplified analogue output	
External control	Zero-setting, presetting, data hold, peak measurement mode selection, peak clear	Zero-setting, presetting, data hold
Power supply	Supplied AC Adapter, or 12 to 24 V DC, max. 700 mA	
Mass	Approx. 900 g (AC adapter excluded)	

*2 Digimatic output shall be up to 6 digits of data. For data of 7 digits or more, all digits will not be output to the display.

Counter Dimensions

Unit: mm



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Linear Gauges

SERIES 575 – LGS ABSOLUTE Digimatic Coolant Proof Linear Gauge

- Compact length measuring instrument with built-in capacitance-type measuring system.
- Dust and splash proof: suitable for installation in machines, measuring devices and multi-position measurement applications.
- Zero-setting via external display unit possible.
- Data output is in Digimatic format to enable processing and documentation of measurement values as well as statistical evaluation via connected Digimatic data processing units or PCs.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP66



575-303

Technical Data

Scale type:	Capacitance-type ABSOLUTE linear encoder
Max. response speed:	Unlimited
Contact point:	ø3 mm carbide
Stem:	ø8 mm
Bearing type:	Plain
Output cable length:	2 m
Output signal:	Digimatic output
Dust/water protection level:	IP66 (gauge head only)

Optional Accessories

Code No.	Description	Price
238774	Rubber boot	**£17.70**
903594	Air drive unit (metric)	**£158.00**
903598	Air drive unit (inch)	**£137.00**
936937	SPC data cable (1 m)	**£42.00**
965014	SPC data cable (2 m)	**£61.60**
02ADD950	Extension cable (0.5 m)	**£82.80**
02ADF640	SPC cable extension adapter	**£58.10**

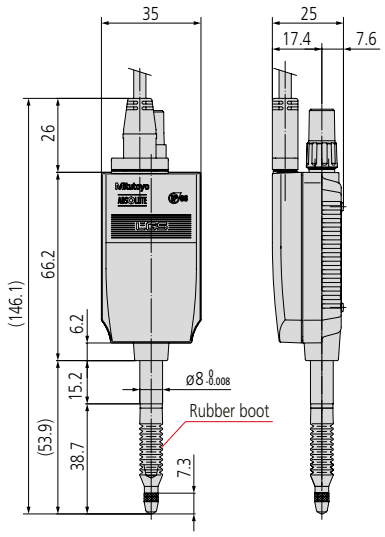
Code No.	575-303	575-313
Range	12.7 mm	.5"
Resolution	10 µm	.0005"
Accuracy	15 µm	.0008"
Measuring force*	2.0/1.8/1.6 N	
Stem	ø8 mm	ø9.52 = 3/8" DIA
Mass	Approx. 190 g	
Price	**£231.00**	**£224.00**

* Orientation of gauge: Spindle down/horizontal/up.

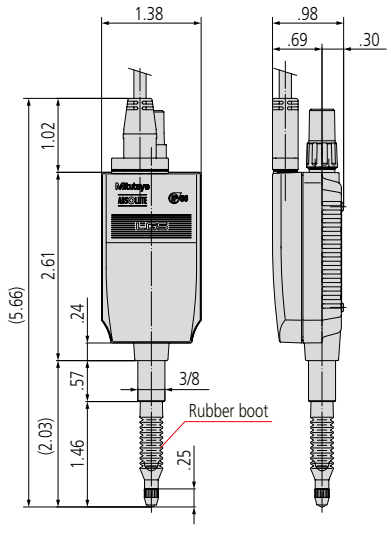
Dimensions

Unit: mm Unit: inch

575-303



575-313



G

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EC Counter

SERIES 542 – Low-Cost Modular Display Unit for LGS Gauges

- Employs DIN size (96 x 48 mm) panel-mount configuration to facilitate system integration.
- Able to produce tolerance judgement and Digimatic measurement data output.



542-007E



Functions

Preset, GO/±NG judgement

Output (selectable)

Tolerance judgement: -NG, OK, +NG (open collector)
Data: Digimatic code

External Control Signal Input

Preset, data hold

Power Supply

Via AC adapter

Optional Accessories

Code No.	Description	Price
214938	DC plug PJ-2	**£6.10**
936937	SPC data cable (1 m)*	**£42.00**
965014	SPC data cable (2 m)*	**£61.60**
21HZA222	I/O cable (2 m)	**£35.30**

*Suitable for data output to other Mitutoyo devices accepting digimatic input via the D type connection. Input SPC cable is determined by the gauge to be connected.

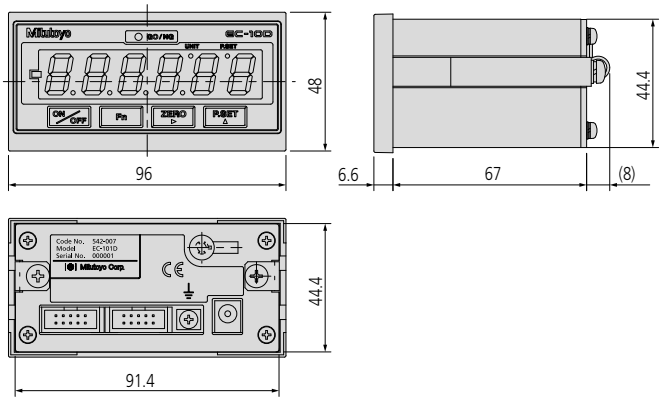
G

Specifications

Code No.	**542-007E**
Model	**EC-101D**
Applicable input	Digimatic code (SPC)
Applicable gauge	LGS
Number of gauge inputs	1
Resolution	0.01, 0.001 mm (automatically set depending on the gauge)
Display	6-digit and a negative [-] sign LED (amber, green, red)
Mass	220 g
Price	**£347.00**

Dimensions

Unit: mm



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EH Counter

SERIES 542 – Multifunction Display Unit

- Employs DIN size (144 x 72 mm) and panel-mount configuration to facilitate system integration.
- Counter can be used on a desktop mounted on a display stand (included).
- The standard RS-232C and USB interface allows easy communication with an external PC. (USB used only with SENSORPAK.)
- A multi-point measuring system can easily be created with the RS Link built-in networking function. (Maximum 12 points.)
- The 2-gauge input type can perform 2-axis display and make addition or subtraction calculations between 2 gauges.

Functions

Zeroset, preset, limit setting (3 or 5-step), GO/±NG judgement, GO/±NG signal output, MAX/MIN/TIR (runout) measurement, counting direction switching, double reading, mm/inch switching, sum/difference calculation of 2 gauges, output mode selection

Output

I/O: Tolerance judgement output (3/5 stages), normal operation output RS-232C, USB or Digimatic code (selectable): various measurement data (USB used only with SENSORPAK)

External Control

I/O: Preset, data hold and error clear
RS-232C: Displayed value output,MAX/MIN/TIR switching, zero set, peak value clear, preset value input, tolerance value input and error clear

RS Link

Up to six EH counters may be connected via one RS-232C or USB port (daisy chained). (USB used only with SENSORPAK.)

Error Display/Output

Power-supply voltage error, overspeed error, overflow error, gauge error, communication error, and tolerance setting error

Maximum Input Frequency

2.5MHz (differential square wave)

Power Supply

Via AC adapter (12-24VDC, 700mA (max))

Optional Accessories

Code No.	Description	Price
936937	SPC data cable (1 m)	**£42.00**
965014	SPC data cable (2 m)	**£61.60**
02ADB440	I/O connector (with cover)	**£24.70**
02ADD950	SPC data cable (0.5 m)	**£82.80**
21HZA195	Conversion plug*1	**£58.20**
21HZA196	Conversion plug*2	**£67.00**

*1 For **542-075E/542-071E** (for connecting LG-100/LG-200)
*2 For **542-073E** (for connecting LG-100/LG-200)

542-075E



542-071E



542-073E



542-072E



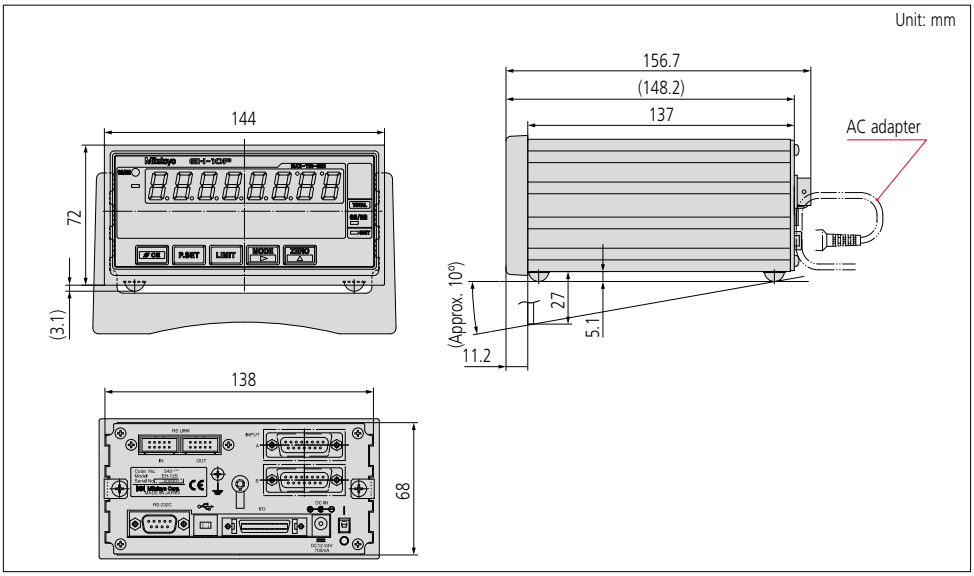
Specifications

Code No.	542-075E	542-071E	542-073E	542-072E
Model	**EH-101P**	**EH-102P**	**EH-102Z**	**EH-102D**
Applicable input	Differential square wave			Digimatic code output
Applicable gauges	LG100*3, LG200*3			LGS, ID
Number of gauge inputs	1	2		
Resolution	0.01, 0.005, 0.001, 0.0005, 0.0001 mm (.0005", .00005", .000005")			Depends on the gauge head connected
Tolerance judgement display	LED display (3 steps: amber, green, red/5 steps: amber, amber flashing, green, red flashing, red)			
Mass	Approx. 760 g	Approx. 800 g		
Price	**£951.00**	**£1,190.00**	**£1,390.00**	**£1,190.00**

*3 A conversion plug is required.

Dimensions

Unit: mm



G

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EJ Counter

SERIES 542 – Space-Saving Display Unit

- A small, high-speed, space-saving counter for linear gauge suitable for in-line and in-laboratory use. It brings visibility into the production site, improves productivity, and enables data accumulation.
- Up to 8 compact counters (EJ counters) can be linked providing the capacity to connect up to 16 gauges.
- On a DIN rail, each unit can be connected directly without using cables, so it takes up minimal space. All linked units and gauges can be driven by a single power source.
- Data can be output through an industrial interface (CC-Link) by linking an EJ counter with an interface unit. Constant data monitoring and positional management are performed. A USB interface is also provided for easy connection with a computer.
- Enables sum difference operations between 2 gauges connected to the same counter.

EJ Counter





Mounting example.

Interface unit **CC-Link**



Interface unit **PROFINET**



Interface unit **EtherNet/IP**



Interface unit **EtherCAT**



Interface unit **USB**



EJ Counter Specifications

Code No.		**542-080**	**542-081**
Model		**EJ-102N**	**EJ-102NE**
Unit		Metric	Inch/metric
Resolution		0.005, 0.001, 0.0005, 0.0001 mm	.0002", .00005", .00002", .000005" (0.005, 0.001, 0.0005, 0.0001 mm)
Number of linear gauge connection ports 2		2	
Supported gauge signal		Differential square wave, differential square wave with reference point mark	
Max. input frequency		5 MHz	
User Interface display		Negative sign + 8 digits and indicator (1 gauge value displayed, manually switchable)	
External I/O	Number of I/O ports	Input: 4 ports (Ch switch, peak clear, data hold, preset) Output: 4 ports (Err/ALLGO, tolerance judgement)	
	Compatible communication standards	CC-Link, USB (supported with optional interface units)	
Max. number of linked units		EJ Counter 8 units + 1 (optional) interface unit (max. number of linear gauge connections: 16)	
Power supply input voltage		10 V to 27 V DC	
Mass		Approx. 120 g	
Price		**£593.00**	**£593.00**

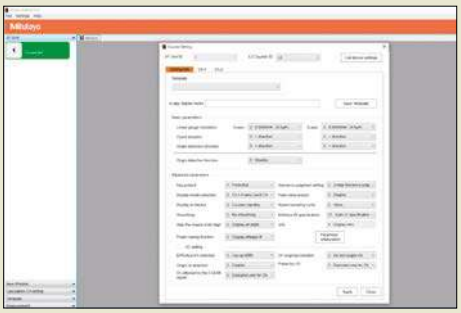
Optional Accessories

Code No.	Description	Price
357651	AC adapter	**£78.80**
02ZAA000	AC cable*1	**£17.60**
21HZA193	Conversion cable*2	**£81.20**
21HZA194	Conversion cable*3	**£74.10**
21HZA209	DC jack with pin terminal*1	**£13.00**

*1 Necessary when using the AC adapter.
*2 For Linear Gauge **LGF/LGK/LGB/LG** Series (not necessary for LG100 Series.
*3 For Linear Gauge **LGF-Z** Series only.

LG QuickSetupTool

LG QuickSetupTool is a free software tool for use with the EJ counter when connected via the optional USB interface. All kinds of settings normally carried out with counter operating keys can now be easily applied from a computer. Measurement value display and operation results can also be viewed on a PC. Please contact your local Mitutoyo office for details.



Parameter setting.

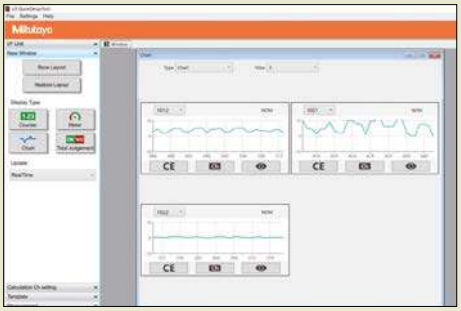


Chart.



General settings.

G

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EJ Counter

SERIES 542 – Space-Saving Display Unit

Interface Unit Specifications

Code No.		21HZA186
Model		**Interface unit CC-Link**
Applicable interface		USB 2.0 Full Speed; CC-Link Ver. 1.10; CC-Link Ver. 2.00
User interface	Display	POWER (green), RUN (green), ERROR (red), EJ-CONNECT (green)
	Switch	Rotary switch x3 (exchange number settings x2, communication speed settings x1)
Functions		Common protocols for USB and CC-Link, readout of current value*, current value hold (software hold), parameter setting on EJ counter, tolerance judgement value settings, preset value settings, preset/zero-set clear, peak clear, error clear
Power supply		Power is supplied from **EJ-102N** (**542-080**/**542-081**) (cannot be charged via USB)
Price		**£778.00**

*Only Ver. 2.00 is supported with CC-Link.

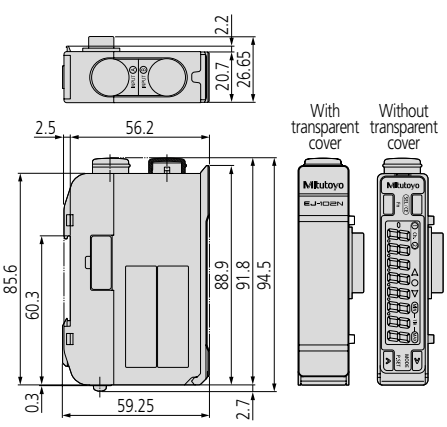
Code No.	21HZA187	21HZA188
Model	**Interface unit PROFINET**	**Interface unit EtherNet/IP**
Applicable interface	PROFINET RT (RT Class1)/USB 2.0 Full Speed	EtherNet/IP
User interface	POWER (green), NETWORK (green/red), MODULE (green/red), LINK PORT1 (green), LINK PORT2 (green), EJ-CONNECT (green)	POWER (green), NETWORK (green/red), MODULE (green/red), LINK PORT1 (green/amber), LINK PORT2 (green/amber), EJ-CONNECT (green)
Functions	Common protocols for USB and PROFINET, readout of current value, current value hold (software hold), parameter setting on EJ counter, tolerance judgement value settings, preset value settings, preset/zero-set clear, peak clear, error clear	Common protocols for USB and EtherNet/IP readout of current value, current value hold (software hold), parameter setting on EJ counter, tolerance judgement value settings, preset value settings, preset/zero-set clear, peak clear, error clear
Power supply	Power is supplied from **EJ-102N** (**542-080**/**542-081**) (cannot be charged via USB)	
Price	**£791.00**	**£847.00**

Code No.	21HZA264	21HZA149
Model	**Interface unit EtherCAT**	**Interface unit USB**
Applicable interface	EtherCAT	USB 2.0 Full Speed
User interface	POWER (green), RUN (green), ERROR (red), L/A IN (green), L/A OUT (red), EJ-CONNECT (green)	POWER (green)
Functions	Common protocols for USB and EtherCAT readout of current value, current value hold (software hold), parameter setting on EJ counter, tolerance judgement value settings, preset value settings, preset/zero-set clear, peak clear, error clear	Readout of current value, current value hold (software hold), parameter setting on EJ counter, tolerance judgement value settings, preset value settings, preset/zeroset clear, peak clear, error clear
Power supply	Power is supplied from **EJ-102N** (**542-080**/**542-081**) (cannot be charged via USB)	
Price	**£881.00**	**£348.00**

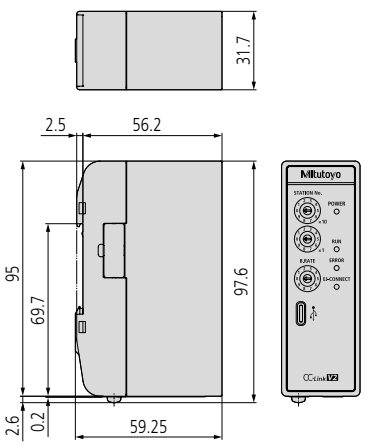
Dimensions

Unit: mm

EJ Counter



Interface Unit



G

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Software

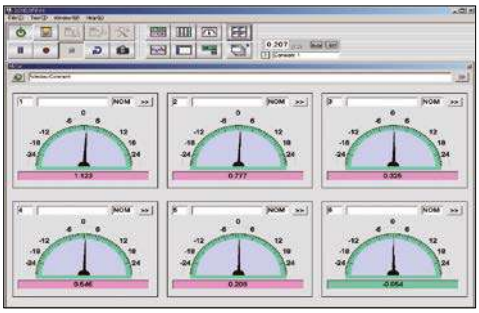
SENSORPAK – Control and Analysis Software

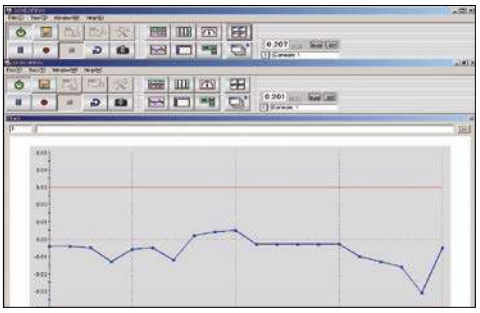
- Allows dynamic display of readings and calculation results for Linear Gauges.
- Arithmetical calculation and maximum width calculation using measurement data.
- Capable of exporting measurement data into MS-Excel, MeasurLink, etc.
- Maximum 60 channels of measuring points can be processed.
- Various graphic displays (numeric value, meter, bargraph, overall judgement).
- Can store up to 60,000 measurement data records with 6 gauges connected.

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
SENSOR

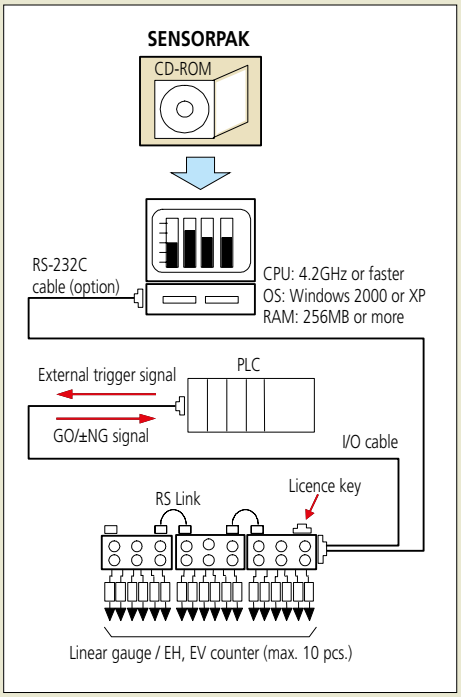


Measurement screen.


Meter screen.


Chart screen.

System Diagram



Specifications

Code No.	02NGB072	02NGB073
	Software only	Software plus I/O cable
Display function	Display type: Counter, bar graph, meter, chart (capable of simultaneous display) Tolerance judgement result: Colour display (green/red) Connectable gauges: Max. 60 gauges Digimatic code (SPC)	
Calculation function	Calculation items: Sum, difference, total, average, maximum, minimum, range (maximum–minimum), calculation with a constant Connectable gauges: Max. 30 calculation items (between gauges)	
Total tolerance judgement	GO/±NG judgement (by specifying gauges to be used for total tolerance judgement) GO/±NG signal output with optional I/O cable	
Input function	Trigger function: by means of key, timer or external TRG (with optional I/O cable) Data input storage capacity: Max. 9000 records (with 60 gauges connected) to 60000 records (with 6 gauges connected)	
Output function	Direct output to Excel spreadsheet, CSV file output (compatible with MeasurLink)	
Connectable items	Various Mitutoyo counters (those compatible with RS Link)	
Processing requirement	Recommendation: PC/AT compatible machine; CPU: Pentium 4.2GHz or higher; Memory: 256MB or more; Disk: 100MB or more; OS: Windows ME, 2000, XP	
Price	**£848.00**	**£1,170.00**

Currently supported languages: English, French, German, Spanish
User's manual: English

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Litematic

SERIES 318 – High-Resolution Measuring Unit

- The Litematic is designed for measuring easily deformed workpieces and high-precision parts such as pin gauges, thin-wall bearings, plastic parts, and springs.
- Extra-low measuring force of 0.01 N (1 gf).
- Ceramic anvil supplied with **VL-50-B** is free from corrosion concerns, hard wearing and easy to maintain.
- Measuring system **VL-50-B** has an integrated display and **VL-50S-B** has a separate display.
- Data output is in Digimatic format to enable processing and documentation of measurement values as well as statistical evaluation via connected Digimatic data processing units or PCs.

Technical Data

Repeatability:	σ = 0.05 µm
Display unit:	8 digits and 14 mm character height
Stroke:	51.2 mm (using standard contact point)
Measuring force:	0.01N
Spindle feed speed:	2 mm/s, 4 mm/s, 8 mm/s
Length standard:	Photoelectric linear encoder
Contact point:	ø3 mm carbide ball
Power supply:	240VAC ±10%

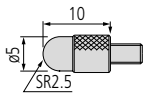
Optional Accessories

Code No.	Description	Price
936937	SPC data cable (1 m)	**£42.00**
957460	Granite stand*[1]	**£3,340.00**
965014	SPC data cable (2 m)	**£61.60**
937179T	Footswitch	**£57.90**
264-020	USB input tool	**£273.00**
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	**£503.00**
357651	AC adapter	**£78.80**
02NGB073	SENSORPAK (data capture software including I/O cable)	**£1,170.00**

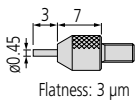
*[1] For model **VL-50S-B** only.

Code No.	Description	Measuring force	Price
101118	Contact point, shell	0.02 N	**£12.90**
120059D	Contact point, ø7.0 mm spherical (carbide)	0.03 N	**£28.10**
120060	Contact point, ø10.5 mm spherical (carbide)	0.06 N	**£31.20**
120066D	Contact point, ø0.45 mm needle (carbide)	0.01 N	**£38.80**

101118

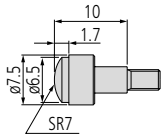


120066

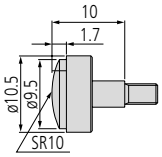


Flatness: 3 µm

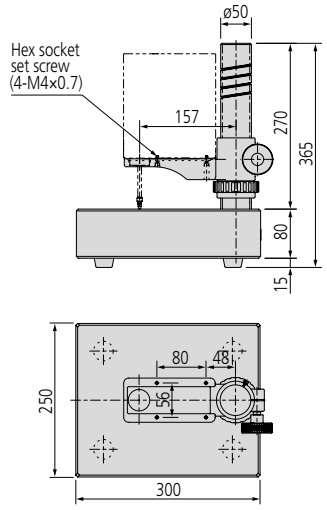
120059



120060



957460



318-221-10E



318-226-10E
(shown with optional stand)



Specifications

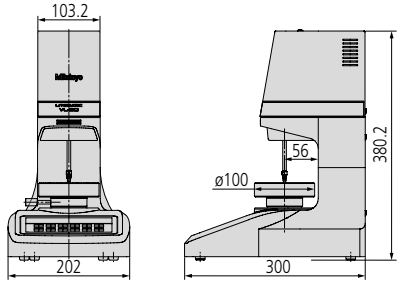
Code No.	Model	Range	Resolution (switchable)	Accuracy (at 20°C±1°C)	Remarks	Price
318-221-10E	**VL-50-B**	0-50 mm (0-2")	0.01/0.1/1 µm, 0.5/5/50 µinch	(0.5+L/100) µm*[2]	Including ø100 mm grooved ceramic anvil	**£6,890.00**
318-226-10E	**VL-50S-B**				—	**£6,890.00**

*[2] L = measured length (mm).

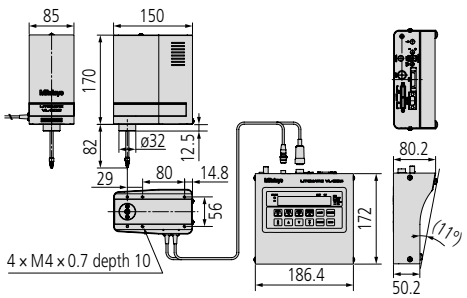
Dimensions

Unit: mm

318-221-10E



318-226-10E



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Laser Scan Micrometers

Example of Laser Scan Micrometer and Controller System Design

Laser Scan Micrometer

LSM- 02-A see page **G-18**

IP67



Laser Scan Micrometer

LSM- 30-A see page **G-19**

IP67



LSM Controller

LSM-CU-A see page **G-20**



I / F module LSM Controller

Interface Units see page **G-21**



Via USB or general-purpose Ethernet.

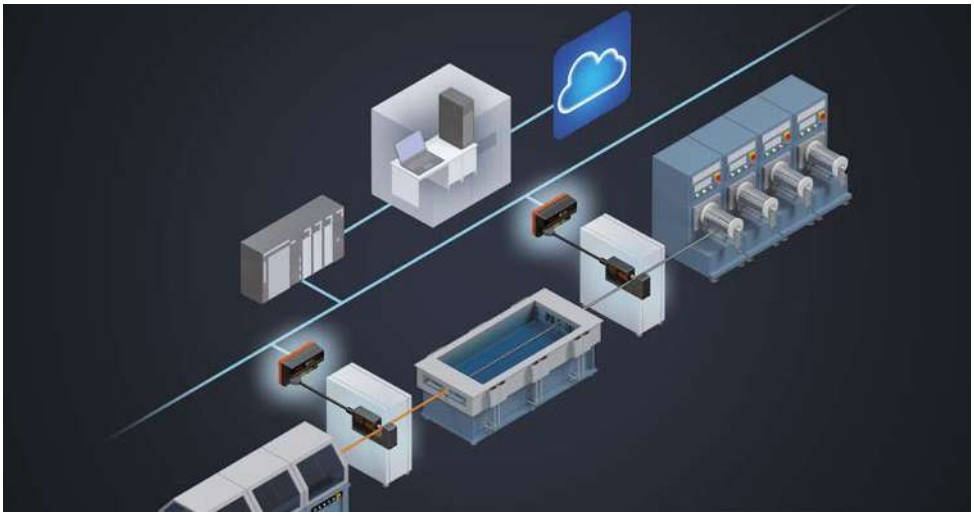
External equipment (PLC)



PC

LSMPAK Software see page **G-19**





Application Examples



Measurement of catheter and magnet wire.*



Measurement of roller bearing.*



Measurement of film sheet thickness.*



Simultaneous measurement of roller outside diameter and deflection.*

* The laser in the picture is for illustrative purposes only.

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Laser Scan Micrometers

SERIES 544 – LSM-02-A High-Accuracy Non-Contact In-Line Measuring System

- Proven accuracy developed by one of the most trusted precision measurement instrument manufacturers.
- Equipped with ultra-fine wire measurement mode, capable of measuring outer diameter of 5 µm.
- Provides high accuracy of ±0.3 µm over the entire measuring range (5 µm to 2 mm).
- Ultra-high repeatability of 0.03 µm.
- Compact body that can fit anywhere.
- IP67 rated.
- High-accuracy scanning with a high-accuracy motor.

COOLANT PROOF™ IP67

Technical Data

Accuracy at 20°C*1: ±0.3 µm
Repeatability (2σ)
Entire range: ±0.03 µm
Narrow range: ±0.015 µm
Positional error*2: ±0.4 µm
Measuring region: 1 x 2 mm
Laser wavelength: 650 nm, visible
Scanning rate: 3200 scans/s
Laser scanning speed: 76 m/s
Protection standard: IP67

*1 At the centre of the measuring region.
*2 Potential measurement error due to variation in workpiece position within the measuring region.

Standard Accessories

Code No.	Description
02AGQ039	CD (user's manual)
02AGQ190	Signal cable

Optional Accessories

Refer to page G-22.

LSMPAK Software

Refer to page G-19.



Its thin profile makes it easy to mount on a DIN rail.*3

*3 The laser in the picture is for illustrative purposes only.

544-123

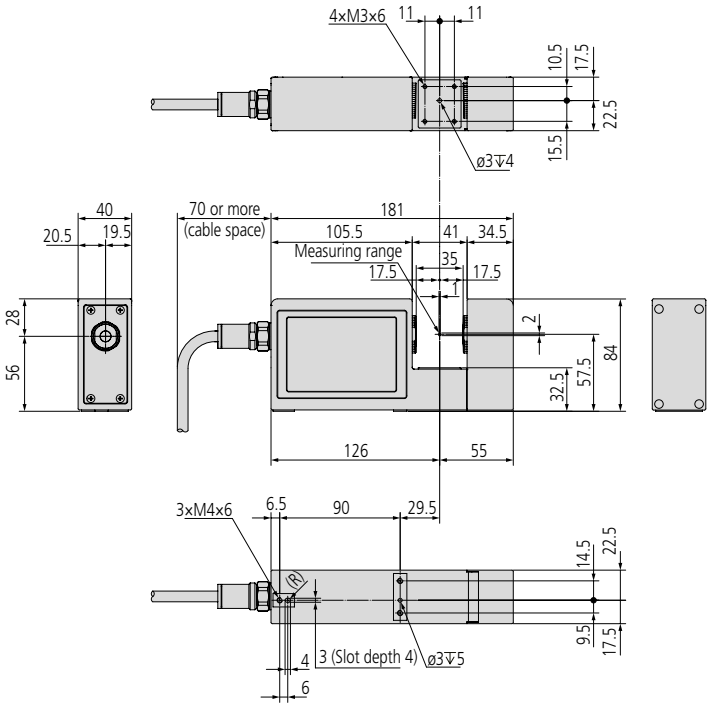


Specifications

Code No.	Model	Range	Resolution	Price
544-123	**LSM-02-A**	0.005 - 2 mm (.0002 - .08")	0.01 µm	**£6,220.00**

Dimensions

Unit: mm



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Laser Scan Micrometers

SERIES 544 – LSM-30-A High-Accuracy Non-Contact In-Line Measuring System

- Proven accuracy developed by one of the most trusted precision measurement instrument manufacturers.
- Separable sensor whose emission/reception unit can be used separately.
- Provides high accuracy of ±1.0 µm over the entire measuring range (0.3 to 2 mm).
- Ultra-high repeatability of 0.09 µm.
- IP67 rated.
- High-accuracy scanning with a high-accuracy motor.

COOLANT PROOF™ IP67



544-124

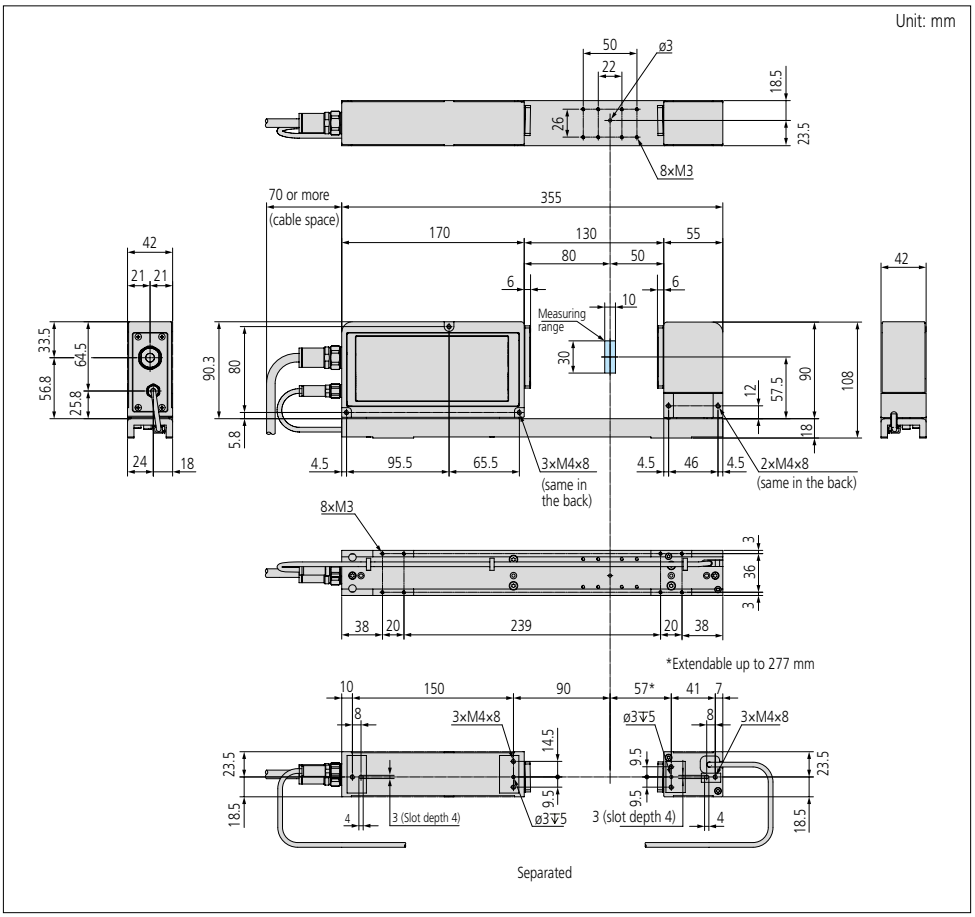
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Specifications

Code No.	Model	Range*	Resolution	Price
544-124	**LSM-30-A**	0.3-30 mm (.012-1.18")	0.01 µm	**£6,220.00**

* 2 units can be stacked to extend the range when used in dual mode. See brackets listed under optional accessories for detail.

Dimensions



Technical Data

Accuracy at 20°C*1
- Entire range: ±1.0 µm
- Narrow range: ±(0.6+0.1ΔD) µm

Repeatability (2σ)
- Entire range: ±0.09 µm
- Narrow range: ±0.06 µm

Positional error*2
- Entire range: ±1.8 µm
- Narrow range: ±1.0 µm

Measuring region: 10 x 30 mm
Laser wavelength: 650 nm, visible
Scanning rate: 3200 scans/s
Laser scanning speed: 226 m/s
Protection standard: IP67

*1 At the centre of the measuring region. ΔD = Difference in diameter between the master gauge and workpiece (mm).
*2 Potential measurement error due to variation in workpiece position within the measuring region.

Standard Accessories

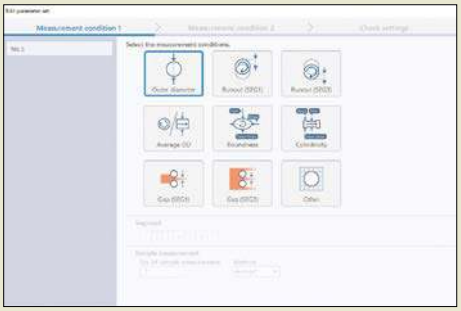
Code No.	Description
02AGQ039	CD (user's manual)
02AGQ190	Signal cable

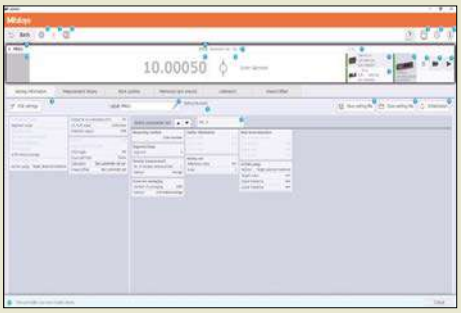
Optional Accessories

Refer to page G-22.

LSMPAK

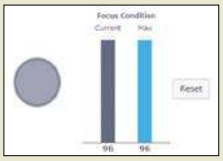
LSMPAK is a free software tool which helps to ensure intuitive operation of LSM's measurement conditions (functions to use, GO/±NG judgement, etc.), execution of calibration, positioning of a workpiece to measure, etc. It can also be used to acquire and monitor measured values.







Before positional adjustment.



After positional adjustment.

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

Laser Scan Micrometers

SERIES 544 – LSM-CU-A Controller

- Compact, thin design that fits in a distribution board or inside equipment.*
- Easily mountable on a DIN rail without using a tool.
- USB Type-C, I/O ports, and industrial interfaces (optional).
- Configuration software included as standard for easy configuration.
- The unit can be turned 90 degrees, enabling flexible layout.

* Body including cable can be stored in a 100 mm deep distribution board



544-121

Functions

Transparent object measurement, ultra-fine wire mode (LSM-02-A only), simultaneous measurement of two items, automatic workpiece detection, outlier elimination, judgement (lower limit/upper limit, multi-limit tolerance zone, target value and tolerance value), dirt detection for protective glass, sample measurement, analogue output, parameter setting (measurement condition): 20, workpiece position, calibration, presetting, offset, statistical analysis, calculation of two or more sets, sensor model identification.

Standard Accessories

D800-396	Socket for I/O terminal block
D827-827	Socket for power supply terminal block
02AGQ068	Grounding wire (4 m)
02NGA070	CD (LSMPAK installer, user's manual)

Optional Accessories

Code No.	Description	Price
02AGQ489	Controller stand	**£221.00**
21HZA209	PSU to controller cable	**£13.00**
63AAA679	DC power supply 24V/5A	**£289.00**





Controller stand (optional accessory) and application.



Installation in a distribution board.



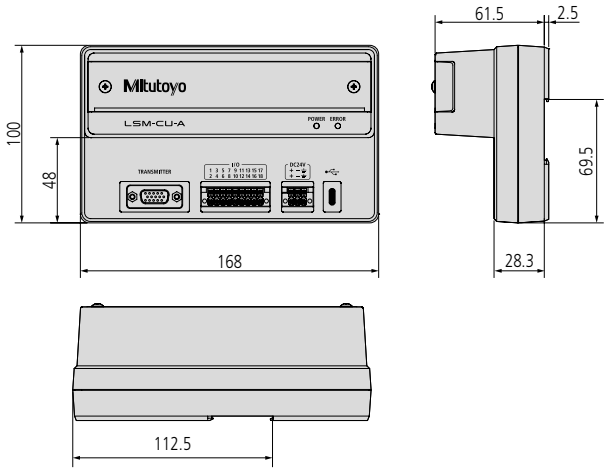
Flexible layout.

Specifications

Code No.	544-121
Model	**LSM-CU-A**
Segment mode	1 to 7 (1 to 3, transparent)
Edge mode	1 to 255
Averaging method	Arithmetic average: from 1 to 2048, Moving average: from 32 to 2048
Indicator	[POWER] LED (green), [ERROR] LED (red)
Mass	Approx. 550 g
Price	**£2,160.00**

Dimensions

Unit: mm



G

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Laser Scan Micrometers

Interface Unit

- Four types of interface are available so that you can select the right one to meet your production line requirements.
- The controller design enables insertion of a module without changing the layout.

EtherNet/IP



02AGQ300

EtherCAT



02AGQ370

PROFINET



02AGQ350

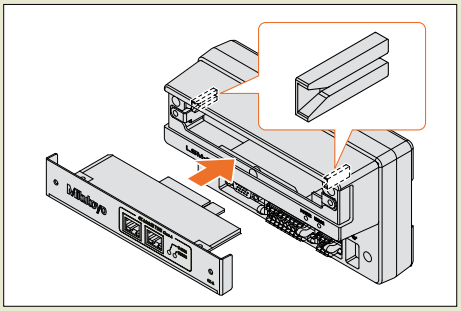
CC-Link IE TSN Class A



02AGQ390

Technical Data

RJ45 connector: 2 channels
Ethernet communication
- Port: RJ45 x 2
- Speed: 100 Mbps full duplex
- Cable used: Cat.5e or more STP cable



Insertion of a module in to the controller.

Specifications

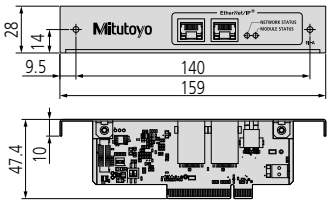
Code No.	02AGQ300	02AGQ370
Model	**LSM-EI-A**	**LSM-EC-A**
Communication standards	EtherNet/IP	EtherCAT
Interface LED	NETWORK STATUS Indicator: Dual colour LED1 (red/green)	RUN Indicator: Single colour LED1 (green)
	MODULE STATUS Indicator: Dual colour LED1 (red/green)	ERROR Indicator: Single colour LED1 (red)
Price	**£762.00**	**£762.00**

Code No.		02AGQ350
Model		**LSM-PN-A**
Communication standards		PROFINET
Interface LED	RUN indicator	Dual colour LED1 (red/green)
	ERROR indicator	Dual colour LED1 (red/green)
PROFINET function	PROFINET RT	Conformance class B PROFINET device Media redundancy protocol (MRP) client Multicast provider and subscriber
	Min. cycle time	2 msec
	Max. number of connections (ARs*1)	2
	No. of CRs*2 per connected controller	For cyclic data: 2, for parameter setting: 1
Price		**£762.00**

Code No.		02AGQ390
Model		**LSM-CC-A**
Communication standards		CC-Link IE TSN
Interface LED	D Link	Dual colour LED1 (red/green)
	ERROR	Single colour LED1 (red)
CC-Link IE TSN function	CC-Link IE TSN	Class A remote station
	Min. cycle time	1 msec
Price		**£762.00**

Dimensions

Unit: mm



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Optional Accessories

For Laser Scan Micrometers



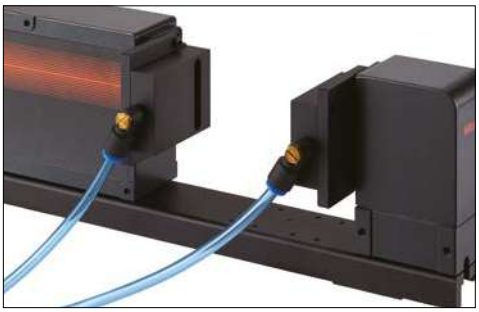
02AGQ461/2/3 bracket.



02AGD130 and **02AGD110** standard calibration gauge sets.



02AGD200 wire guiding pulley.



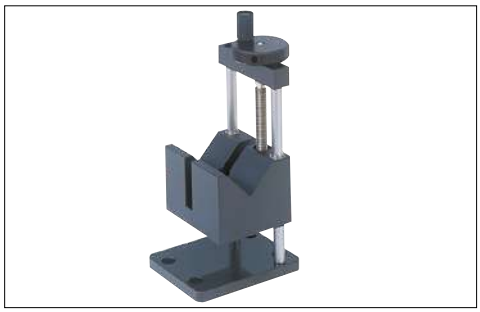
02AGQ450 air shield.



02AGQ452 laser beam stabilization shield.



02AGD490 adjustable workstage.



02AGD270 workstage.

Specifications

Code No.	Description	Application	Price
02AGD110	Calibration gauge set	LSM-02-A	**£453.00**
02AGD130	Calibration gauge set	LSM-30-A	**£502.00**
02AGD200	Wire guiding pulley	LSM-02-A	**£363.00**
02AGD270	Workstage	LSM-30-A	**£703.00**
02AGD440	Centre support	LSM-30-A	**£541.00**
02AGD450	Adjustable V-block	LSM-30-A	**£667.00**
02AGD490	Adjustable workstage	LSM-30-A	**£2,300.00**
02AGN780A	Extension signal cable (5 m) *	Any model of LSM	**£163.00**
02AGN780B	Extension signal cable (10 m) *	Any model of LSM	**£215.00**
02AGN780C	Extension signal cable (15 m) *	Any model of LSM	**£261.00**
02AGN780D	Extension signal cable (20 m) *	Any model of LSM	**£367.00**
02AGQ450	Air shield	LSM-30-A	**£693.00**
02AGQ452	Laser beam stabilization shield	LSM-30-A	**£305.00**
02AGQ461	Brackets for 40-90 mm	LSM-30-A	**£1,890.00**
02AGQ462	Brackets for 90-140 mm	LSM-30-A	**£2,100.00**
02AGQ463	Brackets for 140-180 mm	LSM-30-A	**£2,210.00**
02AGQ464A	Extension relay cable (1 m) *	Any model of LSM	**£347.00**
02AGQ464B	Extension relay cable (3 m) *	Any model of LSM	**£357.00**

* For LSM-02-A, the signal cable should be 20 m max. and the relay cable 2 m max.
For LSM-30-A, the signal cable should be 29 m max. and the relay cable 5 m max.
The total length of a signal cable and relay cable should be 29 m max.

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Mitutoyo

SurfaceMeasure-S Series

SERIES 553 – Non-Contact Line-Laser Sensor

- Line-laser sensor providing stable measurements with simple operations.
- This line-laser sensor combines the optical technology and sensor technology of Mitutoyo.
- It has also achieved the IP67 protection level, providing stable measurements.
- The SurfaceMeasure-S Series can obtain the profiles and three-dimensional shapes of measurement workpieces at high speed (a maximum frame rate of 10 kHz) and make an automatic judgement inside the sensor.
- It is also equipped with a parts matching function that allows the measurement tool to be applied throughout, regardless of the orientations of the parts being measured. Measurements can be taken without performing alignment.
- The software supports intuitive operation and is built into the sensor (software installation is not required), so you can use it immediately after mounting.

COOLANT PROOF™ IP67



553-100



553-110



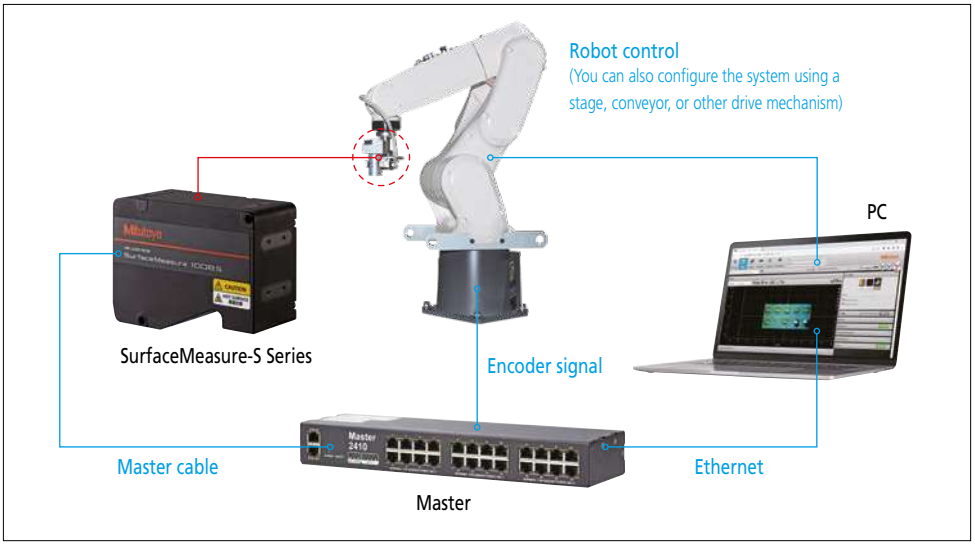
553-120

Specifications

Code No.	553-100	553-110	553-120
Model	**SurfaceMeasure1008S**	**SurfaceMeasure0303S**	**SurfaceMeasure2929S**
Max. measuring width	100 mm	32.5 mm	292 mm
Measuring range	80 mm	25 mm	290 mm
Working distance	80 mm	60 mm	299.5 mm
Scanning error (1σ)*1	20 µm (sphere measurement)	9 µm (sphere measurement)	65 µm (sphere measurement)
Z axis repeatability	0.5 µm	0.4 µm	1.2 µm
Mass	650 g		1480 g
Price	**£24,100.00**	**£20,740.00**	**£20,740.00**

*1 Accuracy inspection environment: Temperature 20°C ± 1°C, humidity 50%RH ± 10%RH.
Measurement workpieces: Specified reference ball for inspection (ø30 mm).
Inspection method: Determined by Mitutoyo-specified inspection method.
The operating environment and the storage environment are different from the guaranteed accuracy environment.

System Configuration Example



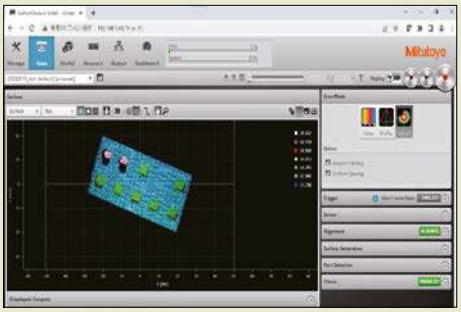
Technical Data

Laser wavelength: 405 nm (visible)
IP rating: IP67*2

*2 Measuring accuracy may deteriorate if any water droplet or dust particle adheres to the optical path.

Powerful Interface

Access the user interface via a web browser to set up measurement conditions and judgement conditions.



- Excellent operability simply by using a mouse.
- Simple and intuitive interface.
- Web browser-based, no need to install software.
- Various built-in measurement tools.
- 2D and 3D data can be obtained.

Sensor Networking Hub Master

In the multi-sensor system, this device is used for distributing power to sensors and synchronizing the sensors.

- Input: Power supply 24 to 48 V, laser enable input, encoder input, external input.



Code No.	02AQL401	02AQL402
Model	**Master810**	**Master2410**
Number of sensor inputs	8	24
Price	**£3,090.00**	**£4,480.00**

For the specifications of various optional Master connecting cables contact your nearest Mitutoyo sales office.

G

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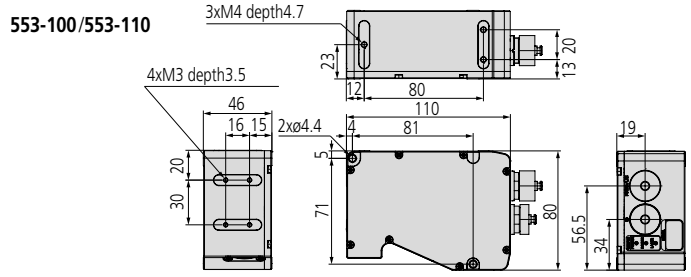
SurfaceMeasure-S Series

SERIES 553 – Non-Contact Line-Laser Sensor

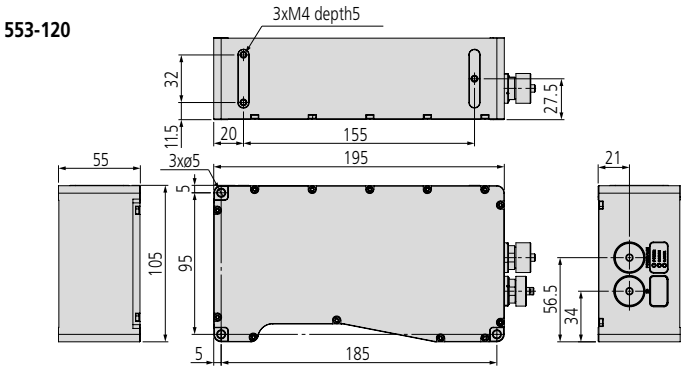
Dimensions

Unit: mm

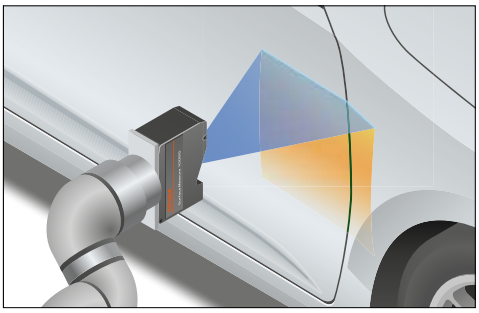
553-100/553-110



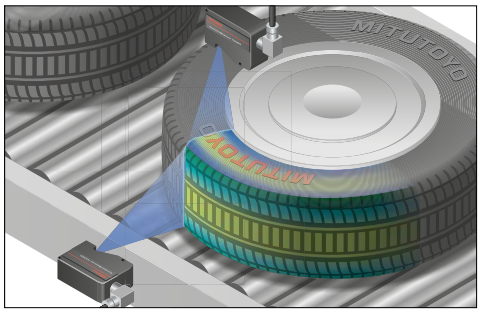
553-120



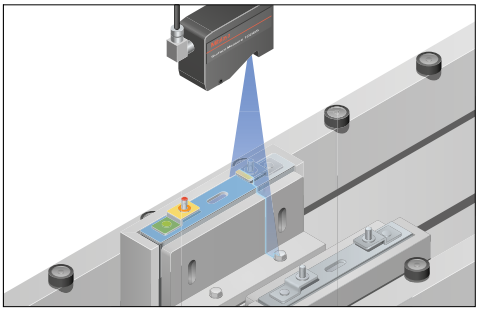
Application Examples



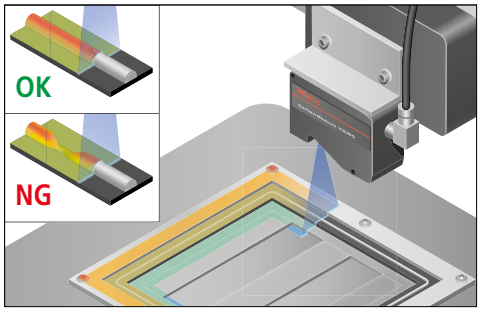
Automobile panel gap inspection.



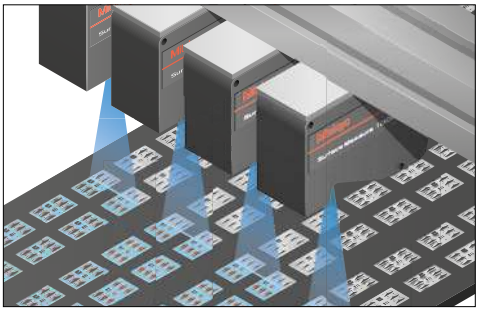
Tyre shape inspection.



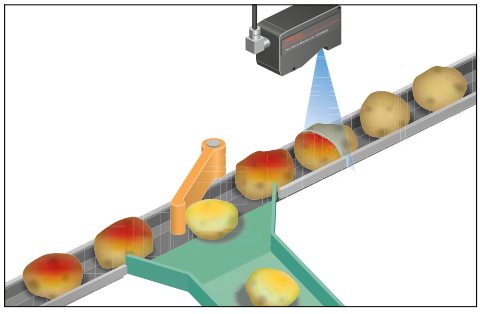
Cell assembly inspection on EV battery.



Adhesive inspection in electrical and electronic industries.



Connector pin inspection in electrical and electronic industries.

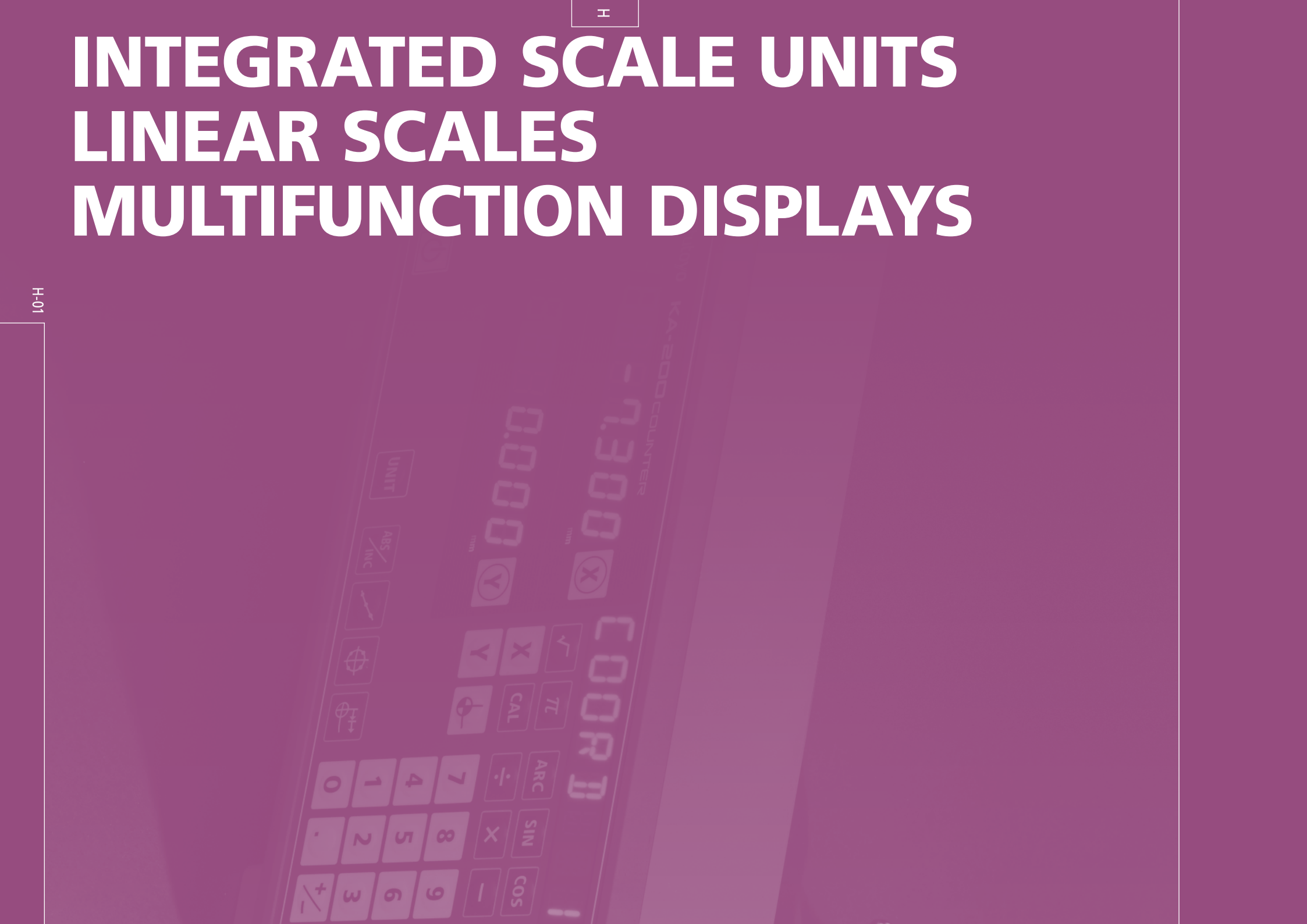


Standard inspection of food, etc.

G

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INTEGRATED SCALE UNITS
LINEAR SCALES
MULTIFUNCTION DISPLAYS



Integrated Scale Units



Linear Scales



Multifunction Displays



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Integrated Scale Units

SERIES 572 – ABSOLUTE Digimatic Scales

EC Counter

This Display Unit with GO/±NG judgement function offers a large LED display for a Digimatic Scale Unit. The bright LED readout is ideal for low-light situations or when the scale unit must be positioned where its own display cannot be viewed directly.



EC counter: 542-007E

Coolant Proof Scale Unit



Single-Function Type Scale Unit



Multifunction Type Scale Unit





DP1-VA LOGGER
Digimatic Mini-Processor

RS-232C output



Multiplexer

RS-232C or USB output

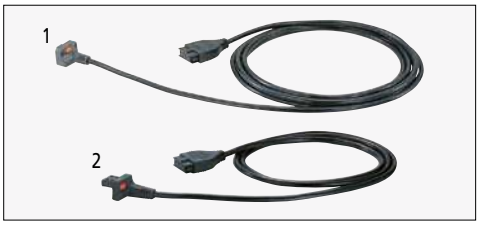


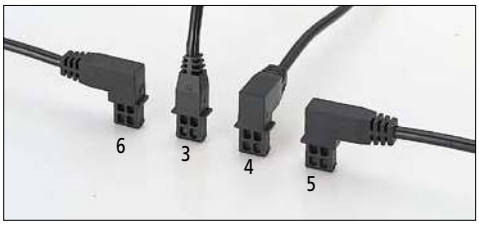
Data Input Device

Data entry via USB

Specifications

	Code No.		Description
—	05CZA624	1	1 m SPC data cable with pushbutton
	05CZA625		2 m SPC data cable with pushbutton
—	959149	2	1 m SPC data cable with pushbutton
	959150		2 m SPC data cable with pushbutton
—	905338	3	1 m SPC data cable
	905409		2 m SPC data cable
	905689	4	1 m SPC data cable
	905690		2 m SPC data cable
	905691	5	1 m SPC data cable
	905692		2 m SPC data cable
	905693	6	1 m SPC data cable
	905694		2 m SPC data cable
—	936937		1 m SPC data cable
	965014		2 m SPC data cable

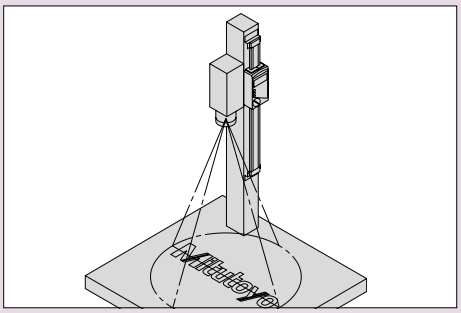




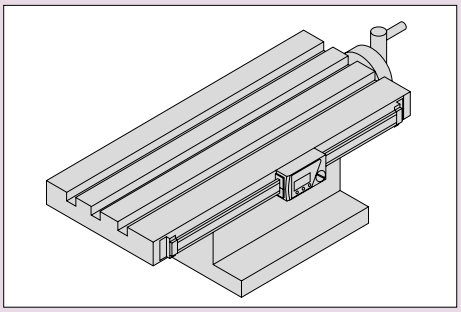
Mitutoyo's ABSOLUTE Digimatic Scale Units can be installed on almost any equipment, offering the user precise linear measurement capability with the added benefits of LCD readout and output for recording data and SPC.

Applications

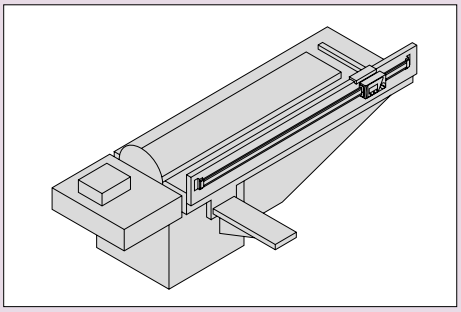
- Positioning of tables, etc., in adverse environments.
- Measuring equipment used on the workshop floor.
- Measurement of structure displacements.
- Positioning of machine tools.
- Measuring equipment used outside (in the rain).



Optical focussing.



Positioning of machine tables.



Cutting machinery.

H

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Integrated Scale Units

SERIES 572 – ABSOLUTE Digimatic Coolant Proof Scale

- A self-powered scale designed to capture positional coordinates from slides on machine tools and precision instruments; such as are incorporated in semiconductor production equipment, for example.
- The proprietary electromagnetic induction method used for detecting the position of the slider on the scale enables use in adverse environments subject to water and cutting oil mist and splashing.
- Specially designed output cables maintain the water resistant structure.
- No overspeed error since it uses an ABSOLUTE scale which does not depend on counting scale graduations.
- Once an absolute zero (origin) point is set, a Digimatic scale such as this always shows the absolute distance from this point when powered on rather than 0.00.
- With SPC data output.

ABSOLUTE DIGIMATIC COOLANT PROOF™ IP66

Technical Data

Accuracy:	±0.03 mm
Resolution:	0005" / 0.01 mm
Repeatability:	0.01 mm
Display:	LCD
Length standard:	ABSOLUTE electromagnetic induction linear encoder
Max. response speed:	Unlimited
Battery:	SR44 (1 pc.), **938882**
Battery life:	Approx. 1.5 years under normal use
Dust/water protection level:	IP66
Functions:	Origin-set, zero-setting, automatic power on/off, data output, inch/mm conversion (inch/mm models)
Alarm:	Low voltage, measurement value composition error

Optional Accessories

Code No.	Description	Price
05CZA624	SPC data cable with pushbutton (1 m)	**£85.60**
05CZA625	SPC data cable with pushbutton (2 m)	**£104.00**
06AFM380A	USB Input Tool Direct USB-ITN-A (2 m)	**£158.00**



572-614

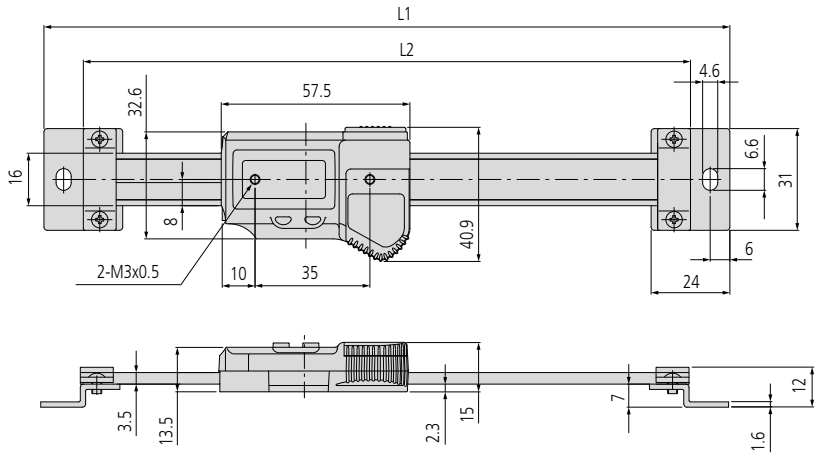
Specifications

Code No.	Range	Accuracy	L1	L2	Mass	Price
572-613	0-4" / 0-100 mm	.001" / 0.03 mm	209 mm	185 mm	0.39 kg	**£275.00**
572-614	0-6" / 0-150 mm		259 mm	235 mm	0.41 kg	**£292.00**
572-615	0-8" / 0-200 mm		311 mm	287 mm	0.43 kg	**£325.00**

H

Dimensions

Unit: mm



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Mitutoyo

Integrated Scale Units

SERIES 572 – ABSOLUTE Digimatic Scales Single-Function Horizontal Type

- Self-powered scales designed to capture positional coordinates from slides on machine tools and precision instruments; such as are incorporated in semiconductor production equipment, for example.
- The ORIGIN key allows setting of an absolute zero point to be used as reference in subsequent measurements. Once set, the ABS Digimatic Scale Unit is ready to show its true position whenever turned on rather than 0.00 as with standard models.
- The ZERO/ABS key allows the display to be zero-set at any slider position along the beam for incremental comparison measurements. This key also allows the return to absolute coordinates with a display of the true position from the origin point.
- No rack, no pinion, no glass scale. The Digimatic scale is safely embedded in the hardened stainless steel blade.
- All units come with two mounting brackets, each located at one end of the scale.
- With SPC data output.

ABSOLUTE DIGIMATIC



572-211-30

Specifications

Code No.	Range	Accuracy	L1	L2	Mass	Price
572-210-30	0-4"/0-100 mm	.001"/0.03 mm	209 mm	185 mm	0.23 kg	£224.00
572-211-30	0-6"/0-150 mm		259 mm	235 mm	0.25 kg	£227.00
572-212-30	0-8"/0-200 mm		311 mm	287 mm	0.27 kg	£272.00
572-213-10	0-12"/0-300 mm	.002"/0.04 mm	444 mm	420 mm	0.37 kg	£488.00

Technical Data

Accuracy:	Refer to Specifications
Resolution:	.0005"/0.01 mm
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
Functions:	Origin-set, zero-setting, power on/off, presetting, data hold, data output, inch/mm conversion (inch/mm models)
Alarm:	Low voltage, measurement value composition error

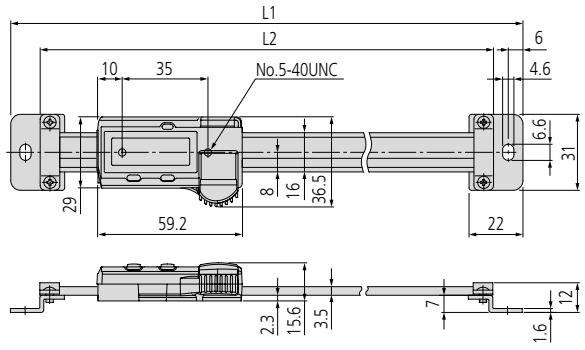
Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m, standard)	£42.00
905409	SPC data cable (2 m, standard)	£47.10
905689	SPC data cable (1 m, L-shape, back)	£42.00
905690	SPC data cable (2 m, L-shape, back)	£57.80
905691	SPC data cable (1 m, L-shape, right)	£42.00
905692	SPC data cable (2 m, L-shape, right)	£57.80
905693	SPC data cable (1 m, L-shape, left)	£42.00
905694	SPC data cable (2 m, L-shape, left)	£57.80
959143	Data hold unit	£25.20
959149	SPC data cable with pushbutton (1 m)	£44.10
959150	SPC data cable with pushbutton (2 m)	£50.30

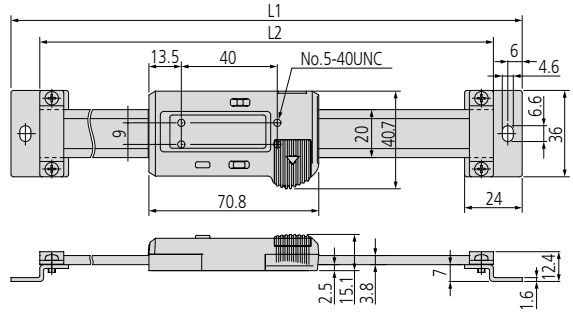
Dimensions

Unit: mm

Range: 0-100 to 0-200 mm.



Range: 0-300 mm.



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Integrated Scale Units

SERIES 572 – ABSOLUTE Digimatic Scales Single-Function Vertical Type

- Self-powered scales designed to capture positional coordinates from slides on machine tools and precision instruments; such as are incorporated in semiconductor production equipment, for example.
- The ORIGIN key allows setting of an absolute zero point to be used as reference in subsequent measurements. Once set, the ABS Digimatic Scale Unit is ready to show its true position whenever turned on rather than 0.00 as with standard models.
- The ZERO/ABS key allows the display to be zero-set at any slider position along the beam for incremental comparison measurements. This key also allows the return to absolute coordinates with a display of the true position from the origin point.
- No rack, no pinion, no glass scale. The Digimatic scale is safely embedded in the hardened stainless steel blade.
- All units come with two mounting brackets, each located at one end of the scale.
- With SPC data output.

ABSOLUTE DIGIMATIC



572-310-10

Technical Data

Accuracy:	Refer to Specifications
Resolution:	.0005" / 0.01 mm
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
Functions:	Origin-set, zero-setting, power on/off, presetting, data hold, data output, inch/mm conversion (inch/mm models)
Alarm:	Low voltage, measurement value composition error

Optional Accessories

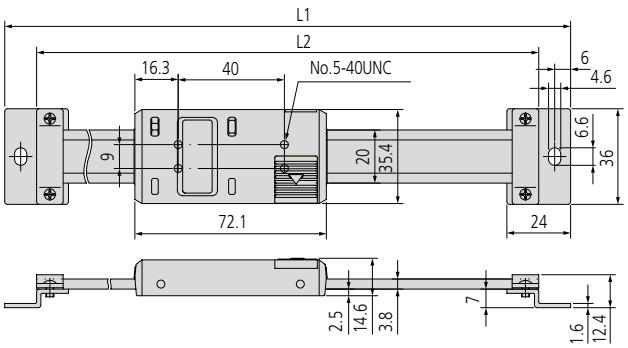
Code No.	Description	Price
905338	SPC data cable (1 m, standard)	**£42.00**
905409	SPC data cable (2 m, standard)	**£47.10**
905689	SPC data cable (1 m, L-shape, back)	**£42.00**
905690	SPC data cable (2 m, L-shape, back)	**£57.80**
905691	SPC data cable (1 m, L-shape, right)	**£42.00**
905692	SPC data cable (2 m, L-shape, right)	**£57.80**
905693	SPC data cable (1 m, L-shape, left)	**£42.00**
905694	SPC data cable (2 m, L-shape, left)	**£57.80**
959143	Data hold unit	**£25.20**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**

Specifications

Code No.	Range	Accuracy	L1	L2	Mass	Price
572-310-10	0-4" / 0-100 mm	.001" / 0.03 mm	209 mm	185 mm	0.23 kg	**£305.00**
572-311-10	0-6" / 0-150 mm		259 mm	235 mm	0.25 kg	**£310.00**
572-312-10	0-8" / 0-200 mm		311 mm	287 mm	0.27 kg	**£327.00**
572-313-10	0-12" / 0-300 mm	.002" / 0.04 mm	444 mm	420 mm	0.37 kg	**£526.00**

Dimensions

Unit: mm



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Integrated Scale Units

SERIES 572 – ABSOLUTE Digimatic Scales Multifunction Horizontal Type

- Self-powered scales designed to capture positional coordinates from slides on machine tools and precision instruments; such as are incorporated in semiconductor production equipment, for example.
- The ORIGIN key allows setting of an absolute zero point to be used as reference in subsequent measurements. Once set, the ABS Digimatic Scale Unit is ready to show its true position whenever turned on rather than 0.00 as with standard models.
- The ZERO/ABS key allows the display to be zero-set at any slider position along the beam for incremental comparison measurements. This key also allows the return to absolute coordinates with a display of the true position from the origin point.
- No rack, no pinion, no glass scale. The Digimatic scale is safely embedded in the hardened stainless steel blade.
- All units come with two mounting brackets, each located at one end of the scale.
- With SPC data output.

ABSOLUTE DIGIMATIC



572-470

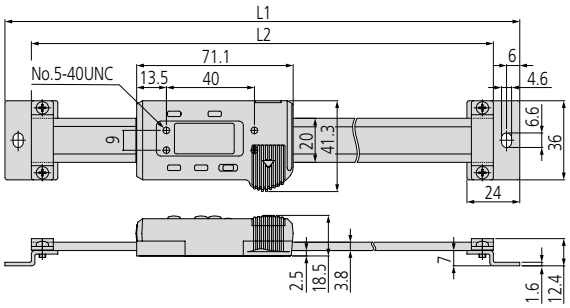
Specifications

Code No.	Range	Accuracy	L1	L2	Mass	Price
572-470	0-4"/0-100 mm	.001"/0.03 mm	244 mm	220 mm	0.25 kg	£473.00
572-471	0-6"/0-150 mm		294 mm	270 mm	0.28 kg	£517.00
572-472	0-8"/0-200 mm		344 mm	320 mm	0.31 kg	£532.00
572-473	0-12"/0-300 mm	.002"/0.04 mm	444 mm	420 mm	0.37 kg	£612.00
572-474	0-18"/0-450 mm		594 mm	570 mm	0.76 kg	£692.00
572-475	0-24"/0-600 mm		774 mm	750 mm	0.90 kg	£791.00
572-476	0-32"/0-800 mm	.0025"/0.06 mm	974 mm	950 mm	1.71 kg	£1,320.00
572-477	0-40"/0-1000 mm	.0025"/0.07 mm	1174 mm	1150 mm	2.04 kg	£1,460.00

Dimensions

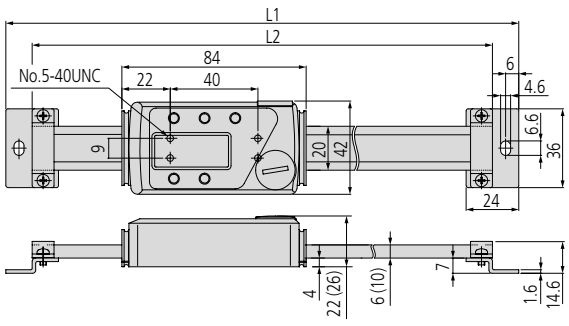
Unit: mm

Range: 0-100 to 0-300 mm.



Range: 0-450 to 0-1000 mm

( ) 0-800 mm range and above only



Technical Data

Accuracy:	Refer to Specifications
Resolution:	.0005"/0.01 mm
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
Functions:	Origin-set, zero-setting, power on/off, presetting, data hold, data output, inch/mm conversion (inch/mm models), measurement direction switching
Alarm:	Low voltage, measurement value composition error

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m, standard)	£42.00
905409	SPC data cable (2 m, standard)	£47.10
905689	SPC data cable (1 m, L-shape, back)	£42.00
905690	SPC data cable (2 m, L-shape, back)	£57.80
905691	SPC data cable (1 m, L-shape, right)	£42.00
905692	SPC data cable (2 m, L-shape, right)	£57.80
905693	SPC data cable (1 m, L-shape, left)	£42.00
905694	SPC data cable (2 m, L-shape, left)	£57.80

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Integrated Scale Units

SERIES 572 – ABSOLUTE Digimatic Scales Multifunction Vertical Type

- Self-powered scales designed to capture positional coordinates from slides on machine tools and precision instruments; such as are incorporated in semiconductor production equipment, for example.
- The ORIGIN key allows setting of an absolute zero point to be used as reference in subsequent measurements. Once set, the ABS Digimatic Scale Unit is ready to show its true position whenever turned on rather than 0.00 as with standard models.
- The ZERO/ABS key allows the display to be zero-set at any slider position along the beam for incremental comparison measurements. This key also allows the return to absolute coordinates with a display of the true position from the origin point.
- No rack, no pinion, no glass scale. The Digimatic scale is safely embedded in the hardened stainless steel blade.
- All units come with two mounting brackets, each located at one end of the scale.
- With SPC data output.

ABSOLUTE DIGIMATIC



572-571

Technical Data

Accuracy:	Refer to Specifications
Resolution:	.0005"/0.01 mm
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
Functions:	Origin-set, zero-setting, power on/off, presetting, data hold, data output, inch/mm conversion (inch/mm models), measurement direction switching
Alarm:	Low voltage, measurement value composition error

Optional Accessories

Code No.	Description	Price
905338	SPC data cable (1 m, standard)	**£42.00**
905409	SPC data cable (2 m, standard)	**£47.10**
905689	SPC data cable (1 m, L-shape, back)	**£42.00**
905690	SPC data cable (2 m, L-shape, back)	**£57.80**
905691	SPC data cable (1 m, L-shape, right)	**£42.00**
905692	SPC data cable (2 m, L-shape, right)	**£57.80**
905693	SPC data cable (1 m, L-shape, left)	**£42.00**
905694	SPC data cable (2 m, L-shape, left)	**£57.80**

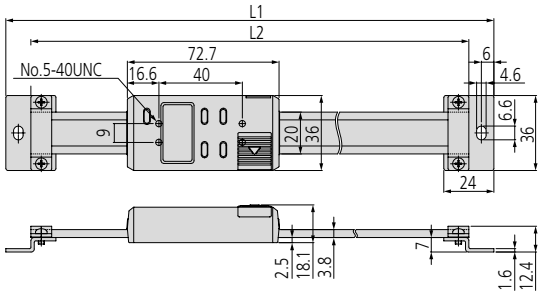
Specifications

Code No.	Range	Accuracy	L1	L2	Mass	Price
572-570	0-4"/0-100 mm	.001"/0.03 mm	244 mm	220 mm	0.25 kg	**£473.00**
572-571	0-6"/0-150 mm		294 mm	270 mm	0.28 kg	**£517.00**
572-572	0-8"/0-200 mm		344 mm	320 mm	0.31 kg	**£532.00**
572-573	0-12"/0-300 mm	.002"/0.04 mm	444 mm	420 mm	0.37 kg	**£612.00**
572-574	0-18"/0-450 mm		594 mm	570 mm	0.76 kg	**£692.00**
572-575	0-24"/0-600 mm		774 mm	750 mm	0.90 kg	**£791.00**
572-576	0-32"/0-800 mm	.0025"/0.06 mm	974 mm	950 mm	1.71 kg	**£1,320.00**
572-577	0-40"/0-1000 mm	.0025"/0.07 mm	1174 mm	1150 mm	2.04 kg	**£1,460.00**

Dimensions

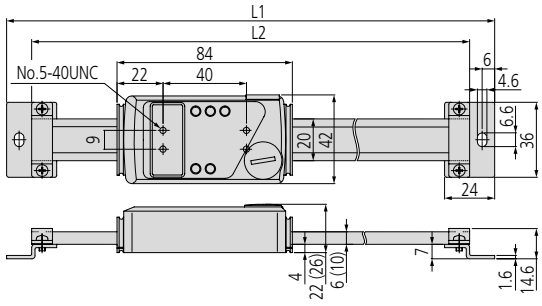
Unit: mm

Range: 0-100 to 0-300 mm.



Range: 0-450 to 0-1000 mm

( ) 0-800 mm range and above only



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DRO Linear Scales

SERIES 539 – AT103 Linear Scale

- Sturdy construction-high resistance to vibration-protection rating are similar in upright and reclining position.
- The innovative rubber lips keep out contaminants when you are using the scale in a machine shop.
- An armoured signal cable is used to connect the scale unit to the DRO counter, so you can operate it safely even in hostile environments.
- The signal cable outlet can be positioned on either side of the slider so you can connect the signal cable from either direction.



Technical Data

Output waveform:	Two 90° phase-shifted sinusoidal signals
Scale grating pitch:	20 µm
Scale reference point pitch:	50 mm
Operating temperature:	0 - 45°C

Optional Accessories

Code No.	Description	Price
09AAA033A	Extension cable (2 m)	**£242.00**
09AAA033B	Extension cable (5 m)	**£340.00**
09AAA033C	Extension cable (7 m)	**£401.00**
174-183E	KA Counter (2 axis)	**£488.00**
174-185E	KA Counter (3 axis)	**£596.00**



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Specifications

Code No.	Effective range	Max. response speed	Accuracy at 20°C*	Signal cable length	Price
Standard type					
539-133-30	1600 mm (64")	120 m/min.	(5+5L/1000) µm	5 m	**£1,250.00**
539-134-30	1700 mm (68")				**£1,410.00**
539-135-30	1800 mm (72")				**£1,500.00**
539-136-30	2000 mm (80")				**£1,600.00**
539-137-30	2200 mm (88")				**£1,710.00**
539-138-30	2400 mm (96")			7 m	**£1,720.00**
539-139-30	2500 mm (100")				**£1,820.00**
539-140-30	2600 mm (104")				**£1,930.00**
539-141-30	2800 mm (112")				**£2,020.00**
539-142-30	3000 mm (120")				**£2,130.00**
Wide effective range type					
539-143-30	3250 mm (130")	50 m/min.	(5+8L/1000) µm	10 m	**£3,890.00**
539-144-30	3500 mm (140")				**£4,130.00**
539-145-30	3750 mm (150")				**£4,360.00**
539-146-30	4000 mm (160")				**£4,600.00**
539-147-30	4250 mm (170")				**£4,830.00**
539-148-30	4500 mm (180")				**£5,070.00**
539-149-30	4750 mm (190")			15 m	**£5,310.00**
539-150-30	5000 mm (200")				**£5,540.00**
539-151-30	5250 mm (210")				**£5,770.00**
539-152-30	5500 mm (220")				**£6,010.00**
539-153-30	5750 mm (230")				**£6,240.00**
539-154-30	6000 mm (240")				**£6,470.00**
High-accuracy type					
539-133-40	1600 mm (64")	120 m/min.	(3+3L/1000) µm	5 m	**£1,630.00**
539-134-40	1700 mm (68")				**£1,730.00**
539-135-40	1800 mm (72")				**£1,840.00**
539-136-40	2000 mm (80")				**£1,960.00**

* L = Effective range (mm).

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DRO Linear Scales

SERIES 539 – AT103 Linear Scale

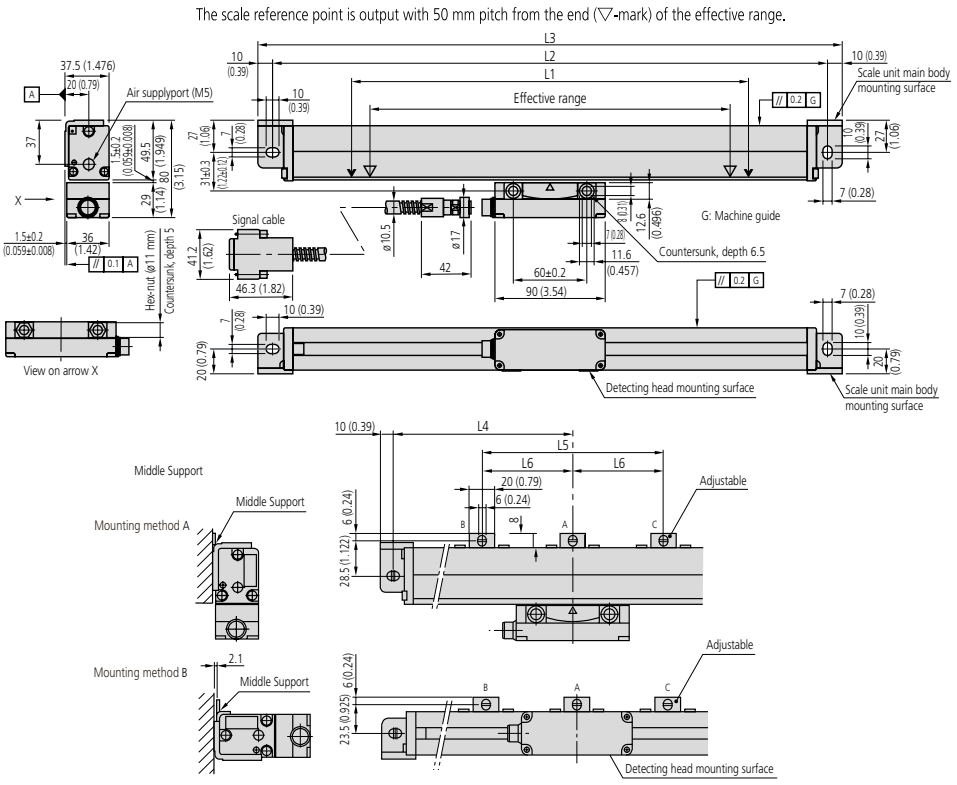
Dimensions

Code No.	L1	L2	L3	L4	L5	L6
Standard type						
539-133-30	1690	1818	1838	—	610	—
539-134-30	1790	1918	1938	—	650	—
539-135-30	1890	2018	2038	—	670	—
539-136-30	2100	2228	2248	—	740	—
539-137-30	2300	2428	2448	—	800	—
539-138-30	2500	2628	2648	1314	1300	650
539-139-30	2600	2728	2748	1364	1340	670
539-140-30	2700	2828	2848	1414	1400	700
539-141-30	2900	3028	3048	1514	1500	750
539-142-30	3100	3228	3248	1614	1600	800
High-accuracy type						
539-133-40	1690	1818	1838	—	610	—
539-134-40	1790	1918	1938	—	650	—
539-135-40	1890	2018	2038	—	670	—
539-136-40	2100	2228	2248	—	740	—

Key: L1 Travel range
L2 Bore centre distance
L3 Total length
L4-L6 Support bracket position

Unit: mm (inch)

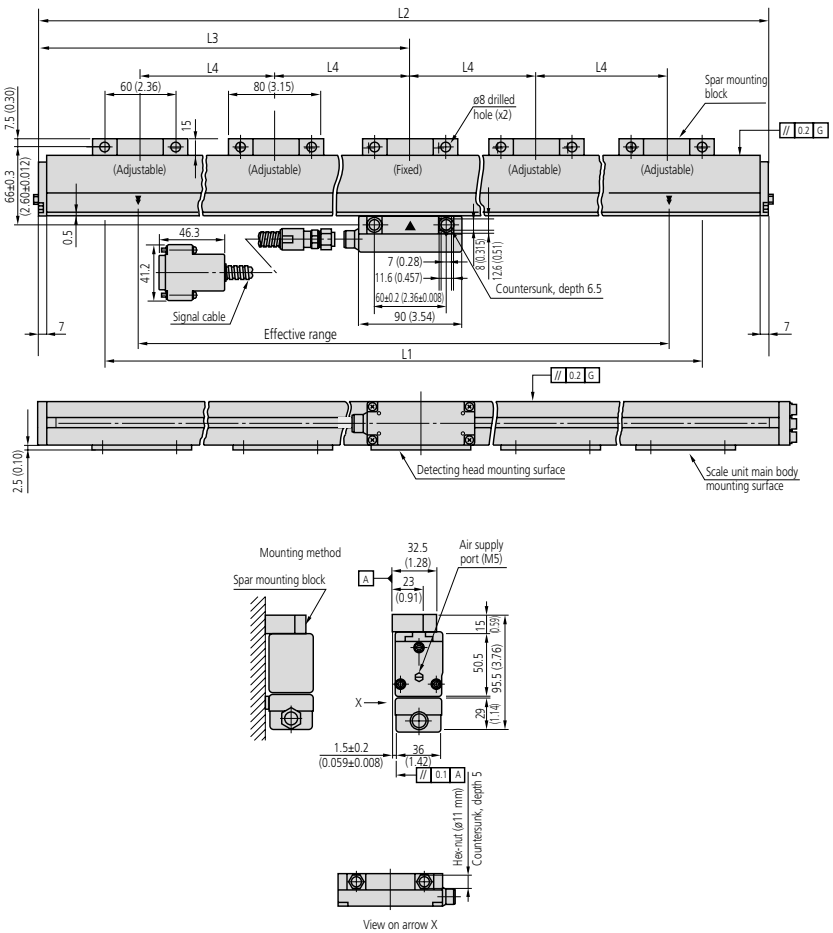
Standard and high-accuracy types



Code No.	L1	L2	L3	L4
Wide effective range type				
539-143-30	3350	3464	1725	800
539-144-30	3600	3714	1850	850
539-145-30	3850	3964	1975	930
539-146-30	4100	4214	2100	1000
539-147-30	4350	4464	2225	1050
539-148-30	4600	4714	2350	1100
539-149-30	4850	4964	2475	800
539-150-30	5100	5214	2600	830
539-151-30	5350	5464	2725	870
539-152-30	5600	5714	2850	910
539-153-30	5850	5964	2975	950
539-154-30	6100	6214	3100	1000

Key: L1 Travel range
L2 Total length
L3-L4 Support bracket position

Wide measuring range type



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DRO Linear Scales

SERIES 539 – AT113 Slimline Linear Scale

- These linear scales are built for limited installation space.
- Glass scale - Zero not coded.
- Expansion factor (8±1) x $10^{-6}/K^{-1}$
- An armoured inox signal cable is used to connect the DRO counter.



Specifications

Code No.	Effective range	Max. response speed	Accuracy at 20°C*	Signal cable length	Price
Standard type					
539-201-30	100 mm (4")	120 m/min.	(5+5L/1000) µm	3 m	**£546.00**
539-202-30	150 mm (6")				**£567.00**
539-203-30	200 mm (8")				**£630.00**
539-204-30	250 mm (10")				**£620.00**
539-205-30	300 mm (12")				**£641.00**
539-206-30	350 mm (14")				**£672.00**
539-207-30	400 mm (16")				**£714.00**
539-208-30	450 mm (18")				**£746.00**
539-209-30	500 mm (20")				**£798.00**
539-211-30	600 mm (24")				**£861.00**
539-213-30	700 mm (28")				**£924.00**
539-214-30	750 mm (30")				**£977.00**
539-215-30	800 mm (32")				**£1,040.00**
539-216-30	900 mm (36")				**£1,100.00**
539-217-30	1000 mm (40")			5 m	**£1,160.00**
539-218-30	1100 mm (44")				**£1,230.00**
539-219-30	1200 mm (48")				**£1,300.00**
539-220-30	1300 mm (52")				**£1,370.00**
539-221-30	1400 mm (56")				**£1,440.00**
539-222-30	1500 mm (60")				**£1,510.00**
High-accuracy type					
539-201-40	100 mm (4")	120 m/min.	(3+3L/1000) µm	3 m	**£599.00**
539-202-40	150 mm (6")				**£630.00**
539-203-40	200 mm (8")				**£651.00**
539-204-40	250 mm (10")				**£672.00**
539-205-40	300 mm (12")				**£693.00**
539-206-40	350 mm (14")				**£735.00**
539-207-40	400 mm (16")				**£767.00**
539-208-40	450 mm (18")				**£798.00**
539-209-40	500 mm (20")				**£861.00**
539-211-40	600 mm (24")				**£977.00**
539-213-40	700 mm (28")				**£1,040.00**
539-214-40	750 mm (30")				**£1,100.00**
539-216-40	900 mm (36")				**£1,210.00**
539-217-40	1000 mm (40")			5 m	**£1,280.00**
539-218-40	1100 mm (44")				**£1,350.00**
539-219-40	1200 mm (48")				**£1,410.00**
539-220-40	1300 mm (52")				**£1,490.00**
539-221-40	1400 mm (56")				**£1,560.00**
539-222-40	1500 mm (60")				**£1,620.00**

* L = Effective range (mm).

Technical Data

Output waveform:	Two 90° phase-shifted sinusoidal signals
Scale grating pitch:	20 µm
Scale reference point pitch:	50 mm
Operating temperature:	0 - 45°C

Optional Accessories

Code No.	Description	Price
09AAA033A	Extension cable (2 m)	**£242.00**
09AAA033B	Extension cable (5 m)	**£340.00**
09AAA033C	Extension cable (7 m)	**£401.00**
174-183E	KA Counter (2 axis)	**£488.00**
174-185E	KA Counter (3 axis)	**£596.00**



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DRO Linear Scales

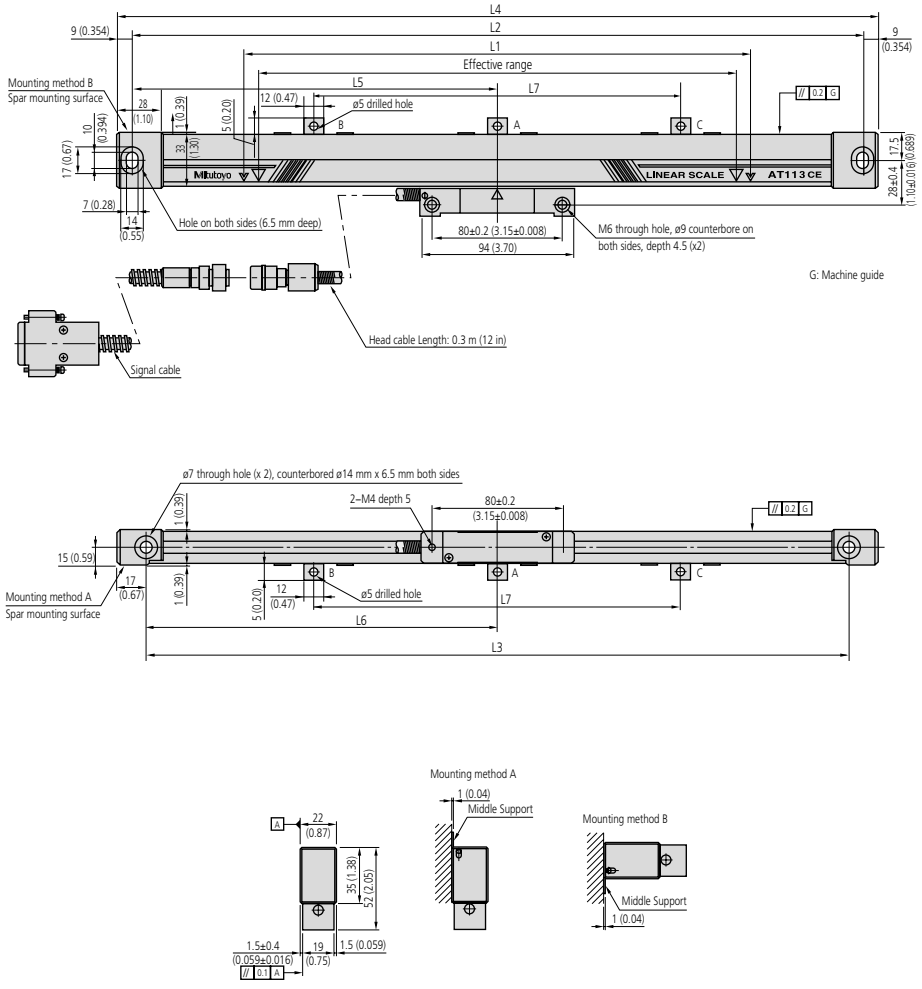
SERIES 539 – AT113 Slimline Linear Scale

Dimensions

Code No.	L1	L2	L3	L4	L5	L6	L7
Standard type							
539-201-30	120	258	242	276	—	—	—
539-202-30	170	308	292	326	—	—	—
539-203-30	220	358	342	376	—	—	—
539-204-30	270	408	392	426	—	—	—
539-205-30	330	468	452	486	—	—	—
539-206-30	380	518	502	536	—	—	—
539-207-30	430	568	552	586	—	—	—
539-208-30	480	618	602	636	—	—	—
539-209-30	540	678	662	696	339	331	—
539-211-30	640	778	762	796	389	381	—
539-213-30	740	878	862	896	439	431	—
539-214-30	780	918	902	936	459	451	—
539-215-30	840	978	962	996	489	481	—
539-216-30	940	1078	1062	1096	539	531	—
539-217-30	1040	1178	1162	1196	589	581	—
539-218-30	1140	1278	1262	1296	—	—	430
539-219-30	1240	1378	1362	1396	—	—	460
539-220-30	1340	1478	1462	1496	—	—	490
539-221-30	1440	1578	1562	1596	—	—	530
539-222-30	1500	1678	1662	1696	—	—	560
High-accuracy type							
539-201-40	120	258	242	276	—	—	—
539-202-40	170	308	292	326	—	—	—
539-203-40	220	358	342	376	—	—	—
539-204-40	270	408	392	426	—	—	—
539-205-40	330	468	452	486	—	—	—
539-206-40	380	518	502	536	—	—	—
539-207-40	430	568	552	586	—	—	—
539-208-40	480	618	602	636	—	—	—
539-209-40	540	678	662	696	339	331	—
539-211-40	640	778	762	796	389	381	—
539-213-40	740	878	862	896	439	431	—
539-214-40	780	918	902	936	459	451	—
539-216-40	940	1078	1062	1096	539	531	—
539-217-40	1040	1178	1162	1196	589	581	—
539-218-40	1140	1278	1262	1296	—	—	430
539-219-40	1240	1378	1362	1396	—	—	460
539-220-40	1340	1478	1462	1496	—	—	490
539-221-40	1440	1578	1562	1596	—	—	530
539-222-40	1500	1678	1662	1696	—	—	560

Key: L1 Travel range
L2-L3 Bore centre distance
L4 Total length
L5-L7 Support bracket position

Unit: mm (inch)



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DRO Linear Scales

SERIES 539 – AT715 ABSOLUTE Coolant Proof Linear Scale

- Only compatible with KA Counter display units.
- Designed to capture positional coordinates from slides on machine tools and precision instruments; such as are incorporated in semiconductor production equipment, for example.
- Uses an ABSOLUTE electromagnetic induction system to achieve IP67 environmental resistance.
- Detects and outputs the absolute position – no reference point setup needed at each power-on.
- Abnormal calculations do not occur as a result of electrical noise.
- Very suitable scale for mounting on the X axis of a lathe. The scale main unit has 2 mounting directions for easy installation on machine tools with difficult mounting positions.

ABSOLUTE COOLANT PROOF™ IP67



Technical Data

Effective range:	100 - 3000 mm
Measurement method:	Electromagnetic induction system
Max. response speed:	50 m/min.
Scale grating pitch:	20 µm
Dust/water protection level:	IP67
Operating temperature:	0 - 45°C

Optional Accessories

Code No.	Description	Price
09AAB674A	Extension cable (2 m)	**£235.00**
09AAB674B	Extension cable (5 m)	**£330.00**
09AAB674C	Extension cable (7 m)	**£388.00**
174-183E	KA Counter (2 axis)	**£488.00**
174-185E	KA Counter (3 axis)	**£596.00**



Specifications

Code No.	Range	Accuracy at 20°C	Signal cable length	Price
539-801N	100 mm (4")	±5 µm	3.5 m	**£308.00**
539-802N	150 mm (6")			**£313.00**
539-803N	200 mm (8")			**£315.00**
539-804N	250 mm (10")			**£319.00**
539-805N	300 mm (12")			**£323.00**
539-806N	350 mm (14")			**£324.00**
539-807N	400 mm (16")			**£325.00**
539-808N	450 mm (18")			**£328.00**
539-809N	500 mm (20")			**£336.00**
539-811N	600 mm (24")	±7 µm		**£343.00**
539-813N	700 mm (28")			**£346.00**
539-814N	750 mm (30")			**£353.00**
539-815N	800 mm (32")			**£361.00**
539-816N	900 mm (36")			**£370.00**
539-817N	1000 mm (40")		5 m	**£390.00**
539-818N	1100 mm (44")			**£410.00**
539-819N	1200 mm (48")			**£432.00**
539-820N	1300 mm (52")			**£460.00**
539-821N	1400 mm (56")			**£482.00**
539-822N	1500 mm (60")			**£474.00**
539-823N	1600 mm (64")			**£585.00**
539-824N	1700 mm (68")			**£621.00**
539-825N	1800 mm (72")			**£656.00**
539-860N	2000 mm (80")	±10 µm		**£807.00**
539-861N	2200 mm (88")			**£868.00**
539-862N	2400 mm (96")		7 m	**£1,030.00**
539-863N	2500 mm (100")			**£1,070.00**
539-864N	2600 mm (104")			**£1,120.00**
539-865N	2800 mm (112")			**£1,180.00**
539-866N	3000 mm (120")			**£1,290.00**

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DRO Linear Scales

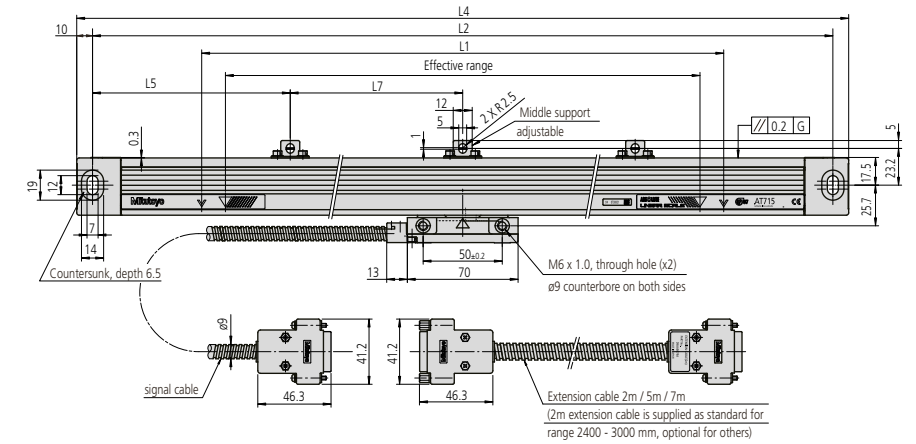
SERIES 539 – AT715 ABSOLUTE Coolant Proof Linear Scale

Dimensions

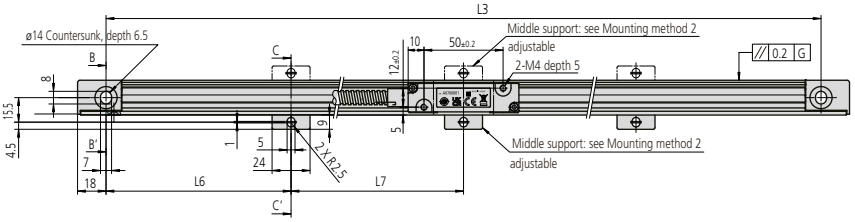
Code No.	L1	L2	L3	L4	L5	L6	L7
539-801N	120	258	242	278	—	—	—
539-802N	170	308	292	328	—	—	—
539-803N	220	358	342	378	—	—	—
539-804N	270	408	392	428	—	—	—
539-805N	330	468	452	488	—	—	—
539-806N	380	518	502	538	—	—	—
539-807N	430	568	552	588	—	—	—
539-808N	480	618	602	638	—	—	—
539-809N	540	678	662	698	339	331	—
539-811N	640	778	762	798	389	381	—
539-813N	740	878	862	898	439	431	—
539-814N	780	918	902	938	459	451	—
539-815N	840	978	962	998	489	481	—
539-816N	940	1078	1062	1098	539	531	—
539-817N	1040	1178	1162	1198	589	581	—
539-818N	1140	1278	1262	1298	424	416	430
539-819N	1240	1378	1362	1398	459	451	460
539-820N	1340	1478	1462	1498	494	486	490
539-821N	1440	1578	1562	1598	524	516	530
539-822N	1540	1678	1662	1698	559	551	560
539-823N	1640	1778	1762	1798	459	451	430
539-824N	1740	1878	1862	1898	479	471	460
539-825N	1840	1978	1962	1998	459	451	530
539-860N	2040	2178	2162	2198	539	531	550
539-861N	2240	2378	2362	2398	469	461	480
539-862N	2440	2578	2562	2598	509	501	520
539-863N	2540	2678	2662	2698	529	521	540
539-864N	2640	2778	2762	2798	549	541	560
539-865N	2840	2978	2962	2998	489	481	500
539-866N	3040	3178	3162	3198	529	521	530

Key: L1 Travel range
L2-L3 Bore centre distance
L4 Total length
L5-L7 Support bracket position

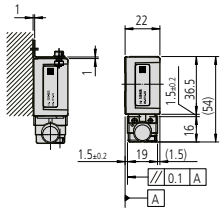
Unit: mm



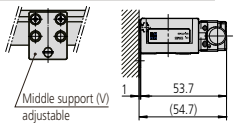
G: Machine guide



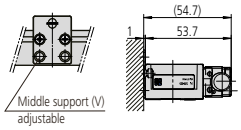
Mounting method 1



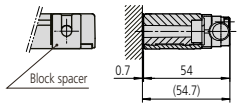
Mounting method 2 C-C' Sectional dimensions



Mounting method 3 C-C' Sectional dimensions



Mounting method 2, 3 B-B' Sectional dimensions



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Multifunction Displays

SERIES 174 – 2/3-Axis KA Counters

- The KA Counter can be used a *standard counter* or a *lathe counter* by modifying parameters.
- Can be used with both the AT100 series optical scales and the AT715 electromagnetic induction scale.
- Text data can be output using the optional USB interface.
- The optional external RS-232C interface enables connection to a PC and a printer.

174-183E
(for 1- or 2-axis applications)



174-185E
(for 3-axis applications)



Technical Data

Display:	8-digit LED and a negative [-] sign
Power supply:	240VAC ±10%, 50/60 Hz

Functions

Zero-setting, preset, resolution setting, measurement direction setting, mm/inch conversion, diameter display, scale reference point setting *1, 1/2 calculation, coordinate system switching, bolt-hole circle machining*2, pitch machining, zero approach machining (inc mode), addition of 2-scale data*3, linearity error compensation, pitch error compensation*1, smoothing, memory backup, lower digit blanking out, external zero-setting*4, RS-232C interface unit*4, USB output*5, error message.

*1 Only available when connecting with AT100 series.
*2 Not available in single-axis use.
*3 Only available for 3-axis model.
*4 Code out unit (06AET993) is required.
*5 Text can be output by interface unit and footswitch.

Optional Accessories

Code No.	Description	Price
06ACF941	Extension cable for remote load and zero (2.2 m)*4	**£178.00**
06AET993	Code out unit*6	**£219.00**
09AAA207	Adapter for previous 6-pin linear scales	**£88.00**
09EAA094	RS-232C cable for DP1-VA LOGGER	**£276.00**
64AAB336	External load footswitch	**£92.00**
64AAB519	RS-232C cable, 25-9 pin (6 ft)	**£17.90**
936553	External zero box*7	**£170.00**
937179T	Footswitch, USB output*4	**£57.90**
937328	External load box*7	**£244.00**
965004	Footswitch, RS-232C output (for 06ACF941 only)	**£116.00**

Display mounting options available on request.

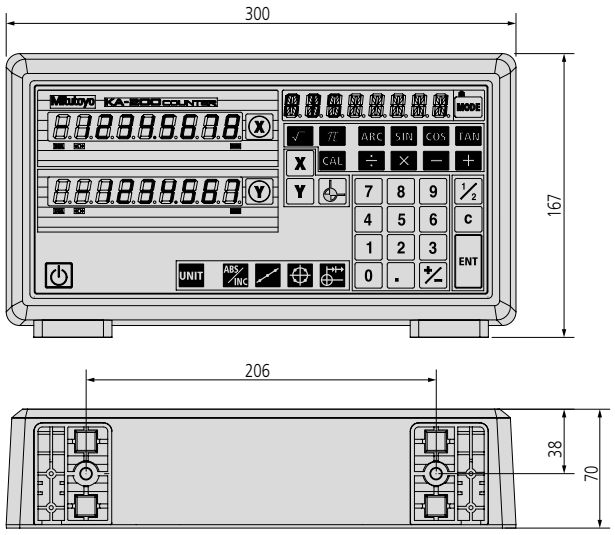
*6 Required for RS-232C / USB output and Digimatic input.
*7 Code out unit (06AET993) and extension cable (06ACF941) are required.

Specifications

Code No.	Scale input ports	Resolution	Mass	Price
174-183E	2	0.05 - 0.0001 mm (AT100 series) 0.01 - 0.001 mm (AT715 series)	1.25 kg	**£488.00**
174-185E	3		1.33 kg	**£596.00**

Dimensions

Unit: mm



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NC Linear Scales

SERIES 579 – ST36 Separate Type Linear Scale

- High accuracy type, ±0.5 µm class (effective range up to 300 mm).
- Has a thinner detector head (thickness 11.5 mm).
- The maximum effective measurement range of 3000 mm enables use on large machines.
- 4 different types available for each signal output specification.
- LED display function for indicating signal errors.
- Compact interface box included as standard.

Technical Data

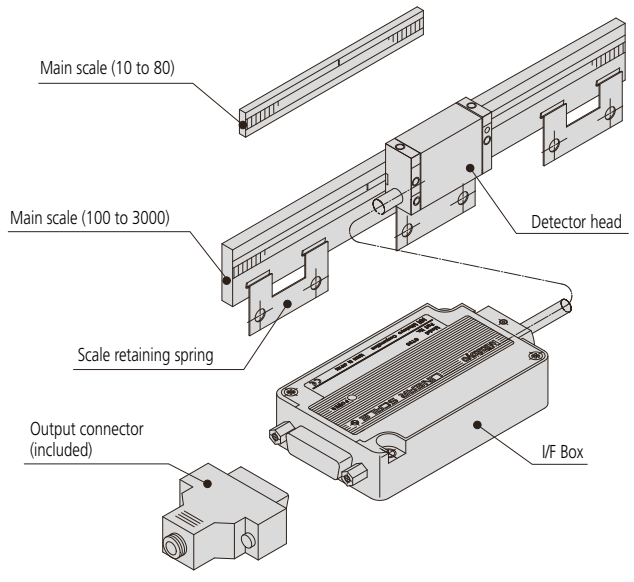
Detection method:	Reflective optical linear encoder
Effective range:	10 to 3000 mm
Max. response speed:	1200 mm/sec.
Scale grating pitch:	8 µm
Signal output pitch:	4 µm
Scale reference point pitch:	50 mm (10 to 80 mm: centre point)
Operating temperature:	0 - 40°C



Specifications

Model		ST36A	ST36B	ST36C	ST36D
Output signal		2-phase sinusoidal signals	2-phase square wave signals (reset input type)	2-phase square wave signals, 2-phase sinusoidal signals	1 Vp-p differential sinusoidal signals
Accuracy (20 °C)	10 to 300 mm	±0.5 µm			
	350 to 500 mm	±1.0 µm			
	600 to 1000 mm	±2.0 µm			
	1100 to 3000 mm	±2.0 µm/m			

System Configuration



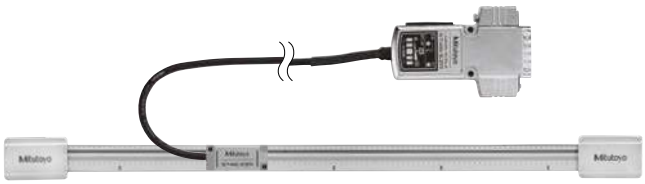
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Mitutoyo

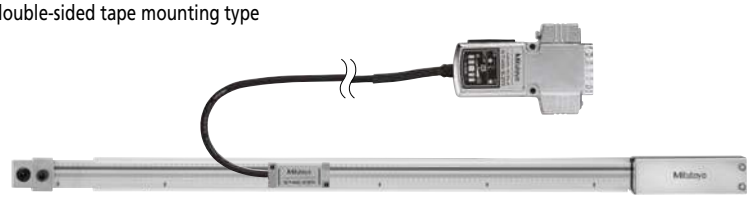
NC Linear Scales

SERIES 579 – ST46-EZA Separate Type Linear Scale

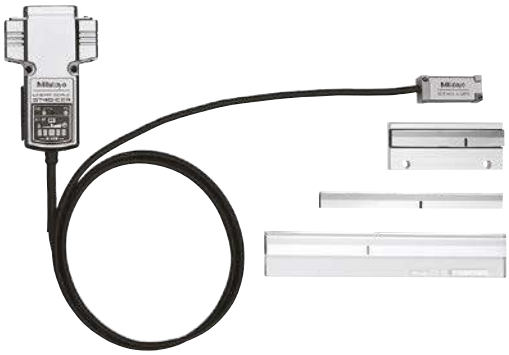
- Includes an automatic adjusting function for the signal (EZA function) at the push of a button.
- Connector incorporates a "Setup indicator" for checking the signal strength without using an oscilloscope or PC.
- When connected with a PC it is possible to check signal strength and set parameter, (optional application program required).
- I/F circuit integrated in connector shell reduces volume to compared to conventional interface.
- The metal tape scale type has a mounting surface area of 12.5 by 9.325 mm, allowing use in applications where a space-saving design is important.
- Glass Scale Type or Metal Tape Scale Type is available.



Metal tape scale type: double-sided tape mounting type



Metal tape scale type: double-ended mounting type



Glass scale type

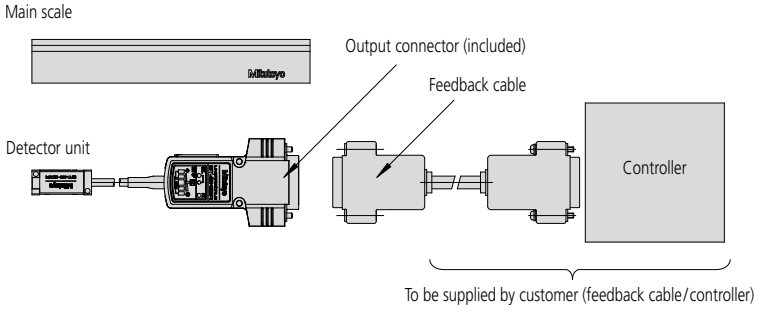
Technical Data

Detection method:	Reflective optical linear encoder
Effective range:	10 to 3000 mm
Max. response speed:	2600 mm/sec.
Scale grating pitch:	20 µm
Scale reference point pitch:	50 mm (10 to 80 mm: centre point)
Operating temperature:	0 - 40°C

Specifications

Model		ST36A	
Scale type		Glass	Metal tape
Output signal	Type B	2-phase square wave signals, reference point pulse, external reset input	
	Type C	2-phase square wave signals, reference point pulse, 2-phase sinusoidal signals	
Accuracy (20 °C)	10 to 300 mm	±1 µm	±5 µm
	350 to 500 mm	±2 µm	
	600 to 1000 mm	±3 µm	
	1100 to 3000 mm	±3 µm/m	±5 µm/m

System Configuration



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NC Linear Scales

SERIES 579 – ABS ST700 ABSOLUTE Slim Separate Type Linear Scale

- ABSOLUTE scales have eliminated the need to re-establish the origin.
- Electromagnetic induction ABS linear encoder with separate exposed scale.
- Non-contact detection is optimal for high speed and high acceleration of linear motors, etc.
- The detector head is approximately 1/3 the previous model size: 50 mm (W) x 28 mm (D) x 11 mm (H).
- Cable outlets can be in four directions, with mounting holes on the top and sides.
- Accuracy (5+5L/1000) µm is realized (previous models: (8+5L/1000) µm).*
- Compatible with servo amplifiers from a range of companies (high-speed serial interfaces).

* L: Effective range (mm)

ABSOLUTE COOLANT PROOF™ IP65



Technical Data

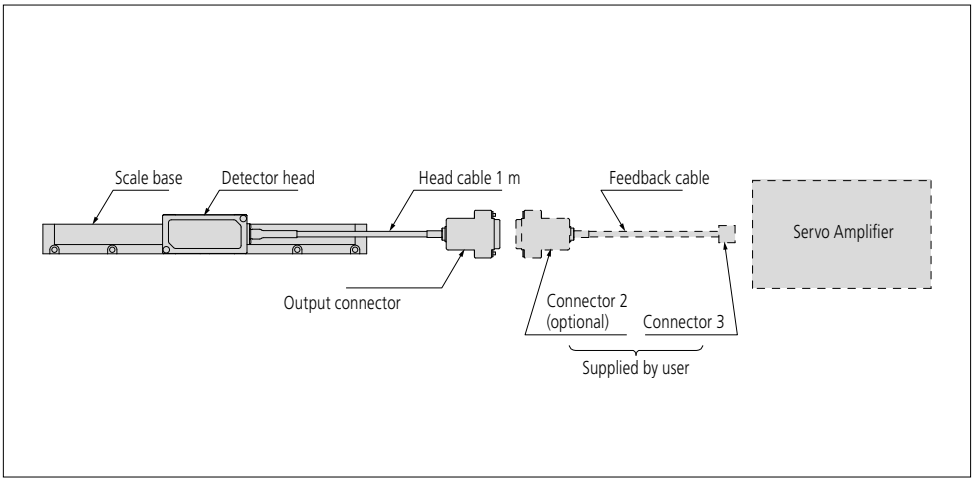
Detection method:	Electromagnetic induction ABSOLUTE position
Effective range:	100 to 6000 mm
Max. response speed:	5000 mm/sec.
Operating temperature:	0 - 50ºC

Specifications

Model	ABS ST700
Scale type	Scale base type
Resolution	0.1 µm
Accuracy (20 °C)	(5+5L/1000) µm*
Vibration resistance	300 m/s² (55 to 2000 Hz)
Shock resistance	500 m/s² (1/2 sin, 11 ms)

* L = Effective range (mm).

System Configuration



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NC Linear Scales

SERIES 579 – ABS ST1300 ABSOLUTE Metal Tape Linear Scale

- Realizes a 12 m maximum effective length, 8-m/s maximum response speed and 1 nm minimum resolution.
- Extensive interface compatibility.
- Outstanding robustness against contamination compared to earlier photoelectric types achieved using a new detection principle.
- Choice between double-sided tape, fixed-ends and centre mounting methods.
- Signal validation program facilitates mounting adjustment and maintenance.

ABSOLUTE COOLANT PROOF™ IP65



Double-ended mounting type



Centre mounting type



Double-sided tape mounting type

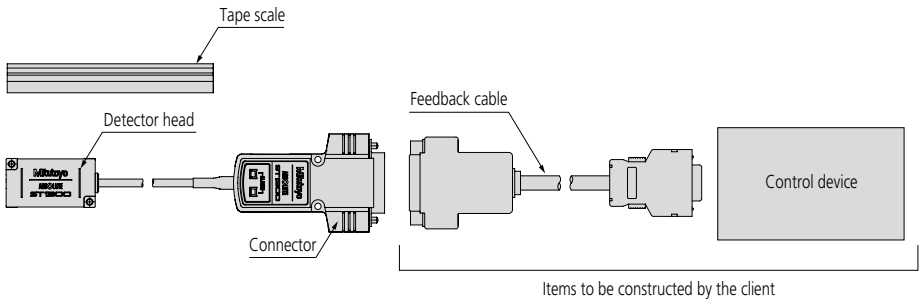
Technical Data

Detection method:	Optical linear encoder
Effective range:	Max. 12 m (depending on mounting type)
Max. response speed:	8000 mm/sec.
Operating temperature:	0 - 50°C

Specifications

Model		ABS ST1300			
Mounting method		Double-ended	Centre	Double-sided tape	
Max. effective range		12 m	6 m	3 m	
Fixing part material		—	—	Equivalent to iron	Other than equivalent to iron
Resolution		0.001 µm / 0.01 µm			
Indication accuracy (20 °C)	1 m or less	±5 µm	With system parameters: ±5 µm Without system parameters: ±10 µm	±5 µm	
	1.1 m or more	±5 µm/m	With system parameters: ±5 µm Without system parameters: ±10 µm	±5 µm/m	

System Configuration



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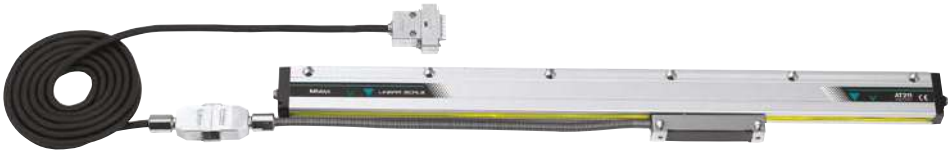
NC Linear Scales

SERIES 559 – AT211 Assembly Type Linear Scale

- This is a slim, sealed scale that can be directly connected to the control unit.
- High speed response up to 2000 mm/s, making it compatible with a wide range of resolutions from 0.1 to 5 µm.
- The multi-point fixing type has excellent vibration resistance.
- Scale alarm display makes for easy maintenance.
- Wide range of specifications enables easy choice to best suit your application.

Technical Data

Output waveform:	Square-wave signal output
Effective range:	100 to 1500 mm
Scale grating pitch:	20 µm
Scale reference point pitch:	50 mm, centre point, left end, right end (fixed when shipped)
Operating temperature:	0 - 45°C



Mounting method: Multi-point fixing



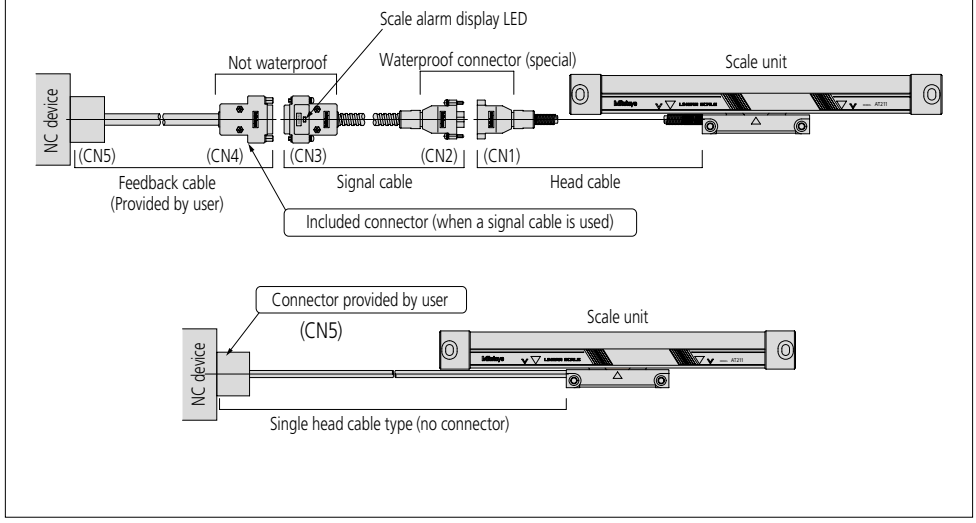
Mounting method: Double-end fixing

Specifications

Model	AT211
Accuracy (20 °C)	(3+3L/1000) µm (for L≤500 mm, we can also fabricate a high-accuracy type: (2+2L/1000) µm)*
Vibration resistance	200 m/s² (conditions: 55 to 2000 Hz) (multi-point fixing type)
Shock resistance	250 m/s² (conditions: half-sine, 11 ms) (multi-point fixing type)
Minimum resolution	0.1, 0.2, 0.5, 1, 2.5, 5 µm (fixed when shipped)
Minimum edge interval	125, 250, 333, 500, 1000 ns (fixed when shipped)

* L = Effective range (mm).

System Configuration



H

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NC Linear Scales

SERIES 559 – ABS AT1100 ABSOLUTE Assembly Type Linear Scale

- This series has adopted a new structure not easily subject to infiltration of coolant and a dust-proof rubber highly resistant to coolant attack. It offers a field support type linear scale with higher reliability than before.
- The sensor-to-scale air gap in this series of electromagnetic induction scales is approximately 0.4 mm – around 4 times as wide as that of a conventional optical or electromagnetic sensor. The increased air gap reduces the likelihood of failure due to the accumulation of contaminants and is one of the world's largest to be found in a machine tool scale.
- The de facto standard frame multipoint mounting method has been adopted to provide high resistance to vibration and shock.
- The improvement of signal processing technology in the electromagnetic induction type absolute linear encoder has achieved approximately 6 times higher accuracy than that of previous scales.
- This series is compatible with the high-speed serial interface from leading machine-tool companies, allowing direct connection to an NC controller.

ABSOLUTE



Technical Data

Detection method:	Electromagnetic induction
Effective range:	Max. 3040 mm
Max. response speed:	3000 mm/sec.
Operating temperature:	0 - 50°C

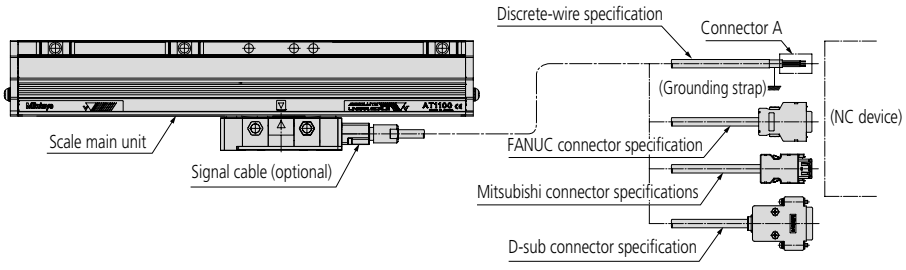
H

Specifications

Model		ABS AT1100
Mounting method		Frame multipoint
Effective range		24 types: 140, 240, 340, 440, 540, 640, 740, 840, 940, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040 mm
Resolution		0.05 µm
Accuracy (20 °C)	L: 140 - 2040*	3+5L/1000 (µm)*
	L: 2240 - 3040*	5+5L/1000 (µm)*
Vibration resistance		≤196 m/s2 (55 - 2000 Hz)
Shock resistance	L: 140 - 2040*	≤343 m/s^2
	L: 2240 - 3040*	≤294 m/s^2 (1/2 sin 11 ms)

* L = Effective range (mm).

System Configuration



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NC Linear Scales

SERIES 559 – ABS AT1300 ABSOLUTE Slim Assembly Type Linear Scale

Technical Data

Detection method:	Optical linear encoder
Effective range:	S type: 100 to 2200 mm, H type: 100 to 1000 mm
Max. response speed:	3000 mm/sec.
Operating temperature:	0 - 50°C

- High-rigidity (S-type) and high-accuracy (H-type) version available.
- Outstanding resistance to contamination compared to conventional optical types by using a new detection principle (in-house testing result).
- Features a new coolant-proof design incorporating a high-performance rubber seal to provide higher reliability in the harsh factory environment.
- Delivers high accuracy and the outstanding resolution of 0.001 µm, the best-in-class in absolute scales.
- Allows space-saving design thanks to a slim form. (AT500-S and AT500-H are compatible with each other in installation.)
- Supports the interfaces of various manufacturers allowing a variety of system configurations.

ABSOLUTE



S type

H type

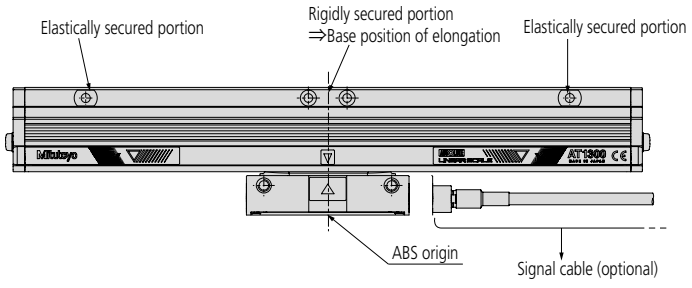
Specifications

Model	ABS AT1300	
Type	High-rigidity (S type)	High-accuracy (H type)
Mounting method	Multi-point elastic fixing	3 or 5-point elastic fixing
Effective range	19 types: 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1800, 2000, 2200 mm	15 types: 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 750, 800, 900, 1000 mm
Resolution	0.001/0.01/0.05 µm	
Accuracy (20 °C)	3+3L/1000 (µm)*	2+2L/1000 (µm)*
Vibration resistance	≤196 m/s^2 (55 - 2000 Hz)	≤147 m/s^2 (55 - 2000 Hz)
Shock resistance	≤343 m/s^2 (1/2 sin 11 ms)	≤196 m/s^2 (1/2 sin 11 ms)

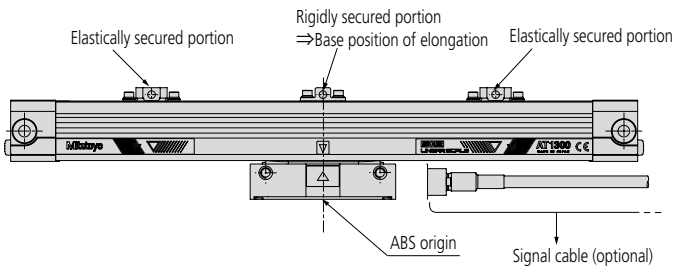
* L = Effective range (mm).

Scale Configuration

S type



H type



H

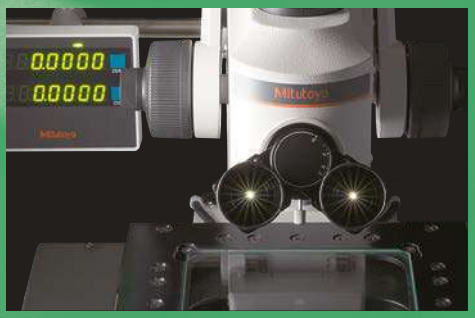
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Mitutoyo

OPTICAL MEASURING



Microscopes



Profile Projectors



TAGLENS



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Magnifiers

SERIES 183 – Clear Loupe Magnifier

- Transparent draw tube enables clear imaging of the workpiece.
- Includes box and cleaning cloth.



183-310



183-312

Specifications

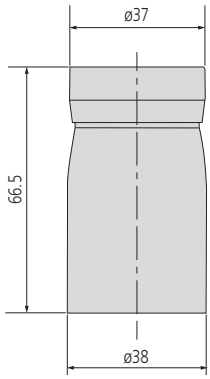
Code No.	183-310	183-312
Magnification	5X	15X
Aperture	ø25 mm	ø19 mm
Field of view	ø34 mm	ø19 mm
Remarks	Drawtube removable	
Mass	24 g	19 mm
Price	**£43.40**	**£64.90**

J

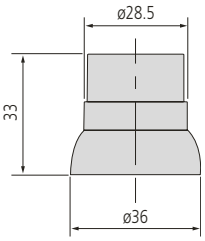
Dimensions

Unit: mm

183-310



183-312



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TM Microscope

SERIES 176 – Toolmakers' Microscope

- The Mitutoyo TM Series is a toolmakers' microscope well suited for measuring dimensions and angles of workpiece features. It can also be used to check the shape of screws and gears by inserting an optional reticle in the eyepiece.
- The compact body makes it ideal for use on shopfloors that have very limited space for measuring instruments.
- Angle measurement is performed easily by turning the angle scale to align the cross-hair reticle with the image of the edges that define a workpiece feature.
- Illumination intensity can be adjusted to suit the reflectance of the surface of the feature under investigation.

U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



TM-505B
(shown with optional Digimatic micrometer heads)

Technical Data

Image type:	Erect
Optical tube:	Monocular (diopter adjustable)
Inclination:	60°
Reticle:	90° broken cross-hair (**176-126**)
Angle reading	
Range:	360°
Min. reading:	6' (by vernier)
Eyepiece:	15X (**176-116**) field number 13 mm
Objective:	2X (**176-138**) working distance: 67 mm
Total magnification:	30X
Power supply:	240VAC ±10%, 50/60Hz

Optional Accessories

Code No.	Description	Price
152-389[*1]	Micrometer head for Y axis (range: 0-25 mm, reading: 0.005 mm)	**£229.00**
152-390[*1]	Micrometer head for X axis (range: 0-25 mm, reading: 0.005 mm)	**£229.00**
164-164[*2]	Digimatic micrometer head (range: 2"/50 mm, reading: .00005"/0.001 mm)	**£925.00**
176-111	Reticle (concentric circles ø4 mm, increment: 0.05 mm)	**£122.00**
176-114	Reticle (60° angle)	**£70.60**
176-115	10X eyepiece	**£189.00**
176-116	15X eyepiece	**£189.00**
176-117	20X eyepiece	**£189.00**
176-126	Reticle (90° broken cross-hair)	**£70.60**
176-135	Reticle (concentric circles ø.2", increment: .01")	**£89.40**
176-137	Objective, 10X	**£208.00**
176-138	Objective, 2X	**£150.00**
176-139	Objective, 5X	**£208.00**
176-204	Dial indicator attachment for Z-axis measurement	**£184.00**
63AAA001	LED ringlight	**£587.00**
264-160-13	QM-Data200 2D data processing unit	**£2,250.00**
611201-131	Gauge block (1")	**£62.20**
611202-131	Gauge block (2")	**£86.90**
611635-031	Gauge block (25 mm)	**£61.20**
611675-031	Gauge block (50 mm)	**£69.70**
959149	SPC data cable with pushbutton (1 m)	**£44.10**
959150	SPC data cable with pushbutton (2 m)	**£50.30**
02AZD790C	SPC data cable for U-WAVE-T (160 mm)	**£77.30**
06AFM380C	USB Input Tool Direct USB-ITN-A (2 m)	**£143.00**

Fixture and stage accessories refer to page J-22
QM-Data200 2D data processing unit refer to page J-19.

*[1] For details refer to page B-80.
*[2] For details refer to page B-68.

Specifications

Model		TM-505B	TM-1005B
Code No.		**176-818-11**	**176-819-11**
XY stage travel range		50 x 50 mm	100 x 50 mm
Measurement method		Micrometer head (optional)	
XY stage size		152 x 152 mm	240 x 152 mm
Effective glass size		96 x 96 mm	154 x 96 mm
Maximum workpiece height		115 mm	107 mm
Maximum stage loading		5 kg	
Transmitted illumination	Light source	White LED	
	Functions	With green filter, light intensity adjustable	
Surface illumination	Light source	White LED	
	Functions	Light intensity adjustable	
Mass		14 kg	15 kg
Price		**£3,610.00**	**£4,640.00**



Angle reading.

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Mitutoyo

MF Microscope

SERIES 176 – Measuring Microscopes

- Standard measuring microscope that has a wide variety of optional accessories including a Vision Unit and various digital CCD cameras.
- The MF measuring microscopes' expandability, such as when used in combination with Mitutoyo's Vision Unit to boost performance or data management on a PC, promises further improved measuring efficiency.
- Observation with a clear and flare-free erect image and a wide field of view.
- Measuring accuracy that is the highest in its class (and conforms to JIS B7153).
- ML series, high-NA objectives that are specially designed for the MF series (long working distance type).
- Illumination unit (reflected/transmitted) selectable from high-intensity LED or halogen bulb types (required).
- Variable aperture diaphragm (reflected/transmitted) allows observation and measurement while suppressing light diffraction.
- Variety of standardised stages in sizes to suit practically any application.
- Quick-release mechanism useful for moving the stage rapidly between measuring points when measuring workpieces that are large in size or quantity.
- Coarse/fine feed handles equipped as standard on both sides allow precise focus and observation measurement regardless of handedness.
- High-magnification eyepiece observation up to 2000X.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



MF-A1010D
(Shown with the binocular tube, monocular tube is also an available option)

J

Specifications

Without Z-axis scale	**Model**	**MF-A1010D**	**MF-A2010D**	**MF-A2017D**	**MF-A3017D**	**MF-A4020D**
	Code No.	**176-961-13**	**176-962-13**	**176-963-13**	**176-964-13**	**176-965-13**
With Z-axis scale	**Model**	**MF-B1010D**	**MF-B2010D**	**MF-B2017D**	**MF-B3017D**	**MF-B4020D**
	Code No.	**176-966-13**	**176-967-13**	**176-968-13**	**176-969-13**	**176-970-13**
Motor-driven Z-axis scale	**Model**	—	—	**MF-J2017D**	**MF-J3017D**	**MF-J4020D**
	Code No.	—	—	**176-891-13**	**176-892-13**	**176-893-13**
XY stage travel range		100 x 100 mm	200 x 100 mm	200 x 170 mm	300 x 170 mm	400 x 200 mm
Focussing method		Manual focussing (coarse 30 mm/rev., fine 0.2 mm/rev.)				
Resolution (switchable)		0.001/0.0005/0.0001 mm (.0001/.00005/.00001")				
Measuring accuracy (at 20°C)		X/Y axes: ±(2.2+2L/100) µm when not loaded, JIS B7153, L = measured length (mm)				
Quick-release mechanism		X and Y axes				
XY stage size		280 x 280 mm	350 x 280 mm	410 x 342 mm	510 x 342 mm	610 x 342 mm
Effective glass size		180 x 180 mm	250 x 150 mm	270 x 240 mm	370 x 240 mm	440 x 240 mm
Swivel function		—		±5° (left)		±3° (left)
Max. stage loading		10 kg		20 kg		15 kg
Max. workpiece height		150 mm		220 mm		
Transmitted illumination	Light source	Halogen bulb (12V, 50W) or white LED				
	Optical system	Telecentric illumination with adjustable aperture diaphragms				
	Functions	Light intensity adjustable, continuous brightness adjustment				
Surface illumination	Light source	Halogen bulb (12V, 50W) or white LED				
	Optical system	Koehler illumination with adjustable aperture diaphragms				
	Functions	Light intensity adjustable, continuous brightness adjustment				

Technical Data

Image type:	BF (Brightfield)/erect
Measurement method:	Linear encoder
Optical tube:	Monocular or binocular tube (one must be selected), inclination: 25°, reticle projection method, with TV mount, optical path ratio (eyepiece/TV mount: 50/50)
Eyepiece:	10X (standard accessory)
Objective:	3X (standard accessory)
Focussing method	
MF-A/-B models:	Manual focussing (coarse 30 mm/rev., fine 0.2 mm/rev.)
MF-J model:	Motor drive (max. measuring speed 20 mm/s)
Display unit	
No. of axes:	2 (MF-A model) or 3 (MF-B/-J models)
Functions:	Zero-setting, direction switching, data output (via RS-232C or USB interface)
Power supply:	240VAC ±10%, 50/60Hz
Remote box functions (MF-J model only):	Speed adjustment, coarse/fine speed switching, jog shuttle, emergency stop switch, AF button, counter reset button, data output button, power switch, limit setting (Z-axis)

Illumination Unit (one must be selected)

Type	LED	Halogen
Code No.	**176-449**	**176-451**

Note: Because the MF-A is not supplied with an illumination unit as standard, it is necessary to purchase either an LED or a Halogen illumination unit in addition to the basic instrument.

Optional Accessories*

Code No.	Description	Price
176-308	Vibration damping stand	**£3,380.00**
375-054	0.5X camera adapter (with C-mount adapter)	**£1,760.00**
970441	C-mount adapter	**£64.70**
12AAJ088	Footswitch	**£312.00**
Filters		
12AAA643	ND2 colour filter	**£84.00**
12AAA645	GIF filter	**£92.00**
12AAA646	LB80 filter	**£84.00**
Mounts		
176-370-1	Slide type nosepiece (2-mount, parfocal)	**£724.00**
176-370-2	Slide type nosepiece (2-mount, mag. adjusted)	**£724.00**

Eyepieces and objective lenses refer to pages J-12 to J-17.
Fixture and stage accessories refer to page J-22.
Illumination units refer to page J-18.
QM-Data200 2D data processing unit refer to page J-19.
Vision unit refer to page J-20.
Focus Pilot FP-05 refer to page J-21.
Calibration Micro Scale refer to page J-21.

* Refer to current brochure for full list of optional accessories.



Optional (factory-fit) slide type nosepiece with 2-lens mount.

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MF-U Microscope

SERIES 176 – High-Power Multi-Function Measuring Microscopes

- The MF-U high-power multi-function measuring microscopes' expandability, such as when used in combination with Mitutoyo's Vision Unit to boost performance or data management on a PC, promises further improved measuring efficiency.
- Observation with a clear and flare-free erect image and a wide field of view.
- Measuring accuracy that is the highest in its class (and conforms to JIS B7153).
- Proven high-NA objectives from the FS optical system (long working distance type).
- Integration of metallurgical and measurement microscope functions provides high-resolution observation and a high-accuracy measurement solution.
- Illumination unit (reflected/transmitted) selectable from high-intensity LED or halogen bulb types (required).
- Variable aperture diaphragm (reflected/transmitted) allows observation and measurement while suppressing light diffraction.
- Quick-release mechanism useful for moving the stage rapidly between measuring points when measuring workpieces that are large in size or quantity.
- High-magnification eyepiece observation up to 4000X.

Technical Data

Image type: Erect
Measurement method: Linear encoder
Optical tube: Siedentoph type (pupil distance adjustment: 51-76 mm), 1X tube lens, binocular tube (inclination: 0-30°), reticle projection method, with TV mount, optical path ratio (eyepiece/TV mount: 50/50)
Eyepiece: 10X (standard accessory)
Turret (optional): Manual or power
Objective (optional): M/BD Plan Apo objective from 1X to 200X
Focussing method
MF-UB/-UD models: Manual focussing (coarse 10 mm/rev., fine 0.1 mm/rev.)
MF-UJ/-UK models: Motor drive (max. measuring speed 20 mm/s)
Display unit
No. of axes: 3
Resolution: 0.001/0.0005/0.0001 mm, .0001"/.00005"/.00001"
Functions: Zero-setting, direction switching, data output (via RS-232C or USB interface)
Power supply: 240VAC ±10%, 50/60Hz
Remote box functions (MF-UJ/-UK models only): Speed adjustment, coarse/fine speed switching, jog shuttle, emergency stop switch, AF button, counter reset button, data output button, power switch, limit setting (Z-axis)

MeasurLink® ENABLED
Data Management Software by Mitutoyo



MF-UJ2017D
(The turret, objectives and illumination unit are optional accessories.)

Illumination Unit (one must be selected)

Type	LED	Halogen
Code No.	**176-450**	**176-452**

Note: Because the MF-U is not supplied with an illumination unit as standard, it is necessary to purchase either an LED or a Halogen illumination unit in addition to the basic instrument.

Optional Accessories*

Code No.	Description	Price
176-308	Vibration damping stand	**£3,380.00**
375-054	0.5X camera adapter (with C-mount adapter)	**£1,760.00**
517181	Halogen bulb (12V, 100W)	**£76.40**
970441	C-mount adapter	**£64.70**
12AAJ088	Footswitch	**£312.00**
12BAD602	Halogen bulb (high intensity type, 12V, 100W)	**£47.70**
DIC units		
378-076	For 100X, SL80X, SL50X objective	**£2,380.00**
378-078	For 50X, SL20X objective	**£2,380.00**
378-079	For 20X objective	**£2,380.00**
378-080	For 10X, 5X objective	**£2,380.00**
Filters		
12AAA643	ND2 colour filter	**£84.00**
12AAA645	GIF filter	**£92.00**
12AAA646	LB80 filter	**£84.00**
12AAG806	GIF filter	**£202.00**
12AAG807	LB80 filter	**£173.00**

Eyepieces and objective lenses refer to pages J-12 to J-17.
Fixture and stage accessories refer to page J-22.
Illumination units refer to page J-18.
QM-Data200 2D data processing unit refer to page J-19.
Vision unit refer to page J-20.
Focus Pilot FP-05 refer to page J-21.
Calibration Micro Scale refer to page J-21.

* Refer to current brochure for full list of optional accessories.

Specifications

Observation type		BF (brightfield)				
With Z-axis scale	**Model**	**MF-UB1010D**	**MF-UB2010D**	**MF-UB2017D**	**MF-UB3017D**	**MF-UB4020D**
	Code No.	**176-976-13**	**176-977-13**	**176-978-13**	**176-979-13**	**176-980-13**
Motor-driven Z-axis	**Model**	—	—	**MF-UJ2017D**	**MF-UJ3017D**	**MF-UJ4020D**
	Code No.	—	—	**176-894-13**	**176-895-13**	**176-896-13**

Observation type		BD (brightfield/darkfield)				
With Z-axis scale	**Model**	**MF-UD1010D**	**MF-UD2010D**	**MF-UD2017D**	**MF-UD3017D**	**MF-UD4020D**
	Code No.	**176-986-13**	**176-987-13**	**176-988-13**	**176-989-13**	**176-990-13**
Motor-driven Z-axis	**Model**	—	—	**MF-UK2017D**	**MF-UK3017D**	**MF-UK4020D**
	Code No.	—	—	**176-897-13**	**176-898-13**	**176-899-13**

XY stage travel range		100 x 100 mm	200 x 100 mm	200 x 170 mm	300 x 170 mm	400 x 200 mm
Resolution (switchable)		0.001/0.0005/0.0001 mm (.0001/.00005/.00001")				
Measuring accuracy (at 20°C)		X/Y axes: ±(2.2+2L/100) µm when not loaded, JIS B7153, L = measured length (mm)				
Quick-release mechanism		X and Y axes				
XY stage size		280 x 280 mm	350 x 280 mm	410 x 342 mm	510 x 342 mm	610 x 342 mm
Effective glass size		180 x 180 mm	250 x 150 mm	270 x 240 mm	370 x 240 mm	440 x 240 mm
Swivel function		—		±5° (left)		±3° (left)
Max. stage loading		10 kg		20 kg		15 kg
Max. workpiece height		150 mm		220 mm		
Transmitted illumination	Light source	Halogen bulb (12V, 50W) or white LED				
	Optical system	Telecentric illumination with adjustable aperture diaphragms				
	Functions	Light intensity adjustable, continuous brightness adjustment				
Surface illumination	Light source	Halogen bulb (12V, 50W) or white LED				
	Optical system	Koehler illumination with adjustable aperture diaphragms				
	Functions	Light intensity adjustable, continuous brightness adjustment				

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Mitutoyo

Microscope Video Unit VMU

SERIES 378 – Microscope Video Unit

- The VMU is a compact, lightweight and easy-to-install microscope unit for CCD camera monitoring in semiconductor fabrication facilities.
- An optical system featuring ultra-long working distance objectives and correction for the wide range of wavelengths in current use.
- Reflected illumination keeps the workpiece free from thermal expansion (the fibre-optic illuminator is required).
- Also available with a laser mount or turret (objective mount).



VMU-V



VMU-H



VMU-LB



VMU-L4B

Technical Data

Magnification of tube: 1X

Reflected illumination: Telecentric system with aperture stop; fibre-optic illuminator (optional) is required

Objective lenses for brightfield observation: M Plan Apo, M Plan Apo SL, G Plan Apo (optional accessories)

Objective lenses for laser cutting: M Plan Apo NIR, LCD Plan Apo NIR, M Plan Apo NUV and LCD Plan Apo NUV (optional accessories)

Objective lenses for laser machining: M Plan UV for **378-514** only (optional accessories)

Illumination Unit (one must be selected)

Type	LED	Halogen
Code No.	**176-386**	**176-316E**

Note: Because the VMU is not supplied with an illumination unit as standard, it is necessary to purchase either an LED or a Halogen illumination unit in addition to the basic instrument.

Specifications

Model	**VMU-V**	**VMU-H**	**VMU-LB**	**VMU-L4B**
Code No.	**378-505**	**378-506**	**378-513**	**378-514**
Applicable wavelengths	Near infrared,visible		Near infrared, visible, near ultraviolet	Near infrared, visible, near ultraviolet, ultraviolet
Vertical CCD camera mount	✓	—	✓	✓
Horizontal CCD camera mount	—	✓	—	—
YAG laser mount	—	—	✓	✓
Fibre optic illumination unit mount	✓	✓	✓	✓
Mass	0.57 kg	0.59 kg	1.27 kg	1.3 kg

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Microscope Video Unit VMU

SERIES 378 – Wide-Field Microscope Video Unit

- Incorporates a wide-field image sensor (APS-C format or smaller size) providing seven times greater viewing area than the VMU Series for greatly enhanced inspection efficiency.
- In addition to normal brightfield observation, this series supports darkfield observation for scratch inspection, etc., and polarized light observation for increased contrast when viewing certain specimens.
- Bulk inspections covering a wide area can be performed with multiple units in a high density configuration.
- Supported sensor size of 2" equivalent, APS-C format.
- Image field of ø30 mm with 1X tube lens.
- Both F-mount and C-mount cameras can be mounted.
- Brightfield observations are supported by the WIDE VMU-HR model.
- Brightfield/darkfield observations are supported by the WIDE VMU-BDV and -BDH models.
- With the flexible orientation for camera and illumination mounting very compact arrangements can be configured.

Technical Data

Magnification of tube: 1X

Reflected illumination: Telecentric system with aperture stop system; fibre-optic illuminator (optional) is required

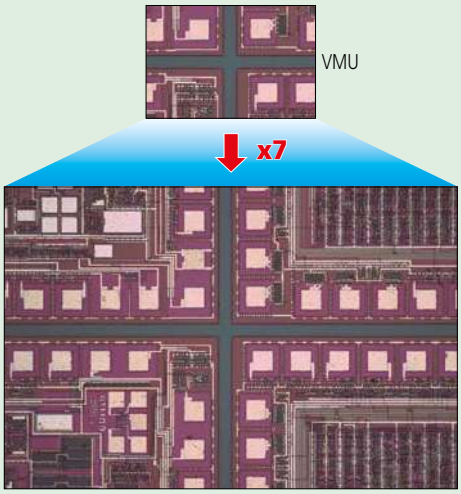
Objective lenses for brightfield observation: M Plan Apo, M Plan Apo HR, M Plan Apo SL, G Plan Apo (optional accessories)

Objective lenses for brightfield/darkfield observation: BD Plan Apo, BD Plan Apo HR, BD Plan Apo SL (optional accessories)

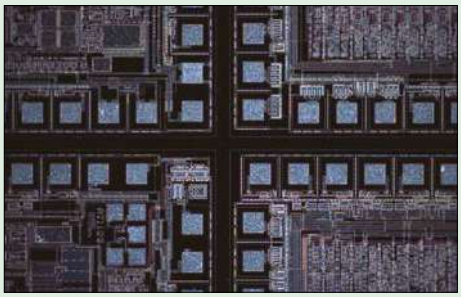
Illumination Unit (one must be selected)

Type	LED	Halogen
Code No.	**176-386**	**176-316E**

Note: Because the VMU is not supplied with an illumination unit as standard, it is necessary to purchase either an LED or a Halogen illumination unit in addition to the basic instrument.



WIDE VMU.



WIDE VMU darkfield.



Highly compact configuration of 4 WIDE VMU units.



WIDE VMU-BDV



WIDE VMU-BDH



WIDE VMU-HR

Specifications

Model	WIDE VMU-BDV	WIDE VMU-BDH	WIDE VMU-HR
Code No.	**378-517**	**378-518**	**378-519**
Image type	BD (brightfield/darkfield)/erect	BD (brightfield/darkfield)/inverted	BF (brightfield)/erect
Vertical CCD camera mount	✓	—	✓
Horizontal CCD camera mount	—	✓	—
Fibre optic illumination unit mount	✓	✓	✓
Mass	2 kg	2.15 kg	1.4 kg

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WLI-Unit

SERIES 378 – White Light Interference Optical Unit

- Non-contact high-accuracy fine surface texture measurement is possible through white light interference: 3D shape measurement, 3D roughness measurement.
- Height measurement accuracy not dependent on optical magnification. Measurement enabled with high Z-resolution even with low-magnification lens.
- High aspect ratio measurement. Supports high aspect ratio shape measurement through detection not dependent on optical-based NA.
- High robustness with regard to disturbance vibration.
- Compact and lightweight.



WLI-Unit
Objective shown mounted on WLI-Unit is optional.

Specifications

Model		WLI-Unit-003	WLI-Unit-005	WLI-Unit-010
Code No.		**554-001**	**554-002**	**554-003**
Cable length		3 m	5 m	10 m
Z motion range		8000 µm		
Measurement mode		High throughput	Standard	High resolution
WLI measurement Z range		2100 µm	1900 µm	1700 µm
Throughput @20 µm range		3.0 s	4.0 s	6.0 s
Z resolution		—	4 nm	
Z repeatability (σ)		—	40 nm	
Sensor head	Dimensions (W x D x H)	108 x 68 x 191 mm		
	Mass	1.7 kg		
Controller	Dimensions (W x D x H)	196 x 180 x 108 mm		
	Mass	2.3 kg		

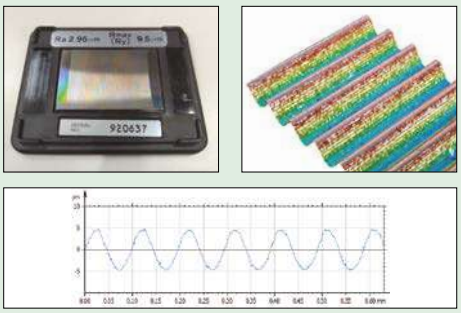
System Configuration Example



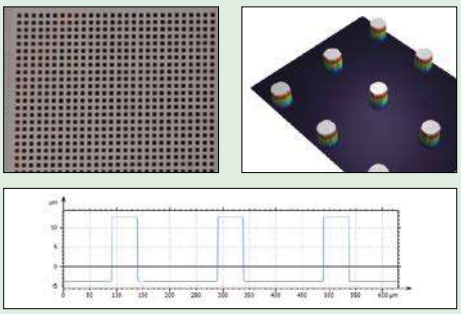
Technical Data

Magnification of tube: 1X
Objective lens: WLI Plan Apo series (optional selection)
Focal range (f mm): 100
Scanning mechanism: Mitutoyo objective lens scanner
Power supply: 240VAC ±10%, 50/60Hz

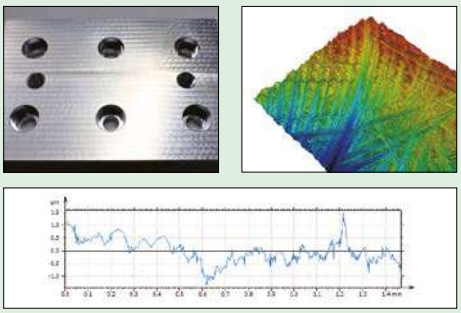
Application Examples



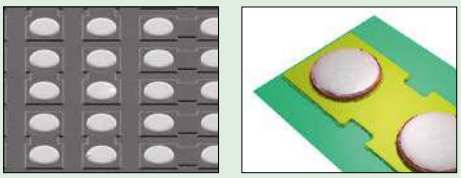
Roughness specimen 3 µm.



Cu pattern (glass substrate).



Metal machined surface (aluminium).



Semiconductor test pattern (TEG).
Provided by Walts Co., Ltd. and ASK INDEX

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WLI-Unit

SERIES 378 – White Light Interference Optical Unit

WLI Plan Apo Series Objective Lens for WLI Measurement

- New design matching the WLI-Unit.
- Ensures long working distance while more compact and lighter-weight (parfocal 60 mm).
- High NA, high resolution.
- Plan apochromat.
- Beam splitter and reference mirror mounted inside objective lens.
- Interference fringe adjustment mechanism equipped as standard.



WLI Plan Apo Specifications

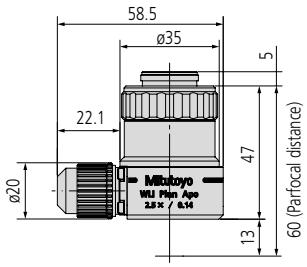
Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
378-400	2.5X	0.14	13.0	40	2.0	60	2.94 x 2.25	2.64 x 3.52	320	**£5,360.00**
378-005	5X	0.28	8.0	20	0.98		1.46 x 1.12	1.32 x 1.76	210	**£3,050.00**
378-401	10X	0.38	6.0	10	0.72		0.73 x 0.56	0.66 x 0.88	220	**£3,890.00**
378-402	25X	0.50	3.6	4	0.55		0.29 x 0.22	0.26 x 0.35	290	**£4,100.00**
378-403	50X	0.70	2.0	2	0.39		0.14 x 0.11	0.13 x 0.18	300	**£6,780.00**

*[1] Field of view when using the WLI-Unit.
*[2] Field of view when using 2/3" CCD camera.
Note: Resolution values in the specifications above are calculated based on reference wavelength (λ = 0.55 μm).

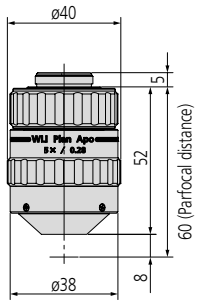
WLI Plan Apo Dimensions

Unit: mm

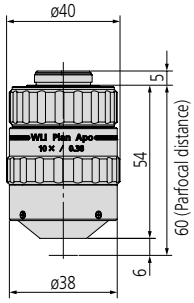
378-400



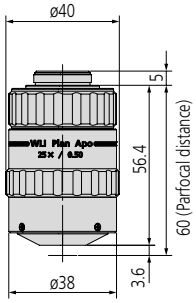
378-005



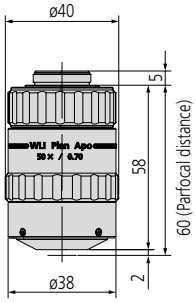
378-401



378-402



378-403



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Microscope Head FS70

SERIES 378 – Microscope Head for Semiconductor Inspection and Repair

- A versatile microscope head typically used as an OEM product suitable for fitting to specialist machines, such as those designed for inspection and repair of semiconductor wafers.
- Excellent operability is provided by the inwardly rotating turret and high quality, long working distance objectives.
- Ideal as the microscope unit of a prober station for semiconductors.
- Ergonomic design with combined knob for coarse- and fine-focus adjustment.
- The FS70L supports three YAG laser wavelengths (1064 nm, 532 nm and 355 nm), while the FS70L4 supports two wavelengths (532 nm and 266 nm), thus expanding the scope of laser applications, allowing laser-cutting of thin-films used in semiconductors and liquid crystal substrates. However, please note that Mitutoyo assumes no responsibility whatever for the performance and/or safety of the laser system used with Mitutoyo microscopes. Careful examination and testing is recommended when selecting a laser source.
- Brightfield, Differential Interference Contrast (DIC) and polarized light observation capabilities are standard with the FS70Z. The FS70L and FS70L4 do not support the DIC method.



FS70L
(The turret, eyepieces and objectives are optional accessories)

Technical Data

Focus adjustment
- Method: With concentric coarse and fine focussing wheels (right and left)
- Range: 50 mm travel range, 0.1 mm/rev. for fine adjustment, 3.8 mm/rev. for coarse adjustment
- Functions: Light intensity adjustable, 100 steps brightness adjustment

Trinocular tube image: Erect
Interpupillary distance: Siedentoph type, adjustment range: 51-76 mm
Field number: 24
Inclination: 0-20° (only - TH, - THS models)
Illumination system: Reflective illumination for brightfield (Koehler illumination, with aperture diaphragm)
Light source: 12V / 100W fibre-optic, non-stopped adjustment, light guide length 1.5 m, power consumption 150W
Objective lenses: M Plan Apo, M Plan Apo SL, G Plan Apo (optional accessories)



FS70L4 (The turret, eyepieces and objectives are optional accessories).



FS70Z (The turret, eyepieces and objectives are optional accessories).

Specifications

Standard type	Model	FS70	FS70-TH	FS70Z	FS70Z-TH
	Code No.	378-184-1	378-184-3	378-185-1	378-185-3
Short-base type	Model	FS70-S	FS70-THS	FS70Z-S	FS70Z-THS
	Code No.	378-184-2	378-184-4	378-185-2	378-185-4
Optical pass ratio		50/50			
Tube lens		1X		1X, 2X zoom	
Camera mount		C-mount (using optional adapter B)			
Loading*[1]		14.5 kgf	13.6 kgf	14.1 kgf	13.2 kgf
Mass		6.1 kg	7.1 kg	6.6 kg	7.5 kg

Standard type	Model	FS70L	FS70L-TH	FS70L4	FS70L4-TH
	Code No.	378-186-1	378-186-3	378-187-1	378-187-3
Short-base type	Model	FS70L-S	FS70L-THS	FS70L4-S	FS70L4-THS
	Code No.	378-186-2	378-186-4	378-187-2	378-187-4
Optical pass ratio		100/0 or 0/100			
Protective filter		Built-in laser beam filter			
Tube lens		1X			
Applicable laser wavelengths		1064/532/355 nm		532/266 nm	
Camera mount		Use a laser with TV port		C-mount receptacle (with green filter switch)	
Objective, optional (for laser-cutting)		M/LCD Plan NIR M/LCD Plan NUV		M Plan UV	
Loading*		14.2 kgf	13.5 kgf	13.9 kgf	13.1 kgf
Mass		6.4 kg	7.2 kg	6.7 kg	7.5 kg

* Allowable loading on optical tube excluding weight of objective lenses and eyepieces.

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Optional Accessories

Eyepieces and Objectives for Measuring Microscopes

Optional Reticles

Code No.	Description	Price
516576	Broken cross hairs (90° and 60°)	**£114.00**
516577	20 mm scale (min. reading: 0.1 mm) with cross hair	**£114.00**
516578	Concentric circle (diametral increment: 1.2 mm)	**£114.00**
516848	Cross hair	**£114.00**
516849	10 mm scale (min. reading: 0.1 mm)	**£114.00**
516850	5 mm scale (min. reading: 0.05 mm)	**£114.00**

SERIES 378 – Eyepieces

- The field of view is extra wide.
- Optional reticles are available.



378-866-5



378-858-5

Code No.	Magnification	Field number	Mass	Price
Individual				
378-866-5	10X	24	150 g	**£462.00**
378-858-5	20X	12	55 g	**£599.00**
2 piece set				
378-866	10X	24	150 g	**£848.00**
378-858	20X	12	55 g	**£1,160.00**

SERIES 378 – Objectives

- The Mitutoyo 378 Series objectives have the world's longest working distance and an infinity correction optical system.
- These objectives provide flexible observation at high magnifications and independent correction of chromatic aberration.
- Long working distance objectives provide excellent clearance between the lens surface and the workpiece surface in focus, making it possible to observe features which are usually hard to bring to focus because of awkward projections.
- The metallurgical plan apochromatic (M Plan Apo) objective is an excellent optical system. This objective provides a flat, chromatic aberration-free image throughout the field of view, making it suitable for any type of microscope.
- Specially designed objectives are also available with correction for near infrared, near ultraviolet, and ultraviolet, or for observing through LCD screen glasses.
- The mounting screw threads of objectives are designed to conform to JIS B-7141-1988.

Note: Focal length and focal depth for objectives are specified at a reference wavelength of 0.55 µm irrespective of working wavelength.



M Plan Apo and M Plan Apo SL objectives for brightfield observation.



BD Plan Apo and BD Plan Apo SL objectives for brightfield/ darkfield observation.



Near-infrared corrected M Plan Apo NIR objectives.



Near-ultraviolet corrected M Plan Apo NUV objectives.



Ultraviolet corrected M Plan UV objectives.

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Optional Accessories

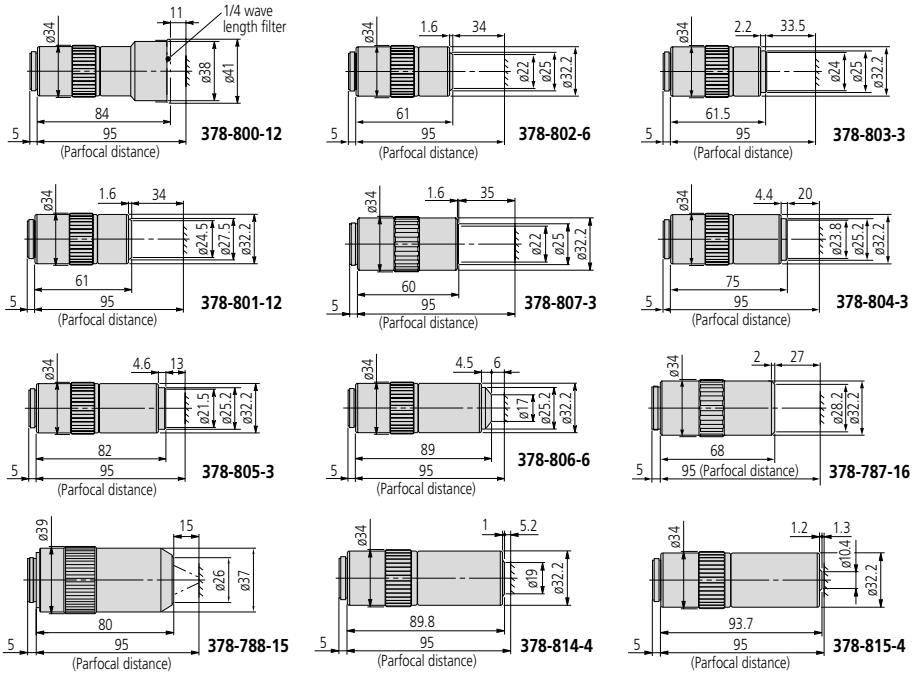
Objectives for Measuring Microscopes

M Plan Apo/M Plan Apo HR for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
M Plan Apo										
378-800-12	1X	0.025	11.0	200	11.0	440	ø24	4.8 x 6.4	300	**£2,440.00**
378-801-12	2X	0.055	34.0	100	5.0	91	ø12	2.4 x 3.2	220	**£798.00**
378-802-12	5X	0.14	34.0	40	2.0	14	ø4.8	0.96 x 1.28	240	**£732.00**
378-807-3	7.5X	0.21	35.0	26.67	1.3	6.2	ø3.6	0.64 x 0.85	240	**£1,440.00**
378-803-3	10X	0.28	33.5	20	1.0	3.5	ø2.4	0.48 x 0.64	230	**£823.00**
378-804-3	20X	0.42	20.0	10	0.7	1.6	ø1.2	0.24 x 0.32	270	**£1,880.00**
378-805-3	50X	0.55	13.0	4	0.5	0.9	ø0.48	0.10 x 0.13	290	**£2,440.00**
378-806-3	100X	0.70	6.0	2	0.4	0.6	ø0.24	0.05 x 0.06	320	**£2,940.00**
M Plan Apo HR										
378-787-16	5X	0.21	27.0	40	1.3	6.2	ø4.8	0.96 x 1.28	285	**£2,630.00**
378-788-15	10X	0.42	15.0	20	0.7	1.6	ø2.4	0.48 x 0.64	460	**£3,470.00**
378-814-4	50X	0.75	5.2	4	0.4	0.49	ø0.48	0.10 x 0.13	400	**£4,490.00**
378-815-4	100X	0.90	1.3	2	0.3	0.34	ø0.24	0.05 x 0.06	410	**£5,130.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm

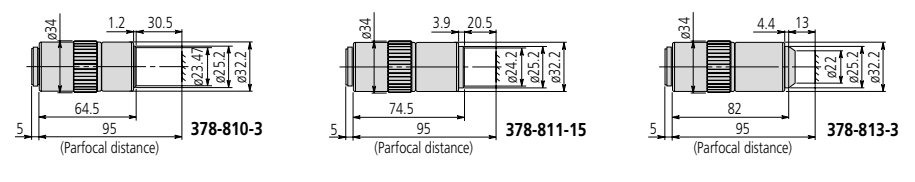


M Plan Apo SL for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
378-810-3	20X	0.28	30.5	10	1.0	3.5	ø1.2	0.24 x 0.32	240	**£1,920.00**
378-811-15	50X	0.42	20.5	4	0.7	1.6	ø0.48	0.10 x 0.13	280	**£2,550.00**
378-813-3	100X	0.55	13.0	2	0.5	0.9	ø0.24	0.05 x 0.06	290	**£3,130.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm



High-resolution objectives

These objectives offer extra-high resolving power for observation or measurement in the most demanding applications. (Note that a Polarizing Unit (**378-074**) is required when using the 1X objective.)



Extra-long working distance objectives

These objectives offer extra-long working distances to enable easier working and provide better protection for the lens.



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Optional Accessories

Objectives for Measuring Microscopes

Optimised for through-glass working

The G Plan Apo Series objectives are designed for observing a workpiece through glass (thickness = 3.5 mm).

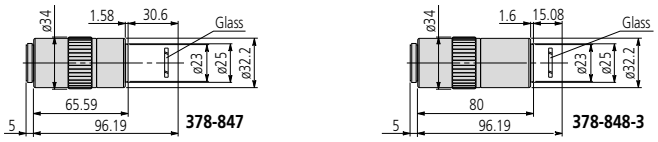


Glass Thickness (t = 3.5 mm) Corrected G Plan Apo for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)*3	Focal length (mm)	Resolving power (µm)	Focal depth (µm)	View field 1*1 (mm)	View field 2*2 (mm)	Mass (g)	Price
378-847	20X	0.28	29.42	10	1.0	3.5	ø1.2	0.24 x 0.32	270	**£3,250.00**
378-848-3	50X	0.50	13.89	4	0.6	1.1	ø0.48	0.10 x 0.13	320	**£3,490.00**

*1 Field of view when using a field number 24 mm eyepiece.
*2 Field of view when using 1/2" CCD camera.
*3 In air.

Unit: mm



High-resolution objectives

These objectives offer extra-high resolving power for observation or measurement in the most demanding applications.

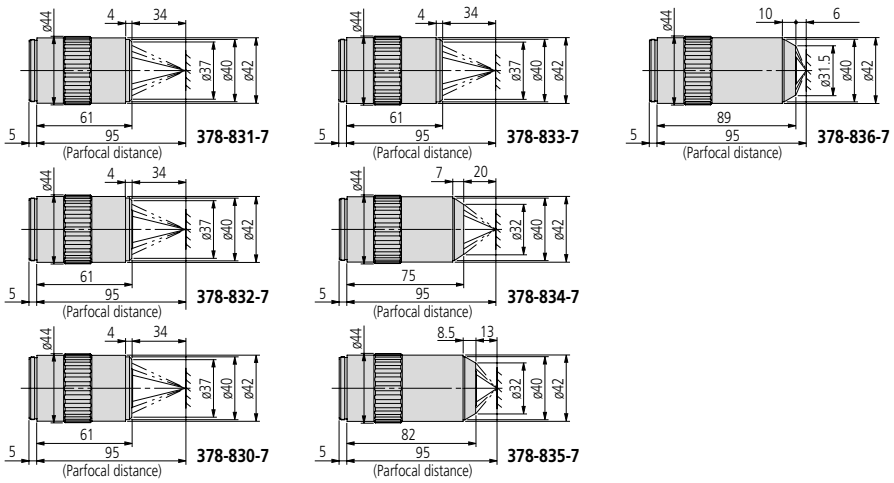


BD Plan Apo for Brightfield/Darkfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (µm)	Focal depth (µm)	View field 1*1 (mm)	View field 2*2 (mm)	Mass (g)	Price
BD Plan Apo										
378-831-13	2X	0.055	34	100	5.0	91	ø12	2.4 x 3.2	340	**£811.00**
378-832-12	5X	0.14	34	40	2.0	14	ø4.8	0.96 x 1.28	350	**£947.00**
378-830-7	7.5X	0.21	34	26.67	1.3	6.2	ø3.6	0.64 x 0.85	350	**£1,440.00**
378-833-7	10X	0.28	34	20	1.0	3.5	ø2.4	0.48 x 0.64	350	**£935.00**
378-834-7	20X	0.42	20	10	0.7	1.6	ø1.2	0.24 x 0.32	400	**£2,210.00**
378-835-7	50X	0.55	13	4	0.5	0.9	ø0.48	0.10 x 0.13	440	**£2,910.00**
378-836-7	100X	0.70	6	2	0.4	0.6	ø0.24	0.05 x 0.06	460	**£3,280.00**

*1 Field of view when using a field number 24 mm eyepiece.
*2 Field of view when using 1/2" CCD camera.

Unit: mm



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Optional Accessories

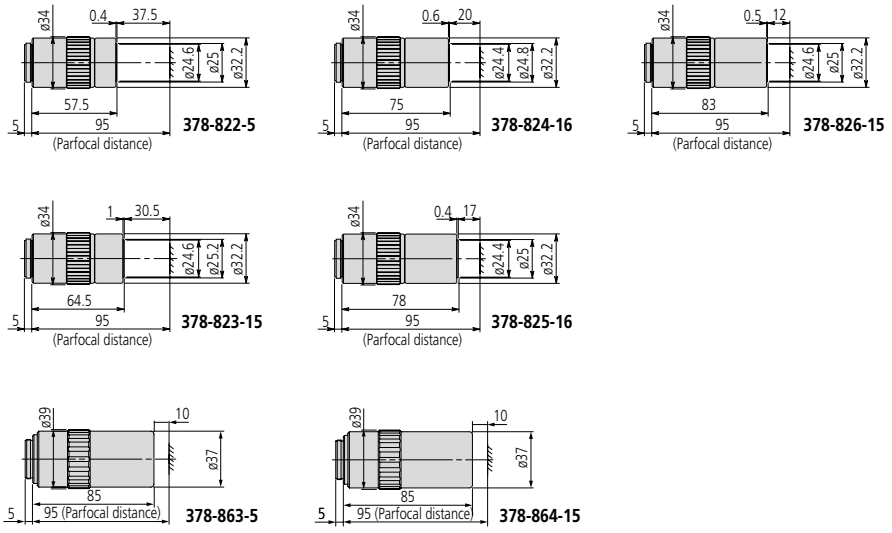
Objectives for Measuring Microscopes

Near-Infrared Corrected
M Plan Apo NIR/M Plan Apo NIR HR for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
M Plan Apo NIR										
378-822-5	5X	0.14	37.5	40	2.0	14	ø4.8	0.96 x 1.28	220	**£848.00**
378-823-15	10X	0.26	30.5	20	1.1	4.1	ø2.4	0.48 x 0.64	250	**£1,390.00**
378-824-16	20X	0.40	20	10	0.7	1.7	ø1.2	0.24 x 0.32	300	**£2,330.00**
378-825-17	50X	0.42	17	4	0.7	1.6	ø0.48	0.10 x 0.13	315	**£2,660.00**
378-826-15	100X	0.50	12	2	0.6	1.1	ø0.24	0.05 x 0.06	335	**£3,070.00**
M Plan Apo NIR HR										
378-863-5	50X	0.65	10	4	0.42	0.65	ø0.48	0.10 x 0.13	450	**£8,060.00**
378-864-15	100X	0.70	10	2	0.39	0.56	ø0.24	0.05 x 0.06	450	**£8,640.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm



Stable parfocal distance with operating wavelength

These objectives are designed so that a workpiece's image remains substantially in focus even when the wavelength used is changed anywhere from the visible range (λ = 480 nm) up to near-infrared (λ = 1800 nm). Therefore the M Plan APO NIR Series is suitable for laser repair. However, when the wavelength used exceeds 1100 nm, the focussing position may slightly deviate from that in the visible range due to changes in glass dispersion and refractive index.

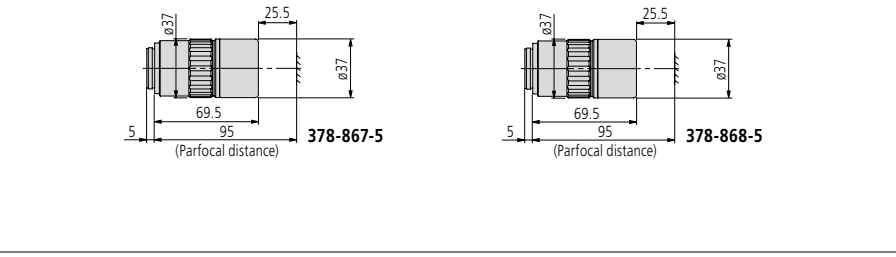


Near-Infrared Corrected
M Plan Apo NIR B for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
378-867-5	20X	0.40	25.5	10	0.7	1.7	ø1.2	0.24 x 0.32	350	**£2,140.00**
378-868-5	50X	0.42	25.5	4	0.7	1.6	ø0.48	0.10 x 0.13	375	**£2,830.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm





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Optional Accessories

Objectives for Measuring Microscopes

Optimised for through-glass working

These near-infrared (λ = 1800 nm) corrected objectives are designed for observing a workpiece through LCD glass thickness = 1.1 mm or 0.7 mm and for laser repair.

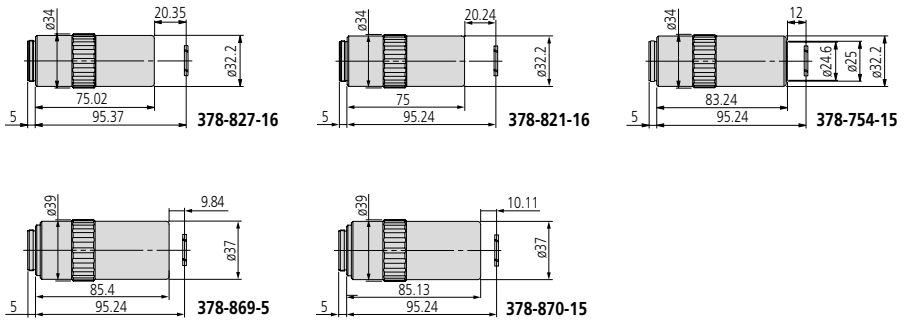


Near-Infrared and LCD Glass Thickness (t = 1.1 mm or 0.7 mm) Corrected
LCD Plan Apo NIR/LCD Plan Apo NIR HR for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*1 (mm)	View field 2*2 (mm)	Mass (g)	Price
LCD Plan Apo NIR (t = 1.1 mm)										
378-827-16	20X	0.40	19.98	10	0.7	1.7	ø1.2	0.24 x 0.32	305	**£2,650.00**
LCD Plan Apo NIR (t = 0.7 mm)										
378-821-16	20X	0.40	20.00	10	0.7	1.7	ø1.2	0.24 x 0.32	305	**£3,000.00**
378-754-15	100X	0.50	12.06	2	0.6	1.1	ø0.24	0.05 x 0.06	335	**£5,670.00**
LCD Plan Apo NIR HR (t = 0.7 mm)										
378-869-5	50X	0.65	9.60	4	0.4	0.7	ø0.48	0.10 x 0.13	450	**£9,920.00**
378-870-15	100X	0.70	9.87	2	0.4	0.7	ø0.24	0.05 x 0.06	490	**£11,240.00**

*1 Field of view when using a field number 24 mm eyepiece.
*2 Field of view when using 1/2" CCD camera.

Unit: mm



Stable parfocal distance with operating wavelength

These objectives are designed so that a workpiece's image remains substantially in focus even when the wavelength used is changed anywhere from the visible range (λ = 620 nm) to the near-ultraviolet range (λ = 355 nm). Therefore the M Plan APO NUV Series is suitable for laser repair applications.

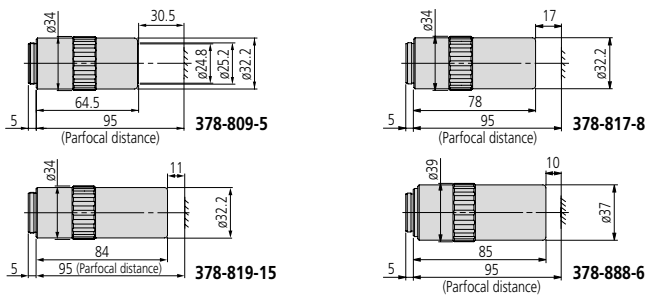


Near-Ultraviolet Corrected
M Plan Apo NUV/M Plan Apo NUV HR for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*1 (mm)	View field 2*2 (mm)	Mass (g)	Price
M Plan Apo NUV										
378-809-5	10X	0.28	30.5	20	1.0	3.5	ø2.4	0.48 x 0.64	255	**£4,060.00**
378-817-8	20X	0.40	17	10	0.7	1.7	ø1.2	0.24 x 0.32	340	**£5,220.00**
378-819-15	100X	0.50	11	2	0.6	1.1	ø0.24	0.05 x 0.06	380	**£5,200.00**
M Plan Apo NUV HR										
378-888-6	50X	0.65	10	4	0.42	0.65	ø0.48	0.10 x 0.13	500	**£13,900.00**

*1 Field of view when using a field number 24 mm eyepiece.
*2 Field of view when using 1/2" CCD camera.

Unit: mm



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Optional Accessories

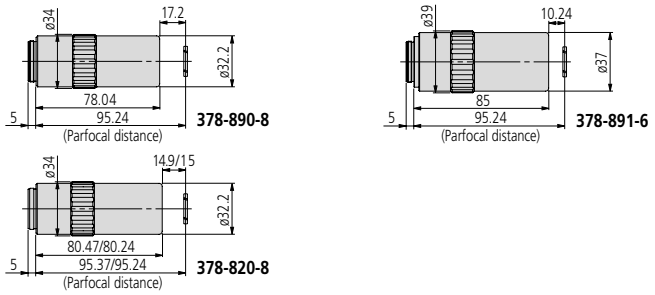
Objectives for Measuring Microscopes

Near-Ultraviolet and LCD Glass Thickness (t = 0.7 mm) Corrected LCD Plan Apo NUV/LCD Plan Apo NUV HR for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
LCD Plan Apo NUV										
378-890-8	20X	0.40	16.96	10	0.7	1.7	ø1.2	0.24 x 0.32	340	**£5,840.00**
378-820-8	50X	0.42	14.76	4	0.7	1.6	ø0.48	0.10 x 0.13	350	**£5,730.00**
LCD Plan Apo NUV HR										
378-891-6	50X	0.65	9.76	4	0.4	0.7	ø0.48	0.10 x 0.13	500	**£11,830.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm



Optimised for through-glass working

These near-infrared (λ = 355 nm) corrected objectives are designed for observing a workpiece through LCD glass and for laser repair.

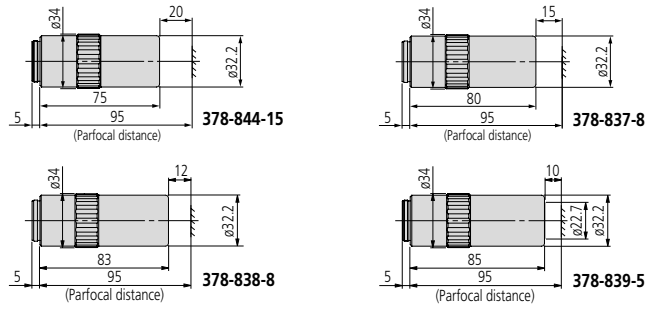


Ultraviolet Corrected M Plan UV for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
378-844-15	10X	0.25	20	20.0	1.1	4.4	ø2.4	0.48 x 0.64	310	**£9,560.00**
378-837-8	20X	0.37	15	10.0	0.7	2.0	ø1.2	0.24 x 0.32	370	**£11,900.00**
378-838-8	50X	0.41	12	4.0	0.7	1.6	ø0.48	0.10 x 0.13	400	**£11,790.00**
378-839-5	80X	0.55	10	2.5	0.5	0.9	ø0.3	0.06 x 0.08	380	**£16,100.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm



Stable parfocal distance with operating wavelength

These ultraviolet corrected objectives are designed so that a workpiece's image remains substantially in focus even when the wavelength used is changed anywhere from the visible range (λ = 550 nm) to the ultraviolet (λ = 266 nm). Therefore the M Plan UV Series is suitable for laser repair applications.

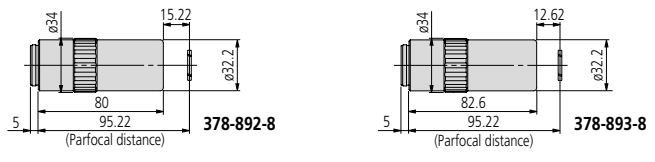


Ultraviolet Corrected LCD Plan UV for Brightfield Observation

Code No.	Magnification	Numerical aperture	Working distance (mm)	Focal length (mm)	Resolving power (μm)	Focal depth (μm)	View field 1*[1] (mm)	View field 2*[2] (mm)	Mass (g)	Price
378-892-8	20X	0.36	15	10	0.8	2.1	ø1.2	0.24 x 0.32	330	**£14,330.00**
378-893-8	50X	0.41	12.4	4	0.7	1.6	ø0.48	0.10 x 0.13	400	**£14,330.00**

*[1] Field of view when using a field number 24 mm eyepiece.
*[2] Field of view when using 1/2" CCD camera.

Unit: mm



Optimised for through-glass working

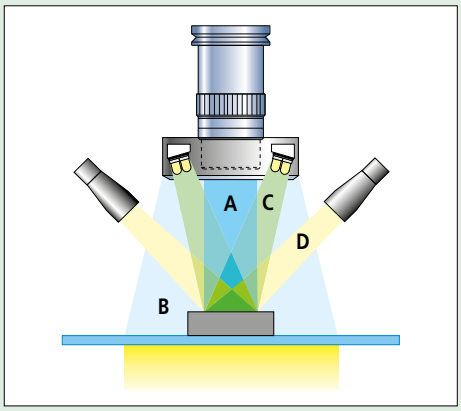
These ultraviolet (λ = 266 nm) corrected objectives are designed for observing a workpiece through LCD glass (thickness = 0.7 mm).

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Optional Accessories

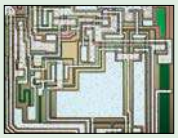
Illumination Units for Measuring Microscopes



A: Vertical surface illumination (Halogen)


PCB.


HDD suspension.


IC circuit.

B: Ring fibre-optic illumination

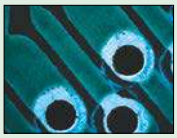

Flexible PCB.


PCB.


Electrical parts.

C: LED ring illumination


HDD suspension.


PCB.


Black resin moulded parts.

D: Twin fibre-optic illumination



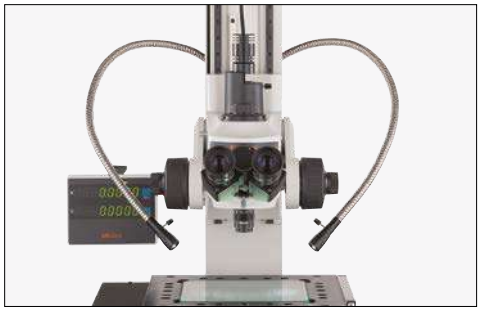
IC package.


Garnet.


PCB.

Twin Fibre-Optic Illuminator





Code No.	176-387
Applicable microscopes	MF, MF-U models
Length of fibre cable	700 mm
Light source	White LED
Dimensions (W x D x H)	Light unit: 235 x 76 x 120 mm
Price	**£1,780.00**

LED Ring Illuminator





Code No.	176-367-2E
Applicable microscopes	MF models (ML objective 10X or lower)
Length of LED cable	1500 mm
Light source	White LED
Dimensions (W x D x H)	Light unit: 75 x 150 x 90 mm
Price	**£2,490.00**

LED Ring Light (for FS Objectives)





Code No.	176-371
Applicable microscopes	MF-U models (FS objective M plan Pro 10X or lower)
Length of LED cable	1500 mm
Light source	Supplied from microscope (surface illumination)
Dimensions (W x D x H)	Light unit: 75 x 150 x 90 mm
Price	**£2,260.00**

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Optional Accessories

SERIES 264 – QM-Data200 2D Data Processing Unit for Measuring Microscopes

- The QM-Data200 is a geometric readout/analysis unit for optical instruments such as measuring microscopes and profile projectors.
- This unit features powerful 2D coordinate measurement capabilities with easy-to-use key operation.
- The QM-Data200 improves operator productivity, minimizes errors and saves total measurement time and production cost.
- Informative graphic displays on the large LCD screen make for easy measurement operations.
- One-key operation for combined measurements that are often used (circle-circle distance, etc.).
- The AI measurement function (Automatic Identification of measuring item) eliminates switching between the measurement command keys.
- Equipped with a measurement procedure teaching function and measuring position navigation in Repeat mode.
- The user-menu function allows the user to store measurement commands or part programs to create custom menus.
- Tolerance zone measurement of data processing results and various statistical processing routines for each item are available.
- Measurement result output in spreadsheet (CSV) format.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



264-160-13

Technical Data

Program functions:	Part program creation, execution, editing
Statistical processing:	Number of data, maximum value, minimum value, mean value, standard deviation, range, histogram
Element memory:	Maximum of 1000 elements
Element recall:	Point, line, circle, distance, ellipse, rectangular hole, slotted hole, intersection and intersecting angle
Element key-in:	Point, line, circle
Display system:	Colour LCD (320 x 240 dots, with LED back light)
Measurement result file output:	RS-232C output (CSV format, MUX-10F format)
Display language:	Japanese/English/German/French/ Italian/Spanish/Portuguese/Cheskey/ Chinese (simplified/traditional), Korean
Data input:	RS-232C, X/Y/Z-axis signal, footswitch
Data output:	RS-232C, printer
Power supply:	240VAC ±10%, 50/60Hz

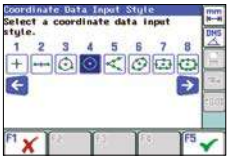


Intuitive panel design
The QM-Data200 employs Geometry Keys to accelerate the measurement process. The routine of probing geometric features and combinations is implemented from these dedicated keys on the front panel. Simply clicking a key and then capturing the feature coordinates means you can complete the measurement quickly and accurately. This improves operator productivity, reduces errors and saves operation time and cost.

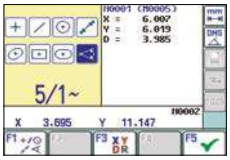
Specifications

Model No.		QM-Data200
Code No.		**264-160-13**
Applicable microscopes		MF/MF-U
Unit of measurement	Length	mm/inch
	Angle	Switchable between decimal degree and sexagesimal notation
Resolution		0.1 µm
Display unit		Colour graphic LCD (equipped with a backlight)
External dimensions (W x H x D)		260 x 242 x 310 mm (including the stand section)
Mass		Approx. 2.9 kg
Price		**£2,250.00**

Graphic display
Measurement information and data are visualized on the back-lit LCD colour display with graphical interfaces. The geometric feature selected is displayed with the probing navigator. The measurements map and blink indication show the probing points and sequences. Simply probe points and click by following the blink indicator. Measurements can be easily completed even by a beginner. This improves operation accuracy and reduces errors and measurement time.



Clear function icons.



Coloured LCD display with backlight.



One-key operation for combined measurements.



Measurement procedure teaching function.

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Optional Accessories

SERIES 359 – Vision Unit for Measuring Microscopes

- Installation of this unit upgrades a standard measuring microscope to match the performance of a vision measuring machine when used with the optional software QSPAK VUE.
- QSPAK VUE enables judgement of measurement results relative to tolerance zones and implementation of various types of statistical processing for each item.
- Informative graphics and measurement navigation functions promote ease of use with measurement tools and macro icons enabling common measurement tasks to be performed in one easy step.
- A series of measuring operations can be performed using just one screen display.
- Measurement results can be output to Microsoft Excel for easy local generation of an inspection report.
- The auto-brightness control function reproduces type and degree of illumination used.
- The image AF (Auto Focus) function is realized when this unit is installed in the MF/MF-U Series (motor-driven Z-axis types).
- Highly accurate height measurements are possible when used with the Focus Pilot.*

*Patent pending.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



Technical Data

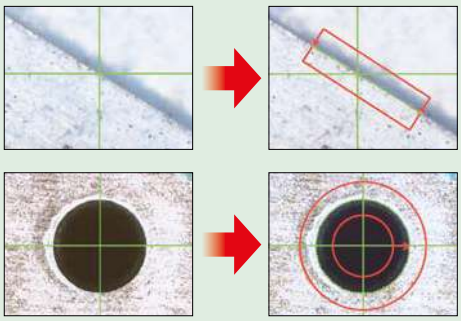
Projected image:	Inverted
Camera	
Image sensor:	1/2" colour CMOS camera
Dimensions:	56 x 54 x 78 mm (W x D x H)
Mass:	0.4 kg
TV adapter (supplied)	
Dimensions:	ø45 x 123 mm
Magnification:	0.5X
Mass:	0.3 kg
Magnification:	19X - 1900X on 22" monitor (image resizeable)

QSPAK VUE (Optional Software)

For observation/comparison of form
- Template matching function.
- Manual pattern matching function.

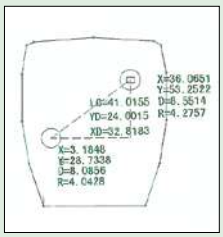
For simple measurement
- One-click edge detection tool function.
- Smart tool function.
- User macro function.

Functions for repeated measurement/auto-measurement
- Quick navigation.
- Playback.
- Graphics.
- External data output.
- Statistical calculations.



One-click edge detection
Just by clicking the mouse near the edge of a workpiece, QSPAK automatically scans the edge and detects it, displaying the coordinates of the closest point on the edge to the cross hair intersection. This function also works with the point tool, box tool, circle tool and auto-focus tool.

Graphics window
The measurement results and measured elements are plotted in the graphics window in real time. By using this function the user can check the current measuring position at a glance. The graphics window can be used for geometrical calculations.



Optional Accessory

Code No.	Description	Price
12AAJ088	Footswitch	£312.00

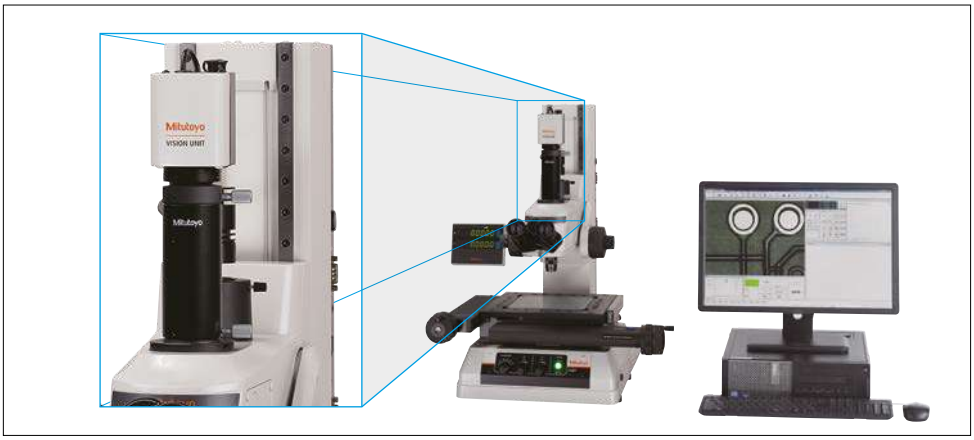
Specifications

Model No.	Vision Unit 6D	Vision Unit 6UD	Vision Unit 8D	Vision Unit 8UD
Code No.	359-707	359-709	359-717	359-719
Applicable microscope	MF-A	MF-UA	MF-B	MF-UB

Model No.	Vision Unit 9D	Vision Unit 9UD	Vision Unit 10D	Vision Unit 7D
Code No.	359-727	359-729	359-763	359-779
Applicable microscope	MF-C	MF-UC	MF-D MF-UD	Hyper MF-B Hyper MF-UB

Relay magnification of the optical system	When installed on the microscope 0.5X (using the 0.5X TV adapter)
Image detection	High-sensitivity 1/2" colour CMOS camera, 3 megapixel
Resolution	0.1 µm
Measuring accuracy	Depends on measuring microscope
Software (optional)	QSPAK Vision Unit Edition

Note: QSPAK VUE and a PC are required as optional accessories.



Vision Unit example setup (PC system, QSPAK VUE software and microscope are optional).

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Optional Accessories

For Measuring Microscopes

Focus Pilot FP-05

- By installing this system on the camera mount of an MF series measuring microscope and projecting a target pattern onto the workpiece surface, the focal plane can be detected with high accuracy and repeatability.
- The brightness of the target pattern can be adjusted according to the reflectivity of the workpiece surface.
- A wide view field observation on the monitor is made possible with the use of a CCD camera (C-mount adapter is included).
- Two target patterns (concentric circle, slit) projected in red or green are available for matching to the workpiece surface texture.





Concentric circle target



Slit target

Code No.	375-057-11	375-058-11	375-067-11	375-068-11
Applicable microscopes	MF models		MF-U models	
Light source	Green LED	Red LED	Green LED	Red LED
Focussing reproducibility	Approximately 1.5 µm (when using a 20X lens)*1			
Camera adapter	C-mount (provided)			
Applicable CCD camera	Up to 2/3"			
Mass	1.8 kg			
Price	**£5,620.00**	**£5,360.00**	**£5,360.00**	**£5,360.00**

*1 This is a reference value based on an inspection performed using our standard sample.

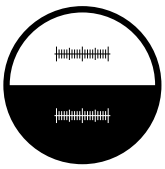
Manual and Power Turrets for MF-U



Code No.		176-211	378-018	176-212-11	378-016-11	378-216-11
Observation type		BD	BF	BD	BF	BF
No. of objective mounts		4				5
Driving method		Manual		Motor		
Power supply		—		240VAC ±10%, 50/60Hz		
Dimensions (W x D x H)	Turret	—		164 x 65 x 137 mm		
	Control box	—		108 x 72 x 193 mm		
Price		**£790.00**	**£1,230.00**	**£8,630.00**	**£4,520.00**	**£9,100.00**

Calibration Micro Scale





Code No.	Scale length	Graduation	Accuracy*2	Dimensions (W x D)	Mass	Price
375-056	1 mm	0.01 mm	±(1+L) µm	76 x 26 mm	16 g	**£352.00**

*2 At 20ºC, L = measured length (mm).

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Optional Accessories

Workpiece Fixtures for Measuring Microscopes

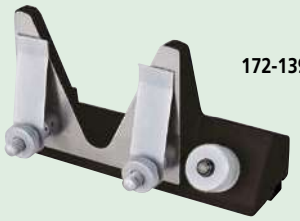
Holder with Clamp



176-107

Code No.	176-107
Max. workpiece height	35 mm
Mass	0.42 kg
Price	**£222.00**

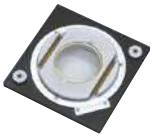
Vertical Holder



172-139

Code No.	172-139
Mass	1.3 kg
Price	**£493.00**

Rotary Tables



176-106



172-198



176-305



176-306

Code No.	176-106	172-198	176-305	176-306
Effective glass diameter	66 mm	96 mm	182 mm	238 mm
Angular resolution	6′	2′	—	
Fine feed	—	Available		
Mass	1.7 kg	2.4 kg	5.5 kg	6.5 kg
Price	**£537.00**	**£797.00**	**£1,820.00**	**£2,340.00**

Centre Support and Centre Support Riser



172-600



172-601

Code No.	172-600	172-601
Description	Centre support	Centre support riser
Max. workpiece height	120 mm (240 mm*1)	60 mm
Mass	3.3 kg	2.2 kg
Price	**£785.00**	**£553.00**

*1 When using a centre support riser (**172-601**).

Swivel Centre Supports

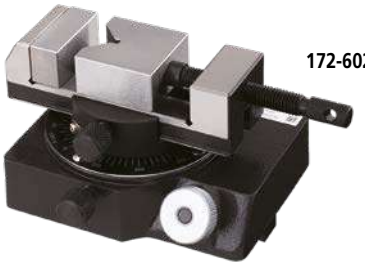


172-604

Code No.	172-003	172-604
Max. workpiece diameter	70 mm (45 mm*2)	80 mm (65 mm*2)
Max. workpiece length	140 mm	
Swivel range	±10°	
Mass	2.4 kg	2.5 kg
Price	**£752.00**	**£915.00**

*2 When swivelled 10°.

Rotary Vice



172-602

Code No.	172-602
Rotation range	360°
Maximum workpiece height	60 mm
Width of jaws	40 mm
Angle graduations	5°
Mass	2.8 kg
Price	**£747.00**

V-Block with Clamp



172-603



172-378

Code No.	172-603	172-378
Maximum workpiece diameter	50 mm	25 mm
Width of block	60 mm	41 mm
Mass	1.24 kg	0.8 kg
Price	**£385.00**	**£290.00**

J

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PJ-PLUS

SERIES 302 – Profile Projectors

- The profile projector that "can be operated intuitively" even by inexperienced operators and also has excellent durability and energy saving performance thanks to adoption of an "LED illumination source" and "fan-less cooling system".
- Provides stable dimension and angle measurements in harsher environments, such as manufacturing and processing lines, than can't be handled by conventional models.
- Stepless illumination has been adopted so as to allow precise adjustment of lighting to suit the surface texture and colour of the workpiece.

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302-801-10

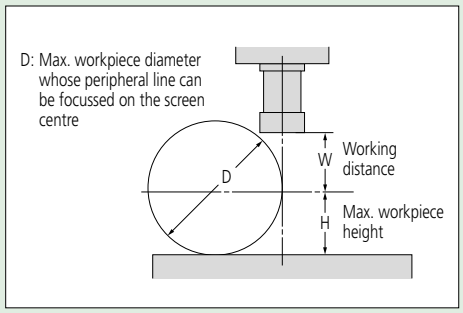


302-802-10

Technical Data

Projected image:	Inverted
Protractor screen	
Effective diameter:	315 mm (12.4")
Screen rotation:	±360°
Angle reading:	Digital counter (LED) Resolution: 1′ or 0.01° (switchable) Range: ±370° ABS/INC mode switching, zero set
Reference lines:	Cross hairs
Projection lens:	10X (**172-296**) Optional: 20X, 50X, 100X
Magnification accuracy	
Contour illumination:	±0.1% or better
Surface illumination:	±0.15% or better
Power supply:	240VAC ±10%, 50/60Hz

Projection Capacity



Unit: mm

		Magnification			
		10X	20X	50X	100X
View field		ø31.5	ø15.7	ø6.3	ø3.1
W		66 (20)	32.5 (2)	12.6	5
H	-100 model	91			
	-200 model	90.5			
D	-100 model	182	87 (61)	27	10
	-200 model	185	87 (61)	27	10

( ): When using surface illumination.

Optional Accessories

Code No.	Description	Price
172-116	Standard scale (50 mm)	**£115.00**
172-117	Standard scale (2")	**£115.00**
172-118	Reading scale (200 mm)	**£191.00**
172-119	Reading scale (8")	**£191.00**
172-160-2	Green filter	**£65.30**
172-161	Reading scale (300 mm)	**£263.00**
172-162	Reading scale (12")	**£263.00**
172-229	Oblique illumination mirror for 10X lens	**£74.00**
172-230	Oblique illumination mirror for 20X lens	**£59.20**
172-297-10	20X projection lens set	**£609.00**
172-298-10	50X projection lens	**£779.00**
172-299-10	100X projection lens	**£779.00**
999678D	Fixture mount adapter	**£963.00**

Fixture and stage accessories refer to page J-30.
QM-Data200 2D data processing unit refer to page J-28.
OPTOEYE 200 image edge sensor refer to page J-29.

Specifications

Model		PJ-P1010A	PJ-P2010A
Code No.		**302-801-10**	**302-802-10**
XY stage travel range		100 x 100 mm	200 x 100 mm
Resolution		0.001 mm or .0001" / 0.001 mm	
Measuring unit		Digital scale	
Quick-release mechanism		X and Y axes	
XY stage size		250 x 250 mm	350 x 280 mm
Effective glass size		142 x 142 mm	240 x 140 mm
Maximum stage loading		10 kg	8 kg
Maximum workpiece height		91 mm	90.5 mm
Contour illumination	Light source	White LED	
	Optical system	Telecentric	
	Functions	Variable brightness adjustment	
Surface illumination	Light source	White LED	
	Optical system	With an adjustable condenser lens	
	Functions	Variable brightness adjustment	
Mass		114 kg	118 kg

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PJ-H30

SERIES 303 – Profile Projectors

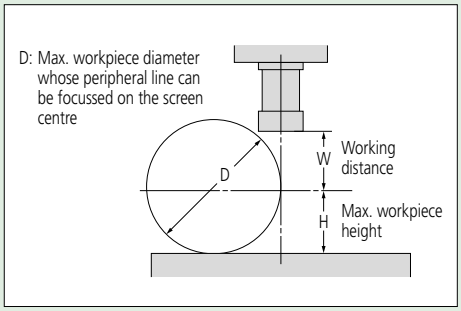
- By rotating the condenser lens and changing the angle of the mirror in the objective, you can represent even poorly reflecting surfaces optimally.
- Improved light intensity of a projected subject thanks to the new optical contour illumination system.
- High measuring accuracy.
- Measuring stage with rapid single-handed adjustment on both axes enabling you to switch smoothly between quick positioning and fine adjustment.
- Constant current power supply unit with acceleration control to maximise the service life of the halogen lamp.
- Easily read digital counter with large digit display.
- RS-232C output.

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Technical Data

Projected image:	Erect
Protractor screen	
Effective diameter:	306 mm (12")
Screen material:	Fine-ground glass
Screen rotation:	±360°, fine feed and clamp
Angle reading:	Digital counter (LED) Resolution: 1′ or 0.01° (switchable) Range: ±370° ABS/INC mode switching, zero set
Reference lines:	Cross hairs
Projection lens:	10X (**172-472**) Optional: 5X, 20X, 50X, 100X
Magnification accuracy	
Contour illumination:	±0.1% or better
Surface illumination:	±0.15% or better
Power supply:	240VAC ±10%, 50/60Hz

Projection Capacity



Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	ø61.2	ø30.6	ø15.3	ø6.12	ø3.06
W	66	70.5	56.5	50	
H	105				
D	148	197	137	114	

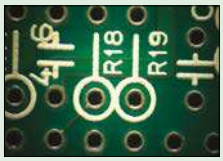
Optional Accessories

Code No.	Description	Price
172-116	Standard scale (50 mm)	**£115.00**
172-117	Standard scale (2")	**£115.00**
172-118	Reading scale (200 mm)	**£191.00**
172-119	Reading scale (8")	**£191.00**
172-161	Reading scale (300 mm)	**£263.00**
172-162	Reading scale (12")	**£263.00**
172-271	5X projection lens	**£1,650.00**
172-473	20X projection lens	**£1,490.00**
172-474	50X projection lens	**£1,550.00**
172-475	100X projection lens	**£1,560.00**
011534	MC special cleaner	**£18.80**
999678D	Fixture mount adapter	**£963.00**
12AAA807	RS-232C cable	**£43.90**
12AAG981	Green filter	**£239.00**
12AAY319	Stand for QM-Data 200	**£630.00**

Fixture and stage accessories refer to page J-30.
QM-Data200 2D data processing unit refer to page J-28.
OPTOEYE 200 image edge sensor refer to page J-29.



Vertical illumination.



Oblique illumination.



303-717-13



303-716-13



303-718-13



303-719-13

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Specifications

Model		PJ-H30A1010B	PJ-H30A2010B	PJ-H30A2017B	PJ-H30A3017B
Code No.		**303-716-13**	**303-717-13**	**303-718-13**	**303-719-13**
Focussing method		Manual			
Accuracy		±(3+0.02L) µm, L = measured length (mm)			
Resolution		0.001 mm			
XY stage travel range		100 x 100 mm	200 x 100 mm	200 x 170 mm	300 x 170 mm
Measuring unit		High-accuracy digital scale			
Quick-release mechanism		X and Y axes			
XY stage size		300 x 240 mm	350 x 280 mm	410 x 342 mm	510 x 342 mm
Effective glass size		180 x 150 mm	250 x 150 mm	270 x 240 mm	370 x 240 mm
Swivel function		±3°		±5°	
Maximum stage loading		10 kg		20 kg	
Maximum workpiece height		105 mm			
Contour illumination	Light source	Halogen bulb (24V, 150W)			
	Optical system	Telecentric zoom			
	Functions	Continuously variable brightness switch, heat-absorbing filter, cooling fan			
Surface illumination	Light source	Halogen bulb (24V, 150W)			
	Optical system	Vertical/oblique illumination with adjustable condenser lens			
	Functions	Continuously variable brightness switch, heat-absorbing filter, cooling fan			

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PV-5110

SERIES 304 – Profile Projectors

- Floor-standing model using overhead illumination which allows a large, conveniently positioned screen so that projected images can be easily traced or compared with a template.
- Digital readout protractor screen (including zero-setting, ABS/INC coordinate switching functions) for easy and error-free angle measurement.
- The optional oblique surface illumination unit (**172-422**) provides clear and bright images, allowing easy inspection of non-reflective workpieces such as plastic parts or printed materials.

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304-919-12



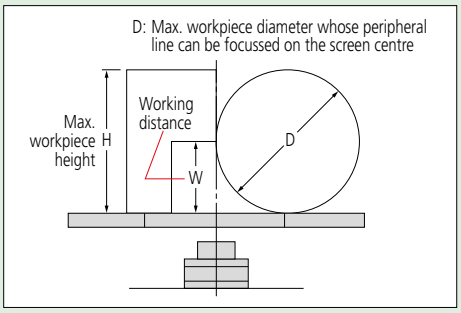
Specifications

Model		PV-5110
Code No.		304-919-12
XY stage travel range		200 x 100 mm
Measurement method		Digital scale
Resolution		0.001 mm
Focussing method		Manual
Quick-release mechanism		X and Y axes
XY stage size		380 x 250 mm
Effective glass size		266 x 170 mm
Swivel function		±3°
Maximum stage loading		5 kg
Contour illumination	Light source	Halogen bulb (24V, 150W)
	Optical system	Telecentric zoom
	Functions	2-step (high/low) brightness switch, heat-absorbing filter, cooling fan
Surface illumination	Light source	Halogen bulb (24V, 150W)
	Optical system	Vertical illumination
	Functions	Adjustable condenser lens, oblique illumination (for 5X, 10X and 20X), heat-absorbing filter, cooling fan
Mass		210 kg

Technical Data

Projected image:	Inverted
Protractor screen	
Effective diameter:	508 mm (20")
Screen material:	Fine-ground glass
Screen rotation:	±360°, fine feed and clamp
Angle reading:	Digital counter (LED) Resolution: 1′ or 0.01° (switchable) Range: ±370° ABS/INC mode switching, zero set
Reference lines:	Cross hairs
Projection lens:	10X (**172-402**) Optional: 5X, 20X, 50X, 100X
Magnification accuracy	
Contour illumination:	±0.1% or better
Surface illumination:	±0.15% or better
Maximum workpiece height:	Refer to *Projection Capacity* below
Power supply:	240VAC ±10%, 50/60Hz

Projection Capacity



Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	ø101.6	ø50.8	ø25.4	ø10.16	ø5.08
W	60 (27)	60		32.4	22.5
H	125	181	206	87	
D	120			64.8	45

( ): When using surface illumination.

Optional Accessories

Code No.	Description	Price
172-116	Standard scale (50 mm)	**£115.00**
172-117	Standard scale (2")	**£115.00**
172-160-2	Green filter	**£65.30**
172-161	Reading scale (300 mm)	**£263.00**
172-162	Reading scale (12")	**£263.00**
172-319	Canopy	**£873.00**
172-329	Reading scale (600 mm)	**£648.00**
172-330	Standard scale (80 mm)	**£225.00**
172-401	5X projection lens set	**£6,110.00**
172-402	10X projection lens set	**£2,050.00**
172-403	20X projection lens set	**£1,630.00**
172-404	50X projection lens set	**£1,680.00**
172-405	100X projection lens set	**£1,860.00**
011534	MC special cleaner	**£18.80**
512305	Halogen bulb (24V, 150W)	**£21.20**
12AAA807	RS-232C cable	**£43.90**
12AAY427	Digital counter stand	**£91.10**

Fixture and stage accessories refer to page J-30.
QM-Data200 2D data processing unit refer to page J-28.
OPTOEYE 200 image edge sensor refer to page J-29.
KA Counter multifunction display unit refer to page H-15.

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PH-3515F

SERIES 172 – Profile Projector

- Bench-top model based on a horizontal optical system.
- Suitable for thread pitch measurements – blurred or distorted images will not be produced when workpiece is angled.
- Erect image on the day-bright screen.
- 353 mm diameter protractor screen with cross hairs and staggered lines for easy alignment.
- Digital angle measurement to 1' or 0.01°.
- Heavy-duty XY stage incorporates linear scales for fast, accurate measurement.

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172-868-12



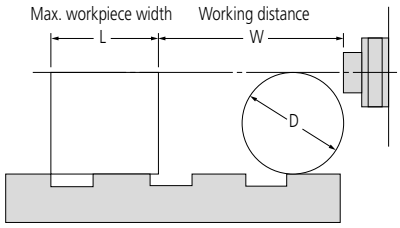
Technical Data

Projected image: Erect
Protractor screen
- Effective diameter: 353 mm (13.9")
- Screen material: Fine-ground glass
- Screen rotation: ±360°, fine feed and clamp
- Angle reading: Digital counter (LED)
  Resolution: 1' or 0.01° (switchable)
  Range: ±370°
  ABS/INC mode switching, Zero Set
- Reference lines: Cross hairs

Projection lens: 10X (**172-482**)
Optional: 5X, 20X, 50X, 100X
Magnification accuracy
- Contour illumination: ±0.1% or better
- Surface illumination: ±0.15% or better

Maximum workpiece height: Refer to *Projection Capacity* below
Power supply: 240VAC ±10%, 50/60Hz

Projection Capacity



D: Max. workpiece diameter whose peripheral line can be focussed on the screen centre

Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	ø70.6	ø35.3	ø17.65	ø7.06	ø3.5
W	160 (64)	93 (35)	40	14.6	9.5
H	175	235		80	109
D	152.4		116	30.4	19

( ): When using surface illumination.

Optional Accessories

Code No.	Description	Price
172-000-100	Stand for PH-3515F	**£974.00**
172-116	Standard scale (50 mm)	**£115.00**
172-117	Standard scale (2")	**£115.00**
172-118	Reading scale (200 mm)	**£191.00**
172-119	Reading scale (8")	**£191.00**
172-161	Reading scale (300 mm)	**£263.00**
172-162	Reading scale (12")	**£263.00**
172-166	100X projection lens set	**£1,350.00**
172-286	Green filter	**£233.00**
172-423	Illumination unit	**£648.00**
172-482	10X projection lens set	**£739.00**
172-484	20X projection lens set	**£546.00**
172-486	50X projection lens set	**£745.00**
332-161	OPTOEYE 200 image edge sensor*	**£1,260.00**
011534	MC special cleaner	**£18.80**
512305	Halogen bulb (24V, 150W)	**£21.20**
12AAA807	RS-232C cable	**£43.90**
12AAY427	Digital counter stand	**£91.10**
12BAA637	Halogen bulb (24V, 200W)	**£70.00**

Fixture and stage accessories refer to page J-30.
QM-Data200 2D data processing unit refer to page J-28.
OPTOEYE 200 image edge sensor refer to page J-29.
KA Counter multifunction display unit refer to page H-15.

Specifications

Model		PH-3515F
Code No.		**172-868-12**
XY stage travel range		254 x 152.4 mm
Measurement method		Digital scale
Resolution		0.001 mm or .0001" / 0.001 mm (using optional KA counter)
Focussing method		Manual
Quick-release mechanism		X axis
XY stage top size		450 x 146 mm
Swivel function		±10°
Maximum stage loading		45 kg
Contour illumination	Light source	Halogen bulb (24V, 150W)
	Optical system	Telecentric
	Functions	2-step (high/low) brightness switch, heat-absorbing filter, cooling fan
Surface illumination	Light source	Halogen bulb (24V, 200W)
	Optical system	Vertical illumination
	Functions	Adjustable condenser lens, vertical/ oblique surface illumination selectable, heat-absorbing filter, cooling fan
Mass		150 kg

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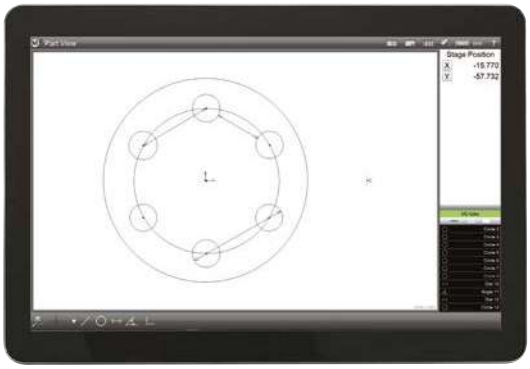
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Optional Accessories

M2 Software for Profile Projectors

- Spend more time measuring and less time reading manuals thanks to the M2 software's straightforward and easy-to-operate user interface.
- Thanks to the familiar use of a touchscreen, the M2 software can quickly be integrated into your process and drastically improve work efficiency.
- The user interface is available for use in either portrait or landscape mode, providing maximum flexibility for the display or mounting device of your choosing.
- Gain access to many powerful features, and an intuitive measuring interface whether using an optical edge-equipped system or an externally generated cross hair device.
- Precise optical edge detection mechanisms provide accurate results as well as access to powerful, industry grade, measurement functionality.



Specifications

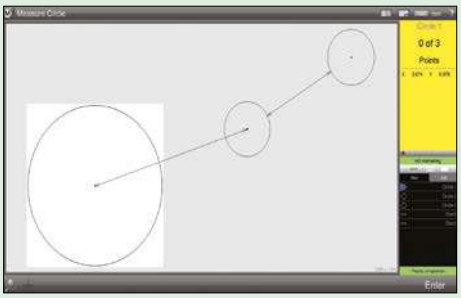
Model No.	M2 Software	
Code No.	**M2SET01**	**M2SET02**
System components	M2 metrology software, 15.6" Windows tablet, 2 axis interface box and 15-pin connecting cables, power supply and USB cable, machine bracket, RAM ball, RAM arm, VESA mount for mounting the tablet PC to the projector body.	
Edge detection	—	✓
Price	**£3,460.00**	**£5,150.00**



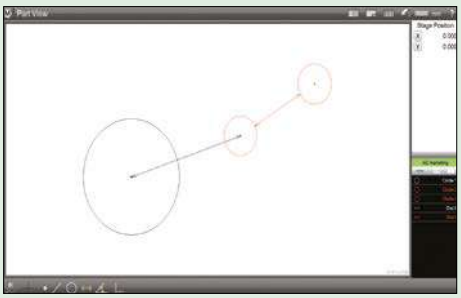
Shown attached to a PJ-Plus Profile Projector.



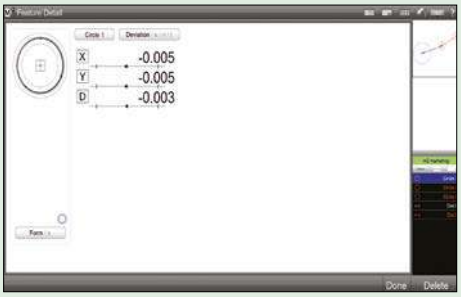
Designed for touchscreen software control.



Part programs and playback.



Graphics-based *Part View* constructions.



Geometric tolerancing.



Comprehensive measurement reports.

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Optional Accessories

SERIES 264 – QM-Data200 2D Data Processing Unit for Profile Projectors

- The QM-Data200 is a geometric readout/analysis unit for optical instruments such as profile projectors and measuring microscopes.
- This unit features powerful 2D coordinate measurement capabilities with easy-to-use key operation.
- The QM-Data200 improves operator productivity, minimizes errors and saves total measurement time and production cost.
- Informative graphic displays on the large LCD screen make for easy measurement operations.
- One-key operation for combined measurements that are often used (circle-circle distance, etc.).
- The AI measurement function (Automatic Identification of measuring item) eliminates switching between the measurement command keys.
- Equipped with a measurement procedure teaching function and measuring position navigation in Repeat mode.
- The user-menu function allows the user to store measurement commands or part programs to create custom menus.
- Tolerance zone measurement of data processing results and various statistical processing routines for each item are available.
- Measurement result output in spreadsheet (CSV) format.
- Two models are available for profile projectors: a stand mounted type with a tilt system and a arm-mount type that attaches to the side of the instrument next to the screen.

Technical Data

Program functions:	Part program creation, execution, editing
Statistical processing:	Number of data, maximum value, minimum value, mean value, standard deviation, range, histogram
Element memory:	Maximum of 1000 elements
Element recall:	Point, line, circle, distance, ellipse, rectangular hole, slotted hole, intersection and intersecting angle
Element key-in:	Point, line, circle
Display system:	Colour graphic TFT LCD
Measurement result file output:	RS-232C output (CSV format, MUX-10F format)
Display language:	Japanese/English/German/French/ Italian/Spanish/Portuguese/Cheskey/ Chinese (simplified/traditional), Korean
Data input:	RS-232C, X/Y/Z-axis signal, footswitch
Data output:	RS-232C, printer
Power supply:	240VAC ±10%, 50/60Hz

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264-160-13 Stand mount type



264-161-13 Arm-mount type.



Intuitive panel design

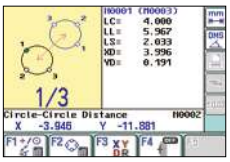
The QM-Data200 employs Geometry Keys to accelerate the measurement process. The routine of probing geometric features and combinations is implemented from these dedicated keys on the front panel. Simply clicking a key and then capturing the feature coordinates means you can complete the measurement quickly and accurately. This improves operator productivity, reduces errors and saves operation time and cost.

Specifications

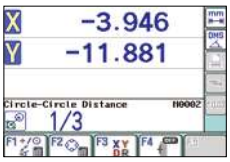
Model No.		QM-Data200	
Code No.		**264-160-13**	**264-161-13**
Type		Stand mount	Arm mount
Unit of measurement	Length	mm/inch	
	Angle	Switchable between decimal degree and sexagesimal notation	
Resolution		0.1 µm	
Display unit		Colour TFT LCD (with LED backlight)	
External dimensions (W x H x D)		260 x 242 x 310 mm (including the stand section)	318 x 153 x 275 mm (when the arm is horizontal)
Mass		Approx. 2.9 kg	Approx. 2.8 kg
Price		**£2,250.00**	**£2,250.00**

Graphic display

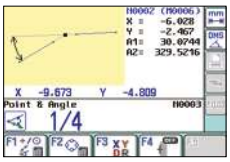
Measurement information and data are visualized on the back-lit LCD colour display with graphical interfaces. The geometric feature selected is displayed with the probing navigator. The measurements map and blink indication show the probing points and sequences. Simply probe points and click by following the blink indicator. Measurements can be easily completed even by a beginner. This improves operation accuracy and reduces errors and measurement time.



Measurement procedure navigation screen.



Magnified counter screen.



Measurement result screen.

J

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Optional Accessories

SERIES 332 – OPTOEYE 200 Image Edge Sensor for Profile Projectors

- The OPTOEYE 200 Image Edge Sensor eliminates the human error that can occur with visual alignment when using the cross hairs for edge location, thus ensuring speedy, accurate, and consistent measurements, regardless of the operator's skill level.
- Bright and dark buttons allow easy calibration.
- A thin fibre-optic cable for the detector connection allows easy set-up and use without obstructing the operator's vision.
- OPTOEYE is conveniently powered from the QM-Data200 via the connecting cable.

332-161



Detector attachment (optional)

Optional Accessories

Code No.	Description	Price
12AAE671	Sensor attachment A (for ø250 to ø350 mm screen of PJ-PLUS, PJ-H30 and PH-3515)	**£34.60**
12AAE672	Sensor attachment B (for ø500 to ø600 mm screen of PV-5110)	**£50.80**



Locating the edge of a hole.

Specifications

Code No.		332-161
Image detection	Directivity	Non-directional
	Minimum diameter	ø2 mm on the screen
	Minimum width	1 mm on the screen
	Maximum capture speed	1000 mm/s
Illumination	Type	Surface/Contour
	Range	30 to 2000 Lux on the screen
Brightfield/darkfield difference		20 Lux
Repeatability		1 µm in contour illumination mode
Function		Creating, performing, and editing measuring procedures
Price		**£1,260.00**

J

Scales for Profile Projectors

Standard Scales

Used for checking magnification accuracy in conjunction with a reading scale.

172-116



Metric

Code No.	172-116	172-330
Graduation	0.1 mm	
Range	50 mm	80 mm
Accuracy (20°C)*	±(3+5L/1000) µm	
Price	**£115.00**	**£225.00**

* L = measured length (mm).

Inch

Code No.	172-117
Graduation	.01"
Range	2"
Accuracy (20°C)	±.00013"
Price	**£115.00**

Reading Scales

Specially designed for inspecting the magnified image of a standard scale on the projection screen.

172-161

172-118



Metric

Code No.	172-118	172-161	172-329
Graduation	0.5 mm		
Range	200 mm	300 mm	600 mm
Accuracy (20°C)*	±(15+15L/1000) µm		
Price	**£191.00**	**£263.00**	**£648.00**

* L = measured length (mm).

Inch

Code No.	172-119	172-162
Graduation	.02"	
Range	8"	12"
Accuracy (20°C)	±.00071"	
Price	**£191.00**	**£263.00**

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Optional Accessories

Workpiece Fixtures for Profile Projectors

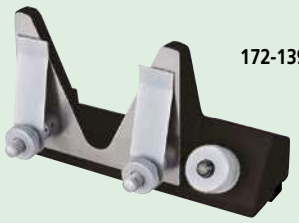
Holder with Clamp



176-107

Code No.	176-107
Max. workpiece height	35 mm
Mass	0.42 kg
Price	**£222.00**

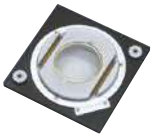
Vertical Holder



172-139

Code No.	172-139
Mass	1.3 kg
Price	**£493.00**

Rotary Tables



176-106



172-198



176-305



176-306

Code No.	176-106	172-198	176-305	176-306
Effective glass diameter	66 mm	96 mm	182 mm	238 mm
Angular resolution	6′	2′	—	
Fine feed	—	Available		
Mass	1.7 kg	2.4 kg	5.5 kg	6.5 kg
Price	**£537.00**	**£797.00**	**£1,820.00**	**£2,340.00**

Centre Support and Centre Support Riser



172-600



172-601

Code No.	172-600	172-601
Description	Centre support	Centre support riser
Max. workpiece height	120 mm (240 mm*1)	60 mm
Mass	3.3 kg	2.2 kg
Price	**£785.00**	**£553.00**

*1 When using a centre support riser (**172-601**).

Swivel Centre Supports

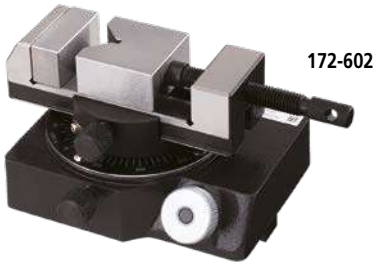


172-604

Code No.	172-003	172-604
Max. workpiece diameter	70 mm (45 mm*2)	80 mm (65 mm*2)
Max. workpiece length	140 mm	
Swivel range	±10°	
Mass	2.4 kg	2.5 kg
Price	**£752.00**	**£915.00**

*2 When swivelled 10°.

Rotary Vice



172-602

Code No.	172-602
Rotation range	360°
Maximum workpiece height	60 mm
Width of jaws	40 mm
Angle graduations	5°
Mass	2.8 kg
Price	**£747.00**

V-Block with Clamp



172-603



172-378

Code No.	172-603	172-378
Maximum workpiece diameter	50 mm	25 mm
Width of block	60 mm	41 mm
Mass	1.24 kg	0.8 kg
Price	**£385.00**	**£290.00**

J

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TAGLENS

SERIES 379 – Ultra High-Speed Varifocal Lens

- Without changing the required magnification, ultra-high speed variable focal length enables obtaining perfectly focused images in real-time with stress-free operation.
- The time required for auto-focusing is drastically reduced, and the optical system focus range is extended without the expense of a mechanical drive.
- A dedicated controller and the software TAGPAK-C are offered as standard accessories.

TAGLENS-T1



Controller



Standard Software

TAGPAK-C

Software for setting the parameters controlling TAGLENS and Pulsed Light Source (PLS) for TAGLENS.
Pulse output functions is available for the following modes: multi focus, mixed image, and 3ch.
As well, a software development kit (SDK) is included to enable use of functions such as Auto Focus, Focus Stacking, TAGLENS-3D, and Z-Adjust, thus making it easy to equip on the system in use.

Optional Software

TAGPAK-E

With a function converting images captured with a TAGLENS-enabled optical system into extended depth of focus images (EDOF* images), various EDOF image-related parameters can be set and images can be saved and uploaded. (I/O-enabled still image file types are .bmp, .tiff, .png, and .jpeg)
Viewer functions in available for the following modes: EDOF, multi-focus (up to 4 cross-sections), mixed image.
For **379-011-1A** this software is included as standard.

*EDOF: Extended Depth of Focus

Code No.	02NEA067B
Price	£4,290.00

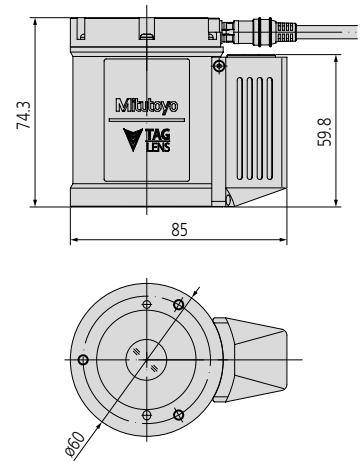
Specifications

Model No.	TAGLENS-T1	
Code No.	**379-010-1A**	**379-011-1A**
Resonance frequency	70 kHz	
Effective aperture	ø11 mm	
Transmittance	90% or more (λ 400 nm to 700 nm)	
Included accessories	Controller, TAGPAK-C software	
TAGPAK-E software included	—	✓
Mass	Approx. 0.6 kg (Controller: approx. 0.4 kg)	
Price	**£13,210.00**	**£17,140.00**

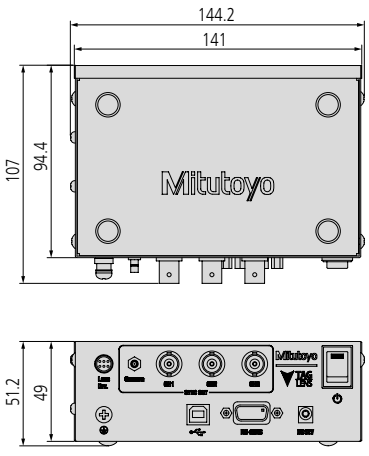
Dimensions

Unit: mm

TAGLENS-T1



Controller



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Optional Accessories

For TAGLENS

VMU-T1 Video Microscope Unit

Microscope unit for configuring a varifocal optical system by incorporating the TAGLENS-T1, the objective lens and the camera.

VMU-T1



Model No.	VMU-T1
Code No.	379-110
Tube lens magnification	1X
Imaging FOV (diagonal)	ø11 mm
Applicable objective lenses	M Plan Apo Series
Price	£5,310.00

Applicable objective lenses (optional)

Code No.	Description	Price
378-801-12	M Plan Apo 2X	£798.00
378-802-12	M Plan Apo 5X	£732.00
378-807-3	M Plan Apo 7.5X	£1,440.00
378-803-3	M Plan Apo 10X	£823.00
378-804-3	M Plan Apo 20X	£1,880.00
378-805-3	M Plan Apo 50X	£2,440.00
378-806-3	M Plan Apo 100X	£2,940.00

Pulsed Light Source (PLS)

In combination with TAGLENS-T1, this ultra-high-speed LED pulsed light source device captures focused images at the desired height as well as focus stacking, etc. Using this product and TAGLENS software (TAGPAK-C), you can adjust the brightness and focus position.



Pulsed Light Source (PLS)

Code No.	379-200A
Lighting system	Pulsed lighting
Luminous colour	White
Maximum light output	30 lm
Frequency	75 kHz or less
Input pulse width	10 ns to 85 ns
Optical pulse width	50 ns to 100 ns
Dimensions (W x H x D)	169.2 x 115.6 x 133.2 mm
Mass	2.7 kg
Price	£5,660.00

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VISION MEASURING SYSTEMS



QM-Fit



QUICK IMAGE



QUICK SCOPE



QUICK VISION Pro



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Optional Accessories	K-23
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Mitutoyo

QM-Fit

SERIES 359 – 2D Vision Measuring System

- QM-Fit, is a smart, compact manual vision measuring machine with intuitive touchscreen operation.
- It enables automatic geometry recognition based on CAD data and displays measurement results as visual overlay for faster, easier inspection.
- Visual guides and auto-suggestions reduce training time and eliminate user errors.
- Automatic edge-snap function (caliper function) enables fast and accurate measurements.
- Easy to read pass/fail indicators.
- Measurement recording function enables automatic repeat measurements.
- High-resolution telecentric lens with 20 MP colour camera enables up to 100X magnification.
- Wide field of view of 115 x75 mm.
- Large depth of focus of 36 mm.



QM-Fit

Technical Data

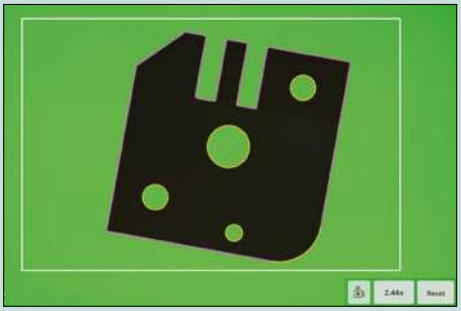
Camera type:	20 megapixel colour CMOS
Repeatability:	2σ ≤4 µm
Illumination	
Transmitted:	Green LED
Ring light:	8-segment white LED
Optical system	
Magnification:	1 to 100 times

Optional Accessory

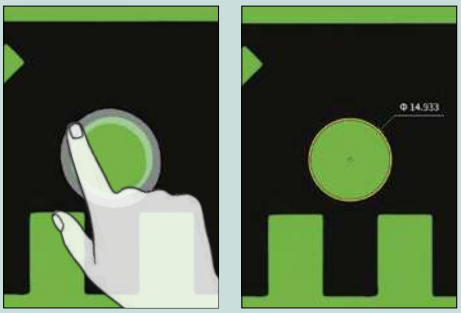
Code No.	Description
359-742	Reference chart



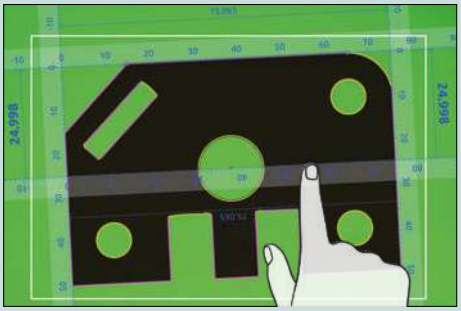
To start measuring a workpiece, simply place it on the measuring stage.



Automatically recognizes and detects circles, lines, and more with just one tap.



Trace the area you want to measure with your finger.



You can move the rulers with your fingers.

Specifications

Model	QM-Fit
Code No.	**359-752-13**
Measuring range (X : Y)	115 x 75 mm
Accuracy guaranteed range	90 x 60 mm
Depth of focus	36 mm
Resolution	0.0001 / 0.001 / 0.01 / 0.1 / 1 mm (selectable)
Measuring accuracy (20°C)*	±10 µm
Stage glass size	154 x 96 mm
Max. stage loading	10 kg
Dimensions (W x D x H)	366 x 407 x 621 mm
Mass	25 kg

* Inspected to a Mitutoyo standard.

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QUICK IMAGE

SERIES 361 – 2D Vision Measuring System

- A high-resolution manual 2D Vision Measuring System featuring double telecentric, fixed-magnification optics with 4-quadrant LED ring lighting and megapixel colour CCD camera providing highly efficient, cost-effective measurement.
- Simple operation with One-Click measurement.
- The stitching function enables the entire display of a large workpiece so that highly accurate and speedy measurement can be performed.
- Deep focal depth and wide field of view objectives.
- Ideal for applications requiring distortion-free imaging with accurate measurement capability for workpieces with multi-level surfaces.
- Excellent repeatability is achieved even at low magnification, and the ability to switch between deep focal depth and high resolution modes for higher accuracy enhances operability.
- Five stages are available up to the largest that provides a 400 x 200 mm XY measuring range for large or multiple workpiece applications.
- Quick-release handles enable the stage to be moved rapidly but with fine feed always available, thus saving time when measuring longer dimensions and dramatically improving productivity.
- The QI-C model is equipped with a motorized stage to offer easy and comfortable stage operation.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

PROPRIETARY INSPECTION CERTIFICATE

QI-A2010D



QI-C2017D



Technical Data for QI-A/QI-C

Measurement modes:	High-resolution/normal
Camera type:	3 megapixel 1/2 inch colour CCD
Accuracy	
Within the screen:	±2 µm (high-resolution mode), ±4 µm (normal mode)
$E1_{XY}$:	±(3.5+0.02L) µm*[1]
Repeatability within the screen (2σ):	±1 µm (high-resolution mode), ±2 µm (normal mode)
Monitor magnification*[2]:	7.6X
Optical system	
Working distance:	90 mm
Magnification*[3]:	0.2X
Field of view:	32 x 24 mm
Depth of focus:	±0.6 mm (high-resolution mode), ±11 mm (normal mode)
Illumination:	Contour, surface and 4-quadrant LED

*[1] L = measured length (mm).
*[2] For 1X digital zoom (when using a 22-inch monitor).
*[3] Double telecentric system.

Optional Accessories

Code No.	Description
937179T	Footswitch
02ATX180	Ring light diffuse plate
12AAJ088	Reinforced footswitch



Ring light diffuse plate.



Motorized stage.

Specifications

Model	QI-A1010D	QI-A2010D	QI-A2017D	QI-A3017D	QI-A4020D
Code No.	**361-850A**	**361-851A**	**361-852A**	**361-853A**	**361-854A**
Stage adjustment	Manual				
Measuring range (X : Y)	100 : 100 mm	200 : 100 mm	200 : 170 mm	300 : 170 mm	400 : 200 mm
Stage glass size	170 x 170 mm	242 x 140 mm	260 x 230 mm	360 x 230 mm	440 x 232 mm
Max. stage loading	10 kg		20 kg		15 kg
Mass	65 kg	69 kg	150 kg	158 kg	164 kg

Model	QI-C2010D	QI-C2017D	QI-C3017D
Code No.	**361-860A**	**361-861A**	**361-862A**
Stage adjustment	Motorized		
Measuring range (X : Y)	200 : 100 mm	200 : 170 mm	300 : 170 mm
Stage glass size	242 x 140 mm	260 x 230 mm	360 x 230 mm
Max. stage loading	10 kg	20 kg	
Mass	72 kg	153 kg	161 kg

K

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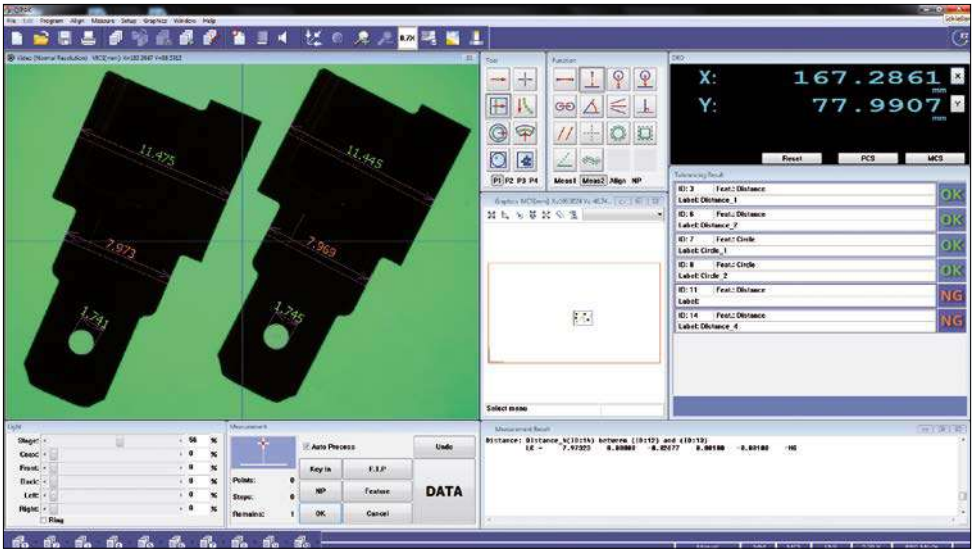
Mitutoyo

QIPAK

Software for QUICK IMAGE Systems

- The NEW stitching function enables the entire display of a large workpiece so that highly accurate and speedy measurement can be performed.
- One-click measurement with a quick pass/fail decision-making function enhances productivity.
- One-click edge-detection tools make this software very easy to use.
- Template tools for comparative analysis.
- Video image capture.
- Stage navigation function gives improved measurement cycles.

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QIPAK layout: PRO Mode.

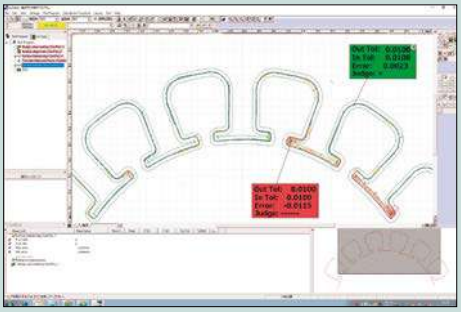


QIPAK layout: EZ Mode.

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
VISION

Optional Additional Software

- QS CAD-IMPORT/EXPORT
- MeasurLink
  This software provides statistical arithmetic processing of measurement results. (See page A-05 for details).
- FORMTRACEPAK-AP
  Simple and easy-to-use 2D contour analysis. Graphic reports for geometry or profile. Allows measurement by comparison.



FORMTRACEPAK-AP sample screenshot.

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QUICK SCOPE

SERIES 359 – 3D Vision Measuring System

- A high-resolution manual 3D Vision Measuring System featuring power-zoom optics, colour CMOS camera, adaptive lighting and a Quick Navigation function for repetitive measurements to provide efficient and cost-effective operation.
- A Z-axis measurement range of 150 mm is standard on all models.
- Newly designed 7X optical zoom unit with interchangeable objective lenses.
- High-speed auto focus allows for highly accurate height measurement.
- 0.1 µm resolution.
- LED coaxial, stage and 4 quadrant ring-lighting provides versatile surface and contour illumination to match workpiece requirements.
- Three stages are available up to the largest that provides a 400 x 200 mm XY measuring range for large or multiple workpiece applications.
- Quick-release handles enable the stage to be moved rapidly but with fine feed always available, thus saving time when measuring longer dimensions and dramatically improving productivity.

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QS-L3017/AFC

Technical Data

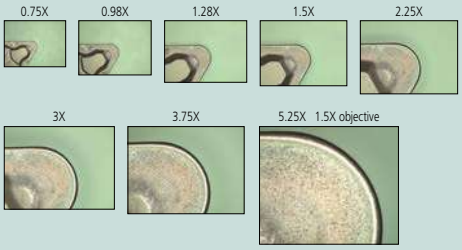
Resolution:	0.1 µm
Scale type:	Linear encoder
Illumination	
Surface:	LED coaxial light and 4-quadrant LED ring light
Contour:	LED stage light

Features

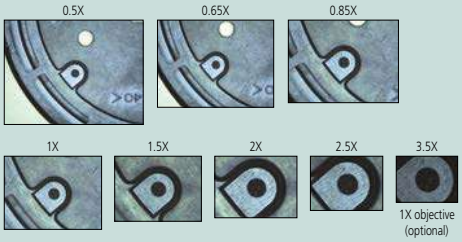
7X optical zoom unit with interchangeable objective lenses

Securely captures measurement targets from wide-field to micro form. In addition, 4X digital zoom is available using software.

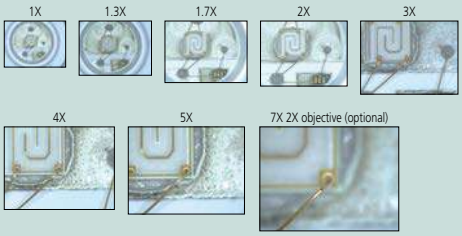
Cutting tool



Plastic moulded article



LED device



Optional Accessories

Code No.	Description
937179T	Footswitch
02ATN695	Calibration chart with holder
12AAJ088	Reinforced footswitch



1X (optional), 1.5X (standard accessory) and 2X (optional) interchangeable lenses.

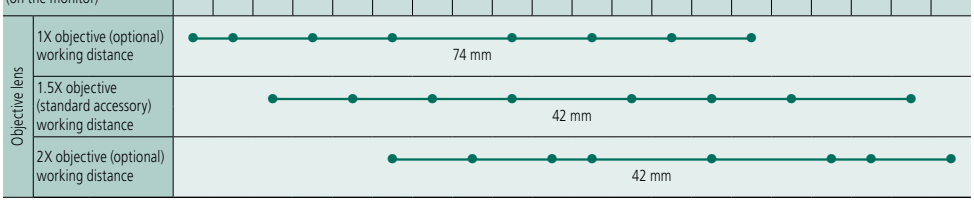
Specifications

Model		QS-L2010Z/AFC	QS-L3017Z/AFC	QS-L4020Z/AFC
Code No.		**359-723-11**	**359-724-11**	**359-725-11**
Measuring range (X : Y : Z)		200 : 100 : 150 mm	300 : 170 : 150 mm	400 : 200 : 150 mm
Measuring accuracy (20°C)*	XY	±(2.2+0.02L) µm		
	Z	±(4.5+0.006L) µm		
Camera type		3 megapixel, colour CMOS		
Stage glass size		250 x 150 mm	370 x 240 mm	450 x 240 mm
Max. stage loading		10 kg	20 kg	15 kg
Max. workpiece height		150 mm		
Main unit	Dimensions (W x D x H)	624 x 711 x 729 mm	692 x 857 x 837 mm	757 x 867 x 837 mm
	Mass	70 kg	160 kg	167 kg

* Using 3.0X zoom magnification,
L = measured distance between two arbitrary points (mm).

From Wide View Measurement to Micro-Measurement

Optical zoom magnification		0.5X	0.65X	0.75X	0.85X	0.98X	1X	1.28X	1.3X	1.5X	1.7X	2X	2.25X	2.5X	3X	3.5X	3.75X	4X	5X	5.25X	7X
View field (mm)	Horizontal (H)	13.10	10.08	8.73	7.71	6.72	6.55	5.14	5.04	4.37	3.85	3.28	2.91	2.62	2.18	1.87	1.75	1.64	1.31	1.25	0.94
	Vertical (V)	9.84	7.57	6.56	5.79	5.05	4.92	3.86	3.78	3.28	2.89	2.46	2.19	1.97	1.64	1.41	1.31	1.23	0.98	0.94	0.70
Total magnification (on the monitor)		19	25	29	33	38	38.5	49.5	50	58	65.5	77	87	96	116	135	145	154	193	202	270



Note: The total magnification indicates the magnification on the monitor when the **QSPAK** video window size is the default 252.7 x 214.9 mm.

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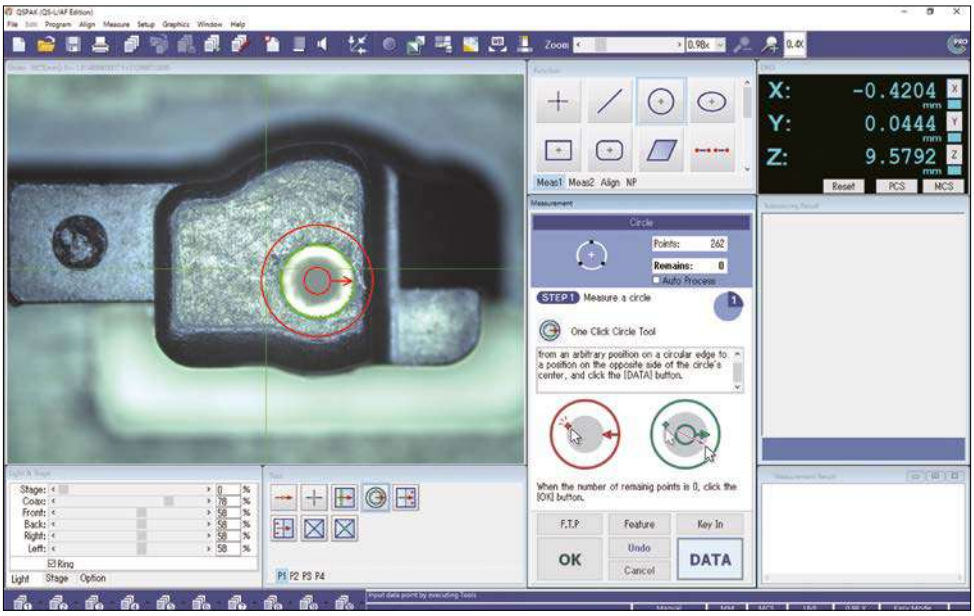
Mitutoyo

QSPAK

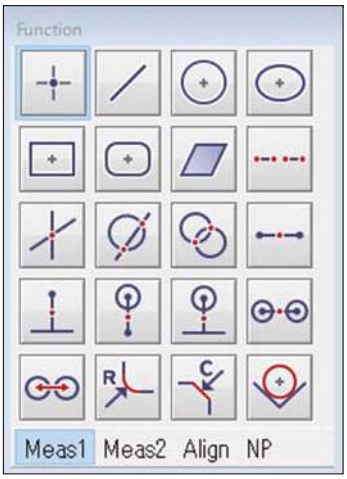
Software for QUICK SCOPE Systems

- Easy to use, one-click edge detection tools.
- Template tools for comparative analysis.
- Video image capture.
- Large screen makes detailed operations easy.

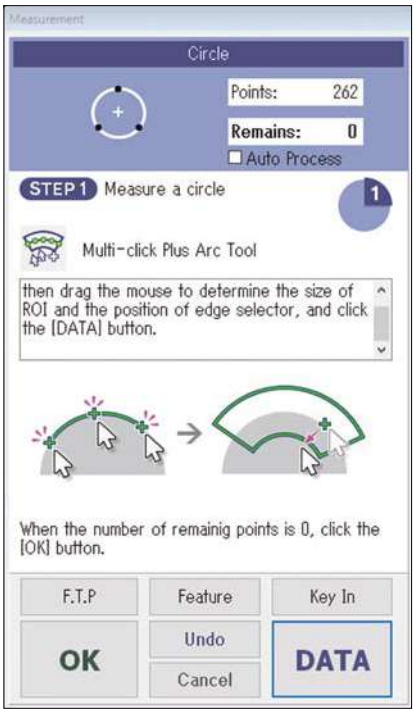
MeasurLink® ENABLED
Data Management Software by Mitutoyo



QSPAK sample screenshot.



Measurement item commands.

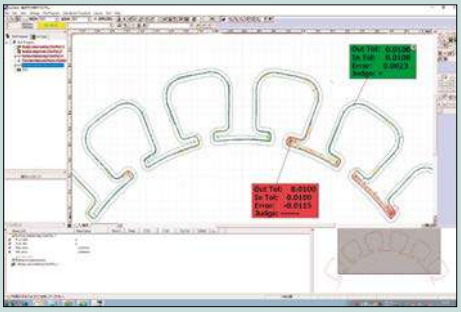


User-friendly operation guidance.

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
VISION

Optional Additional Software

- QS CAD-IMPORT/EXPORT
- MeasurLink
  This software provides statistical arithmetic processing of measurement results. (See page A-05 for details).
- FORMTRACEPAK-AP
  Simple and easy-to-use 2D contour analysis. Graphic reports for geometry or profile. Enables measurement by comparison.



FORMTRACEPAK-AP sample screenshot.

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QV Active

SERIES 363 – CNC Vision Measuring System

- This CNC vision measuring system combines the flexibility of a high quality zoom lens with the speed of a state-of-the-art digital colour camera.
- Programmable LED stage and coaxial lighting.
- Programmable 4-quadrant LED ring lighting.
- High-resolution and high-speed CMOS colour camera.
- High quality 7-step zoom optics with interchangeable lenses.
- Compact design using a fixed bridge, moving table for the ultimate in rigidity.
- Powerful, user-friendly QVPAK software.
- A touch-trigger probe option is available for applications requiring access to undercuts and similar features not accessible to the camera.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

SMS Smart Measuring System

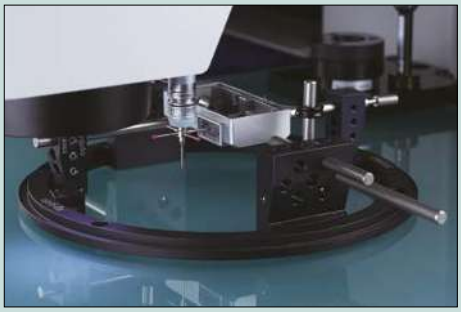
PROPRIETARY INSPECTION CERTIFICATE

Technical Data

Resolution:	0.1 µm
Scale type:	Linear encoder
Illumination	
Coaxial:	White LED
Transmitted:	White LED
Programmable ring light:	4-quadrant fixed white LED

Optional Accessory

Code No.	Description
02ATN695	Calibration chart with holder



Optional touch-trigger probe and Opti-fix clamping system.



1X, 1.5X and 2X interchangeable lenses.



QV Active 404

Specifications

Model		QV Active 202	QV Active 404
Code No.		363-109-30	363-110-30
Measuring range (X : Y : Z)		250 : 200 : 150 mm	400 : 400 : 200 mm
Camera type		Colour CMOS	
Accuracy*	E_{1XY}	±(2+3L/1000) µm	
	E_{1Z}	±(3+5L/1000) µm	
	E_{2XY}	±(2.5+4L/1000) µm	
Magnification changing system		Zoom optical system with 8 positions; standard 1.5X magnification lens	
Stage glass size		311 x 269 mm	466 x 480 mm
Max. stage loading		10 kg	20 kg
Dimensions (W x D x H)		570 x 767 x 1468 mm	776 x 1303 x 1529 mm
Mass (main unit)		155 kg	324 kg

* Inspected to a Mitutoyo standard. L = Measured length (mm).

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Mitutoyo

QUICK VISION Pro

Highly Advanced Non-contact Measurement Technologies

Well-designed main unit structured for high-accuracy measurement and auto focus. Integration of these high-performance technologies has made 3D non-contact measurement a reality. The QUICK VISION Pro, our CNC vision measuring machine family, never stops evolving.

Rich functionality supporting various kinds of measurement

The QUICK VISION Pro achieves the high-level integration of the measurement technologies that Mitutoyo has developed over the years. By combining standard objective lenses, special software (QVPAK), and various optional sensors, the QUICK VISION Pro provides a wide range of functions to support various kinds of measurement. While meeting the growing requirements of measurement environments, it continues to improve these functions to strongly support solving any challenges.

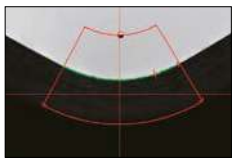
QUICK VISION Pro core functions providing high-throughput measurement

The observation unit and the lighting unit of QUICK VISION Pro have been updated, increasing the measurement throughput by about 40% compared with conventional models. Furthermore, measurement programming in two modes has made it possible to conduct high-throughput measurement of any measurement sample. TAF and high-speed auto-focus provide amazingly high throughput even for measurement samples of varying height.

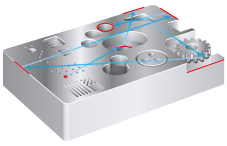
StrobeSnap

A magnified image captured through the optical lens is displayed on a PC screen. Various functions including edge detection and auto focus can be used for dimensional measurement (common to all models).

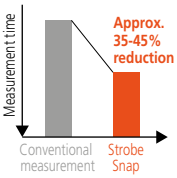




All the QUICK VISION Pro models are equipped with a strobe light, and the newly developed vision measuring function StrobeSnap delivers measurements with both high throughput and high accuracy. Regardless of the continuity of measuring positions, measuring time can be shortened by about 35 to 45% for most measurement samples. Due to the excellent compatibility with part programs allows a part program to be created for high-speed measurement with ease.



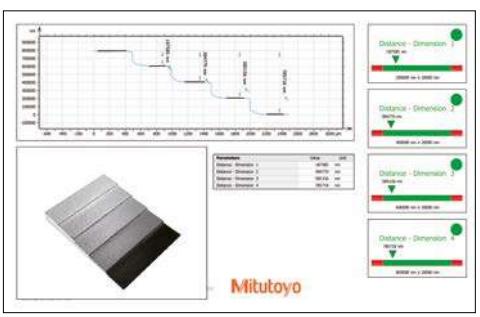
Measurement method



Note: Comparison with old specifications using our demo sample

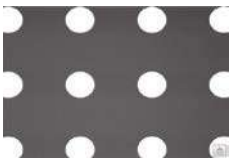
White Light Interferometer

Using the white light interference that occurs between the system and the object, the system performs high-accuracy 3D measurement for surface texture analysis (roughness, etc.) and shape measurement (irregularities of several µm) in a minute area.

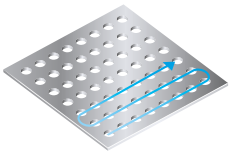


STREAM Function (optional)

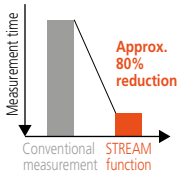
The STREAM function provides an amazingly high throughput, due to the non-stop measurement where the camera motion and the strobe light are synchronized. It can shorten measuring time more than StrobeSnap on account of continuous element measurement as shown in the following conceptual image of measurement. The STREAM function of QUICK VISION Pro, including the HYPER model, can be upgraded as an option.



XY = 0.2 mm pitch, 626
Measured with a field of view of 0.62 × 0.47 mm
STREAM measurement 36 sec.



Measurement method



Note: Comparison with old specifications using our demo sample

Touch Trigger Probe

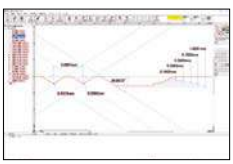
By also using the touch trigger probe, the system can capture a 3D object by measuring its sides at a given height without rotating it, something that is difficult with the camera alone.



CPS Probe

Differences in the focal length of the white light source are used to measure an angled surface. Additionally, thickness of a thin, transparent object is measured by simultaneous detection of surface heights at two points on the object.





Feature Icons Key

Icon	Feature description
White LED	White LED illumination unit
Colour LED	Colour LED illumination unit
Halogen	Halogen illumination unit
B&W camera	Black & white camera imaging device
Colour camera	Colour camera imaging device
Strobe	StrobeSnap function
STREAM	STREAM function
TAF	Tracking Auto Focus (TAF) function
TP	Touch trigger probe function
Type 1	Type 1
Type 4	Type 4
PFF	Points From Focus (PFF) function
WLI	White Light Interferometer (WLI) function
ISO ISO compliant	ISO10360-7:2011 compliant

Colour LED Available

Colour LED Special order

Colour LED Not available

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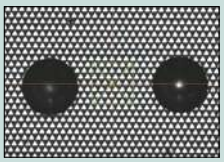
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QUICK VISION Pro

Highly Advanced Non-contact Measurement Technologies

High-performance Image Auto Focus

The image auto focus of QUICK VISION Pro can measure the height of mirror-finished surfaces through to rough surfaces, such as machined surfaces and plastic moulded parts, with high accuracy and at high speed under any conditions. Image auto focus speed has been improved by about 30% compared with conventional models.

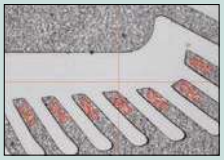


IC package



Pattern focus

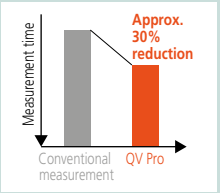
By projecting a pattern through the optical path, auto focus can be applied to even surfaces on which it is difficult to obtain contrast, such as glass surfaces, film surfaces, and mirror-finished surfaces used widely for semiconductor parts.





Multi-point auto focus

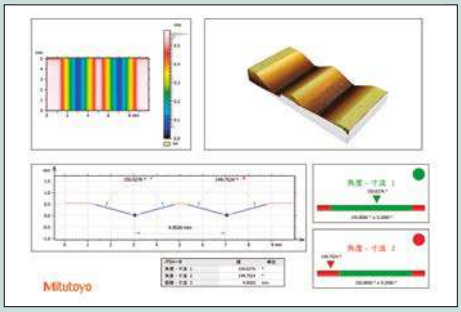
Multi-point auto focus can be used to set multiple focus positions, sizes, and angles to independent locations. This tool can be used to obtain multiple sets of height information with a single focus operation, which makes it possible to perform highly efficient height and flatness measurements.



Note: Comparison with old specifications using our demo sample

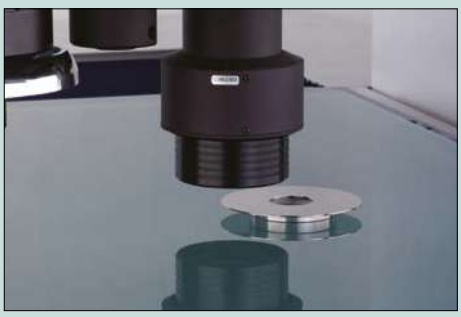
PFF (Point From Focus)

Scanning the object by auto focusing the objective lens can capture multiple cross-section images (image contrasts) at different heights. Thus obtaining 3D shape data from such images.



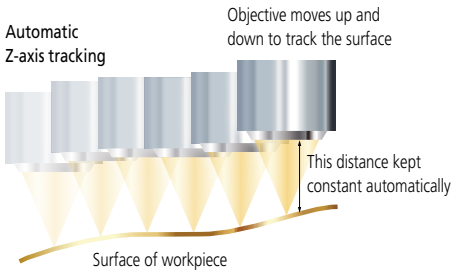
Laser Probe

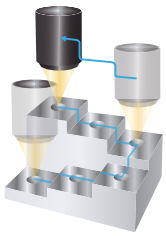
The laser confocal sensor, less affected by the colour of the object, can scan surfaces. The sensor scans the object to capture the surface shape data in a non-contact manner.



Tracking Auto Focus (TAF)

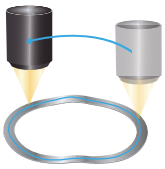
Laser emitted from the objective lens enables automatic focusing. The system automatically keeps the object in focus according to its shape, eliminating the task of focus adjustment and increasing measurement throughput. Height change in a workpiece can be tracked in the Z-axis direction quickly by laser. StrobeSnap and STREAM allow it to perform effectively, resulting in a significant increase of measurement throughput.





Measurement points with different heights.

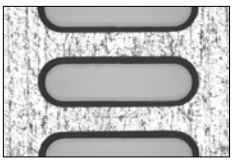
Measurement method



Thin shapes prone to deformation.

Highly Functional Illumination Unit

- QUICK VISION Pro uses LEDs' for all of their light sources: contour, surface, and programmable ring light.
- Lighting uniformity has been achieved at a high level, which leads to excellent part program compatibility between multiple QUICK VISION machines.
- LED light sources have excellent responsiveness, which improves measurement throughput.
- LED light sources have longer life spans than halogen types, which reduces illumination fluctuations and thereby minimizes any errors caused by changes in light intensity.



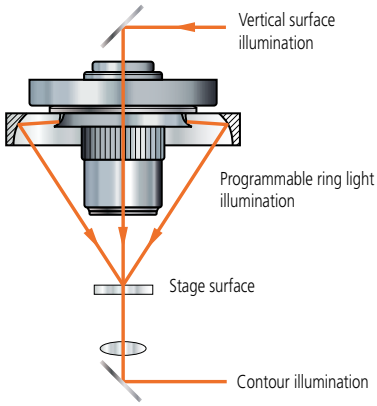
Surface illumination.



Programmable ring light illumination.



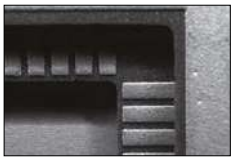
Contour illumination.



Programmable Ring Light (PRL)

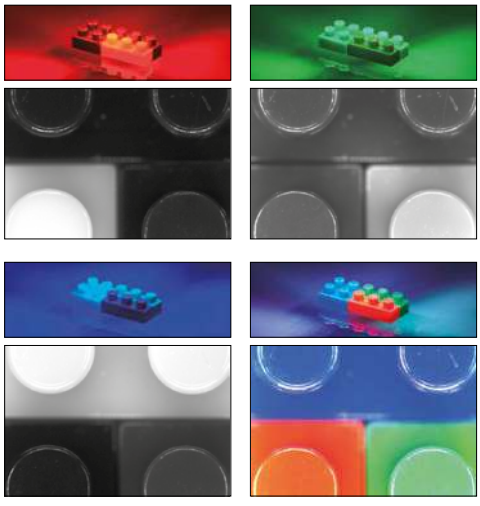
Changing the positions of the two curved mirrors sets the ring light's direction to any chosen value between 30° and 80°. This is effective for enhancing the edges of inclined surfaces or very small steps. Furthermore, the PRL light's illumination can be controlled independently in every direction, front and back, right and left. This makes it possible to configure highly variable lighting settings to match measurement locations.





White LED illumination/Colour LED illumination

With QUICK VISION Pro, white LED lighting is standard with optional coloured surface and ring light LED lighting available. The coloured LED model can emphasize edge contrast by changing the emitted light colour.



Using the pseudo-colour image display function generates a colour observation image with high colour reproducibility from each of the RGB-irradiated images.

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Mitutoyo

QV APEX Pro

SERIES 363 – CNC Vision Measuring System

- This is a superior model of QUICK VISION, which is equipped with the StrobeSnap function as standard, enabling high-speed measurement.
- By utilizing the optional TAF (Tracking Auto Focus), it can deliver high-speed measurement of an edge that fluctuates in the vertical direction, by tracking the edge automatically.
- The optional STREAM function provides an amazingly high throughput, due to the non-stop measurement where the camera motion and the strobe light are synchronized.

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SMS Smart Measuring System

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QV Apex 302 Pro

Technical Data

Resolution:	0.1 µm
Scale type:	Linear encoder
Temperature compensation function:	Manual
Observation unit:	Programmable power turret 1X-2X-6X*1

*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

Features

White LED | Colour LED | B&W camera | Strobe | STREAM | TAF
TP | Type 1 | Type 4 | PFF | WLI | ISO compliant

Icon key:

Available | Special order | Not available

Optional Accessory

Code No.	Description
02ATN695	Calibration chart with holder

Specifications

Model		QV APEX 302 Pro				QV APEX 404 Pro			
Code No.		363-601-10	363-603-10	363-602-10	363-604-10	363-611-10	363-613-10	363-612-10	363-614-10
Measuring range (X : Y : Z)		300 : 200 : 200 mm				400 : 400 : 250 mm			
Tracking auto focus		—	✓	—	✓	—	✓	—	✓
Illumination unit	Contour	White LED							
	Surface	White LED		Colour LED		White LED		Colour LED	
	PRL	White LED		Colour LED		White LED		Colour LED	
Vision measuring accuracy*2	EUX / EUY,MPE	±(1.5+3L/1000) µm							
	EUXY,MPE	±(2.0+4L/1000) µm							
	EUZ,MPE	±(1.5+4L/1000) µm							
LAF repeatability		—	σ≤0.8 µm	—	σ≤0.8 µm	—	σ≤0.8 µm	—	σ≤0.8 µm
Stage glass size		399 x 271 mm				493 x 551 mm			
Max. stage loading		20 kg				40 kg			
Main unit	Dimensions (W x D x H)	866 x 930 x 1612 mm				1118 x 1426 x 1776 mm			
	Mass	355 kg				640 kg			

Model		QV APEX 606 Pro			
Code No.		363-621-10	363-623-10	363-622-10	363-624-10
Measuring range (X : Y : Z)		600 : 650 : 250 mm			
Tracking auto focus		—	✓	—	✓
Illumination unit	Contour	White LED			
	Surface	White LED		Colour LED	
	PRL	White LED		Colour LED	
Vision measuring accuracy*2	EUX / EUY,MPE	±(1.5+3L/1000) µm			
	EUXY,MPE	±(2.0+4L/1000) µm			
	EUZ,MPE	±(1.5+4L/1000) µm			
LAF repeatability		—	σ≤0.8 µm	—	σ≤0.8 µm
Stage glass size		697 x 758 mm			
Max. stage loading		50 kg			
Main unit	Dimensions (W x D x H)	1400 x 1994 x 1804 mm			
	Mass	1465 kg			

*2 Inspected to a Mitutoyo standard. L = Measured length (mm).

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QV HYPER Pro

SERIES 363 – High-accuracy CNC Vision Measuring System

- The QV HYPER Pro is a highly accurate model that is equipped with a high-resolution/-accuracy scale.
- By utilizing the optional TAF (Tracking Auto Focus), it can deliver high-speed measurement of an edge that fluctuates in the vertical direction, by tracking the edge automatically.
- The optional STREAM function provides an amazingly high throughput, due to the non-stop measurement where the camera motion and the strobe light are synchronized.
- This model is standard-equipped with automatic temperature compensation that uses a temperature sensor on the main unit of the measuring machine and a temperature sensor for the workpiece.

Technical Data

Resolution: 0.02 µm
Scale type: Linear encoder
Temperature compensation function: Automatic
Observation unit: Programmable power turret 1X-2X-6X*1

*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

Features

White LED, Colour LED, B&W camera, Strobe, STREAM, TAF, TP, Type 1, Type 4, PFF, WLI, ISO compliant

Icon key:

Available | Special order | Not available

Optional Accessory

Code No.	Description
02ATN695	Calibration chart with holder

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QV HYPER 302 Pro

Specifications

Model		QV HYPER 302 Pro				QV HYPER 404 Pro			
Code No.		363-605-10	363-607-10	363-606-10	363-608-10	363-615-10	363-617-10	363-616-10	363-618-10
Measuring range (X : Y : Z)		300 : 200 : 200 mm				400 : 400 : 250 mm			
Tracking auto focus		—	✓	—	✓	—	✓	—	✓
Illumination unit	Contour	White LED							
	Surface	White LED		Colour LED		White LED		Colour LED	
	PRL	White LED		Colour LED		White LED		Colour LED	
Vision measuring accuracy*2	E_{UX} / $E_{UY,MPE}$	±(0.8+2L/1000) µm							
	$E_{UXY,MPE}$	±(1.4+3L/1000) µm							
	$E_{UZ,MPE}$	±(1.5+2L/1000) µm							
LAF repeatability		—	σ≤0.8 µm	—	σ≤0.8 µm	—	σ≤0.8 µm	—	σ≤0.8 µm
Stage glass size		399 x 271 mm				493 x 551 mm			
Max. stage loading		15 kg				30 kg			
Main unit	Dimensions (W x D x H)	866 x 930 x 1612 mm				1118 x 1426 x 1776 mm			
	Mass	355 kg				640 kg			

Model		QV HYPER 606 Pro			
Code No.		363-625-10	363-627-10	363-626-10	363-628-10
Measuring range (X : Y : Z)		600 : 650 : 250 mm			
Tracking auto focus		—	✓	—	✓
Illumination unit	Contour	White LED			
	Surface	White LED		Colour LED	
	PRL	White LED		Colour LED	
Vision measuring accuracy*2	E_{UX} / $E_{UY,MPE}$	±(0.8+2L/1000) µm			
	$E_{UXY,MPE}$	±(1.4+3L/1000) µm			
	$E_{UZ,MPE}$	±(1.5+2L/1000) µm			
LAF repeatability		—	σ≤0.8 µm	—	σ≤0.8 µm
Stage glass size		697 x 758 mm			
Max. stage loading		40 kg			
Main unit	Dimensions (W x D x H)	1400 x 1994 x 1804 mm			
	Mass	1465 kg			

*2 Inspected to a Mitutoyo standard. L = Measured length (mm).

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QVTP Pro

SERIES 364 – CNC Vision Measuring System equipped with a Touch Trigger Probe

- Non-contact measurement and contact measurement can be done solely by one unit. QVTP Pro can perform contact measurement by using the vision measuring function and the touch trigger probe.
- Three-dimensional workpiece measurements can be performed. Enables 3D measurement of workpieces such as press-moulded products, plastic-moulded products, and cut products, which until now could not be measured with image processing alone.
- Using the probe module change rack allows switching between vision measurement and touch trigger probe measurement during an automatic measuring sequence.

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QVTP HYPER 404 Pro

Specifications

Model		QVTP APEX 302 Pro				QVTP APEX 404 Pro			
Code No.		364-601-10	364-603-10	364-602-10	364-604-10	364-611-10	364-613-10	364-612-10	364-614-10
Measuring range (X : Y : Z)*2	Vision	300 : 200 : 200 mm				400 : 400 : 250 mm			
	Touch probe	234 : 200 : 200 mm				334 : 400 : 250 mm			
Touch probe accuracy*3 $E_{X,MPE}$ / $E_{Y,MPE}$ / $E_{Z,MPE}$		±(1.8+3L/1000) µm							

Model		QVTP APEX 606 Pro			
Code No.		364-621-10	364-623-10	364-622-10	364-624-10
Measuring range (X : Y : Z)*2	Vision	600 : 650 : 250 mm			
	Touch probe	534 : 650 : 250 mm			
Touch probe accuracy*3 $E_{X,MPE}$ / $E_{Y,MPE}$ / $E_{Z,MPE}$		±(1.8+3L/1000) µm			

Model		QVTP HYPER 302 Pro				QVTP HYPER 404 Pro			
Code No.		364-605-10	364-607-10	364-606-10	364-608-10	364-615-10	364-617-10	364-616-10	364-618-10
Measuring range (X : Y : Z)*2	Vision	300 : 200 : 200 mm				400 : 400 : 250 mm			
	Touch probe	234 : 200 : 200 mm				334 : 400 : 250 mm			
Touch probe accuracy*3 $E_{X,MPE}$ / $E_{Y,MPE}$ / $E_{Z,MPE}$		±(1.7+3L/1000) µm							

Model		QVTP HYPER 606 Pro			
Code No.		364-625-10	364-627-10	364-626-10	364-628-10
Measuring range (X : Y : Z)*2	Vision	600 : 650 : 250 mm			
	Touch probe	534 : 650 : 250 mm			
Touch probe accuracy*3 $E_{X,MPE}$ / $E_{Y,MPE}$ / $E_{Z,MPE}$		±(1.7+3L/1000) µm			

*2 When a module change rack, a master ball, and a calibration ring are mounted, the measurement ranges are smaller than those given in the table. Other specifications are the same as those for QV APEX Pro and QV HYPER Pro. Please contact our sales office for more details.
*3 Inspected to a Mitutoyo standard. L = Measured length (mm).

Technical Data

Resolution
- APEX: 0.1 µm
- HYPER: 0.02 µm

Scale type: Linear encoder

Temperature compensation function
- APEX: Manual
- HYPER: Automatic

Observation unit: Programmable power turret 1X-2X-6X*1

*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

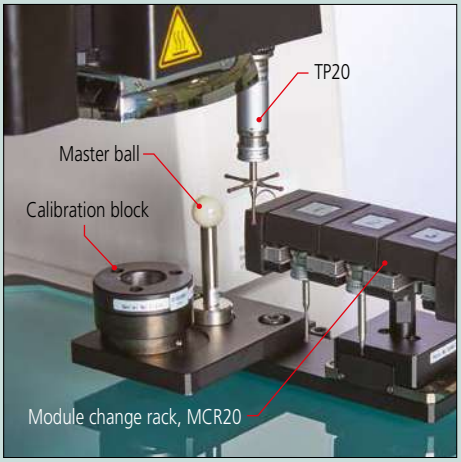
Features

White LED | Colour LED | B&W camera | Strobe | STREAM | TAF
TP | Type 1 | Type 4 | PFF | WLI | ISO (ISO compliant)

Icon key:
Available | Special order | Not available

Optional Accessory

Code No.	Description
02ATN695	Calibration chart with holder





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QVH4 Pro

SERIES 365 – CNC Vision Measuring System equipped with a Non-contact Displacement Sensor

- This dual system with a non-contact displacement sensor has a scanning function that enables measurement of minute height differences and 3D shapes.
- The non-contact displacement sensor (CPS probe) uses the wavelength confocal method.
- The LED used as the light source of the displacement sensor has an auto-brightness control function that enables seamless measurement of materials with different reflectivity.

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Technical Data

Resolution
- APEX: 0.1 µm
- HYPER: 0.02 µm

Scale type: Linear encoder

Temperature compensation function
- APEX: Manual
- HYPER: Automatic

Observation unit: Programmable power turret 1X-2X-6X*1

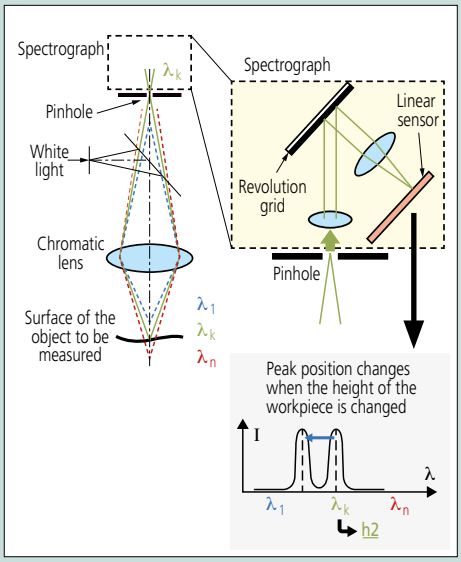
*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

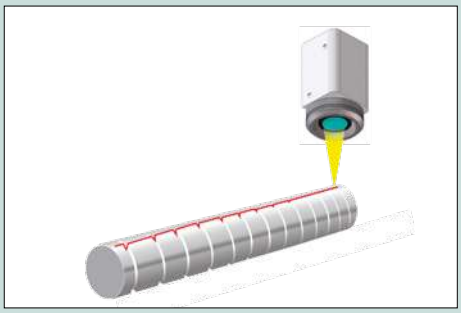
Features

White LED | Colour LED | B&W camera | Strobe | STREAM | TAF | TP | Type 1 | Type 4 | PFF | WLI | ISO (ISO compliant)

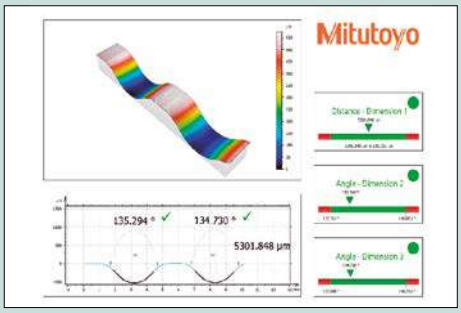
Icon key:

Available | Special order | Not available





Scanning measurement with automatic movement in the Z-axis direction.



Analysis example.

QVH4 HYPER 606 Pro



Specifications

Model		QVH4 APEX 302 Pro	QVH4 APEX 404 Pro	QVH4 APEX 606 Pro
Code No.		**365-601-10**	**365-611-10**	**365-621-10**
Measuring range (X : Y : Z)	Vision	300 : 200 : 200 mm	400 : 400 : 250 mm	600 : 650 : 250 mm
	Displacement sensor	176 : 200 : 200 mm	276 : 400 : 250 mm	476 : 650 : 250 mm
Illumination unit	Contour	White LED		
	Surface	White LED		
	PRL	White LED		
Vision measuring accuracy*2	E_{UX}/$E_{UY,MPE}$	±(1.5+3L/1000) µm		
	$E_{UXY,MPE}$	±(2.0+4L/1000) µm		
	$E_{UZ,MPE}$	±(1.5+4L/1000) µm		
Displacement sensor measuring accuracy*2 E_{1Z}		±(1.5+4L/1000) µm		
Stage glass size		399 x 271 mm	493 x 551 mm	697 x 758 mm
Max. stage loading		20 kg	40 kg	50 kg
Main unit	Dimensions (W x D x H)	866 x 930 x 1612 mm	1118 x 1426 x 1776 mm	1400 x 1994 x 1804 mm
	Mass	365 kg	650 kg	1475 kg

Model		QVH4 HYPER 302 Pro	QVH4 HYPER 404 Pro	QVH4 HYPER 606 Pro
Code No.		**365-605-10**	**365-615-10**	**365-625-10**
Measuring range (X : Y : Z)	Vision	300 : 200 : 200 mm	400 : 400 : 250 mm	600 : 650 : 250 mm
	Displacement sensor	176 : 200 : 200 mm	276 : 400 : 250 mm	476 : 650 : 250 mm
Illumination unit	Contour	White LED		
	Surface	White LED		
	PRL	White LED		
Vision measuring accuracy*2	E_{UX}/$E_{UY,MPE}$	±(0.8+2L/1000) µm		
	$E_{UXY,MPE}$	±(1.4+3L/1000) µm		
	$E_{UZ,MPE}$	±(1.5+2L/1000) µm		
Displacement sensor measuring accuracy*2 E_{1Z}		±(1.5+2L/1000) µm		
Stage glass size		399 x 271 mm	493 x 551 mm	697 x 758 mm
Max. stage loading		15 kg	30 kg	40 kg
Main unit	Dimensions (W x D x H)	866 x 930 x 1612 mm	1118 x 1426 x 1776 mm	1400 x 1994 x 1804 mm
	Mass	365 kg	650 kg	1475 kg

*2 Inspected to a Mitutoyo standard. L = Measured length (mm).

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QVWLI

SERIES 363 – Non-Contact 3D Measuring System

- The QVWLI is a high accuracy 3D measurement system consisting of QV and a white light interferometer.
- 3D data captured by the WLI optical system enables 3D surface texture analysis and 3D roughness analysis.
- The QVWLI also performs dimension measurement and cross-section measurement at a specific height using 3D data.

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QVWLI 606

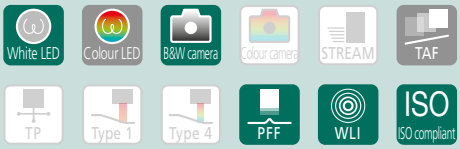


Technical Data

Resolution:	0.01 µm
Scale type:	Linear encoder
Temperature compensation function:	Automatic
Observation unit:	Programmable power turret 1X-2X-6X*1

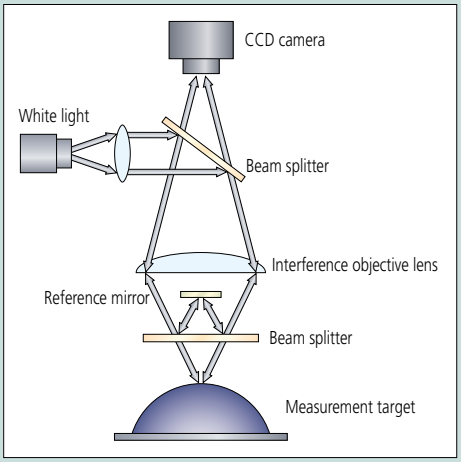
*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

Features

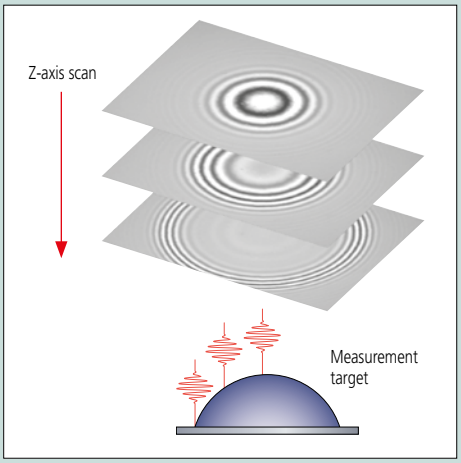


Icon key:

Available | Special order | Not available



WLI optical system head.



Interference fringe production and measurement by WLI.

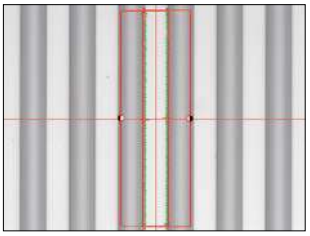
Specifications

Model		QVWLI Pro 404	QVWLI Pro 606
Code No.		363-716-10	363-717-10
Measuring range (X : Y : Z)	Vision measuring area	400 : 400 : 240 mm	600 : 650 : 220 mm
	WLI measuring area*2	315 : 400 : 240 mm	515 : 650 : 220 mm
Illumination unit	Contour	White LED	
	Surface	White LED	
	PRL	White LED	
	WLI optical head	Halogen	
Vision measuring accuracy*3	E1XY	±(0.8+2L/1000) µm	
	E1Z	±(1.5+2L/1000) µm	
	E2XY	±(1.4+3L/1000) µm	
WLI repeatability*3		2σ ≤ 0.08 µm	
Stage glass size		493 x 551 mm	697 x 758 mm
Max. stage loading		25 kg	35 kg
Main unit	Dimensions (W x D x H)	1118 x 1426 x 1781 mm	1400 x 1994 x 1794 mm
	Mass	1205 kg	2275 kg

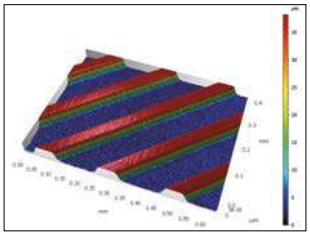
*2 Movable range of WLI optical head.
*3 Determined by Mitutoyo's inspection method. L is the measured length (mm).

Optional Accessories

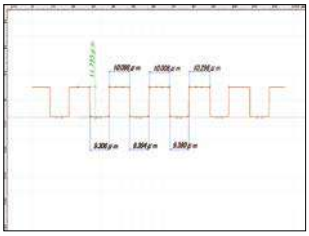
Code No.	Description
02ALT600	QVWLI 25X objective
02ALT630	QVWLI 10X objective
02ALY400	QVWLI 5X objective



Video image of part.



3D analysis of measured part.



2D analysis of measured part.

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QV ACCEL

SERIES 363 – Large-sized CNC Vision Measuring Systems

- The primary focus is on measurement efficiency, with the moving-bridge design eliminating the need for a moving stage. This allows a more simplified design of the workpiece fixture, resulting in a significant reduction in the time required for fixture fabrication and inspection.
- The moving-bridge design makes it suitable for measuring large objects.
- The exceptionally rigid construction allows a drive speed in X and Y of 400 mm/s, approximately 30% faster than standard QV Apex models, therefore minimizing non-productive time during the measuring cycle.
- QV ACCEL 1212 (measuring range 1250 x 1250 x 100 mm) and QV ACCEL 1517 (measuring range 1500 x 1750 x 100 mm) are available to special order.

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Technical Data

Resolution:	0.1 µm
Scale type:	Linear encoder
Temperature compensation function:	Automatic
Observation unit:	Programmable power turret 1X-2X-6X*1

*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

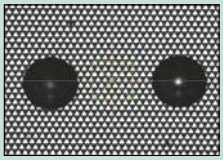
Features

White LED | Colour LED | B&W camera | Colour camera | STREAM | TAF
TP | Type 1 | Type 4 | PFF | WLI | ISO (ISO compliant)

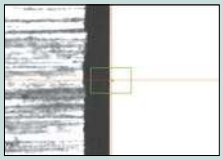
Icon key:

Available | Special order | Not available

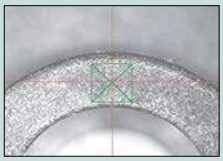
Image multi-auto focus:
The optimal focus can be selected for each surface texture and measured feature, realizing high repeatability and reliable edge detection.



Pattern focus.

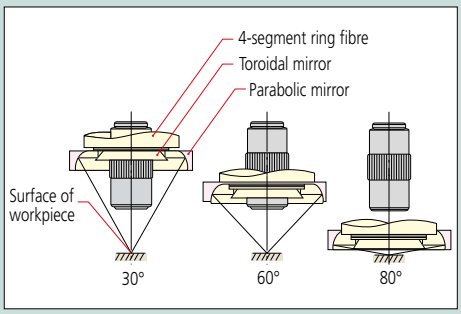


Edge focus.



Surface focus.

Programmable Ring Light (PRL):
Fine control of angle and direction provides optimum illumination for optical measurement. The angle can be set in the range from 30° to 80°. This type of illumination is effective for enhancing the edge of inclined surfaces or very small steps. Illumination can be controlled independently from back or front, right or left. Measurement with edge enhancement is possible if you form a shadow by illuminating from only one direction.



QV ACCEL 808



Specifications

Model		QV ACCEL 808	QV ACCEL 1010
Code No.		363-315-20	363-335-20
Measuring range (X : Y : Z)*2		800 : 800 : 150 mm	1000 : 1000 : 150 mm
Illumination unit	Contour	White LED	
	Surface	White LED	
	PRL	4-quadrant white LED	
Vision measuring accuracy*2	E1X, E1Y	±(1.5+3L/1000) µm	
	E1Z	±(1.5+4L/1000) µm	
	E2XY	±(2.5+4L/1000) µm	
Repeatability (X/Y axes)*2	Short dimension	3σ = 0.2 µm	
	Long dimension	3σ = 0.7 µm	
Stage glass size		883 x 958 mm	1186 x 1186 mm
Max. stage loading		10 kg	30 kg
Dimensions (W x D x H)		1475 x 1860 x 1578 mm	1912 x 2116 x 1603 mm
Mass		2050 kg	2950 kg

*2 Determined by Mitutoyo's inspection method. L is the measured length (mm).
Short dimension = repeatability within a single screen, long dimension = repeatability over several screen movements.

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QV ULTRA

SERIES 363 – Ultra-high Accuracy CNC Vision Measuring System

- QV ULTRA is an ultra-high accuracy CNC vision measuring system.
- This machine uses air bearings specially developed for use in high-accuracy 3D measuring machines on the X-, Y-, and Z-axes to provide a guide system with minimum straightness errors.
- Optimal design is achieved by using FEM (Finite Element Method) analysis to provide high rigidity of the main unit.
- Our proprietary high-resolution (0.01 µm) and high-accuracy low-expansion glass scales are used on the X, Y and Z axes.
- The main unit utilizes a highly rigid moving Y axis table with a fixed bridge.
- The base is made of high stability granite.

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QV ULTRA 404



Technical Data

Resolution:	0.01 µm
Scale type:	Linear encoder
Temperature compensation function:	Automatic
Observation unit:	Programmable power turret 1X-2X-6X*1

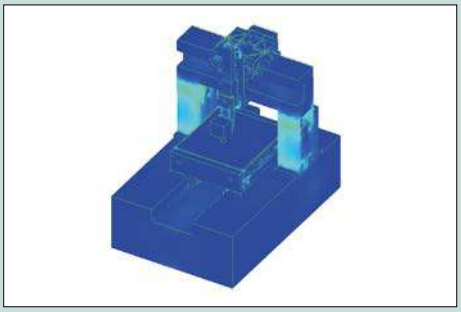
*1 Programmable power turret 1X-2X-4X model and 1X-2X-4X-6X model available to special order.

Features

Halogen | Colour LED | B&W camera | Colour camera | STREAM | TAF
TP | Type 1 | Type 4 | PFF | WLI | ISO (ISO compliant)

Icon key:

Available | Special order | Not available



By using FEM (Finite-Element Method) analysis of the base design, the placement of stiffening ribs and beams has been determined for the QV ULTRA to provide optimal structural rigidity.



The QV ULTRA is equipped with a crystallized glass scale having a resolution of 0.01 µm and linear expansion coefficient of 0.08×10^{-6}/K. This virtually zero thermal expansion means the QV ULTRA can minimize accuracy fluctuation resulting from thermal changes.



Mitutoyo's ultra-precision scale manufacturing facility eleven metres underground produces the exceptionally accurate scales for the QV ULTRA.

Specifications

Model		QV ULTRA 404	
Code No.		363-520-10	363-521-10
Measuring range (X : Y : Z)*2		400 : 400 : 200 mm	
Tracking auto focus		—	✓
Illumination unit	Contour	White LED	
	Surface	White LED	
	PRL	White LED	
Vision measuring accuracy*2	E1X, E1Y	±(0.35+1.3L/1000) µm	
	E1Z	±(1.5+2L/1000) µm	
	E2XY	±(0.5+2L/1000) µm	
LAF repeatability		—	σ≤0.8 µm
Stage glass size		493 x 551 mm	
Max. stage loading		40 kg	
Dimensions (W x D x H)		1172 x 1736 x 1910 mm	
Mass		2150 kg	

*2 Determined by Mitutoyo's inspection method. L is the measured length (mm).

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UMAP

SERIES 364 – Micro Form Measuring System

- The extremely small styli used by the Ultra Micro Accurate Probe (UMAP) system have made possible highly accurate measurement of minute features not previously possible with a contact method.
- Sophisticated, high accuracy non-contact and contact measurement capabilities with one machine.
- This unit includes the UMAP probe and the non-contact type vision head. The combination of contact and non-contact measurement methods at this scale provides a solution for previously difficult (or even impossible) applications.

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SMS Smart Measuring System

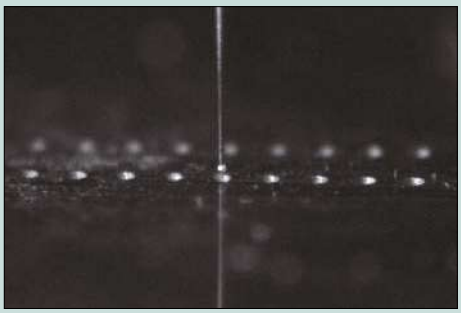
PROPRIETARY INSPECTION CERTIFICATE

UMAP Probe

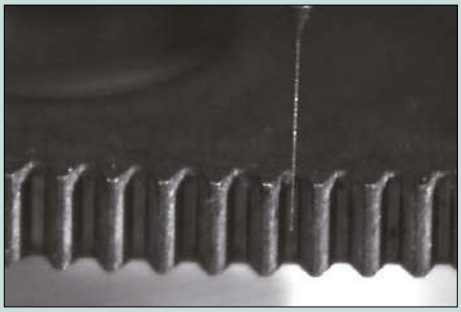


A stylus vibrating at an ultrasonic frequency enables the UMAP probe to sense contact with minute workpiece features. Five stylus tip diameters are available, from 15 to 300 µm.

Application Examples



Contour measurement of a ø0.125 hole.



Measuring form accuracy of micro gear teeth.



UMAP TYPE2 HYPER 302 Pro.

UMAP TYPE2 ULTRA 404

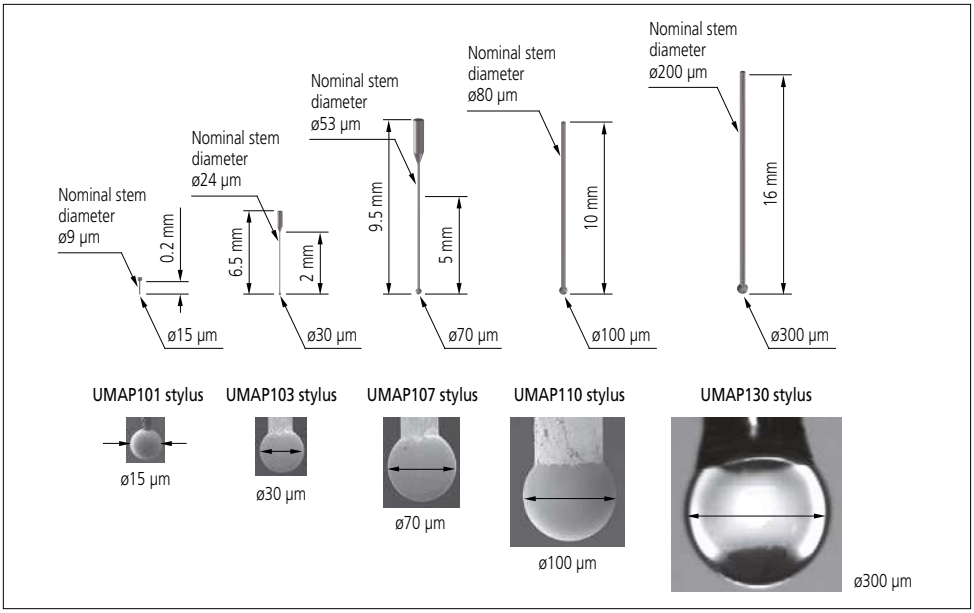


Specifications

Model		UMAP TYPE2 HYPER 302 Pro	UMAP TYPE2 ULTRA 404
Code No.		364-714-10	364-718-10
Measuring range	X : Y	185 : 200 mm	285 : 400 mm
	Z (UMAP101/103)	173 mm / 175 mm	
	Z (UMAP107/110)	178 mm / 178.5 mm	
	Z (UMAP130)	200 mm	
Accuracy* (Vision)	E_{1XY}	±(0.8+2L/1000) µm	±(0.35+1.8L/1000) µm
	E_{1Z}	±(1.5+2L/1000) µm	
Repeatability	UMAP 101/103/107	σ = 0.1 µm	σ = 0.08 µm
	UMAP 110/130	σ = 0.15 µm	σ = 0.12 µm

* Inspected to a Mitutoyo standard. L = Measured length (mm).

UMAP Stylus Dimensions



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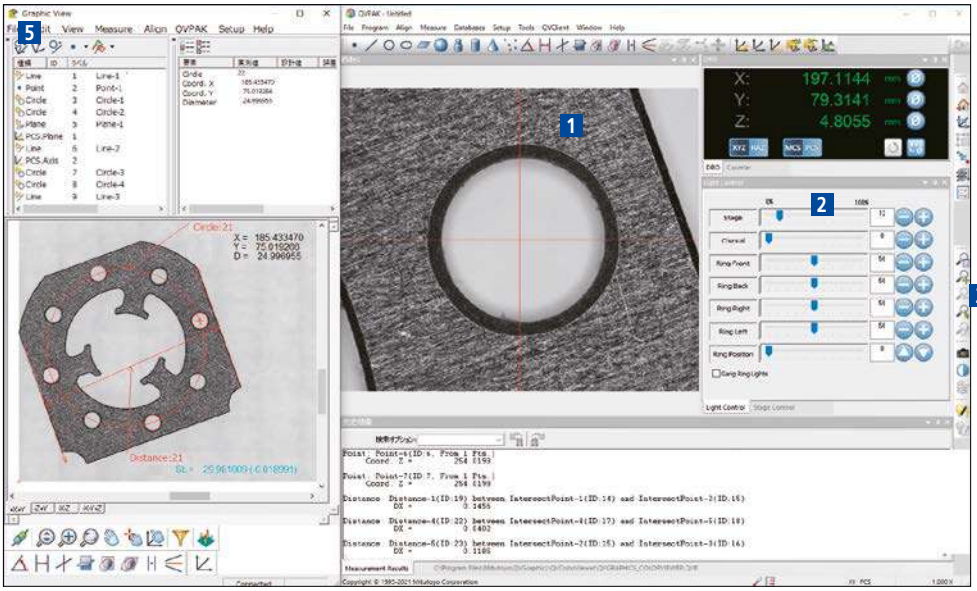
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QVPAK

Software for Quick Vision Systems

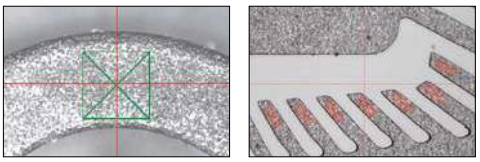
- QVPAK controls multiple sensors: CCD cameras, Touch Probes, continuous scanning devices and special probes such as UMAP and LNP.
- Powerful mathematical algorithms are provided that help detect difficult edges via noise filters (similar to morphological filters) and advanced detection tools that take into account the texture of the target surface.
- Part programming and editing is made easy with the user-friendly Easy Editor.
- 3D graphic display or measuring planes display with QVClient QVGraphic.
- QVPAK also offers various QVClients (standard), real assistants for users (programming mode) or operators (production mode) such as QVSmartEditor and QVNavigator.

A Rich Choice of Measuring Functions



3 Multi-Point Autofocus

You can subdivide an autofocus tool or set up multiple autofocus tools at desired sizes, positions, and angles.



4 MiCAT Reporter NEW

MiCAT Reporter is equipped as standard with the purpose to create reports from the QVPAK measurement results. The software can output data into PDF directly, allowing you to create medical component reports and other reports requiring reliability.



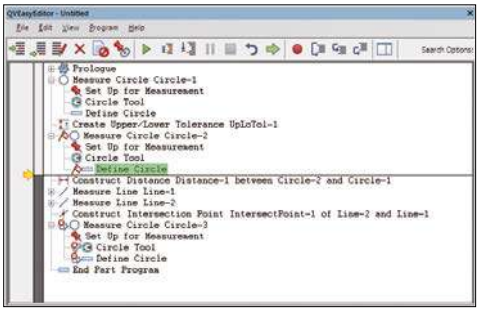
5 QV Graphics NEW

Not only can this feature be used for reports of measurement results, but also high-level calculations, such as calculations between elements and PCD measurements can be performed by selecting diagrams with the mouse. In addition, effective use of the graphics function makes it possible to easily edit part programs and is also useful in checking the coordinate system of the current workpiece and in checking for any forgotten measurements.



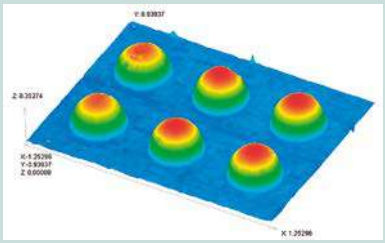
6 QV EasyEditor

QV EasyEditor records and allows you to easily edit the details of the operator's measuring process. The program list displays error icons for you to quickly find the parts to correct.



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Optional PFF Function (Points From Focus)



- PFF enhances the functionality of standard QV models with 3D topography measurements.
- No additional sensor necessary.
- High scanning range in Z axis from 2.7 mm up to 40.6 mm depending on the objective lens in use and in wide range mode.
- PFF is a retro-fit option for QV APEX Pro, QV HYPER Pro, QV ACCEL and QV ULTRA.
- Contact your local Mitutoyo office for more details.

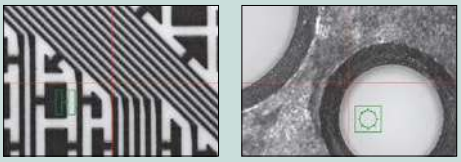
1 One-Click Tool

Whatever your proficiency level, this function enables you to perform high-accuracy measurements by simply selecting the measurement item (circle, line, etc.) and clicking the edge to measure. The outlier removal function automatically removes traces of burrs and contaminants.



2 AI Illumination Tools

There are two tools: the dual area contrast tool, which can adjust the light intensity to the optimal value at procedure creation time, and the brightness tool, which automatically compensates for the light intensity at program creation time. These tools stabilize the light intensity during repeat measurements, which increases edge detection repeatability and reduces the occurrence of edge detection errors caused by light intensity fluctuations



Dual area contrast tool

Brightness tool

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QVPAK

Software for Quick Vision Systems

Optional Application Software

FORMTRACEPAK-AP

Verifies designed values and performs form analysis on the basis of the contour data obtained via the QV auto trace tool, non-contact displacement sensor, PFF or WLI.

Contour Tolerancing Function

- Design data creation: CAD data conversion, master workpiece conversion, function specification, text file conversion, and aspherical surface design value creation.
- Tolerancing: Normal vector direction tolerancing, axial direction tolerancing, and best-fit tolerancing.

Microscopic Form Analysis

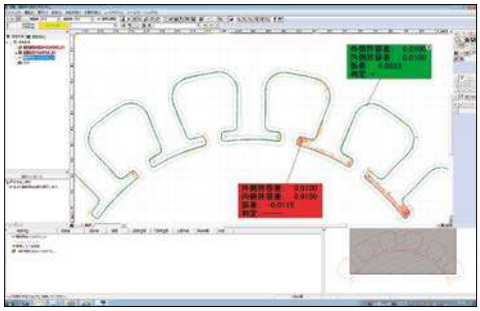
- Analyzed items: point measurement, line measurement, circle measurement, distance measurement, intersection measurement, angle measurement, origin setting, and axial rotation.
- Calculated items: maximum, minimum, average, standard deviation, and area.

Report Creation Function

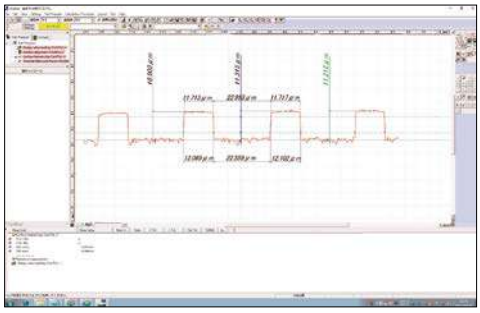
- Measurement result, error graph, and error developed view.

Other Functions

- Recording and executing analysis procedures.
- External output function: CSV, text ,or DXF / IGES format output.



Tolerancing example.



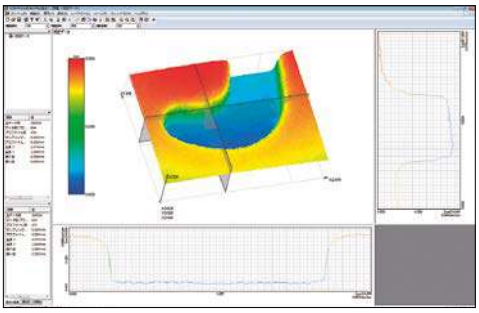
Example of using WLI to perform line, space, and conductor thickness measurements on a printed circuit board.

FORMTRACEPAK-PRO

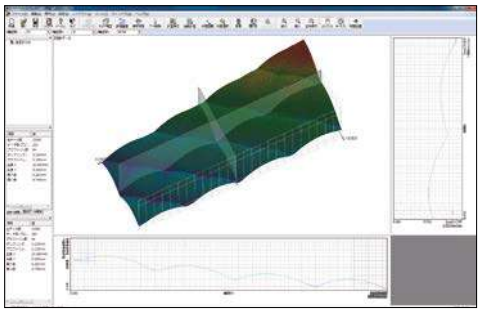
3D data captured by WLI can be analyzed for 3D surface roughness and surface texture. You can also analyze the displayed 3D shape information captured by the non-contact displacement sensor of PFF or QV Hybrid.

Main Functions

- 3D display: Wireframe, shading, contour line, contour line filling.
- Trend compensation and filter processing: Trend compensation using flat surfaces, spherical surfaces, cylindrical surfaces, and polyhedrons. 1D and 2D digital filters for each profile.
- Digitization of a rich variety of surface textures: Relative load curves and area distribution curves can be used to evaluate wear and oil accumulation areas. Spectral analysis, cutoff area and volume analysis, angle of inclination calculations at peaks and valleys, and histogram calculations of numbers of valleys can be performed.
- Function for extracting features from measurement data: Extraction of a chosen cross-section, slope enhancement, and simultaneous analysis of the peaks and valleys of the cutoff surface can be performed.



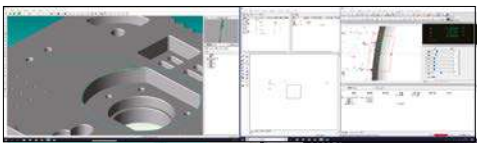
Example of using PFF to measure a moulded component.



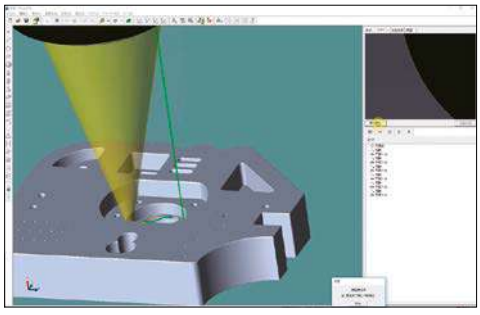
Example of using CPS to perform acrylic lens array measurements.

QV3DCAD

QV3DCAD creates a QVPAK part program from a 3D CAD model. The current version supports two modes: the online mode that allows you to teach while monitoring the actual workpiece by synchronizing the software with the QV system, and the offline mode that allows you to create a part program on a PC not connected to the main unit.



Online teaching mode.



Offline teaching mode.

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QVPAK

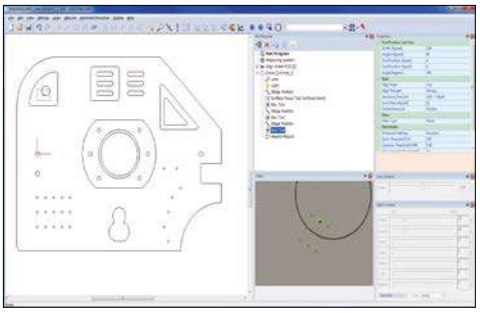
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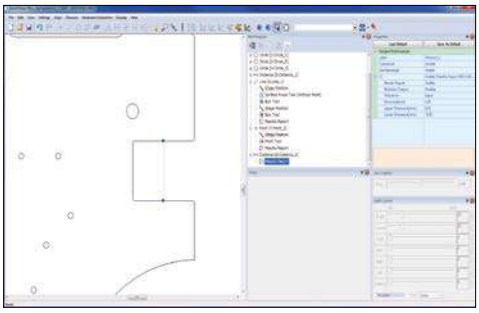
Optional Application Software

EASYPAG-PRO

Creates QVPAK measurement procedure programs using 2D CAD data. This allows users to reduce program creation man-hours and shorten lead times.



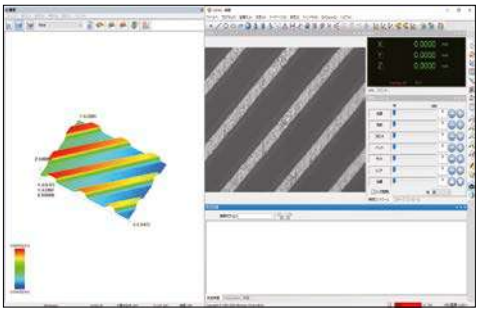
Offline teaching operation display.



Line-to-arbitrary point distance measurement.

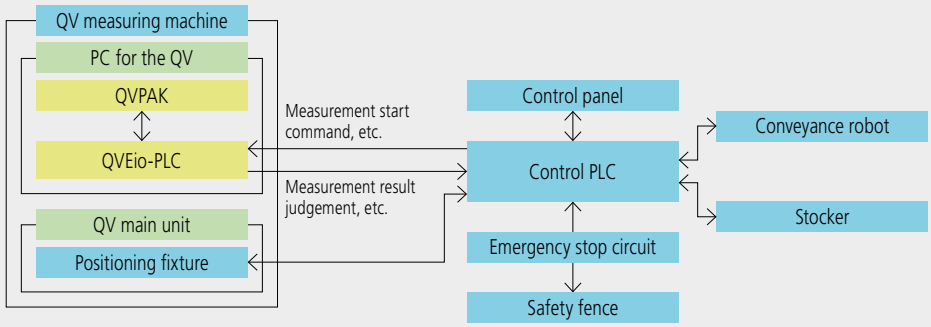
QV3DPAK

Generates 3D models from PFF (Points From Focus) or WLI (White Light Interferometer) data.



QVEio

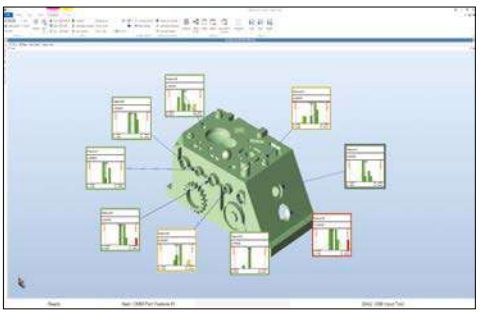
This is a client application that can externally control QVPAK or provide the operating status of QVPAK by connecting a PLC or remote software on an external PC. QVEio can also connect an automatic transfer robot to a signal tower.

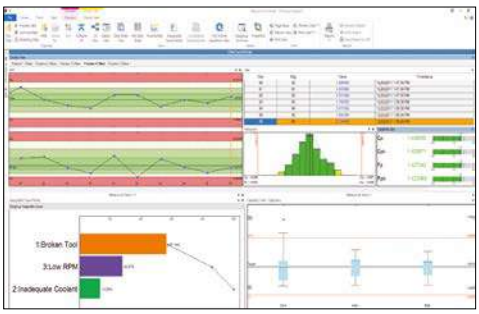


QVEio-PLC supported example.

MeasurLink

Enables statistical arithmetic processing of measurement results (see page A-05).





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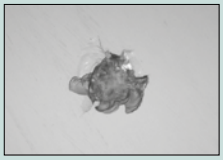
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DDPAK-QV

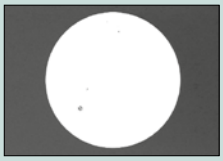
Flaw Inspection Software for Quick Vision Systems

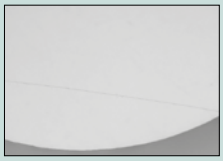
- Utilized during measurement to inspect for flaws, such as contaminants, burrs and cracks while performing high-accuracy non-contact measurement at the same time.
- Creates a seamless flaw inspection system that transfers the image data captured by the QUICK VISION Series to DDPAK-QV, outputs the flaw coordinates and automatically saves the image.
- Measures the dimensions of a flaw and analyzes its shape. Analyzing the coordinate, size, depth, height and other statistics of a flaw can help analyze the cause, prevent recurrence, and improve the production process.
- You can add DDPAK-QV, the flaw inspection software, to your QUICK VISION. Add the inspection feature to expand the applications of your QUICK VISION.

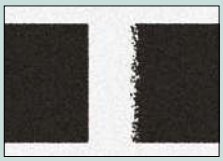
Flaw Detection Examples

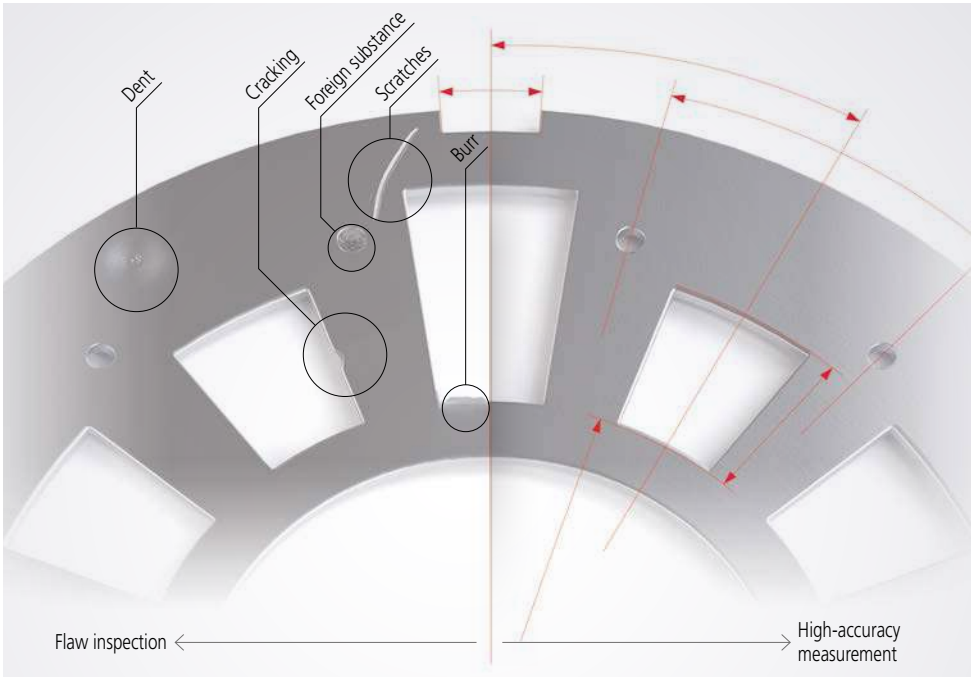

Chip on glass.

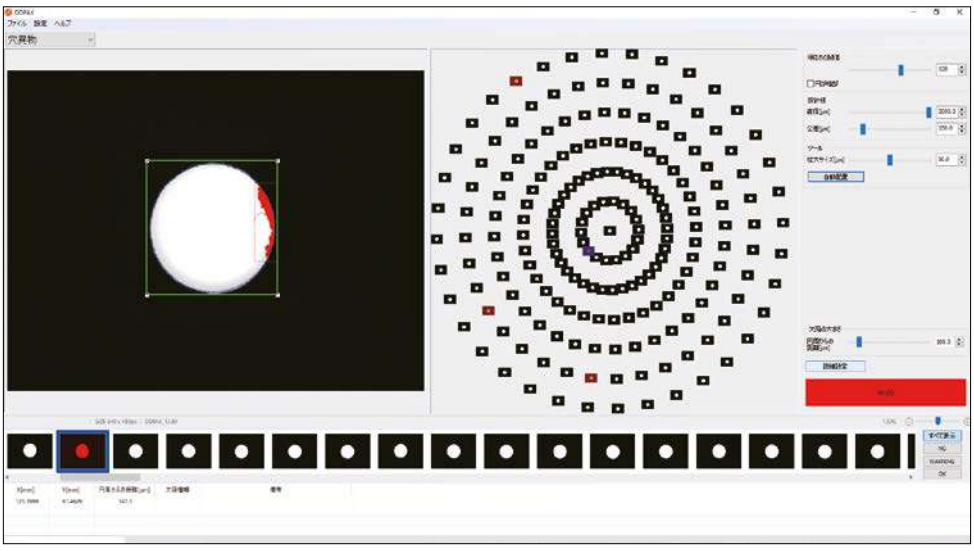

Cracked glass.

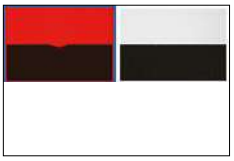

Foreign substance in a hole.


Scratched mirror-finished surface.


Print blurring on an electronic part.




Inspection for foreign substances in shower head diameters.


The image of the detected flaw turns red.


Chipped blade.

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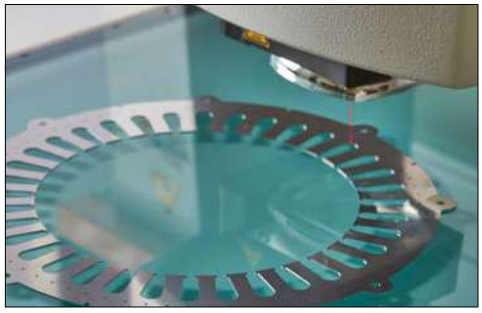
Optional Accessories

For Quick Vision Systems

Tracking Auto Focus (TAF)*1

- For QV APEX Pro, QV HYPER Pro, QVTP Pro and ULTRA QV.
- The Tracking Auto Focus unit (TAF) allows stable, high-speed measurement in the Z direction due to the precision knife-edge method adopted in the detection system.
- The TAF function tracks the contours of the workpiece surface in the Z direction and enhances throughput compared with the normal measuring mode.
- TAF enables non-stop measurement when used on a Quick Vision Stream Plus system.

*1 Factory-fit option



Order No.	TAF-HR1X	TAF-SL1X	TAF-HR2.5X	TAF-SL2.5X	TAF-5X
Laser source	Semiconductor laser (peak wavelength: 690 nm)				
Laser safety	Class 2 (JIS C6802:2011, EN/IEC 60825-1:2007)				
Auto focus system	Objective coaxial autofocussing (knife-edge method)				
Applicable objectives	QV-HR1X	QV-SL1X	QV-HR2.5X	QV-SL2.5X	QV-5X
Tracking range*2	±3.15 mm	±3.15 mm	±0.5 mm	±0.5 mm	±0.125 mm
Laser spot diameter	5.2 µm	8 µm	2.1 µm	3.1 µm	1.5 µm

*2 The tracking range depends on the surface texture and reflectance of a workpiece.

Objective Lenses

A wide choice of objectives enables magnification of the optical system to be specified over the range of 0.5 to 25X to provide the best match to the application. The longer working distance type is also available.



Objective	Order No.	Working distance	Turret lens magnification*3	Monitor magnification*4	Field of view
QV-SL0.5X	**02AKT199**	30.5 mm	1X	15X	12.54 x 9.4
			2X	29X	6.27 x 4.7
			6X	87X	2.09 x 1.56
QV-HR1X	**02AKT250**	40.6 mm	1X	29X	6.27 x 4.7
			2X	58X	3.13 x 2.35
			6X	173X	1.04 x 0.78
QV-SL1X	**02ALA150**	52.5 mm	1X	29X	6.27 x 4.7
			2X	58X	3.13 x 2.35
			6X	173X	1.04 x 0.78
QV-HR2.5X	**02AKT300**	40.6 mm	1X	72X	2.49 x 1.86
			2X	144X	1.24 x 0.93
			6X	430X	0.41 x 0.31
QV-SL2.5X	**02ALA170**	60.0 mm	1X	72X	2.49 x 1.86
			2X	144X	1.24 x 0.93
			6X	430X	0.41 x 0.31
QV-HR5X	**02AWD010**	20.0 mm	1X	144X	1.24 x 0.93
			2X	290X	0.62 x 0.47
			6X	870X	0.20 x 0.15
QV-5X	**02ALA420**	33.5 mm	1X	144X	1.24 x 0.93
			2X	290X	0.62 x 0.47
			6X	870X	0.20 x 0.15
QV-HR10X	**02AKT650**	20.0 mm	1X	290X	0.62 x 0.47
			2X	580X	0.31 x 0.23
			6X	1730X	0.10 x 0.07
QV-10X	**02ALG010**	30.5 mm	1X	290X	0.62 x 0.47
			2X	580X	0.31 x 0.23
			6X	1730X	0.10 x 0.07
QV-25X	**02ALG020**	13.0 mm	1X	720X	0.25 x 0.18
			2X	1440X	0.12 x 0.09
			6X	4300X	0.04 x 0.03

*3 The monitor magnification is a reference value when an image is displayed at 1X screen magnification on a 22-inch wide LCD monitor. QVPAK version 10 or later supports changing of video window size.

*4 When using a 10X or 25X objective lens in conjunction with a 2X or 6X power turret, brightness illumination may be insufficient depending on the workpiece.

QV Index*5

Using the QV Index to rotate the workpiece makes it possible to automatically measure multiple surfaces without having to dismount and remount the workpiece.

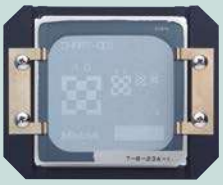
*5 Available on 302, 404 and 606 models only.



Model	QV Index
Minimum rotation angle	0.1°
Maximum rotation speed	10 rpm
Positional accuracy	±0.5°
Maximum workpiece diameter	140 mm
Maximum workpiece mass	2 kg

Calibration and Compensation Charts

These glass charts are used to compensate for differences in the pixel size of the CCD chip, autofocus accuracy and the optical axis offset at each magnification of the Programmable Power Turret (PPT).





Order No.	Description
02ATN695	Calibration chart with holder
02ATN697	Compensation chart with holder

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OPTI-FIX

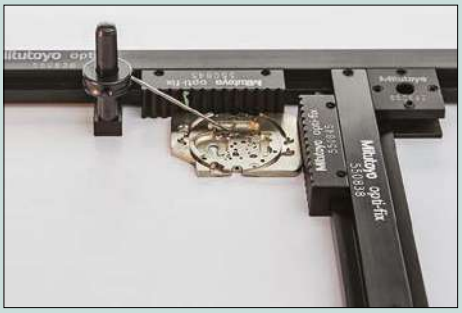
The Modular Clamping System for Vision Measuring Systems

- The system's highly compact components are designed to enable firm retention of a workpiece in the required position during a measurement cycle without obstructing the target surface.
- Enables reliable, repeated measurements on a batch of parts or in particular positions.
- Dovetail joints are used to connect the clamping and support elements to the rails for ease of assembly and handling.
- A wide choice of set contents offers various configurations to enable adaptation to practically any part.

Application Examples



Holding a cylindrical part between centres.



Toothed location elements provide access to edges for the camera while one or more spring clips lightly clamp a part in the measurement position.



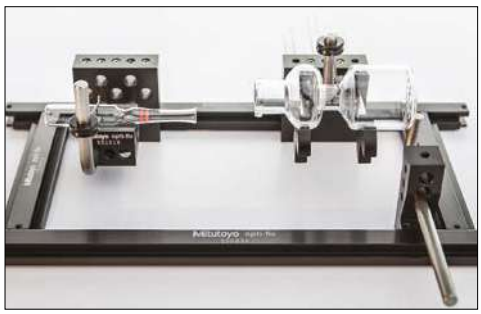
Batch measurement of identical parts simply located against connected rails.



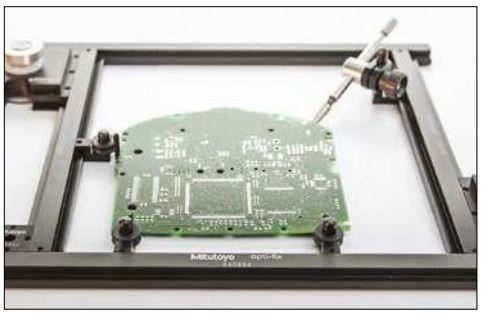
Opti-Set Round

Specifications

Order No.	Set	Elements	Description
K550298	Opti-Set Round	18	Allows aerial positioning of complex parts (supplied in a case)
K551056	Opti-Set Start	16	Construction of a right-angled frame: 250 x 100 mm
K551057	Opti-Set Basic	26	Construction of a frame: 200 x 100 mm
K551058	Opti-Set Rotation	23	Construction of a frame: 250 x 200 mm (includes accessories for holding cylindrical parts)
K551059	Opti-Set Advanced	51	Construction of a frame: 400 x 250 mm (allows aerial positioning of parts)
K551060	Opti-Set Professional	115	Construction of a frame: 400 x 250 mm (complete and highly versatile kit)



Dissimilar parts located and clamped ready for measurement within the same cycle.



Support and clamping of a PCB at three points to enable positive location of the irregular profile at the measurement position.

K

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FORM MEASUREMENT



Surface Roughness Measurement



Contour Measurement



Surface Roughness/Contour Measurement



Roundness Measurement



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Surftest SJ-220

SERIES 178 – Portable Surface Roughness Tester

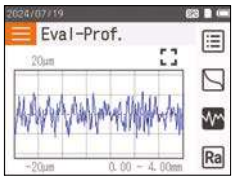
- The screen size has been expanded to 2.8 inches, achieving high visibility, while maintaining a compact device size to fit in one hand. The backlight makes it clear and easy to see, even in dimly lit locations.
- The Surftest SJ-220 is equipped with a touchscreen and a new user interface. You can perform operations like changing the display screen and adjusting the settings with your fingertip. In addition to touch operations, it also supports flick and swipe operations, making it easy for anyone to perform measuring work.
- The display interface supports 25 languages, which can be freely switched.
- In addition to conventional roughness standards, it supports the new surface texture standard ISO 21920.
- By attaching the optional wireless communication unit, it is possible to have wireless communication via Bluetooth® with a device (PC or smartphone).
- We provide free software that allows you to import various data (measurement conditions, parameter settings, calculation results, measurement data) from the SJ-220 to create and edit inspection reports on your PC. This software can significantly reduce the amount of time you need to spend on reporting.

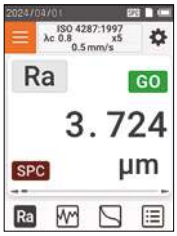
U-WAVE

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Surftest SJ-220







Specifications / Configuration

Model		SJ-220					
Code No. (inch/mm)		**178-741-13**	**178-742-13**	**178-743-13**	**178-744-13**	**178-745-13**	**178-746-13**
Drive unit	Type	Standard		Retractable		Transverse tracing	
	Code No.						
Measuring range		17.5 mm				5.6 mm	
Measuring speed		0.25, 0.5, 0.75, 1 mm/s (returning: 1 mm/s)					
Measuring method		Skidded					
Stylus tip	Angle	60°	90°	60°	90°	60°	90°
	Radius	2 µm	5 µm	2 µm	5 µm	2 µm	5 µm
Detector	Range	360 µm (-200 µm to +160 µm)					
	Measuring force	0.75 mN	4 mN	0.75 mN	4 mN	0.75 mN	4 mN
	Code No.	178-296	178-390	178-296	178-390	178-387	178-386
Assessed profiles		P (primary profile), R (roughness profile), DF (DF profile), roughness profile-motif					
Evaluation parameters		Ra, Rc, Ry, Rz, Rq, Rt, Rmax, Rp, Rv, R3z, Rsk, Rku, Rc, RPc, Rsm, Rz1max, S, HSC, RzJIS, Rppi, RΔa, RΔq, Rlr, Rmr, Rmr(c), RδC, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rpm, tp, Htp, R, Rx, AR, possible to customize					
Analysis graphs		Bearing area curve (BAC), amplitude distribution curve (ADC)					
Power supply		Via AC adapter or rechargeable battery					
Battery	Charge time	Approx. 4 hours (may vary due to ambient temperature)					
	Endurance	Approx. 1000 measurements (differs slightly due to usage and environmental conditions)					
Dimensions (W x D x H)	Display unit	164.7 x 67.1 x 51.9 mm					
	Drive unit	115 x 23 x 26 mm					
Mass		330 g (Display unit), 180 g (Drive unit), 7.8 g (Detector)					
Price		**£2,050.00**	**£2,050.00**	**£2,280.00**	**£2,280.00**	**£3,540.00**	**£3,540.00**

Technical Data

Detector
- Skid radius of curvature: 40 mm
- Skid force: Less than 400 mN
- Type: Differential inductance

External I/O: USB, Digimatic output, printer output, RS-232C, footswitch

Evaluation Capability

Applicable standards: JIS'82, JIS'94, JIS'01, ISO'97, ANSI, VDA
Digital filters: Gaussian , 2CR75 , PC75
Cutoff length: λc: 0.08 , 0.25 , 0.8 , 2.5 mm
λs: 2.5 , 8 µm
Sampling length: 0.08 , 0.25 , 0.8 , 2.5, 8 mm
Number of sampling lengths (x n):
- Standard type: x1, x2, x3, x4, x5, x6, x7, x8, x9, x10 arbitrary length (0.1 to 16 mm: 0.01 mm interval)
- Retractable type: x1, x2, x3, x4, x5, x6, x7, x8, x9, x10 arbitrary length (0.3 to 16 mm: 0.01 mm interval)
- Transverse type: x1, x2, x3, x4, x5, x6, x7, x8, x9, x10 arbitrary length (0.1 to 5.6 mm: 0.01 mm interval)

Functions

Customization: Desired parameters can be selected for calculation and display
GO/±NG judgement: By max value / 16% / mean rule
Storage of setups: Save the setup at power OFF
Storage
- Internal memory: Setups (10 sets), Measured profile (1 set)
- Memory card (option): 500 setups, 10,000 measured profiles, 500 display images, text file (setups / measured profile / assessed profile / BAC / ADC)

Calibration: Auto-calibration with the entry of numerical value / average calibration with multiple measurement (max. 5 times) is available

Optional Accessories

Refer to pages L-05 to L-06.





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Surftest SJ-310

SERIES 178 – Portable Surface Roughness Tester

- The handheld data processing unit and the 5.7-inch colour graphic LCD touch-panel provide superior readability and operability. The LCD also includes a backlight for improved visibility in dark environments.
- The excellent user interface provides intuitive and easy-to-understand operability.
- Complies with the following standards: JIS (JIS-B0601-2001, JIS-B0601-1994, JIS B0601-1982), VDA, ISO- 1997, and ANSI.
- The Measure-Start and other frequently used buttons are strengthened to resist wear and the detrimental effects of workshop contaminants.
- Equipped with a large-capacity battery allowing approximately 1500 measurements when fully charged.
- Includes convenient carrying case for protection in the field.
- A high-speed printer is built into the main unit. Either landscape or portfolio mode can be selected according to the application. Paper saving mode is supported.
- The display interface supports 16 languages, which can be freely switched.
- 10 setups can be saved in the measurement unit. An optional memory card can save setups and the measured profile.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



Surftest SJ-310

Technical Data

Detector
- Skid radius of curvature: 40 mm
- Skid force: Less than 400 mN
- Type: Differential inductance

External I/O: USB, Digimatic output, RS-232C, external software interface

Evaluation Capability

Applicable standards: JIS'82, JIS'94, JIS'01, ISO'97, ANSI, VDA
Digital filter: 2CR, PC75, Gaussian
Cutoff length: lc: 0.08, 0.25, 0.8, 2.5, 8 mm; ls: 2.5, 8 µm
Sampling length: 0.08, 0.25, 0.8, 2.5, 8 mm
Number of sampling lengths (x n): x1, x2, x3, x4, x5, x6, x7, x8, x9, x10 arbitrary length (0.3 to 16.0 mm: 0.01 mm interval)
x1, x2, x3, x4, x5, x6, x7, x8, x9, x10 arbitrary length (0.3 to 5.6 mm: 0.01 mm interval)*
Printer: Thermal type
Printing width: 48 mm (paper width: 58 mm)
Recording magnification
- Vertical: 10X to 100,000X, auto
- Horizontal: 1X to 1,000X, auto

* Only for transverse tracing drive unit type.

Functions

Customization: Desired parameters can be selected for calculation and display
Statistical processing: Maximum value, minimum value, mean value, standard deviation, pass rate, histogram of each parameter
GO/±NG judgement: Maximum value rule, 16% rule, average value rule, standard deviation (1σ, 2σ, 3σ)
Storage
- Internal memory: Setups (10 sets)
- Memory card (option): 500 setups, 10,000 measured profiles, 500 display images, text file (setups / measured profile / assessed profile / bearing area curve / amplitude distribution curve), 500 statistical data, etc.

Calibration: Auto-calibration with the entry of numerical value / average calibration with multiple measurement (max.12 times) is available
Power saving function: Auto-sleep-function, auto shutdown of backlight by ECO mode

Optional Accessories

Refer to pages L-05 to L-06.



Specifications / Configuration

Model		SJ-310					
Code No. (inch/mm)		**178-571-21E**	**178-571-22E**	**178-573-21E**	**178-573-22E**	**178-575-21E**	**178-575-22E**
Drive unit	Type	Standard		Retractable		Transverse tracing	
	Code No.	178-230-2		178-235		178-233-2	
Measuring range		16 mm				5.6 mm	
Measuring speed		0.25, 0.5, 0.75 mm/s (returning: 1 mm/s)					
Measuring method		Skidded					
Stylus tip	Angle	60°	90°	60°	90°	60°	90°
	Radius	2 µm	5 µm	2 µm	5 µm	2 µm	5 µm
Detector	Range	360 µm (-200 µm to +160 µm)					
	Measuring force	0.75 mN	4 mN	0.75 mN	4 mN	0.75 mN	4 mN
	Code No.	178-296	178-390	178-296	178-390	178-387	178-386
Assessed profiles		P (primary profile), R (roughness profile), DIN4776, roughness motif, waviness motif					
Evaluation parameters		Ra, Ry, Rz, Rt, Rp, Rq, Rv, Rsk, Rku, Rc, RSm, S, RPc, R3z, Rmr (c), Rpk, Rvk, Rδc, Rk, Mr1, Mr2, Lo, Rppi, R, AR, Rx, A1, A2, Vo, HSC, Rmr, SK, Ku, RΔa, RΔq, Rlr, λa, λq, Rpm, RzJIS (JIS'01), tp (ANSI), Htp (ANSI), Wte, Wx, W, AW, Rz1max (ISO), Rmax (VDA, ANSI, JIS'82), possible to customize					
Analysis graphs		Bearing area curve (BAC), amplitude distribution curve (ADC)					
Power supply		AC adapter and rechargeable battery					
Battery	Charge time	Max. 4 hours					
	Endurance	Approx. 1500 measurements (differs slightly due to usage and environmental conditions)					
Dimensions (W x D x H)	Display unit	275 x 109 x 198 mm					
	Drive unit	115 x 23 x 26.7 mm					
Mass	Display unit	Approx. 1.7 kg					
	Drive unit	0.2 kg					
Price		**£3,730.00**	**£3,730.00**	**£3,860.00**	**£3,860.00**	**£5,670.00**	**£5,670.00**

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Optional Accessories

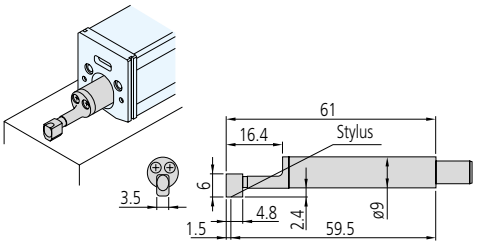
For Surftest SJ-220 and SJ-310

Detectors

Standard detectors

Code No.	Measuring force	Stylus profiles*	Applicable drive unit	Price
178-296	0.75 mN	R2 µm/60°	Standard or retractable	£468.00
178-390	4 mN	R5 µm/90°		£612.00
178-387	0.75 mN	R2 µm/60°	Transverse	£490.00
178-386	4 mN	R5 µm/90°		£468.00
178-391	4 mN	R10 µm/90°	Standard or retractable	£612.00

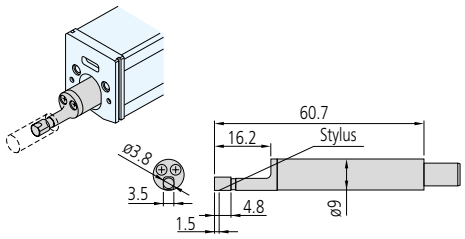
* Tip radius / tip angles



Small hole detectors

Code No.	Measuring force	Stylus profiles*	Min. measurable hole	Price
178-383	0.75 mN	R2 µm/60°	ø4.5 mm	£666.00
178-392	4 mN	R5 µm/90°		£597.00

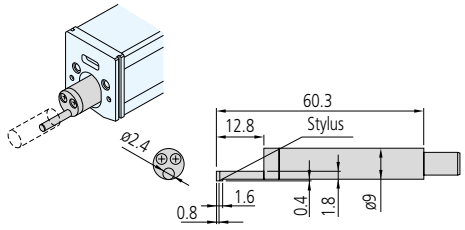
* Tip radius / tip angles



Extra small hole detectors

Code No.	Measuring force	Stylus profiles*	Min. measurable hole	Price
178-384	0.75 mN	R2 µm/60°	ø2.8 mm	£626.00
178-393	4 mN	R5 µm/90°		£548.00

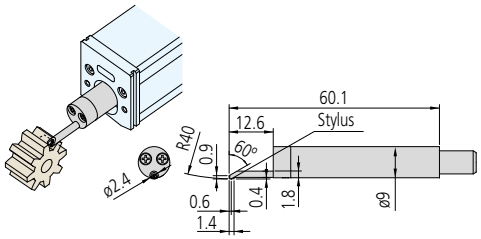
* Tip radius / tip angles



Gear-tooth surface detectors

Code No.	Measuring force	Stylus profiles*	Price
178-388	0.75 mN	R2 µm/60°	£1,130.00
178-398	4 mN	R5 µm/90°	£1,090.00

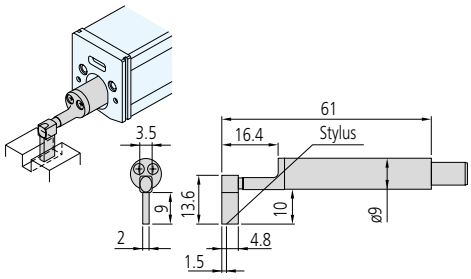
* Tip radius / tip angles



Deep groove detectors

Code No.	Measuring force	Stylus profiles*	Applicable drive unit	Price
178-385	0.75 mN	R2 µm/60°	Standard or retractable	£637.00
178-394	4 mN	R5 µm/90°		£597.00

* Tip radius / tip angles



Setting Attachments (for standard and retractable drive units only)

Improves measurement efficiency by allowing the setup of multiple workpieces of the same type and the positioning of hard-to-access features of a workpiece.

Code No.	Description	Price
178-033	V-type for measuring in the cylinder axis direction	£2,670.00
178-034	Magnetic slider type	£2,170.00
178-035	Inside diameter type	£2,550.00



The V-width is adjustable to the cylinder diameter facilitating axial measurement of a wide range of cylinder diameters.

- Adjustable range: ø5 - ø150 mm



The magnet attached to the bottom surface of the frame allows hands-free measurements to be made.



Greatly facilitates measurement of internal wall surfaces of, for example, cylinder-block bores.

- Applicable diameter: ø75 - ø95 mm
- Accessible depth: 30 - 135 mm

SJ-Printer for SJ-220

Assessed profiles and calculation results and curves can be printed out by connecting the SJ-220-dedicated printer, which is palm sized (W x D x H: 93 x 125 x 70 mm) and can run on an internal battery.

- Power supply can be selected. (AC adapter or optional battery pack).
- Printable items: Setups, calculation results, assessed profile, bearing area curve (BAC), amplitude distribution curve (ADC), and environment settings.



178-421UK

Code No.	Description	Price
178-421UK	SJ-Printer for SJ-220	£438.00
12AAL067	Connecting cable	£80.70
270732	Printer paper (5 packs)	£25.30
SP17826	Rechargeable battery pack	£203.00

DP-1VA LOGGER

It is possible to process Digimatic data output from the Surftest SJ series with the DP-1VA LOGGER. This compact, hand-held device can provide printouts of measurement data and various statistical analysis results such as histograms, D-charts, and X-bar R control charts. With optional output cables, DP-1VA LOGGER is also capable of RS-232C output of measurement data to a PC (cable **09EAA084**) and GO/±NG judgement output (cable **965516**).



264-505E

Code No.	Description	Price
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
936937	Connecting cable (1 m)	£42.00
965014	Connecting cable (2 m)	£61.60

U-WAVE-TIB Wireless Unit for SJ-220

By attaching the optional wireless communication unit, it is possible to have wireless communication via Bluetooth® with a device (PC or smartphone) on which the dedicated app is installed.



Code No.	Description	Price
264-628	U-WAVE-TIB transmitter	£305.00

L

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MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
FORM

Optional Software

SJ-Tools

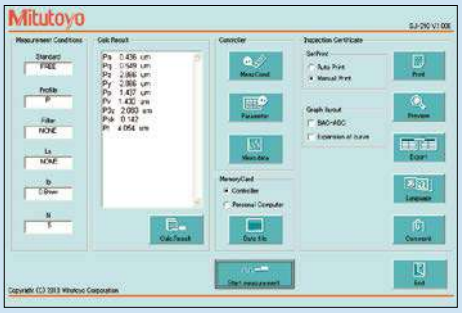
Output software based on Microsoft Excel* for controlling instruments and reproducing and storing measurement data. Complete with exclusive accessories.

- Measurement device control.
- Definition of measurement variables.
- Graphic representation of the profile.
- Storage of measurement records.
- Documentation of measurement results.
- Connecting cable.

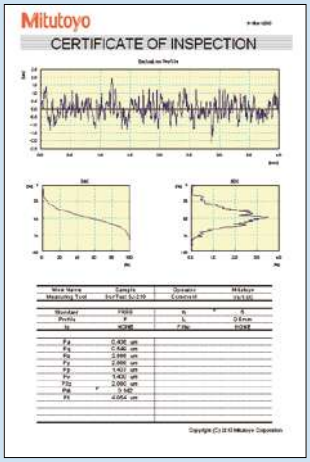
*Microsoft Excel is not included. To be supplied by the customer.

Cables required:

Code No.	Description	Price
12AAL068	USB PC connecting cable (USB cable) for SJ-220	£34.10
12AAD510	USB PC connecting cable (USB cable) for SJ-310	£58.10
12AAY688	RS-232C cable for SJ-220	£200.00
12AAA882D	RS-232C cable for SJ-310	£70.10



SJ-Tools input mask for Surftest SJ series.



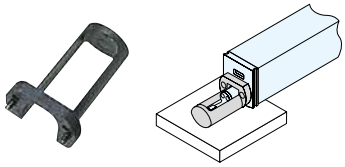
SJ-Tools output record from MS-Excel (This program can be downloaded for free from the Mitutoyo website www.mitutoyo.co.uk).

Optional Accessories

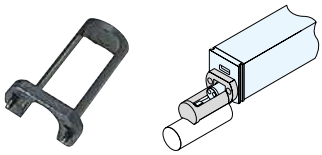
For Surftest SJ-220 and SJ-310

Attachments

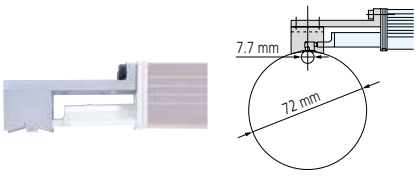
Nosepiece for flat surfaces
- SJ-310 standard accessory (not for transverse tracing type).



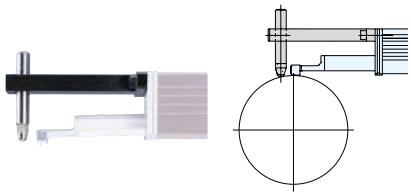
Nosepiece for cylindrical surfaces
- SJ-310 standard accessory (not for transverse tracing type).



V-type adapter
- SJ-310 Transverse tracing type standard accessory.

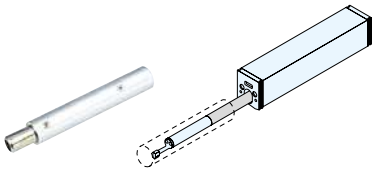


Point-contact adapter
- SJ-310 Transverse tracing type standard accessory.

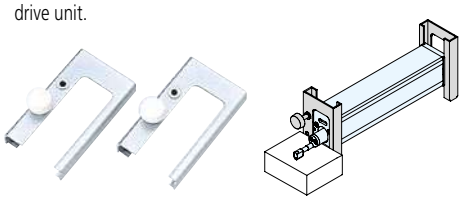


Extension rod (50 mm)
- Not available for the transverse tracing drive unit.

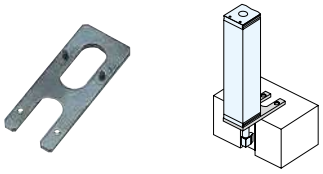
(Note: Only one rod can be used)



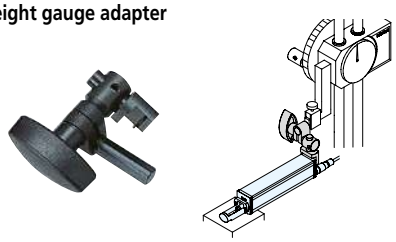
Support feet set
- SJ-301/301R standard accessory.
- Not available for the detector end of the transverse tracing drive unit.



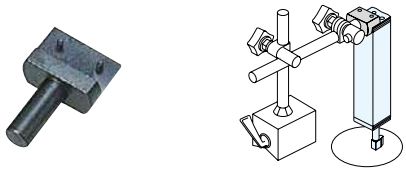
Vertical positioning adapter
- Not available for the transverse tracing drive unit.



Height gauge adapter



Magnetic stand adapter



Extension cable (1 m)
- Only one cable can be used.



Code No.	Description	Price
12AAA210	Extension rod (50 mm)	£159.00
12AAA216	Support feet set	£101.00
12AAA217	Nosepiece for flat surfaces	£101.00
12AAA218	Nosepiece for cylindrical surfaces	£101.00
12AAA219	Vertical positioning adapter	£32.10
12AAA220	Magnetic stand adapter (ø9.5 mm)	£36.30

Code No.	Description	Price
12AAA221	Magnetic stand adapter (ø8 mm)	£36.30
12AAA222	Height gauge adapter (9 x 9 mm)	£68.50
12AAA233	Height gauge adapter (1/4 x 1/2")	£68.50
12AAE643	Point-contact adapter	£162.00
12AAE644	V-type adapter	£174.00
12BAA303	Extension cable for SJ-220 (1 m)	£72.70
12AAW066	Extension cable for SJ-310 (1 m)	£97.40







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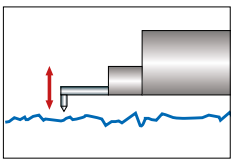
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Surftest SJ-410

SERIES 178 – Portable Surface Roughness Tester

- Skidded and skidless measurements are both possible with this series. Measures 46 roughness parameters that conform to the latest ISO, DIN, ANSI, and JIS standards.
- A wide range, high-resolution detector and efficient drive unit provide superior high-accuracy measurement.
- A skidless detector and a curved surface compensation function provide efficient evaluation of cylinder surface roughness.
- Ultra-fine steps, straightness and waviness can be measured by using the skidless measurement function.
- The handheld data processing unit and the 5.7-inch colour graphic LCD touch-panel provides superior readability and operability. The LCD also includes a backlight for improved visibility in dark environments.
- The excellent user interface provides intuitive and easy-to-understand operability.
- Measured data can be output to a PC with an optional RS-232C or USB cable.
- Digital filter function for accurate roughness profiles.
- GO/±NG judgement function.
- Auto-calibration function.
- The display interface supports 16 languages, which can be freely switched.
- Simplified contour analysis function supports four types of measurement: step, level change, area and coordinate difference.
- Access to each feature can be password protected, which prevents unintended operations and enables established settings to be protected.
- The optional attachments for mounting on a column stand significantly increase the application range.

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Skidless measurement.



Surftest SJ-412

Specifications

Model		SJ-411		SJ-412	
Code No. (inch/mm)		**178-581-31E**	**178-581-32E**	**178-583-31E**	**178-583-32E**
Measuring range		25 mm		50 mm	
Speed		Measuring: 0.05, 0.1, 0.2, 0.5, 1.0 mm/s, returning: 0.5, 1, 2, 5 mm/s			
Range/resolution		800 µm/0.0125 µm, 80 µm/0.00125 µm, 8 µm/0.000125 µm (up to 2400 µm with an optional stylus)			
Measurement method		Skidless/skidded			
Stylus tip	Angle	60°	90°	60°	90°
	Radius	2 µm	5 µm	2 µm	5 µm
Detector measuring force		0.75 mN	4 mN	0.75 mN	4 mN
Assessed profiles		P (primary profile), R (roughness profile), DF (DF profile), W (filtered waviness profile), roughness motif, waviness motif			
Evaluation parameters		Ra, Rq, Rz, Ry, Rp, Rv, Rt, R3z, Rsk, Rku, Rc, RPc, RSm, Rmax(VDA, ANSI), Rz1max(ISO'97), S, HSC, RzJIS(JIS'01), Rppi, RΔa, RΔq, Rlr, Rmr, Rmr(c), Rδc, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, δq, Lo, Rpm, tp(ANSI), Htp(ANSI), R, Rx, AR, W, AW, Wx, Wte			
Analysis graphs		Bearing Area Curve (BAC), Amplitude Distribution Curve (ADC)			
Power supply		Via AC adapter or rechargeable battery			
Rechargeable battery		Recharge time: 4 hours (for a maximum 1000 measurements without printing)			
Price		**£7,620.00**	**£7,620.00**	**£9,140.00**	**£9,140.00**

Technical Data

X axis (drive unit)
- Traverse direction: Backward
- Traverse straightness: 0.3 µm/25 mm (SJ-411), 0.5 µm/50 mm (SJ-412)
- Positioning: ±1.5° (tilting), 10 mm (up/down)

Detector
- Skid radius of curvature: 40 mm
- Type: Differential inductance

Storage
- Internal memory: Setups (10 sets)
- Memory card (option): 500 setups, 10,000 measured profiles, 500 display images, text file (setups / measured profile / assessed profile / bearing area curve / amplitude distribution curve), 500 statistical data, etc.

Dimensions (W x D x H)
- Display unit: 275 x 109 x 198 mm
- Height-tilt adjustment unit: 131 x 63 x 99 mm
- Drive unit: 128 x 36 x 47 mm (SJ-411), 155 x 36 x 47 mm (SJ-412)
- Control unit mass: Approx. 1.7 kg
- Height-tilt adjustment unit: Approx. 0.4 kg
- Drive unit: 0.6 kg (SJ-411), 0.7 kg (SJ-412)

Evaluation Capability

Applicable standards: JIS'82, JIS'94, JIS'01, ISO'97, ANSI, VDA, Free
Digital filter: 2CR, PC75, Gaussian
Cutoff length: λc: 0.08, 0.25, 0.8, 2.5, 8 mm
λs: 2.5, 8, 25 µm (availability of switching depends on the selected standard)
Sampling length: 0.08, 0.25, 0.8, 2.5, 8, 25*mm; or an arbitrary length in the range 0.1 to 25 mm (0.1 to 50 mm: SJ-412) in 0.01 mm increments
Number of sampling lengths: 1, 2, 3, ~20 (limited by traverse range)
Printer: Thermal type
Printing width: 48 mm (paper width: 58 mm)
Recording magnification
- Vertical: 10X to 100,000X, auto
- Horizontal: 1X to 1,000X, auto

Function
- Customize: Selection of display/evaluation parameter
- Data compensation: R-surface, tilt compensation

Ruler function: Step, level change, area and coordinate difference
DAT function: Helps to level workpiece prior to skidless measurement. Displacement detection mode enables the stylus displacement to be input while the drive unit is stopped.
Statistical processing: Max. value, min. value, mean value, standard deviation (s), pass ratio, histogram
GO/±NG judgement: Maximum value rule, 16% rule, average value rule, standard deviation (1σ, 2σ, 3σ)
Calibration: Auto-calibration with the entry of numerical value/average calibration with multiple measurement (max.12 times) is available
Power saving function: Auto-sleep-function, auto shutdown of backlight by ECO mode

*Only for SJ-412.

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Optional Software

SJ-Tools

Output software based on Microsoft Excel* for controlling instruments and reproducing and storing measurement data. Complete with exclusive accessories.

- Measurement device control.
- Definition of measurement variables.
- Graphic representation of the profile.
- Storage of measurement records.
- Documentation of measurement results.
- Connecting cable.

*Microsoft Excel is not included. To be supplied by the customer.

Surfstand (optional accessory)

Mounted on the same large surface plate as the workpiece to be inspected, this substantially built stand can be manoeuvred and adjusted to position the detector on practically any surface of the workpiece desired. The SJ-400 Series detector is carried on an adjustable-length tube mounted on an extendable arm carried by a vertically travelling carriage on the column, thus enabling positioning of the detector anywhere in the vertical plane within reach.



Model	Measuring range				Depth into bore
	Z axis	X axis	θ1 axis	θ2 axis	
Standard	660 mm	375 mm	180°	—	270 mm
Depth pole	620 mm			360°	515 mm
Long arm	660 mm	650 mm		—	270 mm
Long arm & depth pole	620 mm			360°	515 mm

Surftest SJ-410

SERIES 178 – Portable Surface Roughness Tester

Optional Accessories

Code No.	Description	Price
178-010	Auto-set unit for 178-039	£2,860.00
178-019	Precision vice for XY levelling table (jaw opening: 36 mm)	£899.00
178-020	X-axis adjustment unit for 178-039	£1,490.00
178-030	Tilting adjustment unit (Inclination adjustment unit) for 178-039	£2,260.00
178-039	Manual column stand (granite base, vertical travel: 250 mm)	£642.00
178-048	Levelling table with DAT function (mm) (tilting: ±1.5°, max. loading: 15 kg)	£1,720.00
178-049	Digital XY levelling table (25 x 25 mm) (max. loading: 15 kg)	£1,830.00
178-052-1	Digital XY levelling table (1 x 1") (tilting: ±1.5°, max. loading: 15 kg, swivelling: ±3°)	£2,940.00
178-059	Digimatic XY levelling table (1 x 1") (max. loading: 15 kg)	£1,600.00
178-183	XY levelling table (25 x 25 mm) (tilting: ±1.5°, max. loading: 15 kg, swivelling: ±3°)	£2,800.00
178-184	XY levelling table (1 x 1") (tilting: ±1.5°, max. loading: 15 kg, swivelling: ±3°)	£2,400.00
178-185	Digital XY levelling table (25 x 25 mm) (tilting: ±1.5°, max. loading: 15 kg, swivelling: ±3°)	£2,390.00
178-195	Levelling table (tilting: ±1.5°, max. loading: 15 kg)	£740.00
178-196	Levelling table with DAT function (inch) (tilting: ±1.5°, max. loading: 15 kg)	£1,650.00
178-610	Step gauge (step: 1 µm, 2 µm, 5 µm, 10 µm)	£587.00
178-611	Reference step specimen (mm)	£503.00
178-612	Reference step specimen (mm/inch)	£511.00
264-020	Input tool (USB type)	£273.00
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
965014	SPC cable (2 m)	£61.60
998291	Precision V-block for XY levelling table (workpiece ø1 - ø160 mm)	£822.00
12AAA882D	PC connecting cable (RS-232C cable)	£70.10
12AAB358	Cylindrical surface adapter (workpiece ø15 - 60 mm)	£172.00
12AAD510	USB PC connecting cable (USB cable)	£58.10
12AAJ088	Footswitch	£312.00
12AAL069	Memory card	£35.50
12AAM556	Height/tilt adjustment unit	£530.00

Styli refer to pages L-15 to L-16.

Consumables

Code No.	Description	Price
270732	Durable printer paper (25 m, 5 rolls/set)	£25.30
12AAN040	LCD protective sheet (10 sheets/set)	£196.00
12AAN046	Replacement battery	£185.00

Measurement Applications













Shown with optional accessories.



Measurement example with Surfstand (optional accessory).

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Surftest SJ-500

SERIES 178 – Surface Roughness Tester with Dedicated Control/Display Unit

- High-precision/performance surface roughness tester with a dedicated control unit, featuring user-friendly display and simple operation.
- Equipped with a 7.5-inch, colour TFT LCD with backlight, large colour icons and touch-panel buttons for easy control of machine function.
- Feed-knobs on the main unit allow fine positioning of a small stylus for measuring small holes.
- Simple setup for surface roughness measuring conditions.
- A simple input function is used to calculate according to ISO/JIS roughness standard drawing instruction symbols. Complicated setups can easily be entered by selecting a drawing instruction symbol from the surface roughness menu.
- Built-in thermal printer.

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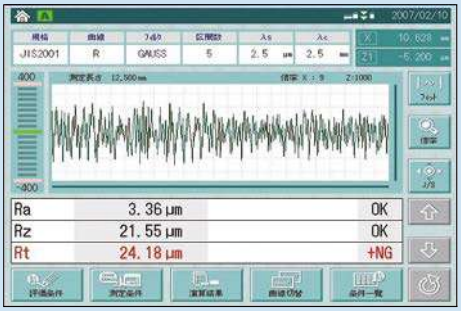
Surftest SJ-500



Evaluation Capability

Assessed profiles:	P (primary profile), R (roughness profile), WC, WCA, WE, WEA, envelope residual profile, roughness motif, waviness motif
Evaluation parameters:	Ra, Rc, Ry, Rz, Rq, Rt, Rmax, Rp, Rv, R3z, Sm, S, Pc, mr(c), δc, mr, tp, Htp, Lo, Ir, Ppi, HSC, Δa, Δq, Ku, Sk, Rpk, Rvk, Rk, Mr1, Mr2, A1, A2, Vo, λa, λq
Roughness motif parameters:	R, AR, Rx
Waviness motif parameters:	W, AW, Wx, Wte
Analysis graphs:	ADC, BAC, power spectrum chart
Digital filter:	2CR-75%, PC-75%, Gaussian, robust spline
Cutoff length:	λs: 0.25, 0.8, 2.5, 8, 25, 80, 250 µm, no filter λc*: 0.025, 0.08, 0.25, 0.8, 2.5, 8, 25 mm λf: 0.08, 0.25, 0.8, 2.5, 8, 25 mm, no filter
Sampling length*:	0.025, 0.08, 0.25, 0.8, 2.5, 8, 25 mm
Data compensation functions:	Parabola compensation, hyperbola compensation, ellipse compensation, R-plane (curved surface) compensation, conic compensation, tilt compensation

*An arbitrary length can also be specified in the range from 0.025 mm to the maximum traverse length.



Specifications

Model		SJ-500	
Code No. (mm)		**178-532-01E**	**178-532-02E**
Code No. (inch/mm)		**178-533-01E**	**178-533-02E**
Measuring range		50 mm	
Resolution		0.05 µm	
Scale		Linear encoder	
Drive speed		0 - 20 mm/s	
Measuring speed		0.02 - 5 mm/s	
Traverse direction		Backward	
Traverse straightness		0.2 µm/50 mm	
Positioning		±1.5° (tilting, with DAT function) 30 mm (up/down)	
Detector range/resolution		800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm	
Measurement method		Skidless/skidded	
Stylus tip	Angle	60°	90°
	Radius	2 µm	5 µm
Detector measuring force		0.75 mN	4 mN
Skid radius of curvature		40 mm	
Detector type		Differential inductance	
Drive unit control		Joystick operation with manual adjustment knob	
Display magnification		Horizontal: X0.5 to X10,000 auto, vertical: X10 to X500,000 auto	
Mass		6.7 kg (drive unit: 2.7 kg, control unit: 4 kg)	

Optional Accessories

Styli refer to pages L-13 to L-14.
Fixture and stage accessories refer to pages L-33 to L-35.

Consumable

Code No.	Description	Price
270732	Durable printer paper (25 m, 5 rolls/set)	**£25.30**



The SJ-500 can also be mounted on a manual column stand.

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Surftest SJ-500P

SERIES 178 – Surface Roughness Tester with PC

- High-precision/performance surface roughness tester that runs under the FORMTRACEPAK sophisticated analysis software package.
- Software icons enable easy control of machine function.
- Feed-knobs on the main unit allow fine positioning of a small stylus for measuring small holes.
- Simple setup for surface roughness measuring conditions.
- A simple input function is used to calculate according to ISO/JIS roughness standard drawing instruction symbols. Complicated setups can easily be entered by selecting a drawing instruction symbol from the surface roughness menu.

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Evaluation Capability: FORMTRACEPAK

Assessed profiles:	P (primary profile), R (roughness profile), WC, WCA, WE, WEA, DIN4776 profile, envelope residual profile, roughness motif, waviness motif
Evaluation parameters:	Ra, Rq, Rz, Ry, Rz(JIS), Ry(DIN), Rc, Rp, Rpmax, Rpi, Rv, Rvmax, Rvi, Rt, Rti, R3z, R3zi, R3y, S, Pc (Ppi), Sm, HSC, mr, δc, plateau ratio, mrd, Rk, Rpk, Rvk, Mr1, Mr2, Δa, Δq, λa, λq, Sk, Ku, Lo, Lr, A1, A2
Roughness motif parameters:	Rx, R, AR, SR, SAR, NR, NCRX, CPM
Waviness motif parameters:	Wte, Wx, W, AW, SW, SAW, NW
Analysis graphs:	ADC, BAC1, BAC2, power spectrum chart, auto-correlation chart, Walsh power spectrum chart, Walsh auto-correlation chart, slope distribution chart, local peak distribution chart, parameter distribution chart, digital filter 2CR-75%, 2CR-50%, 2CR-75% (phase corrected), 2CR-50% (phase corrected), Gaussian-50%
Cutoff length*:	λc: 0.025, 0.08, 0.25, 0.8, 2.5, 8, 25 mm fl: 0.08, 0.25, 0.8, 2.5, 8, 25 mm fh: 0.08, 0.25, 0.8, 2.5, 8 mm
Sampling length*:	0.025, 0.08, 0.25, 0.8, 2.5, 8, 25 mm
Data compensation functions:	Tilt compensation, R-plane (curved surface) compensation, ellipse compensation, parabola compensation, hyperbola compensation, quadric curve automatic compensation, polynomial compensation, polynomial automatic compensation

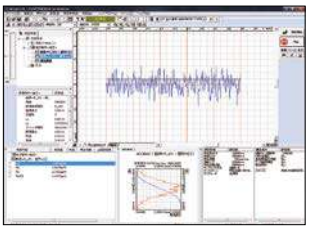
*An arbitrary length can also be specified in the range from 0.025 mm to the maximum traverse length.

Optional Accessories

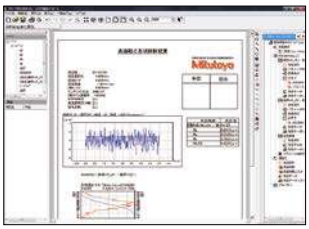
Styli refer to pages L-13 to L-14.
Fixture and stage accessories refer to pages L-33 to L-35.

Surftest SJ-500P









Specifications

Model		SJ-500P	
Code No. (mm)		**178-534-11E**	**178-530-02E**
Code No. (inch/mm)		**178-534-13E**	**178-531-02E**
Measuring range		50 mm	
Resolution		0.05 µm	
Scale		Linear encoder	
Drive speed		0 - 20 mm/s	
Measuring speed		0.02 - 5 mm/s	
Traverse direction		Backward	
Traverse straightness		0.2 µm/50 mm	
Positioning		±1.5° (tilting, with DAT function) 30 mm (up/down)	
Detector range/resolution		800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm	
Measurement method		Skidless/skidded	
Stylus tip	Angle	60°	90°
	Radius	2 µm	5 µm
Detector measuring force		0.75 mN	4 mN
Skid radius of curvature		40 mm	
Detector type		Differential inductance	
Drive unit control		PC	
Display magnification		Horizontal: X0.5 to X10,000 auto, vertical: X10 to X500,000 auto	
Mass		6.5 kg (main unit 2.7 kg; PC interface unit 3.8 kg)	

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Formtracer Avant FTA-S3000

SERIES 178 – Surface Roughness Tester

- The Formtracer Avant FTA-S3000 is the next-generation surface roughness measuring machine that boasts outstanding operability and a wide variety of measurement functions because of the further expansion of the optional equipment range.
- Easy to operate.
- High-accuracy surface roughness testers.
- A large range of optional styli ensure access to restricted features.
- Remote control box for quick and accurate machine positioning.
- The detector holders (optional) enables both crank and /or upward measurement.
- 3D/Y-axis table (optional) with a travel range of 100 mm enables 3D surface roughness measurement.
- DAT unit (optional) can tilt the X-axis drive unit to allow a workpiece to be levelled easily.
- Retrofit options for contour measurement.
- X-axis tilting.

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Formtracer Avant FTA-S3000

Technical Data

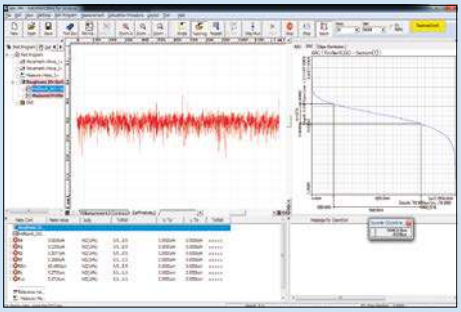
X1 axis (drive unit)	
Resolution:	0.05 µm
Scale:	Linear encoder
Drive speed:	0 - 80 mm/s
Measuring speed:	0.02 - 5 mm/s
Inclination range:	±45° (with X1-axis inclination unit)
Z2 axis (column)	
Resolution:	1 µm
Scale:	ABSOLUTE linear encoder
Drive speed:	0 - 30 mm/s
Measurement method:	Skidless / skidded
Type:	Differential inductance

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Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.





Detector holder S-3000C (optional accessory).



Detector holder S-3000CR (optional accessory).



Detector holder S-3000MR (optional accessory).

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Formtracer Avant FTA-S3000

SERIES 178 – Surface Roughness Tester

Optional Accessories

Code No.	Description	Price
178-050	DAT unit	£4,950.00
178-077	3D levelling table	£6,420.00
178-078	θ-2 axis rotary table	£5,540.00
178-096	3D/Y-axis table	£11,900.00
178-097	Y-axis table	£10,790.00
178-141	Detector holder S3000C-D	£2,690.00
178-142	Detector holder S3000CR-D set	£4,030.00
178-143	Detector holder S3000MR-D set	£6,870.00
178-181	Side table, standard base	£3,130.00
178-188	Vibration isolator, standard base	£9,970.00
178-189	Vibration isolator, wide base	£13,280.00
178-397-2	Detector, 4 mN	£865.00
178-611	Step gauge (2 µm, 10 µm)	£503.00
218-261-11	C3200 retrofit kit (mm)	£18,950.00
218-271-11	C4500 retrofit kit (mm)	£31,950.00
12AAD975	θ-1 axis rotary table	£12,250.00
12AAG202	Extension rod, 50 mm	£413.00
12AAG203	Extension rod, 100 mm	£514.00
12AAV701	Detector stand for retrofit	£1,020.00

Styli refer to pages L-13 to L-14.

Simplified CNC Function

Support for a wide range of optional peripherals designed for use with the CNC models enables automatic measurement.



Using Y-axis table.



Using rotary table θ1.



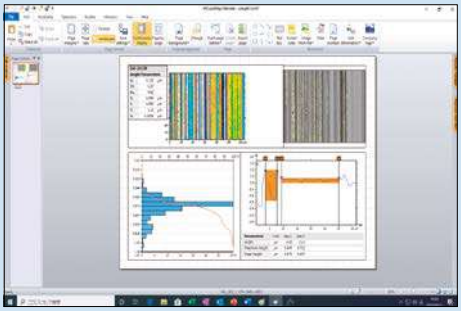
Using rotary table θ2.

Optional Software

MCubeMap

3D surface property analyzing software. Parameter analysis is available for not only the vertical directions of Sa and Sq, but also spaces, compounds, and features. A wide variety of graphical technologies help visualize the analyzed data in detail.

Note: The Y-axis table for 3D measurement is required separately.



3D analysis screen.

Specifications

Model		FTA-S4S3000	FTA-H4S3000	FTA-W4S3000	FTA-L4S3000
Code No.		178-151-11	178-152-11	178-153-11	178-154-11
Stylus tip	Angle	60°			
	Radius	2 µm			
Detector measuring force		0.75 mN			
Detector range/resolution		800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm			
X1-axis measuring range		100 mm			
X1-axis traverse straightness*		(0.05+0.001L) µm, L = measured length (mm)			
Dimensions (main unit, W x D x H)		759 x 482 x 966 mm	759 x 482 x 1166 mm	1159 x 482 x 1176 mm	1159 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Model		FTA-S8S3000	FTA-H8S3000	FTA-W8S3000	FTA-L8S3000
Code No.		178-156-11	178-157-11	178-158-11	178-159-11
Stylus tip	Angle	60°			
	Radius	2 µm			
Detector measuring force		0.75 mN			
Detector range/resolution		800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm			
X1-axis measuring range		200 mm			
X1-axis traverse straightness*		(0.1+0.002L) µm, L = measured length (mm)			
Dimensions (main unit, W x D x H)		759 x 482 x 966 mm	759 x 482 x 1166 mm	1159 x 482 x 1176 mm	1159 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

* With the X1 axis in the horizontal orientation.



Formtracer Avant FTA-S3000 shown with vibration isolator desk and side table (optional accessories, see page L-47).

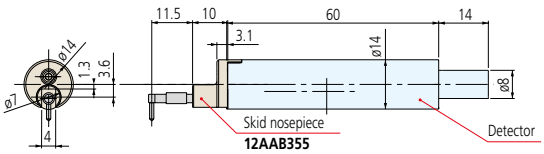
L

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Mitutoyo

Optional Styli

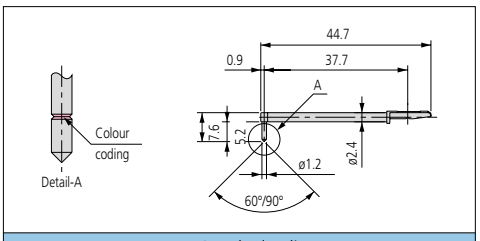
Compatible with SJ-410, SJ-500, FTA-S3000 Models



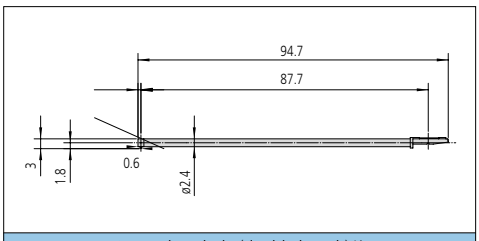
178-396-2 Detector (0.75 mN)
178-397-2 Detector (4 mN)



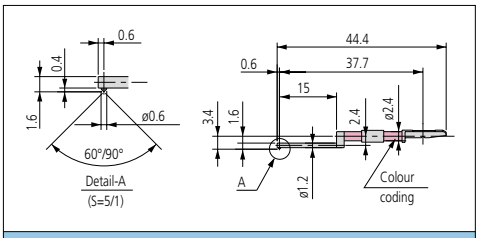
12AAG202 50 mm extension rod
12AAG203 100 mm extension rod



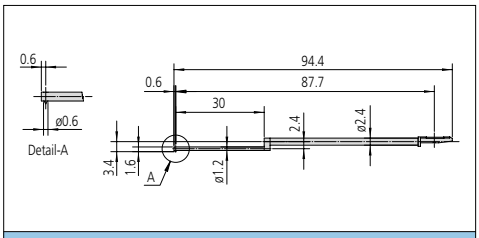
1. Standard styli



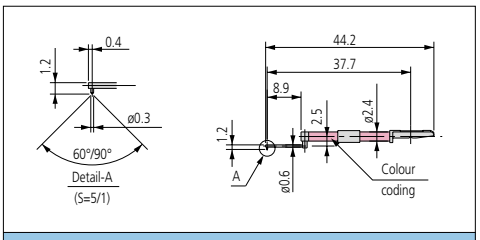
2. For deep hole (double length) *1



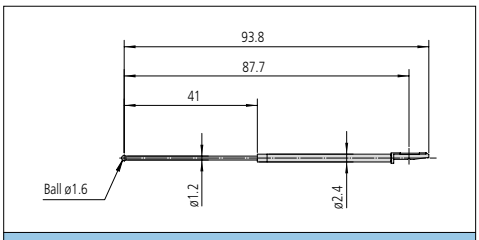
3. For small hole



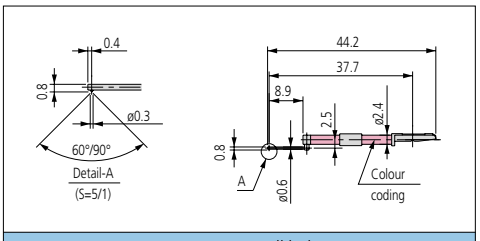
4. For small hole / deep hole (double length) *1



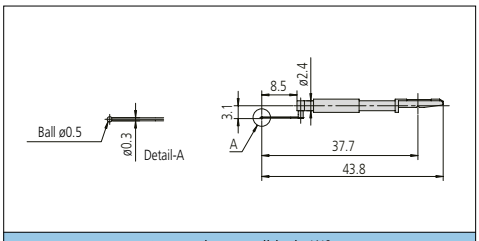
5. For very small hole



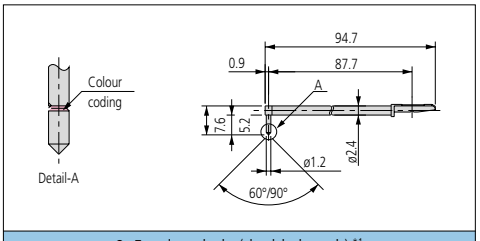
6. For small hole *1*2



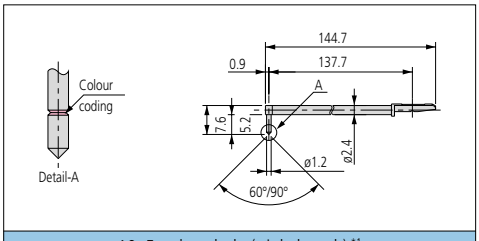
7. For extra-small hole



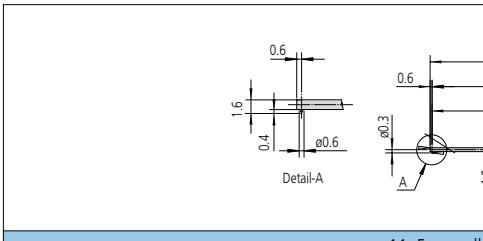
8. For ultra-small hole *1*2



9. For deep hole (double length) *1



10. For deep hole (triple length) *1



11. For small slotted hole *1

Specifications

Code No.	Stylus tip radius	Stylus tip angle
1. Standard styli		
12AAE882	1 µm	60°
12AAE924	1 µm	90°
12AAC731	2 µm	60°
12AAB403	5 µm	90°
12AAB415	10 µm	90°
12AAE883	250 µm	60°
2. For deep hole (double length) *1		
12AAE898	2 µm	60°
12AAE914	5 µm	90°
3. For small hole		
12AAC732	2 µm	60°
12AAB404	5 µm	90°
12AAB416	10 µm	90°
4. For small hole / deep hole (double length) *1		
12AAE892	2 µm	60°
12AAE908	5 µm	90°
5. For very small hole		
12AAC733	2 µm	60°
12AAB405	5 µm	90°
12AAB417	10 µm	90°
6. For small hole *1*2		
12AAE884	0.8 mm	—
7. For extra-small hole		
12AAC734	2 µm	60°
12AAB406	5 µm	90°
12AAB418	10 µm	90°
8. For ultra-small hole *1*2		
12AAJ662	250 µm	—
9. For deep hole (double length) *1		
12AAC740	2 µm	60°
12AAB413	5 µm	90°
12AAB425	10 µm	90°
10. For deep hole (triple length) *1		
12AAC741	2 µm	60°
12AAB414	5 µm	90°
12AAB426	10 µm	90°
11. For small slotted hole *1		
12AAE938	2 µm	60°
12AAE940	5 µm	90°

*1 For downward-facing measurement only.
*2 Used for calibration, a standard step gauge (178-611 optional accessory) is also required.

Tip radius	1 µm	2 µm	5 µm	10 µm	250 µm
Colour coding	White	Black	No colour	Yellow	No notch or colour

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Optional Styli

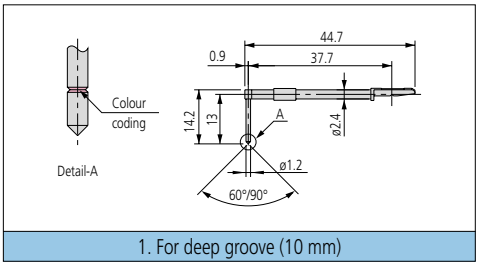
Compatible with SJ-410, SJ-500, FTA-S3000 Models

Specifications

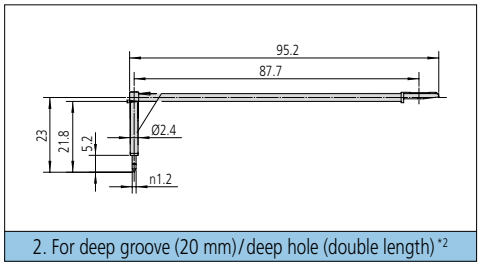
Code No.	Stylus tip radius	Stylus tip angle
1. For deep groove (10 mm)		
12AAC735	2 µm	60°
12AAB409	5 µm	90°
12AAB421	10 µm	90°
2. For deep groove (20 mm)/deep hole (double length) *2		
12AAE893	2 µm	60°
12AAE909	5 µm	90°
3. For deep groove (20 mm) *1		
12AAC736	2 µm	60°
12AAB408	5 µm	90°
12AAB420	10 µm	90°
4. For deep groove (40 mm) *1		
12AAE895	2 µm	60°
12AAE911	5 µm	90°
5. For deep groove (30 mm) *1		
12AAC737	2 µm	60°
12AAB407	5 µm	90°
12AAB419	10 µm	90°
6. For deep groove (30 mm) *1/deep hole (double length)		
12AAE894	2 µm	60°
12AAE910	5 µm	90°
7. For gear tooth		
12AAB339	2 µm	60°
12AAB410	5 µm	60°
12AAB422	10 µm	60°
8. For gear tooth *1/deep hole (double length)		
12AAE896	2 µm	60°
12AAE912	5 µm	60°
9. For rolling circle waviness surface *2		
12AAB338	0.8 mm	—
10. For rolling circle waviness *1/deep hole (double length) *2		
12AAE886	250 µm	—
11. For knife-edge detector		
12AAC738	2 µm	60°
12AAB411	5 µm	90°
12AAB423	10 µm	90°
12. For corner hole *1/deep hole (double length)		
12AAM601	2 µm	60°
12AAM603	5 µm	60°
13. For eccentric arm *1		
12AAC739	2 µm	60°
12AAB412	5 µm	90°
12AAB424	10 µm	90°
14. For bottom surface		
12AAE899	2 µm	60°
12AAE915	5 µm	90°

*1 For downward-facing measurement only.
*2 Used for calibration, a standard step gauge (178-611 optional accessory) is also required.

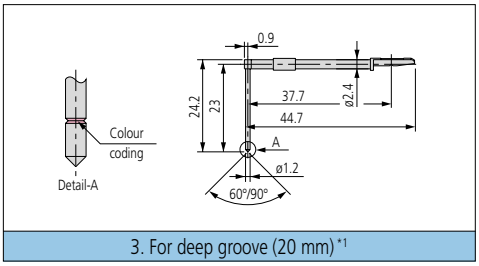
Tip radius	1 µm	2 µm	5 µm	10 µm	250 µm
Colour coding	White	Black	No colour	Yellow	No notch or colour



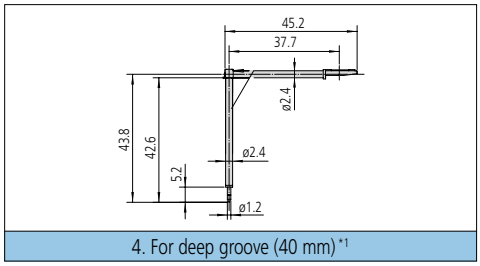
1. For deep groove (10 mm)



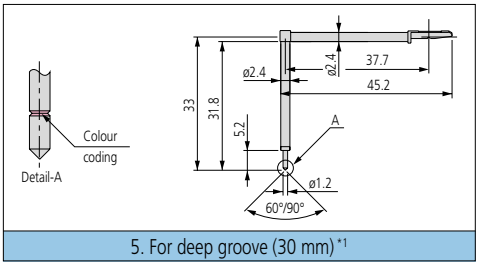
2. For deep groove (20 mm)/deep hole (double length) *2



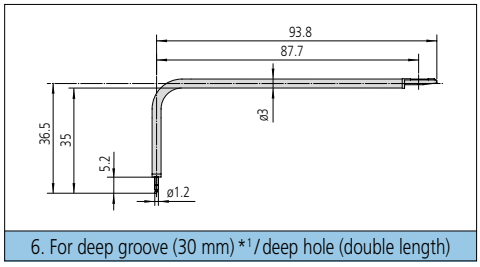
3. For deep groove (20 mm) *1



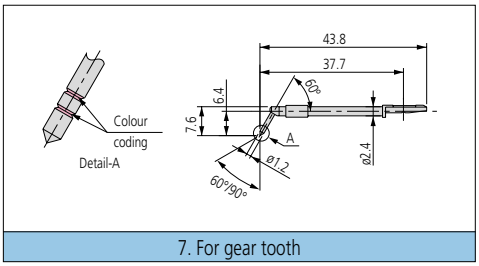
4. For deep groove (40 mm) *1



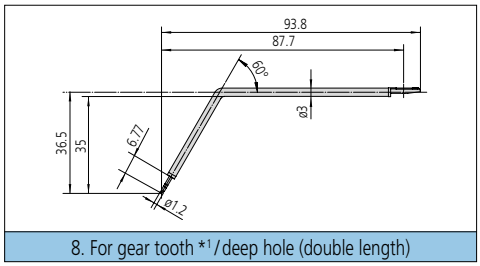
5. For deep groove (30 mm) *1



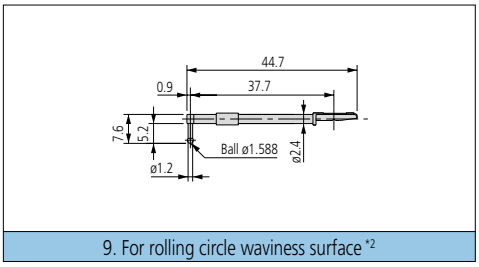
6. For deep groove (30 mm) *1/deep hole (double length)



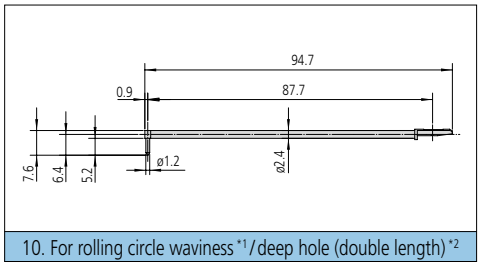
7. For gear tooth



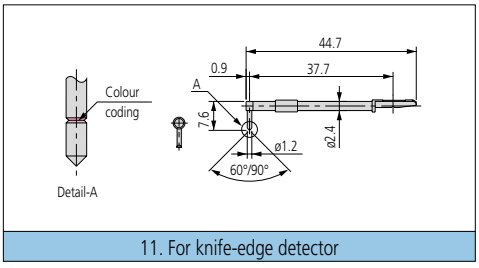
8. For gear tooth *1/deep hole (double length)



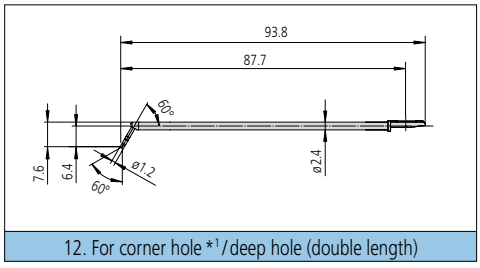
9. For rolling circle waviness surface *2



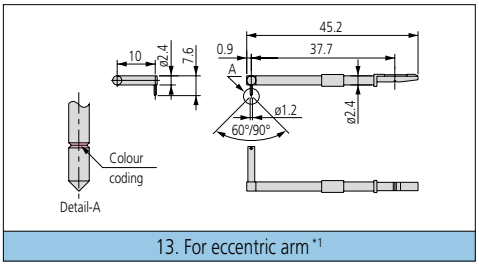
10. For rolling circle waviness *1/deep hole (double length) *2



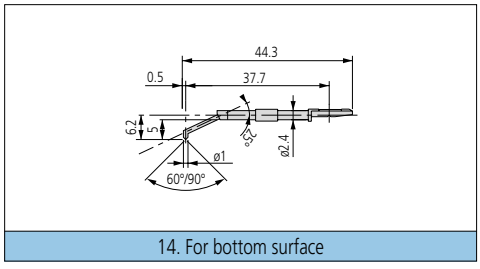
11. For knife-edge detector



12. For corner hole *1/deep hole (double length)



13. For eccentric arm *1



14. For bottom surface

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Mitutoyo

Surftest Extreme SV-3000CNC

SERIES 178 – CNC Surface Roughness Testers

- A highly accurate measuring instrument that allows CNC measurement of surface roughness and fine contour.
- Each axis has a maximum drive speed of 200 mm/s, permitting high-speed positioning for increased throughput of multiple-profile/multiple-workpiece measurement tasks.
- For models equipped with the α axis, it is possible to perform continuous measurement over horizontal and inclined surfaces by power-tilting the drive unit.
- It is possible to expand the measuring range for multiple workpieces etc., through positioning in the Y-axis direction.
- With optional rotary tables for axes θ1 and θ2, designed for use with the CNC models, it is possible to expand the CNC measurement application range.
- Inclined plane measurement is possible through simultaneous control of the X1 and Z2-axes.
- The Z1 axis incorporates an anti-collision safety device to automatically stop the detector unit if it collides with a workpiece or jig.
- An easy-to-operate Remote Box enables the user to make any movement by selecting the required axis using the two joysticks. The current axis selection is easily identified by the icon on the key top.
- Communication with the data processing/analysis section is via USB.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



Surftest Extreme SV-3000CNC

Specifications

Model		SV-3000CNC			
Code No.		178-508-12E	178-509-12E	178-528-12E	178-529-12E
X1-axis	Measuring range	200 mm			
	Resolution	0.05 µm			
	Scale	Reflective-type linear encoder			
	Drive speed	Max. 200 mm/s (CNC), 0 - 60 mm/s (joystick)			
	Measuring speed	0.02 - 2 mm/s			
	Traverse straightness	0.5 µm/200 mm			
Detector range/resolution		800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm			
Z2-axis	Vertical travel	300 mm		500 mm	
	Resolution	0.05 µm			
	Scale	Reflective-type linear encoder			
	Drive speed	Max. 200 mm/s (CNC), 0 - 60 mm/s (joystick)			
	Base size (W x D)	750 x 600 mm			
Y-axis table unit	Measuring range	200 mm			
	Resolution	0.05 µm			
	Scale unit	Reflective-type linear encoder			
	Drive speed	200 mm/s (max., CNC), 0-60 mm/s (joystick)			
	Loading capacity	Max. 20 kg			
	Traverse straightness	0.5 µm/200 mm			
	Accuracy (at 20°C)	±(2+2L/100), L = dimension between two measured points (mm)			
	Table size	200 x 200 mm			
	Dimensions (W x D x H)	320 x 646 x 105 mm			
	Mass	35 kg			
α-axis unit		—	Installed	—	Installed
Dimensions (W x D x H)		800 x 651 x 1000 mm		800 x 651 x 1200 mm	
Mass		240 kg		250 kg	

Technical Data

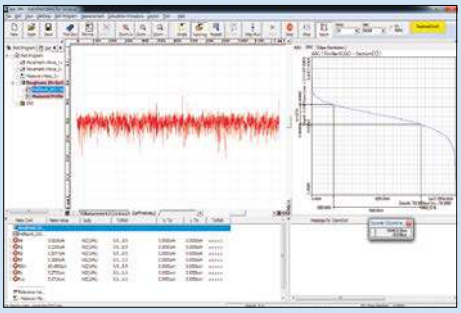
Measuring force:	4 mN (178-397-2) 0.75 mN (low force type 178-396-2)
Stylus tip:	Diamond, 90°/SR5 µm (60°/SR2 µm: low force type)
α axis	
Inclination angle:	-45° to +10°
Resolution:	0.000225°
Rotation speed:	1 rpm

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the standard in world metrology software
FORM

Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.



Vibration Isolator Stand (Optional Accessory)

Vibration isolation mechanism	Diaphragm air spring
Natural frequency	2.5 - 3.5 Hz
Damping mechanism	Orifice
Levelling mechanism	Automatic control with mechanical valves
Air supply pressure	0.4 MPa
Allowable loading capacity	350 kg
Dimensions (W x D x H)	1000 x 895 x 715 mm
Mass	280 kg

Optional Accessories

Fixture and stage accessories refer to pages L-33 to L-36.

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Surftest Extreme SV-M3000CNC

SERIES 178 – CNC Surface Roughness Testers

- A CNC Surface Roughness Tester that handles measurement of large/heavy workpieces such as engine blocks, crankshafts and similar components.
- Combined with the surface roughness detector swivelling unit, S-3000AR (optional), continuous measurement over the bottom, top and side surfaces of a workpiece is possible.
- With an optional large table for supporting a load of 100 kg, or a large θ2 table, continuous automatic measurement of larger workpieces is possible.
- Suitable for automatic surface roughness measurement on large and heavy workpieces.
- A moving column configuration eliminates workpiece size constrictions. Advantageous for measuring large and/or heavy workpieces.
- An 800 mm Y-axis stroke makes measurement of multiple profiles on large workpieces possible.
- The load table has a self-contained structure ensuring that variously sized workpieces, and standard and custom jigs, auto-feed devices, etc., are easily accommodated.

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Surftest Extreme SV-M3000CNC



Technical Data

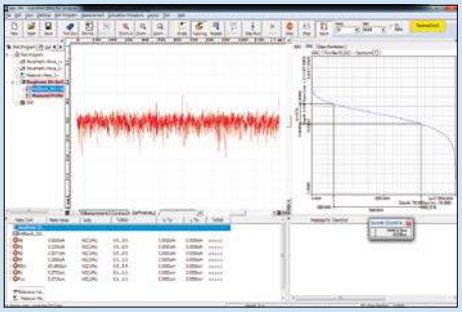
Measuring force: 4 mN (178-397-2)
0.75 mN (low force type 178-396-2)
Stylus tip: Diamond, 90° / SR5 µm
(60° / SR2 µm: low force type)
Type: Differential inductance

MiCAT
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the standard in world metrology software
FORM

Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.



Optional Accessories

Fixture and stage accessories refer to pages L-33 to L-36.

Specifications

Model		SV-M3000CNC		
Code No.		**178-549-2E**		
X1-axis measuring range		200 mm		
Detector holder*	Type	Standard S-3000	Long-type S-3000L	Rotary-type S-3000
	Code No.	178-071	178-072	178-073
X1-axis	Measuring range	200 mm		
	Resolution	0.05 µm		
	Scale	Reflective-type linear encoder		
	Drive speed	Max. 200 mm/s (CNC), 0-50 mm/s (joystick)		
	Measuring speed	0.02 - 2 mm/s		
	Traverse straightness	0.5 µm/200 mm	0.7 µm/200 mm	0.5 µm/200 mm (up/down) 0.7 µm/200 mm (forward/backward)
Detector range/resolution		800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm (up to 2400 µm with an optional stylus)		
Z2-axis vertical travel		500 mm		
Y-axis	Travel range	800 mm		
	Resolution	0.05 µm		
	Scale	Reflective-type linear encoder		
	Traverse straightness	0.5 µm/50 mm, 2 µm/800 mm	0.7 µm/50 mm, 3 µm/800 mm	0.7 µm/50 mm, 3 µm/800 mm (up/down)
α-axis	Inclination angle	-45° (CCW), +10° (CW)		
	Resolution	0.000225°		
	Rotation speed	1 rpm		
Steel base size (W x D)		600 x 1500 mm		
Base unit loading capacity:		300 kg		
Dimensions (W x D x H)		1085 x 1695 x 1922 mm		
Mass (main unit)		1600 kg (including vibration isolation unit)		

* Required option.

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Therefore the company reserves the right to change any or all aspects of any product specification without notice.

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Contracer CV-2100N4

SERIES 218 – Contour Measuring Instruments

- A digital arc-scale is equipped in the Z-axis detecting unit. This gives a wider range of measurement with higher resolution. No more reliance on measurement magnification.
- A data analysis system (PC system and FORMTRACEPAK software) is available.
- The CV-2100N4 is portable and can be carried to the machine shop for measurement of large workpieces.

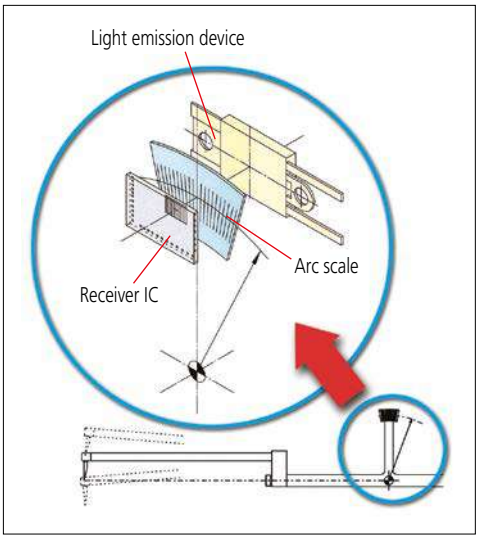
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Data Management Software by Mitutoyo

Contracer CV-2100N4



Specifications

Model		**CV-2100N4**
Code No. (mm)		**218-613E**
Code No. (inch/mm)		**218-623E**
X1 axis	Measuring range	100 mm
	Resolution	0.1 µm
	Scale type	Reflective-type linear encoder
	Drive speed	0.2, 1 mm/s and manual
	Measuring speed	0.2, 0.5 mm/s
	Measuring direction	Forward and backward
	Traverse straightness	2.5 µm/100 mm
	Accuracy (at 20°C)	±(2.5+2L/100) µm, L = Drive length (mm)
Stylus tip		Carbide, SR25 µm
Mass (main unit)		5.8 kg



Arc scale on the Z axis.

Technical Data

Z1 axis (detector unit)

Measuring range:	50 mm
Resolution:	0.1 µm
Scale type:	Arc encoder
Accuracy (at 20°C):	±(2.5+|0.2H|) µm H: measurement height from the horizontal position (mm)
Stylus movement:	Arc
Stylus orientation:	Downward
Measuring force:	30±10 mN
Traceable angle:	Ascent: 77°, descent: 87° using the standard stylus provided and depending on the surface roughness
Power supply:	240VAC ±10%, 50/60Hz

Optional Accessories

Code No.	Description	Price
172-144	Rotary vice	**£788.00**
172-197	Swivel centre support	**£594.00**
172-378	V-block with clamp (max. workpiece ø25 mm)	**£290.00**
172-600	Centre support	**£785.00**
172-601	Centre support riser	**£553.00**
172-603	V-block with clamp (max. workpiece ø50 mm)	**£385.00**
176-107	Holder with clamp	**£222.00**
178-023	Vibration isolator	**£3,750.00**
178-024	Vibration isolator stand	**£914.00**
218-002	Rugged table	**£1,500.00**
218-003	Rotary vice (heavy-duty type)	**£1,470.00**
218-171	Cross-travel table (XY range: 4x2")	**£2,560.00**
218-024	Column stand (vertical travel: 320 mm, inclination: ±45°)	**£4,080.00**
218-041	Cross-travel table (XY range: 50x25 mm)	**£2,720.00**
998862	Pin gauge unit for calibration (mm)	**£305.00**

Arms and styli refer to page L-19.



CV-2100N4 can be attached to the optional column stand.

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Contracer CV-2100M4

SERIES 218 – Contour Measuring Instruments

- A digital arc-scale is equipped in the Z-axis detecting unit. This gives a wider range of measurement with higher resolution. No more reliance on measurement magnification.
- A data analysis system (PC system and FORMTRACEPAK software) is available.

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Technical Data

Z1 axis (detector unit)

Measuring range:	50 mm
Resolution:	0.1 µm
Scale type:	Arc encoder
Accuracy (at 20°C):	±(2.5+|0.2H|) µm H: measurement height from the horizontal position (mm)
Stylus movement:	Arc
Stylus orientation:	Downward
Measuring force:	30±10 mN
Traceable angle:	Ascent: 77°, descent: 87° using the standard stylus provided and depending on the surface roughness
Base size (W x H):	600 x 450 mm
Base material:	Granite
Power supply:	240VAC ±10%, 50/60Hz

Optional Accessories

Code No.	Description	Price
172-144	Rotary vice	£788.00
172-197	Swivel centre support	£594.00
172-378	V-block with clamp (max. workpiece ø25 mm)	£290.00
172-600	Centre support	£785.00
172-601	Centre support riser	£553.00
172-603	V-block with clamp (max. workpiece ø50 mm)	£385.00
176-107	Holder with clamp	£222.00
178-023	Vibration isolator	£3,750.00
178-024	Vibration isolator stand	£914.00
218-002	Rugged table	£1,500.00
218-003	Rotary vice (heavy-duty type)	£1,470.00
218-171	Cross-travel table (XY range: 4 x 2")	£2,560.00
218-041	Cross-travel table (XY range: 50 x 25 mm)	£2,720.00
998862	Pin gauge unit for calibration (mm)	£305.00

Arms and styli refer to page L-19.

Contracer CV-2100M4



Specifications

Model		CV-2100M4
Code No. (mm)		**218-633E**
Code No. (inch/mm)		**218-643E**
X1 axis	Measuring range	100 mm
	Resolution	0.1 µm
	Scale type	Reflective-type linear encoder
	Drive speed	0.2, 1 mm/s and manual
	Measuring speed	0.2, 0.5 mm/s
	Measuring direction	Forward and backward
	Traverse straightness	2.5 µm/100 mm
	Accuracy (at 20°C)	±(2.5+2L/100) µm, L = Drive length (mm)
Z2 axis (column)	Column type	Manual
	Vertical travel	350 mm
	Drive speed	1 - 5 mm/s and manual
Stylus tip		Carbide, SR25 µm
Mass (main unit)		145.8 kg



A quick-vertical-motion stand with remarkable operability.



Motor-driven jog shuttle.



Centralised front control panel.

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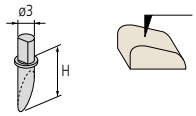
Mitutoyo

Optional Arms and Styli

For CV-2100 Models

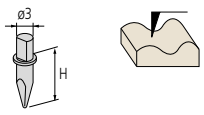
Styli

Single bevel



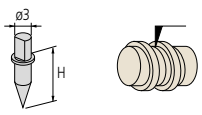
Tip angle: 12°
Tip radius: 25 µm
Tip material: Carbide

Cross ground



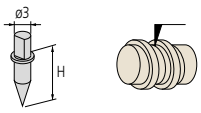
Tip angle: 20°
Tip radius: 25 µm
Tip material: Carbide

Cone



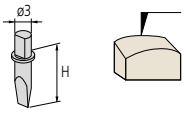
Tip angle: 20°
Tip radius: 25 µm
Tip material: Carbide

Cone



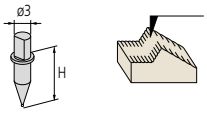
Tip angle: 30° (SPH-79: 50°)
Tip radius: 25 µm
Tip material: Carbide, Sapphire (SPH-79: Diamond)

Knife edge



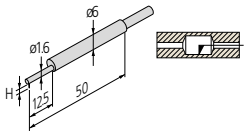
Tip angle: 20°
Edge width: 3 mm
Tip radius: 25 µm
Tip material: Carbide

Ball



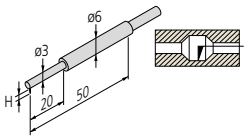
Ball diameter: 1 mm
Tip material: Carbide

Small hole:
932693/12AAE873



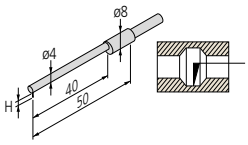
	932693	12AAE873
Tip shape:	Single	Bevel cone
Tip angle:	20°	30°
Tip radius:	25 µm	25 µm
Tip material:	Carbide	Carbide

Small hole:
932694/12AAE874



	932694	12AAE874
Tip shape:	Single	Bevel cone
Tip angle:	20°	30°
Tip radius:	25 µm	25 µm
Tip material:	Carbide	Carbide

Small hole:
932695/12AAE875



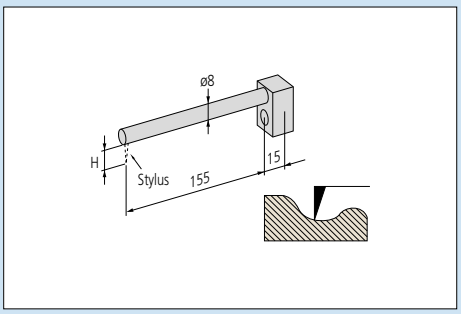
	932695	12AAE875
Tip shape:	Single	Bevel cone
Tip angle:	20°	30°
Tip radius:	25 µm	25 µm
Tip material:	Carbide	Carbide

Stylus No.	Code No.	Compatible arm No.	H (mm)
Single-bevel stylus carbide-tipped			
SPH-51	**354882**	AB-51, 52	6
SPH-61	**354883**	AB-61, 62	12
SPH-71*	**354884**	AB-71, 72	20
SPH-81	**354885**	AB-81, 82	30
SPH-91	**354886**	AB-91, 92	42
Cross-ground stylus carbide-tipped			
SPH-52	**354887**	AB-51, 52	6
SPH-62	**354888**	AB-61, 62	12
SPH-72	**354889**	AB-71, 72	20
SPH-82	**354890**	AB-81, 82	30
SPH-92	**354891**	AB-91, 92	42
Cone stylus carbide-tipped tip angle 20°			
SPH-57	**12AAE865**	AB-51, 52	6
SPH-67	**12AAE866**	AB-61, 62	12
SPH-77	**12AAE867**	AB-71, 72	20
SPH-87	**12AAE868**	AB-81, 82	30
SPH-97	**12AAE869**	AB-91, 92	42
Cone stylus sapphire-tipped tip angle 30°			
SPH-53	**354892**	AB-51, 52	6
SPH-63	**354893**	AB-61, 62	12
SPH-73	**354894**	AB-71, 72	20
SPH-83	**354895**	AB-81, 82	30
SPH-93	**354896**	AB-91, 92	42
Cone stylus diamond-tipped tip angle 50°			
SPH-79	**355129**	AB-71, 72	20

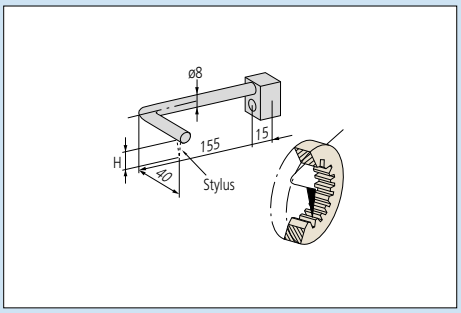
Stylus No.	Code No.	Compatible arm No.	H (mm)
Cone stylus carbide-tipped tip angle 30°			
SPH-56	**12AAA566**	AB-51, 52	6
SPH-66	**12AAA567**	AB-61, 62	12
SPH-76	**12AAA568**	AB-71, 72	20
SPH-86	**12AAA569**	AB-81, 82	30
SPH-96	**12AAA570**	AB-91, 92	42
Knife-edge stylus carbide-tipped			
SPH-54	**354897**	AB-51, 52	6
SPH-64	**354898**	AB-61, 62	12
SPH-74	**354899**	AB-71, 72	20
SPH-84	**354900**	AB-81, 82	30
SPH-94	**354901**	AB-91, 92	42
Ball stylus carbide-tipped			
SPH-55	**354902**	AB-51, 52	6
SPH-65	**354903**	AB-61, 62	12
SPH-75	**354904**	AB-71, 72	20
SPH-85	**354905**	AB-81, 82	30
SPH-95	**354906**	AB-91, 92	42
Small-hole stylus carbide-tipped one-sided cut			
SP-11	**932693**	AB-11	0.4
SP-12	**932694**		1
SP-13	**932695**		2.5
Small-hole stylus carbide-tipped cone			
SP-31	**12AAE873**	AB-11	0.4
SP-32	**12AAE874**		1
SP-33	**12AAE875**		2.5

*Supplied as standard.

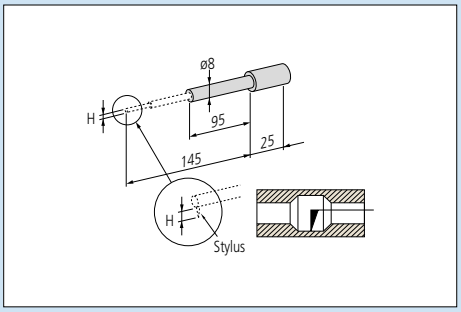
Arms



Straight type.



Eccentric type.



For small-hole stylus.

Arm No.	Code No.	Compatible stylus No.	H (mm)
Straight type			
AB-51	**935111**	SPH-5x	6
AB-61	**935112**	SPH-6x	12
AB-71*	**935113**	SPH-7x	20
AB-81	**935114**	SPH-8x	30
AB-91	**935115**	SPH-9x	42
Eccentric type			
AB-52	**935116**	SPH-5x	6
AB-62	**935117**	SPH-6x	12
AB-72	**935118**	SPH-7x	20
AB-82	**935119**	SPH-8x	30
AB-92	**935120**	SPH-9x	42
Small hole			
AB-11	**9351216**	SP-11, 31	0.4
		SP-12, 32	1
		SP-13, 33	2.5

*Supplied as standard.

L

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Formtracer Avant FTA-C3000

SERIES 218 – Contour Measuring Instruments

- A high-accuracy 2D contour measuring instrument; the Avant FTA-C3000 is a benchtop machine and comes with a motorised granite column and stand.
- Easy to operate.
- Accurate measurement of small features.
- Large vertical range and very high resolution.
- A large range of optional arms and styli ensures access to restricted features.
- Magnetic joint for a quick change of arms – quick and simple calibration.
- Simplified CNC operation.
- Optional motorised accessories.
- Retrofit options for surface roughness measurement.

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Formtracer Avant FTA-C3000

Technical Data

X1 axis
- Resolution: 0.05 µm
- Scale type: Ultra-high precision linear encoders
- Drive speed: 0 - 80 mm/s
- Measuring speed: 0.02 - 5 mm/s
- Measuring direction: Forward/backward
- Inclination range: ±45°

Z2 axis (column)
- Resolution: 1 µm
- Scale type: ABSOLUTE linear encoder
- Drive speed: 0 - 30 mm/s and manual

Z1 axis (detector unit)
- Measuring range: ±30 mm
- Resolution: 0.04 µm
- Scale type: Rotary arc encoder
- Accuracy (at 20°C): ±(1.2+l2Hl/100) µm, H: measurement height from the horizontal position (mm)
- Stylus orientation: Upward/downward
- Measuring force: 30 mN
- Traceable angle: Ascent: 77°, descent: 83° using the standard stylus provided and depending on the surface roughness

Base material: Granite

Mass
- Main unit: See table
- Controller unit: 14 kg
- Remote control box: 0.9 kg

Power supply: 240VAC ±10%, 50/60 Hz

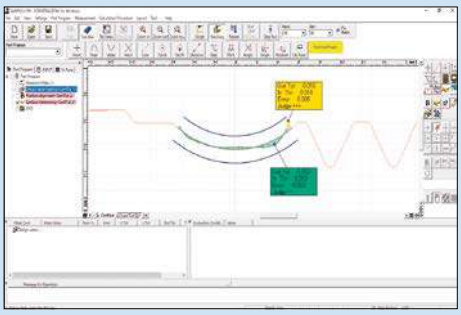
Power consumption: 400 W (main unit only)

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the standard in world metrology software
FORM

Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.



Optional Accessories

Arms and styli refer to page L-22.
Fixture and stage accessories refer to pages L-33 to L-35.
Vibration Isolator Desks and Side Tables refer to page L-47.

Specifications

Model		FTA-S4C3000	FTA-H4C3000	FTA-W4C3000	FTA-L4C3000
Code No.		218-361-11	218-362-11	218-363-11	218-364-11
X1 axis	Measuring range	100 mm			
	Traverse straightness	0.8 µm/100 mm (X1 axis in horizontal orientation)			
	Accuracy (at 20°C)	±(0.8+0.01L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		759 x 482 x 966 mm	759 x 482 x 1166 mm	1159 x 482 x 1176 mm	1159 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Model		FTA-S8C3000	FTA-H8C3000	FTA-W8C3000	FTA-L8C3000
Code No.		218-366-11	218-367-11	218-368-11	218-369-11
X1 axis	Measuring range	200 mm			
	Traverse straightness	2 µm/200 mm (X1 axis in horizontal orientation)			
	Accuracy (at 20°C)	±(0.8+0.015L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		769 x 482 x 966 mm	769 x 482 x 1166 mm	1169 x 482 x 1176 mm	1169 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

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Mitutoyo

Formtracer Avant FTA-C4000

SERIES 218 – Contour Measuring Instruments

- A high-accuracy 2D contour measuring instrument with dual stylus system; the Avant FTA-C4000 is a benchtop machine and comes with a motorised granite column and stand.
- "Hot plug" exchange of drive units.
- Easy to operate.
- Dual stylus system for upward and downward contour measurements with C4000 type.
- Variable contour measuring force set with Formtracepak software with C4000 type.
- High accurate contour measurements.
- A large range of optional arms and styli ensures access to restricted features.
- Remote control box for quick and accurate machine positioning.
- Simplified CNC operation.
- Optional motorised accessories.

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Formtracer Avant FTA-C4000 shown with vibration isolator and side table (optional accessories, see page L-47).



FTA-C4000 double-cone stylus.





Upward/downward measurement direction is switchable.

Technical Data

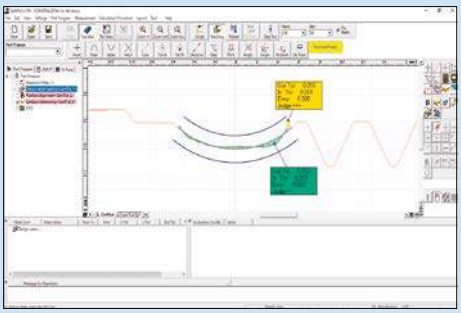
X1 axis	
Resolution:	0.05 µm
Scale type:	Linear encoder
Drive speed:	0 - 80 mm/s and manual
Measuring speed:	0.02 - 5 mm/s
Measuring direction:	Forward/backward
Inclination range:	±45°
Z2 axis (column)	
Resolution:	1 µm
Scale type:	ABSOLUTE linear encoder
Drive speed:	0 - 30 mm/s and manual
Z1 axis (detector unit)	
Measuring range:	±30 mm
Resolution:	0.02 µm
Scale type:	Rotary arc encoder
Accuracy (at 20°C):	±(0.8+l2Hl/100) µm, H: measurement height from the horizontal position (mm)
Stylus orientation:	Upward/downward
Measuring force:	10, 20, 30, 40, 50 mN (specified from the data-processing program FORMTRACEPAK)
Traceable angle:	Ascent: 77°, descent: 83° using the standard stylus provided and depending on the surface roughness
Base material:	Granite
Mass	
Main unit:	See table
Controller unit:	14 kg
Remote control box:	0.9 kg
Power supply:	240VAC ±10%, 50/60 Hz
Power consumption:	400 W (main unit only)

MiCAT
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the standard in world metrology software
FORM

Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.



Specifications

Model		FTA-S4C4000	FTA-H4C4000	FTA-W4C4000	FTA-L4C4000
Code No.		218-371-11	218-372-11	218-373-11	218-374-11
X1 axis	Measuring range	100 mm			
	Traverse straightness	0.8 µm/100 mm (X1 axis in horizontal orientation)			
	Accuracy (at 20°C)	±(0.8+0.01L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		759 x 482 x 966 mm	759 x 482 x 1166 mm	1159 x 482 x 1176 mm	1159 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Model		FTA-S8C4000	FTA-H8C4000	FTA-W8C4000	FTA-L8C4000
Code No.		218-376-11	218-377-11	218-378-11	218-379-11
X1 axis	Measuring range	200 mm			
	Traverse straightness	2 µm/200 mm (X1 axis in horizontal orientation)			
	Accuracy (at 20°C)	±(0.8+0.015L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		769 x 482 x 966 mm	769 x 482 x 1166 mm	1169 x 482 x 1176 mm	1169 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Optional Accessories

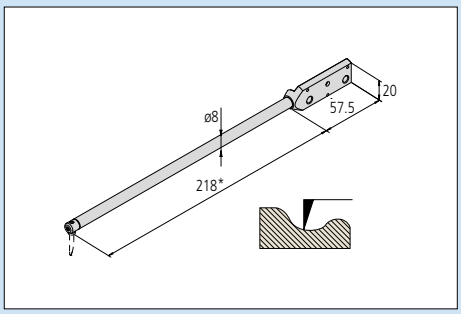
Arms and styli refer to page L-22.
Fixture and stage accessories refer to pages L-33 to L-35.
Vibration Isolator Desks and Side Tables refer to page L-47.

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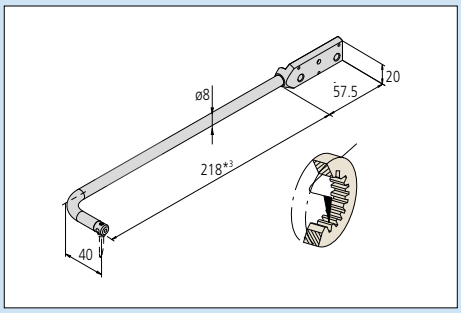
Optional Arms and Styli

For FTA-C3000 and FTA-C4000 Models

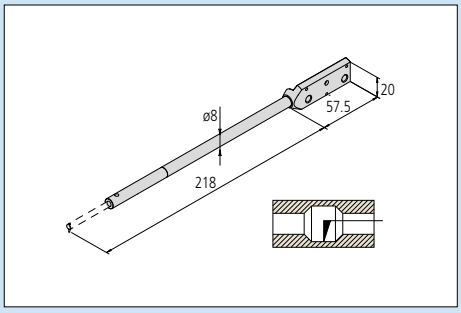
Arms



Straight type.



Eccentric type.



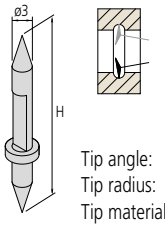
For small-hole stylus.

Arm No.	Code No.	Compatible stylus No.
Straight type		
AB-31*1	**12AAM101**	SPH-5x, 6x, 7x, 8x, 9x SPHW*2-56, 66, 76
Eccentric type		
AB-32*3	**12AAM102**	SPH-5x, 6x, 7x, 8x, 9x SPHW*2-56, 66, 76
Small hole		
AB-33	**12AAM103**	SPH-41, 41, 43

*1 Supplied as standard.
*2 Stylus for FTA-C4000 series.
*3 One-sided cut stylus SPH-71(standard accessory) mounting.

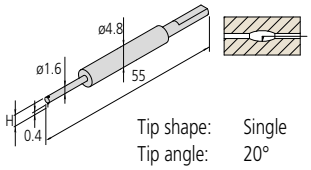
Styli

Double cone



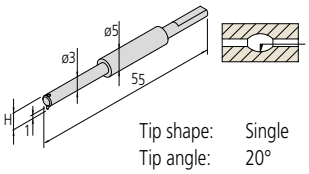
Tip angle: 30°
Tip radius: 25 µm
Tip material: Carbide

Small hole: SPH-41



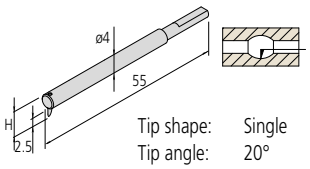
Tip shape: Single
Tip angle: 20°
Tip radius: 25 µm
Tip material: Carbide

Small hole: SPH-42



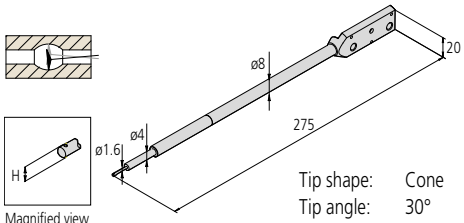
Tip shape: Single
Tip angle: 20°
Tip radius: 25 µm
Tip material: Carbide

Small hole: SPH-43



Tip shape: Single
Tip angle: 20°
Tip radius: 25 µm
Tip material: Carbide

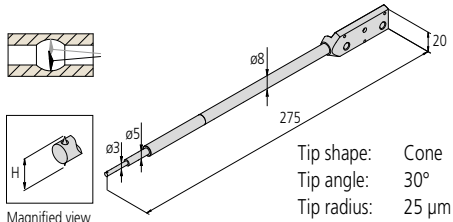
Double small-hole arm stylus: SPHW-31



Magnified view of the tip

Tip shape: Cone
Tip angle: 30°
Tip radius: 25 µm
Tip material: Carbide

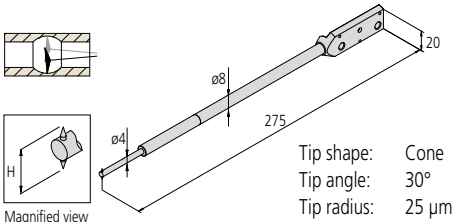
Double small-hole arm stylus: SPHW-32



Magnified view of the tip

Tip shape: Cone
Tip angle: 30°
Tip radius: 25 µm
Tip material: Carbide

Double small-hole arm stylus: SPHW-33



Magnified view of the tip

Tip shape: Cone
Tip angle: 30°
Tip radius: 25 µm
Tip material: Carbide

Stylus No.	Code No.	Compatible arm No.	H (mm)
Double-cone stylus *4			
SPHW-56	**12AAM095***5	AB-31, 32	20
SPHW-66	**12AAM096**		32
SPHW-76	**12AAM097**		48
Single-bevel stylus carbide-tipped			
SPH-51	**354882**	AB-31, 32	6
SPH-61	**354883**		12
SPH-71	**354884***6		20
SPH-81	**354885**		30
SPH-91	**354886**		42
Cross-ground stylus carbide-tipped (see page opposite)			
SPH-52	**354887**	AB-31, 32	6
SPH-62	**354888**		12
SPH-72	**354889**		20
SPH-82	**354890**		30
SPH-92	**354891**		42
Cone stylus sapphire-tipped tip angle 30° (see page opposite)			
SPH-53	**354892**	AB-31, 32	6
SPH-63	**354893**		12
SPH-73	**354894**		20
SPH-83	**354895**		30
SPH-93	**354896**		42
Cone stylus carbide-tipped tip angle 30° (see page opposite)			
SPH-56	**12AAA566**	AB-31, 32	6
SPH-66	**12AAA567**		12
SPH-76	**12AAA568**		20
SPH-86	**12AAA569**		30
SPH-96	**12AAA570**		42

*4 Stylus for FTA-C4000 series.
*5 Standard accessory of FTA-C4000 series.
*6 Standard accessory of FTA-C3000 series.

Stylus No.	Code No.	Compatible arm No.	H (mm)
Cone stylus carbide-tipped tip angle 20° (see page opposite)			
SPH-57	**12AAE865**	AB-31, 32	6
SPH-67	**12AAE866**		12
SPH-77	**12AAE867**		20
SPH-87	**12AAE868**		30
SPH-97	**12AAE869**		42
Cone stylus diamond-tipped tip angle 50° (see page opposite)			
SPH-79	**355129**	AB-31, 32	20
Knife-edge stylus carbide-tipped (see page opposite)			
SPH-54	**354897**	AB-31, 32	6
SPH-64	**354898**		12
SPH-74	**354899**		20
SPH-84	**354900**		30
SPH-94	**354901**		42
Ball stylus carbide-tipped (see page opposite)			
SPH-55	**354902**	AB-31, 32	6
SPH-65	**354903**		12
SPH-75	**354904**		20
SPH-85	**354905**		30
SPH-95	**354906**		42
Small-hole stylus			
SPH-41	**12AAM104**	AB-33	2
SPH-42	**12AAM105**		4
SPH-43	**12AAM106**		6.5
Double small-hole arm stylus*7 (integrated arm and stylus) only for FTA-C4000			
SPHW-31	**12AAM108**	—	2.4
SPHW-32	**12AAM109**		5
SPHW-33	**12AAM110**		9

*7 Arm stylus for FTA-C4000 series.

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Formtracer Avant FTA-H3000

SERIES 525 – Surface Roughness/Contour Measuring System

- Both surface roughness and contour measurement can be evaluated simultaneously with one trace.
- A high-accuracy 2D surface roughness and contour measuring instrument; the Avant H type is a benchtop machine and comes with a motorised granite column and stand.
- 16 mm Z-axis measurement range (3.2x wider than conventional models).
- "Hot plug" exchange of drive units.
- Easy to operate.
- High accurate surface roughness and contour measurements.
- A large range of optional arms and styli ensures access to restricted features.
- Remote control box for quick and accurate machine positioning.
- Simplified CNC operation.
- Optional motorised accessories.

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Data Management Software by Mitutoyo



Formtracer Avant FTA-H8H3000
shown with vibration isolator and monitor arm (optional accessories, see page L-47).

Specifications

Model		FTA-S4H3000	FTA-H4H3000	FTA-W4H3000	FTA-L4H3000
Code No.		525-241-11	525-242-11	525-243-11	525-244-11
X1 axis	Measuring range	100 mm			
	Traverse straightness	0.2 µm/100 mm (X1 axis in horizontal orientation)			
	Accuracy (at 20°C)	±(0.8+0.01L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		759 x 482 x 966 mm	759 x 482 x 1166 mm	1159 x 482 x 1176 mm	1159 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Model		FTA-S8H3000	FTA-H8H3000	FTA-W8H3000	FTA-L8H3000
Code No.		525-246-11	525-247-11	525-248-11	525-249-11
X1 axis	Measuring range	200 mm			
	Traverse straightness	0.6 µm/200 mm (X1 axis in horizontal orientation)			
	Accuracy (at 20°C)	±(0.8+0.015L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		769 x 482 x 966 mm	769 x 482 x 1166 mm	1169 x 482 x 1176 mm	1169 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Technical Data

X axis (drive unit)
- Resolution: 0.05 µm
- Scale: Ultra-high precision linear encoders
- Drive speed: 0 - 80 mm/s and manual
- Measuring speed: 0.02 - 5 mm/s
- Measuring direction: Forward/backward
- Inclination range: ±45°

Z1 axis
- Measuring range: 16 mm
- Resolution: 0.0003 µm
- Scale: Rotary arc encoder
- Accuracy (at 20°C): ±(0.5+|2H|/100) µm
  Note: H = measurement height from the horizontal position (mm)
- Operation: Arc movement
- Face of stylus: Downward
- Traceable angle: Ascent/descent: 65° (using the standard stylus provided and depending on the surface texture)
- Stylus tip: Contour: sapphire, SR25 µm
  Surface roughness: diamond, 60°/SR2 µm
- Type: Differential inductance

Z2 axis (column)
- Resolution: 1 µm
- Scale: ABSOLUTE linear encoder
- Drive speed: 0 - 30 mm/s and manual

Mass
- Controller unit: 14 kg
- Remote control box: 0.9 kg
- Power supply: 240VAC ±10%, 50/60Hz
- Power consumption: 400 W (main unit only)

Optional Accessories

Styli refer to page L-24.
Fixture and stage accessories refer to pages L-33 to L-35.
Vibration Isolator Desks and Side Tables refer to page L-47.

Simplified CNC Function

Support for a wide range of optional peripherals designed for use with the CNC models enables automatic measurement.


Using Y-axis table.


Using rotary table θ1.


Using rotary table θ2.

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Optional Arms and Styli

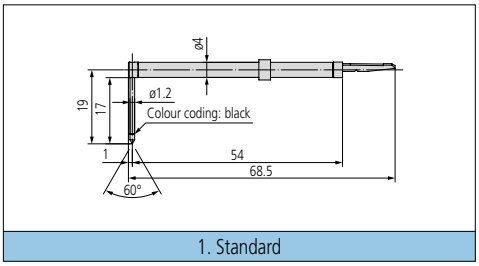
For FTA-H3000 Models

Specifications

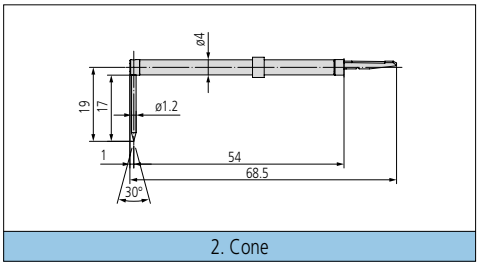
Code No.	Stylus tip radius	Stylus tip angle
1. Standard styli		
12AAY442	2 µm	60°
2. Cone		
12AAY443	25 µm	30°
3. ø0.5 ball		
12AAY444	250 µm	60°
4. For small hole		
12AAY445	2 µm	60°
5. Eccentric		
12AAY446	2 µm	60°
6. For gear tooth		
12AAY447	2 µm	60°
7. For groove (7 mm)		
12AAY448	2 µm	60°
8. For deep groove (40 mm)		
12AAY449	2 µm	60°
9. Double length		
12AAY450	5 µm	40°
10. Double length for deep hole		
12AAY451	5 µm	60°
11. 2.7x-length		
12AAY452	25 µm	30°



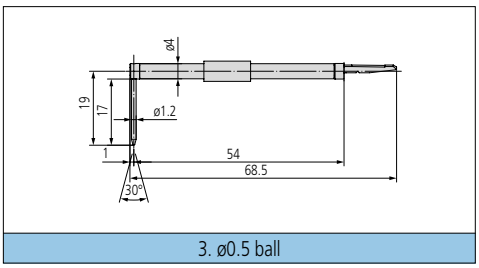
Detector holder H-3000.



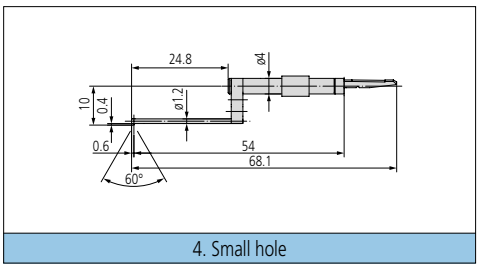
1. Standard



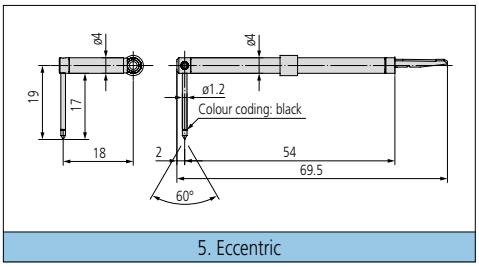
2. Cone



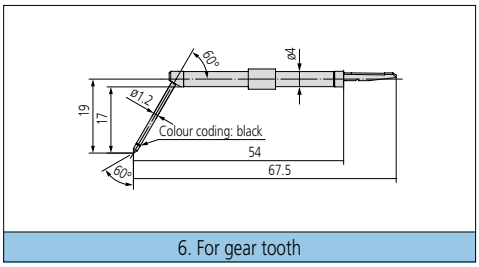
3. ø0.5 ball



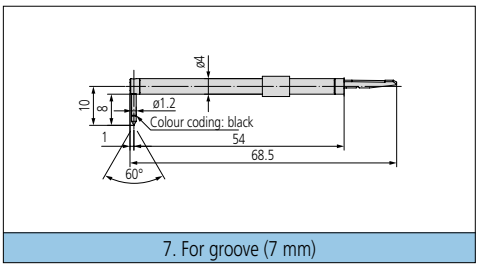
4. Small hole



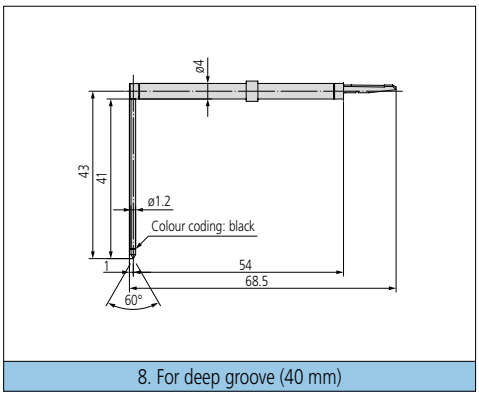
5. Eccentric



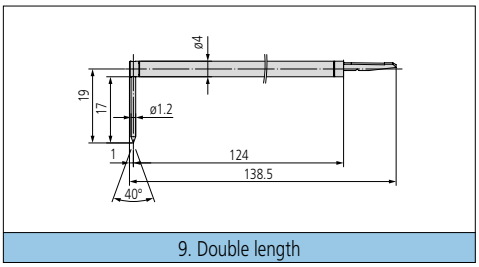
6. For gear tooth



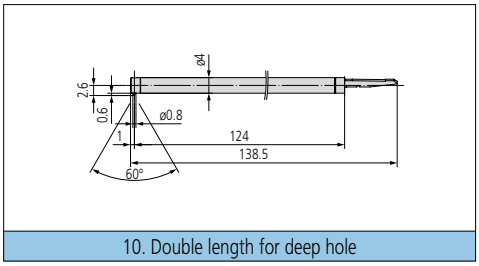
7. For groove (7 mm)



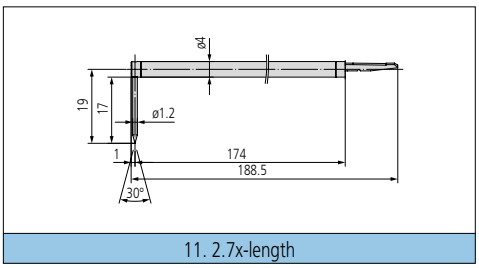
8. For deep groove (40 mm)



9. Double length



10. Double length for deep hole



11. 2.7x-length

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Formtracer Avant FTA-D3000/FTA-D4000

SERIES 525 – Surface Roughness/Contour Measuring System

- A high-accuracy 2D surface roughness and contour measuring instrument; the Avant D type is a benchtop machine and comes with a motorised granite column and stand.
- "Hot plug" exchange of drive units.
- Easy to operate.
- Dual stylus system for upward and downward contour measurements with D4000 type.
- Variable contour measuring force set with Formtracepak software with D4000 type.
- High accurate surface roughness and contour measurements.
- A large range of optional arms and styli ensures access to restricted features.
- Remote control box for quick and accurate machine positioning.
- Simplified CNC operation.
- Optional motorised accessories.

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Formtracer Avant FTA-D3000



Formtracer Avant FTA-D4000

Technical Data

X axis (drive unit)	
Resolution:	0.05 µm
Scale:	Ultra-high precision linear encoders
Drive speed:	0 - 80 mm/s and manual
Measuring speed:	0.02 - 5 mm/s
Measuring direction:	Forward/backward
Inclination range:	±45° (with X1 axis inclination unit)
Z1 axis (contour detector)	
Measuring range:	±30 mm
Resolution:	0.04 µm (FTA-D3000), 0.02 µm (FTA-D4000)
Scale:	Rotary arc encoder
Accuracy (at 20°C):	±(1.2+|2H|/100) µm (FTA-D3000) ±(0.8+|2H|/100) µm (FTA-D4000) Note: H = measurement height from the horizontal position (mm)
Stylus up/down operation:	Arc movement
Face of stylus:	Upward/downward (FTA-D3000), Upward/downward, direction switch by FORMTRACEPAK (FTA-D4000)
Measuring force:	30 mN (FTA-D3000) 10, 20, 30, 40, 50 mN (FTA-D4000) Note: As for FTA-C4000, set the measurement force with FORMTRACEPAK
Traceable angle:	Ascent: 77°, descent: 83° (using the standard stylus provided and depending on the surface roughness)
Stylus tip:	Carbide, SR25 µm
Z1 axis (surface roughness detector)	
Range / resolution:	800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm (up to 2400 µm with an optional stylus)
Stylus tip:	Diamond, 60°/SR2 µm
Measuring force:	0.75 mN
Type:	Differential inductance
Z2 axis (column)	
Resolution:	1 µm
Scale:	ABSOLUTE linear encoder
Drive speed:	0 - 30 mm/s and manual
Mass	
Controller unit:	14 kg
Remote control box:	0.9 kg
Power supply:	240VAC ±10%, 50/60Hz
Power consumption:	400 W (main unit only)

Optional Accessories

Styli refer to pages L-27 to L-28.
Fixture and stage accessories refer to pages L-33 to L-35.
Vibration Isolator Desks and Side Tables refer to page L-47.

Simplified CNC Function

Support for a wide range of optional peripherals designed for use with the CNC models enables automatic measurement.



Using Y-axis table.



Using rotary table θ1.



Using rotary table θ2.

L

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Formtracer Avant FTA-D3000/FTA-D4000

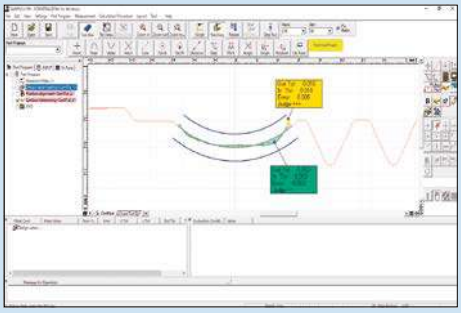
SERIES 525 – Surface Roughness/Contour Measuring System

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
FORM

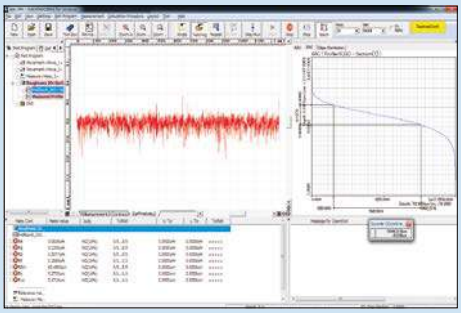
Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.



Contour measurement screen.



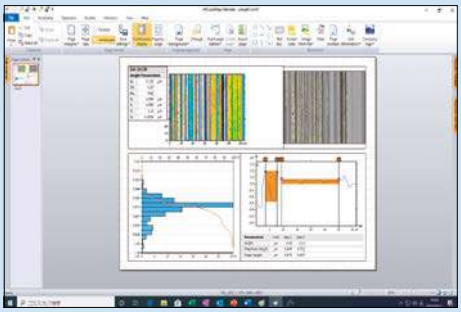
Surface roughness measurement screen.

Optional Software

MCubeMap

3D surface property analyzing software. Parameter analysis is available for not only the vertical directions of Sa and Sq, but also spaces, compounds, and features. A wide variety of graphical technologies help visualize the analyzed data in detail.

Note: The Y-axis table for 3D measurement is required separately.



3D analysis screen.

Specifications

Model		FTA-S4D3000	FTA-H4D3000	FTA-W4D3000	FTA-L4D3000
Code No.		525-311-11	525-312-11	525-313-11	525-314-11
Model		**FTA-S4D4000**	**FTA-H4D4000**	**FTA-W4D4000**	**FTA-L4D4000**
Code No.		**525-321-11**	**525-322-11**	**525-323-11**	**525-324-11**
X axis	Measuring range	100 mm			
	Traverse straightness*	(0.05+0.001L) µm, L = measured length (mm)			
	Accuracy (at 20°C):	±(0.8+0.01L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		759 x 482 x 966 mm	759 x 482 x 1166 mm	1159 x 482 x 1176 mm	1159 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

Model		FTA-S8D3000	FTA-H8D3000	FTA-W8D3000	FTA-L8D3000
Code No.		525-316-11	525-317-11	525-318-11	525-319-11
Model		**FTA-S8D4000**	**FTA-H8D4000**	**FTA-W8D4000**	**FTA-L8D4000**
Code No.		**525-326-11**	**525-327-11**	**525-328-11**	**525-329-11**
X1 axis	Measuring range	200 mm			
	Traverse straightness*	(0.1+0.002L) µm, L = measured length (mm)			
	Accuracy (at 20°C):	±(0.8+0.015L) µm, L = drive length (mm)			
Z2-axis vertical travel		300 mm	500 mm		700 mm
Base size (W x D)		600 x 450 mm		1000 x 450 mm	
Dimensions (main unit, W x D x H)		769 x 482 x 966 mm	769 x 482 x 1166 mm	1169 x 482 x 1176 mm	1169 x 492 x 1430 mm
Mass (main unit)		140 kg	150 kg	220 kg	270 kg

* With the X1 axis in the horizontal orientation.



Formtracer Avant FTA-D4000 shown with monitor arm, vibration isolator desk and side table (optional accessories, see page L-47).

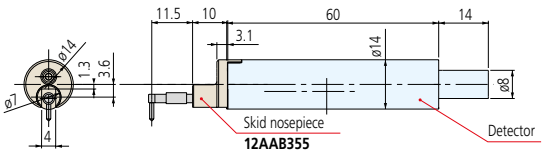
L

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Mitutoyo

Optional Styli

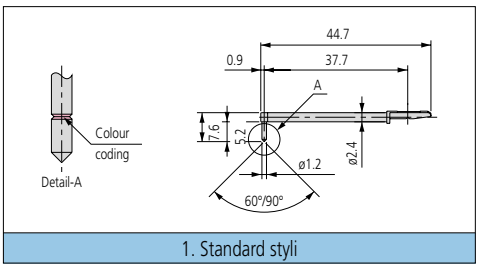
Compatible with FTA-D3000, FTA-D4000 Models



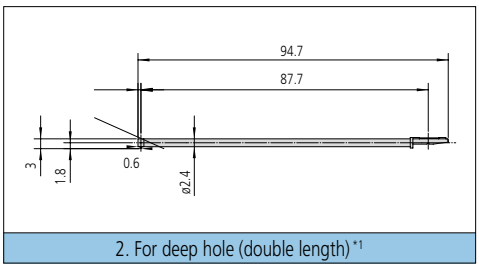
178-396-2 Detector (0.75 mN)
178-397-2 Detector (4 mN)



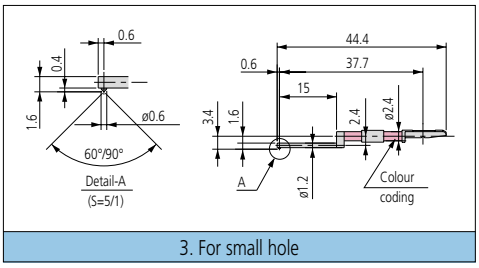
12AAG202 50 mm extension rod
12AAG203 100 mm extension rod



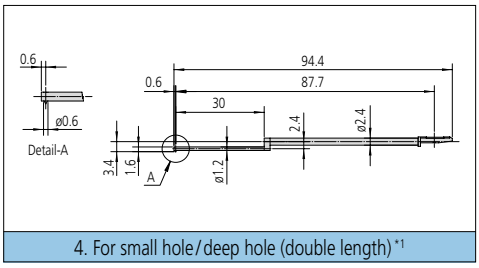
1. Standard styli



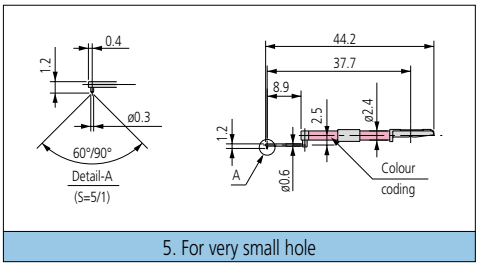
2. For deep hole (double length) *1



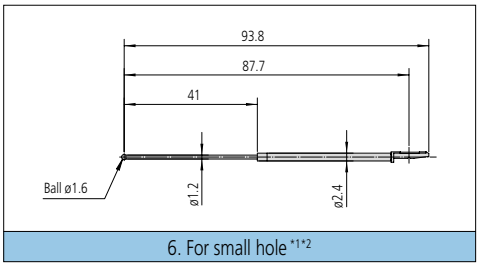
3. For small hole



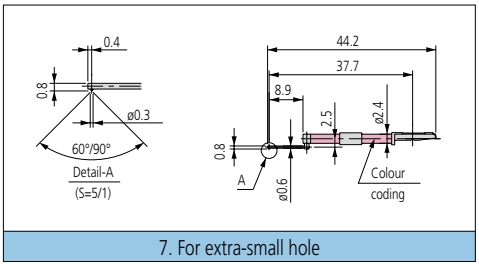
4. For small hole / deep hole (double length) *1



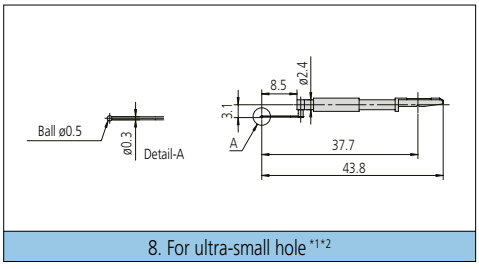
5. For very small hole



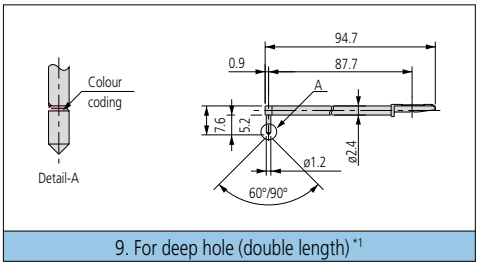
6. For small hole *1*2



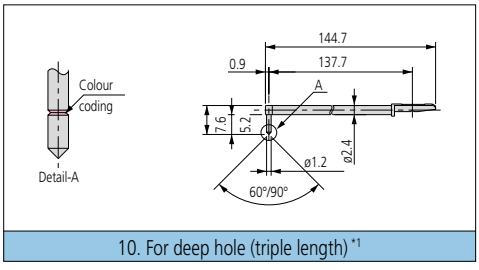
7. For extra-small hole



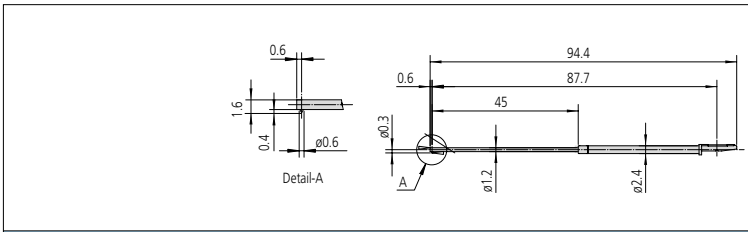
8. For ultra-small hole *1*2



9. For deep hole (double length) *1



10. For deep hole (triple length) *1



11. For small slotted hole *1

Specifications

Code No.	Stylus tip radius	Stylus tip angle
1. Standard styli		
12AAE882	1 µm	60°
12AAE924	1 µm	90°
12AAC731	2 µm	60°
12AAB403	5 µm	90°
12AAB415	10 µm	90°
12AAE883	250 µm	60°
2. For deep hole (double length) *1		
12AAE898	2 µm	60°
12AAE914	5 µm	90°
3. For small hole		
12AAC732	2 µm	60°
12AAB404	5 µm	90°
12AAB416	10 µm	90°
4. For small hole / deep hole (double length) *1		
12AAE892	2 µm	60°
12AAE908	5 µm	90°
5. For very small hole		
12AAC733	2 µm	60°
12AAB405	5 µm	90°
12AAB417	10 µm	90°
6. For small hole *1*2		
12AAE884	0.8 mm	—
7. For extra-small hole		
12AAC734	2 µm	60°
12AAB406	5 µm	90°
12AAB418	10 µm	90°
8. For ultra-small hole *1*2		
12AAJ662	250 µm	—
9. For deep hole (double length) *1		
12AAC740	2 µm	60°
12AAB413	5 µm	90°
12AAB425	10 µm	90°
10. For deep hole (triple length) *1		
12AAC741	2 µm	60°
12AAB414	5 µm	90°
12AAB426	10 µm	90°
11. For small slotted hole *1		
12AAE938	2 µm	60°
12AAE940	5 µm	90°

*1 For downward-facing measurement only.
*2 Used for calibration, a standard step gauge (178-611 optional accessory) is also required.

Tip radius	1 µm	2 µm	5 µm	10 µm	250 µm
Colour coding	White	Black	No colour	Yellow	No notch or colour

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Optional Styli

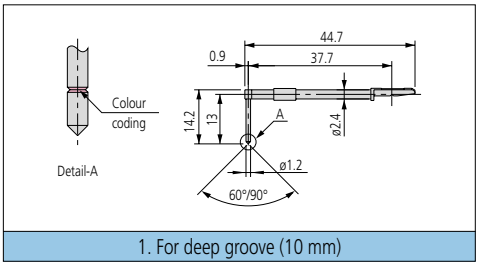
Compatible with FTA-D3000, FTA-D4000 Models

Specifications

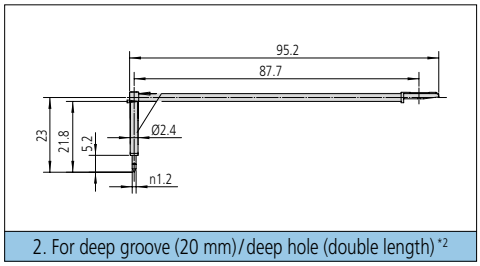
Code No.	Stylus tip radius	Stylus tip angle
1. For deep groove (10 mm)		
12AAC735	2 µm	60°
12AAB409	5 µm	90°
12AAB421	10 µm	90°
2. For deep groove (20 mm)/deep hole (double length) *2		
12AAE893	2 µm	60°
12AAE909	5 µm	90°
3. For deep groove (20 mm) *1		
12AAC736	2 µm	60°
12AAB408	5 µm	90°
12AAB420	10 µm	90°
4. For deep groove (40 mm) *1		
12AAE895	2 µm	60°
12AAE911	5 µm	90°
5. For deep groove (30 mm) *1		
12AAC737	2 µm	60°
12AAB407	5 µm	90°
12AAB419	10 µm	90°
6. For deep groove (30 mm) *1/deep hole (double length)		
12AAE894	2 µm	60°
12AAE910	5 µm	90°
7. For gear tooth		
12AAB339	2 µm	60°
12AAB410	5 µm	60°
12AAB422	10 µm	60°
8. For gear tooth *1/deep hole (double length)		
12AAE896	2 µm	60°
12AAE912	5 µm	60°
9. For rolling circle waviness surface *2		
12AAB338	0.8 mm	—
10. For rolling circle waviness *1/deep hole (double length) *2		
12AAE886	250 µm	—
11. For knife-edge detector		
12AAC738	2 µm	60°
12AAB411	5 µm	90°
12AAB423	10 µm	90°
12. For corner hole *1/deep hole (double length)		
12AAM601	2 µm	60°
12AAM603	5 µm	60°
13. For eccentric arm *1		
12AAC739	2 µm	60°
12AAB412	5 µm	90°
12AAB424	10 µm	90°
14. For bottom surface		
12AAE899	2 µm	60°
12AAE915	5 µm	90°

*1 For downward-facing measurement only.
*2 Used for calibration, a standard step gauge (178-611 optional accessory) is also required.

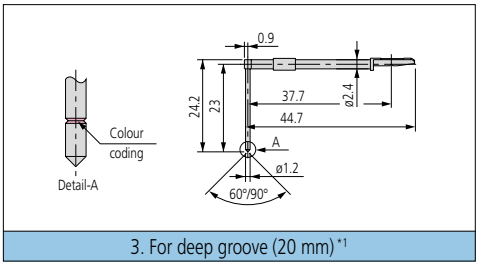
Tip radius	1 µm	2 µm	5 µm	10 µm	250 µm
Colour coding	White	Black	No colour	Yellow	No notch or colour



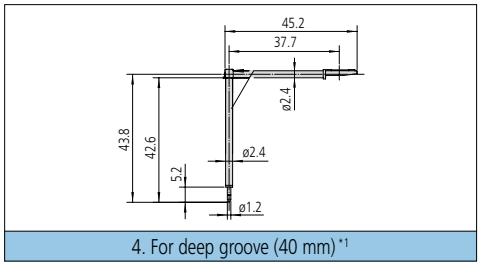
1. For deep groove (10 mm)



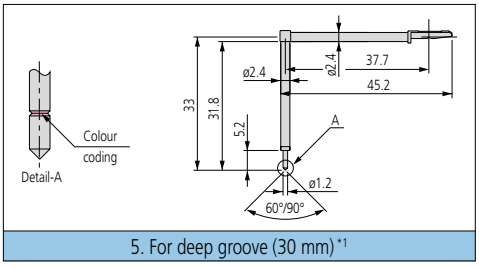
2. For deep groove (20 mm)/deep hole (double length) *2



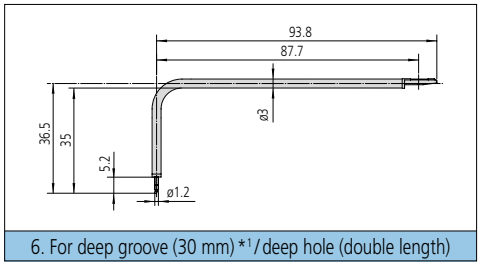
3. For deep groove (20 mm) *1



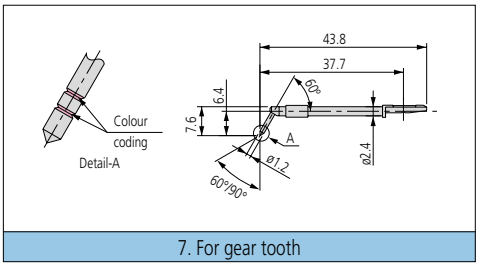
4. For deep groove (40 mm) *1



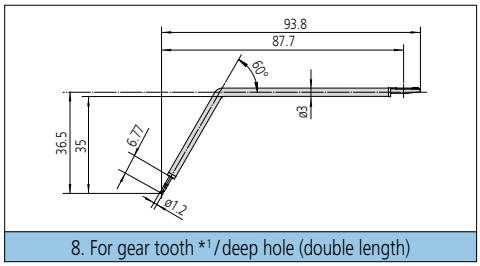
5. For deep groove (30 mm) *1



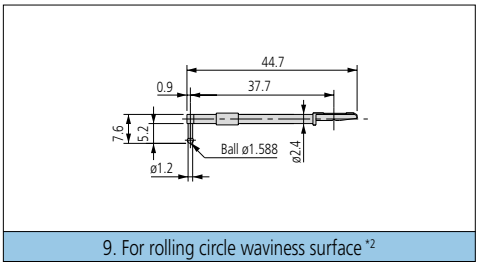
6. For deep groove (30 mm) *1/deep hole (double length)



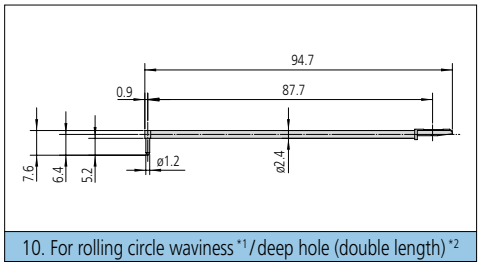
7. For gear tooth



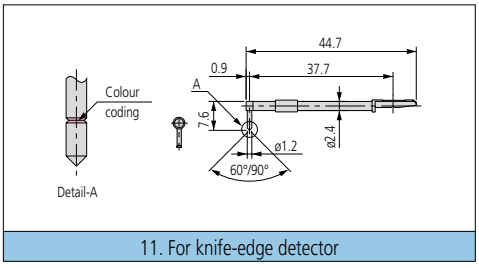
8. For gear tooth *1/deep hole (double length)



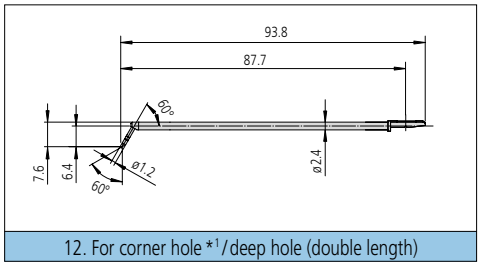
9. For rolling circle waviness surface *2



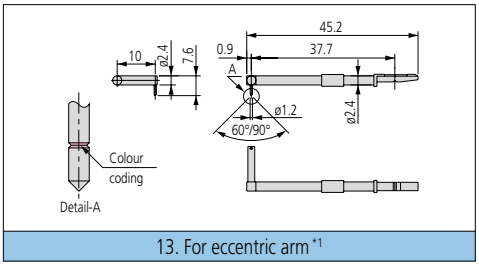
10. For rolling circle waviness *1/deep hole (double length) *2



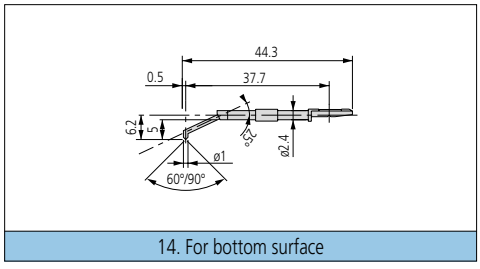
11. For knife-edge detector



12. For corner hole *1/deep hole (double length)



13. For eccentric arm *1



14. For bottom surface

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Formtracer Extreme SV-C4500CNC

SERIES 525 – Surface Roughness/Contour Measuring System

- A high-accuracy CNC measuring system that enables measurement of surface roughness and form/contour with just one instrument.
- Each axis has a maximum drive speed of 200 mm/s, which permits high-speed positioning that potentially offers a large increase in the throughput of multiple-profile / multiple-workpiece measurement tasks.
- For models with the α axis, it is possible to perform continuous measurement over horizontal and inclined surfaces by power-tilting the drive unit.
- For models with the Y-axis table, it is possible to expand the measuring range for multiple workpieces through positioning in the Y-axis direction.
- The contour drive unit is equipped with a Laser Hologage detector giving excellent narrow- and wide-range accuracy and resolution in the Z1 axis.
- Enables inclined plane measurements through simultaneous control of the X1 and Z2 axes.
- If the contour detector is replaced with that for surface roughness measurement, or vice versa, it is a simple, one-touch replacement without rerouting of the connecting cables.
- The Z1 axis incorporates an anti-collision safety device to automatically stop the detector if it collides with a workpiece or jig.
- Supplied with an easy-to-operate Remote Box, from which the user can make any movement by selecting the required axis using the two joysticks. The current axis selection is easily identified by the icon on the key top.
- Communication with the Data Processing/Analysis Unit is via USB.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Formtracer Extreme SV-C4500CNC



Surface Roughness Detector



Contour Detector



Technical Data

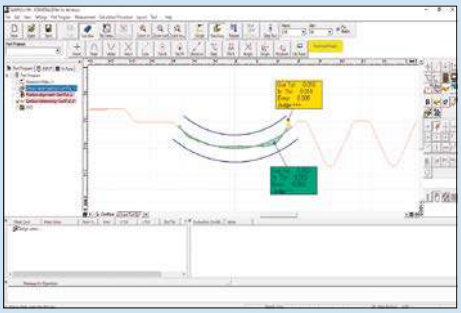
Z1 axis (contour detector)	
Measuring range:	60 mm (±30 mm from the horizontal position)
Resolution:	0.02 µm
Scale type:	Laser Hologage
Accuracy (at 20°C):	±(0.8+|2H|/100) µm, H = measured height from the horizontal position (mm)
Stylus up/down operation:	Circular movement
Face of stylus:	Downward
Measuring force:	0.75 mN
Traceable angle:	Ascent: 70°, descent: 70° (using the standard chisel-cut stylus and depending on the surface roughness)
Stylus tip:	Carbide, 30°
Z1 axis (surface roughness detector)	
Range / resolution:	800 µm/0.01 µm, 80 µm/0.001 µm, 8 µm/0.0001 µm
Measuring force:	0.75 mN
Stylus tip:	60°, SR2µm
Detecting method:	Differential inductance
α axis	
Inclination angle:	-45° (CCW), +10° (CW)
Resolution:	0.000225°
Rotation speed:	1 rpm
Power supply:	240VAC ±10%, 50/60Hz
Power consumption:	500 W (main unit only)

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
FORM

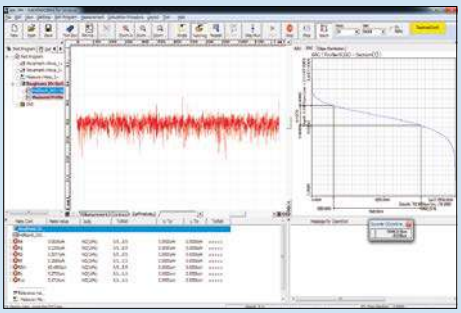
Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.



Contour measurement screen.



Surface roughness measurement screen.

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Formtracer Extreme SV-C4500CNC

SERIES 525 – Surface Roughness/Contour Measuring System

Optional Accessories

Vibration isolator stand

Vibration isolation mechanism:	Diaphragm air spring
Natural frequency:	2.5-3.5 Hz
Damping mechanism:	Orifice
Levelling mechanism:	Automatic control with mechanical valves
Air supply pressure:	0.4 MPa
Allowable loading capacity:	350 kg
Dimensions (W x D x H):	1000 x 895 x 715 mm
Mass:	315 kg

Y-axis table unit

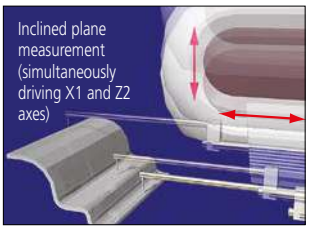
Measuring range:	200 mm
Resolution:	0.05 µm
Scale unit:	Reflective-type linear encoder
Drive speed:	200 mm/s (max., CNC), 0-50 mm/s (joystick)
Maximum loading capacity:	20 kg
Traverse straightness:	0.5 µm / 200 mm
Accuracy (at 20°C):	±(2+2L/100) µm, L = measured length (mm)
Table size:	200 x 200 mm
Dimensions (W x D x H):	320 x 646 x 105 mm
Mass:	35 kg

Styli refer to pages L-27, L-28 and L-32.
Fixture and stage accessories refer to pages L-33 to L-36.

Specifications

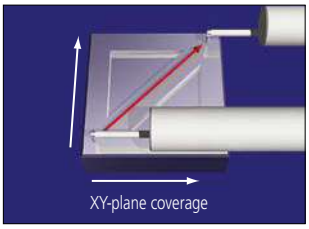
Model		SV-C4500CNC							
Code No. (mm)		**525-661E**	**525-662E**	**525-663E**	**525-664E**	**525-681E**	**525-682E**	**525-683E**	**525-684E**
Code No. (inch)		**525-671E**	**525-672E**	**525-673E**	**525-674E**	**525-691E**	**525-692E**	**525-693E**	**525-694E**
X1 axis (drive unit)	Measuring range	200 mm							
	Resolution	0.05 µm							
	Scale	Reflective-type linear encoder							
	Accuracy (at 20°C)	±(0.8+4L/200) µm, L = drive length (mm)							
	Drive speed	Max. 200 mm/s (CNC), 0-50 mm/s (joystick)							
	Measuring speed	0.02 - 2 mm/s							
	Measuring direction	Forward/backward							
	Traverse straightness	0.5 µm / 200 mm							
Z2 axis (column)	Vertical travel	300 mm				500 mm			
	Resolution	0.05 µm							
	Scale	Reflective-type linear encoder							
	Drive speed	Max. 200 mm/s (CNC), 0-50 mm/s (joystick)							
Y-axis table unit		—		Installed		—		Installed	
α-axis unit		—	Installed	—	Installed	—	Installed	—	Installed
Granite base size (W x D)		200 x 200 mm							
Main unit dimensions (W x D x H)		800 x 620 x 1000 mm				800 x 620 x 1200 mm			
Mass	Main unit	240 kg				250 kg			
	Controller unit	28 kg							
	Remote control box	1.5 kg							

Measurement Applications













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Mitutoyo

Formtracer Extreme
CS-5000CNC/CS-H5000CNC

SERIES 525 – CNC Form Measuring Instruments

- High-accuracy stylus type CNC Surface Measuring Instrument that allows simultaneous measurement of surface roughness and form / contour.
- The X1 and Z2 axes have maximum drive speeds of 40 mm/s and 200 mm/s, respectively. This permits high-speed positioning that potentially offers a large increase in the throughput of multiple-profile/multiple-workpiece measurement tasks.
- Mitutoyo Laser Holoscales are incorporated in the X1 and Z1 axes to provide sufficiently high resolution for simultaneous measurement of form/contour and surface roughness, which is vital for batch working.
- The active control method is employed for the Z1-axis detector to implement a wide-range measurement capability wherein the variation in dynamic measuring force is restricted.
- The Z1 axis incorporates an anti-collision safety device to automatically stop the detector unit if it collides with a workpiece or jig.
- The CS-5000CNC model has an α axis, enabling continuous measurement over horizontal and inclined surfaces by power-tilting the detector unit.
- Models with the Y-axis table installed allow greater coverage of larger workpieces and enable multiple workpieces to be measured at one setup.
- Supplied with the easy-to-operate Remote Box by which the user can control any movement by selecting the required axis using the two joysticks.
- Uses USB for communicating with the Data Processing/Analysis Unit (optional).

MeasurLink® ENABLED
Data Management Software by Mitutoyo



Formtracer Extreme CS-H5000CNC

Specifications

Model		CS-5000CNC			
Code No.		525-727-12E	525-729-12E	525-747-12E	525-749-12E
Model		CS-H5000CNC			
Code No.		525-776-12E	525-777-12E	525-706-12E	525-707-12E
X1 axis	Measuring range	200 mm			
	Resolution	0.00625 µm			
	Scale type:	Laser Holoscale			
	Drive speed:	Max. 40 mm/s (CNC), 0-40 mm/s (joystick)			
	Measuring speed	0.02 - 0.2 mm/s (surface roughness), 0.02 - 2 mm/s (form/contour)			
	Measuring direction	Forward / backward direction			
Z2 axis (column unit)	Vertical travel	300 mm		500 mm	
	Resolution	0.05 µm			
	Scale type	Reflective-type linear encoder			
	Drive speed	Max. 200 mm/s (CNC), 0-50 mm/s (joystick)			
Y-axis table unit		—	Installed	—	Installed
α-axis unit		Installed			
Dimensions (main unit, W x D x H)		800 x 620 x 1000 mm		800 x 620 x 1200 mm	
Mass (main unit)		240 kg		250 kg	

Technical Data

X1 axis
- Traverse straightness: CS-5000CNC: (0.1+0.0015L) µm - standard stylus; (0.2+0.0015L) µm - 2X-long stylus; CS-H5000CNC: (0.05+0.0003L) µm - standard stylus; (0.1+0.0015L) µm - 2X-long stylus
- Accuracy (at 20°C): CS-5000CNC: ±(0.3+0.002L) µm; CS-H5000CNC: ±(0.16+0.001L) µm; L = measured length (mm)

Z1 axis
- Measuring range: 12 mm (with standard stylus); 24 mm (with 2X-long stylus)
- Resolution: 0.0008 µm (with standard stylus); 0.0016 µm (with 2X-long stylus)
- Stylus movement: Arc
- Scale type: Laser Holoscale
- Accuracy (at 20°C): CS-5000CNC: ±(0.3+|0.02H|) µm; CS-H5000CNC: ±(0.07+|0.02H|) µm; H = measured height (mm)
- Measuring force: 4 mN (with standard stylus); 0.75 mN (with 2X-long stylus)
- Traceable angle: 60° for ascent, 60° for descent (Depending on the workpiece surface condition)
- Face of stylus: Downward

Base size (W x D): 750 x 600 mm
Base material: Granite

Y axis
- Measuring range: 200 mm
- Resolution : 0.05 µm
- Drive speed: Max. 200 mm/s (in CNC mode); 0~50 mm/s (in joystick control mode)
- Max. table load: 20 kg
- Traverse linearity: 0.5 µm / 200 mm
- Accuracy (at 20°C): ±(2+2L/100) µm; L = measured length (mm)

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
FORM

Standard Software

FORMTRACEPAK

Enables control of the optional motor-driven Y-axis table and rotary table for realizing efficient measurement automation. Contour evaluation can be performed such as analysis of level differences, angle, pitch, area and other characteristics based on surface roughness data. In addition, an original inspection certificate can be created by setting the print format to suit your particular requirements.

Optional Accessories

Styli refer to page L-32.
Fixture and stage accessories refer to pages L-33 to L-36.

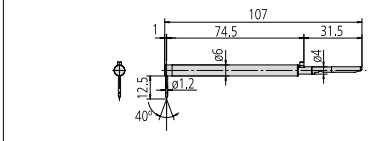


Wide-range detector employing active control technology.

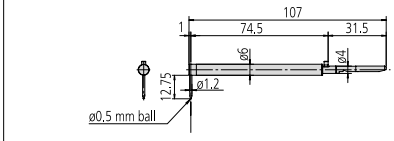
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Optional Styli

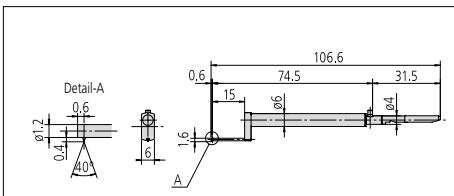
Compatible with CS-5000CNC, CS-H5000CNC Models



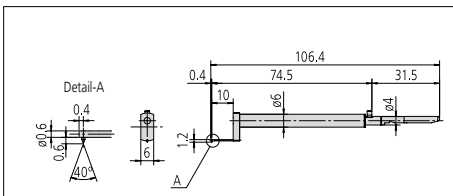
1. Standard



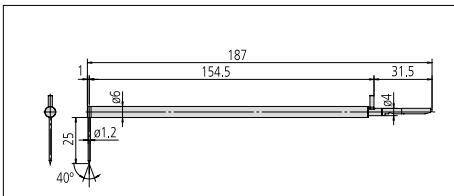
2. Standard ball



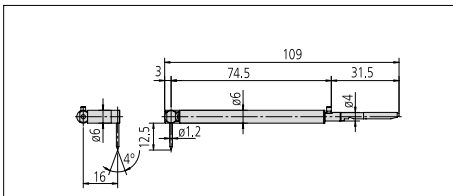
3. For small hole



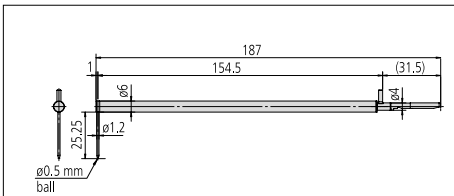
4. For extra small hole



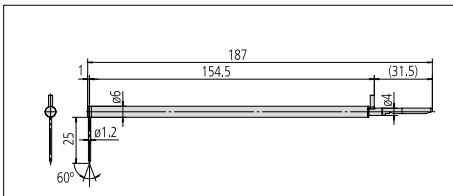
5. Double length



6. Eccentric type



7. Double length ball



8. Double length

Code No.	Measurement use	Tip radius	Tip angle	Tip material	Standard accessory	
					CS-5000CNC	CS-H5000CNC
1. Standard						
12AAD543	Contour/surface roughness	5 µm	40°	Diamond	✓	—
12AAJ037	Contour/surface roughness	5 µm	40°	Diamond	—	✓
2. Standard ball						
12AAD544	Contour/surface roughness	—	—	Sapphire	✓	✓
3. For small hole						
12AAD651	Contour/surface roughness	5 µm	40°	Diamond	—	—
4. For extra small hole						
12AAD652	Contour/surface roughness	5 µm	40°	Diamond	—	—
5. Double length						
12AAD545	Contour/surface roughness	5 µm	40°	Diamond	✓	—
12AAJ039	Contour/surface roughness	5 µm	40°	Diamond	—	✓
6. Eccentric type						
12AAD653	Contour/surface roughness	5 µm	40°	Diamond	—	—
7. Double length ball						
12AAD546	Contour/surface roughness	—	—	Sapphire	✓	✓
8. Double length						
12AAJ041	Contour/surface roughness	2 µm	60°	Diamond	—	✓

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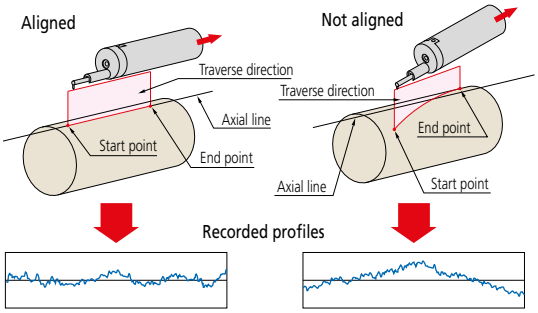
Mitutoyo

Optional Accessories

For Surftest, Formtracer and Contracer

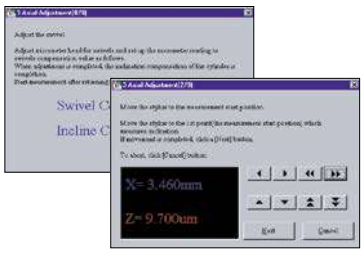
3-Axis Adjustment Table

This table helps make the alignment adjustments required when measuring cylindrical surfaces. The corrections for the pitch angle and the swivel angle are determined from a preliminary measurement and the Digimatic micrometers are adjusted accordingly. A flat-surfaced workpiece can also be levelled with this table.



178-182





Code No.	Description	Price
178-182	3-axis adjustment table	£4,690.00

Levelling Table

- Table top: 130 x 100 mm.
- Levelling range: ±1.5°.
- XY travel: ±12.5 mm.

178-183



Code No.	Description	Price
178-183	Levelling table (mm)	£2,800.00
178-184	Levelling table (inch)	£2,400.00

Digital Levelling Table

- Table top: 130 x 100 mm.
- Levelling range: ±1.5°.
- XY travel: ±12.5 mm.

178-185



Code No.	Description	Price
178-185	Digital levelling table (mm)	£2,390.00

DAT Levelling Table

- Table top: 130 x 100 mm.
- Levelling range: ±1.5°.
- Max. load: 15 kg

178-196



Code No.	Description	Price
178-196	Digital levelling table (mm)	£1,650.00

Levelling Table

- Table top: 130 x 100 mm.
- Levelling range: ±1.5°.
- Height: 40 mm.

178-195



Code No.	Description	Price
178-195	Levelling table	£740.00

Cross-Travel Table

- Table top: 280 x 180 mm.
- XY travel: 100 x 50 mm.

218-171



Code No.	Description	Price
218-171	Cross-travel table (mm)	£2,560.00

Cross-Travel Table

- Table top: 280 x 152 mm.
- XY travel: 50 x 25 mm.

218-041



Code No.	Description	Price
218-041	Cross-travel table (mm)	£2,720.00

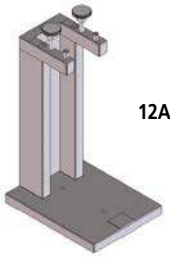
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Optional Accessories

For Surftest, Formtracer and Contracer

Calibration Stand

- Required for calibrating upward measurement.



12AAM100

Code No.	Description	Price
12AAM100	Calibration stand	£1,230.00

Calibration Stand

- Required for calibrating in bulk by mounting straight arm/ small-hole stylus arm without using cross-travel table and Y-axis table.



12AAG175

Code No.	Description	Price
12AAG175	Calibration stand	£344.00

Precision Vice

- Max. workpiece size: 36 mm.
- Can be mounted on a levelling table.

178-019



Code No.	Description	Price
178-019	Precision vice	£899.00

Rotary Vice

- Two-slide jaw type.
- Max. workpiece size: ø60 mm.
- Resolution: 1°.

218-173



Code No.	Description	Price
218-173	Rotary vice	£1,470.00

Swivel Centre Support

- Max. workpiece diameter: 80 mm*.
- Max. workpiece length: 140 mm.

* 65 mm when swivelled 10°.

172-604



Code No.	Description	Price
172-604	Swivel centre support	£915.00

Holder with Clamp

- Used with a cross-travel table or rugged table.
- Max. workpiece height: 35 mm.

176-107



Code No.	Description	Price
176-107	Holder with clamp	£222.00

Centre Support

- Max. workpiece diameter: 120 mm.
- 60 mm riser is optional.

172-600



Code No.	Description	Price
172-600	Centre support	£785.00

Centre Support Riser

- Used with a centre support.
- Max. workpiece diameter: 240 mm.

172-601



Code No.	Description	Price
172-601	Centre support riser	£553.00

V-Block with Clamp

- Used with a cross-travel table or rugged table.

172-603



172-378



Code No.	Description	Price
172-603	V-block with clamp (max. workpiece ø50 mm)	£385.00
172-378	V-block with clamp (max. workpiece ø25 mm)	£290.00

V-Block

- Workpiece diameter: 1 to 160 mm.
- Can be mounted on a levelling table.

998291



Code No.	Description	Price
998291	V-block	£822.00

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Optional Accessories

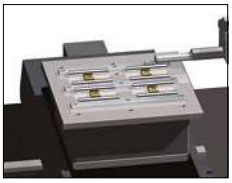
For Surftest, Formtracer and Contracer

Y-Axis Table

Enables efficient, automatic measurement of multiple aligned workpieces and multiple points on a single measurement surface. Allows semi-automatic measurement with a manually operated machine.

(Not for CNC models.)



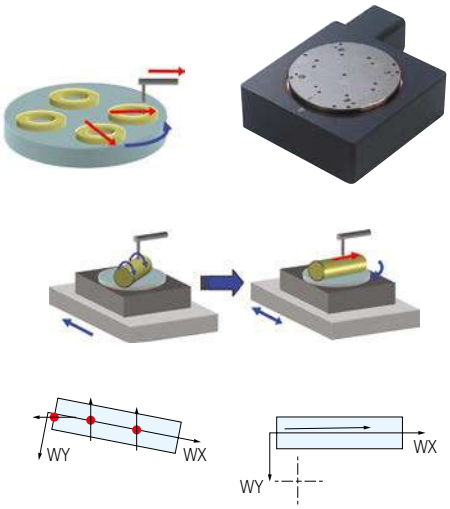


Code No.	178-097
Travel range	200 mm
Resolution	0.05 µm
Positioning accuracy	±3 µm
Drive speed	Max. 80 mm/s
Maximum load	50 kg
Mass	28 kg
Price	**£10,790.00**

θ1-Axis Table

For efficient measurement in the axial/transverse directions. When measuring a cylindrical workpiece, automatic alignment can be performed in combination with the Y-axis table.

Note: θ1-axis mounting plate (12AAE630) is required when directly installing on the base of the FTA-S3000.



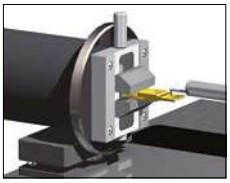
Code No.	12AAD975
Displacement	360°
Resolution	0.004°
Maximum load	12 kg
Rotational speed	Max. 10°/s
Mass	7 kg
Price	**£12,250.00**

θ2-Axis Table

Enables measurement of multiple points on a cylindrical workpiece and automation of front/rear/side measurement. Allows semi-automatic measurement with a manually operated machine.

Note: θ2-axis mounting plate (12AAE718) is required when directly installing on the base of the FTA-S3000.





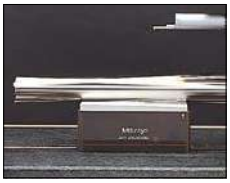


Code No.	178-078
Displacement	360°
Resolution	0.0072°
Maximum load	4 kg
Rotational speed	Max. 18°/s
Mass	5 kg
Price	**£5,540.00**

Automatic Levelling Table

This is a stage that performs fully automatic levelling as measurement starts, freeing the user from this troublesome operation. Fully automatic levelling can be done quickly, easily and reliably.





Code No.	178-087	178-037
For models	SV, CV	CNC
Inclination adjustment angle	±2°	
Maximum load	7 kg	
Table dimensions	130 x 100 mm	
Mass	3.5 kg	
Price	**£3,650.00**	**£3,750.00**

Quick Chuck

This chuck is useful when measuring small workpieces, which are easily clamped by tightening the knurled ring.



Code No.		211-032
Holding capacity	Internal jaws	OD: 1 - 36 mm
	Internal jaws	ID: 14 - 70 mm
	External jaws	OD: 25 - 79 mm
Dimensions		ø118 x 41 mm
Mass		1.2 kg
Price		**£1,700.00**

Micro-Chuck

This chuck is suitable for clamping extra-small diameter workpieces (ø1 mm or less), which cannot be retained with the Quick Chuck.



Code No.	211-031
Holding capacity	OD: 0.1 - 1.5 mm
Dimensions	ø107 x 48.5 mm
Mass	0.6 kg
Price	**£1,310.00**

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Optional Accessories

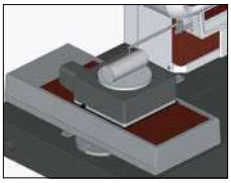
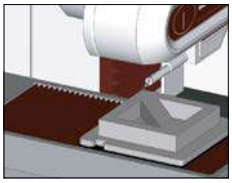
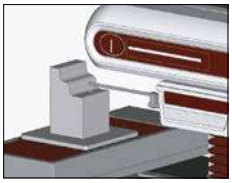
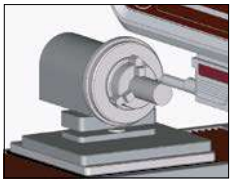
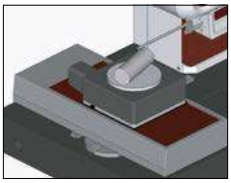
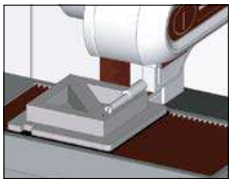
For Surftest, Formtracer and Contracer

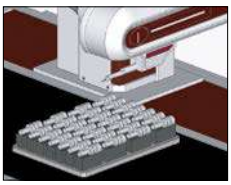
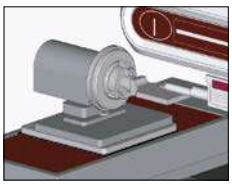
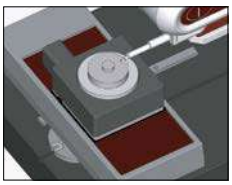
Examples of Optimal Combinations of Accessories for CNC Models

Function	Optional accessory					
	Y-axis table	θ1 axis table	θ2 axis table	Drive unit tilting function (Patent pending: Japan)	Large θ table	Rotary detector holder
						
Automatic levelling	—	—	—	●	—	—
Automatic alignment (Patent registered: Japan)	●	●	—	▲	—	—
Multiple workpiece batch measurement	▲	—	—	—	—	—
Measurement in the Y-axis direction	●	—	—	—	—	—
Oblique measurement in the XY plane*	●	—	—	—	—	—
Outside 3D surface roughness measurement/evaluation*	●	—	—	▲	—	—
Multiple-piece measurement in the Y-axis direction (positioning in the Y-axis direction)	●	—	—	—	—	—
Multiple-piece measurement in the radial direction (rotary positioning in the XY plane)	▲	●	—	—	—	—
Tracking measurement in the Z-axis direction**	—	—	—	●	—	—
Inclined surface measurement in the X-axis direction	▲	—	—	●	—	—
Inclined hole inside measurement in the X-axis direction	▲	—	—	●	—	—
Multiple cylinder generatrix line measurement	▲	—	●	—	—	—
Measurement of both top and bottom surfaces	▲	—	●	—	—	—
Rotary positioning of a large workpiece***	—	—	—	—	●	—
Upward/downward and frontward/backward measurement of a large workpiece***	—	—	—	—	—	●

● Highly suitable
▲ Suitable
— Not required
* Applicable only to surface roughness measurement
** Applicable only to form/contour measurement
*** Applicable only for SV-M3000CNC

For the combinations and the specifications of various optional accessories described in this catalogue, contact your nearest Mitutoyo sales office.

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Roundtest RA-120/RA-120P

SERIES 211 – Roundness Measuring Instruments

- The Roundtest RA-120/RA-120P is compact, affordable, and simple-to-use device for measuring part geometry on the shop floor.
- Provides outstanding data analysis capabilities required of a laboratory roundness measuring instrument having a ±1000 µm wide range detector and a precision turntable with excellent rotational accuracy.
- RA-120 has a dedicated processor and control panel incorporated in the main unit for controlling operations.
- RA-120P is a PC-based model with all operations controlled via ROUNDPAK software (optional).

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RA-120



RA-120P



Specifications

Model		RA-120		RA-120P	
Code No.		211-544E	211-546E	211-547E	211-545E
Turntable	DAT function	—	Installed	—	Installed
	Rotational accuracy	Radial: (0.04+6H/10000) µm, H = probing height (mm) Axial: (0.04+6X/10000) µm, X = probing radius (mm)			
	Rotational speed	6 rpm			
	Table diameter	150 mm			
	Centering range	±3 mm			
	Levelling range	±1°			
	Max. probing diameter	280 mm (380 mm when the detector is vertical, in which orientation measurement is restricted to features more than 50 mm above the table surface)			
	Max. workpiece diameter	440 mm			
	Max. table loading	25 kg			
Z axis (column)	Vertical travel	280 mm			
	Max. probing height	280 mm from the turntable surface			
	Max. probing depth	100 mm (min. ID: 30 mm)			
X-axis horizontal arm travel		165 mm (including a protrusion of 25 mm over the turntable axis)			
Probe and stylus	Measuring range	±1000 µm			
	Measuring force	70 to 100 mN			
	Standard stylus	12AAL021, carbide ball, ø1.6 mm			
	Measuring direction	Bi-directional			
	Stylus angle adjustment	±45° (with graduations)			
Dimensions (W x D x H)		450 x 360 x 636 mm			
Mass		32 kg (main unit), 2 kg (air regulator)			

Technical Data

Data analysis unit
- Processing unit: RA-120: Built-in; RA-120P: PC with ROUNDPAK
- Data sampling points: Max. 3600 points/revolution
- Types of roundness evaluation: LSC, MZC, MIC, MCC
- Recording device: Built-in thermal line printer
- Recording magnification: RA-120: X5 to X200,000 (15-steps); RA-120P: X1 to X500,000 (Auto)
- Roughness component reduction: Low pass filter, band pass filter
- Filter type: 2CR-75%, 2CR-50%, 2CRPC-75% (phase corrected), 2CRPC-50% (phase corrected), Gaussian, filter OFF
- Cutoff values: 15 upr, 50 upr, 150 upr, 500 upr, 15-150 upr, 15-500 upr, 50-500 upr
- Number of measuring sections: RA-120: Max. 5; RA-120P: 100-section

Air supply
- Air pressure: 390 kPa
- Air consumption: 30 L/min.

Power supply: 240VAC ±10%, 50/60Hz

Optional Accessories

Styli refer to page L-41.
Fixture and stage accessories refer to pages L-46 to L-47.

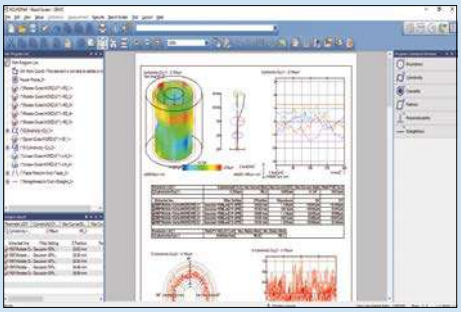
Consumables

Code No.	Description	Price
358592	Element for air filter (1 pc./set)	£58.30
358593	Element for air regulator (10 pcs./set)	£82.40
12AAH181	Printer paper (10 rolls/set)	£92.00

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Software

ROUNDPAK
Provides a wide variety of parameters as standard features, including those for roundness/ cylindricity, as well as flatness and parallelism.



DAT (Digital Adjustment Table) Function

Refer to opposite page.

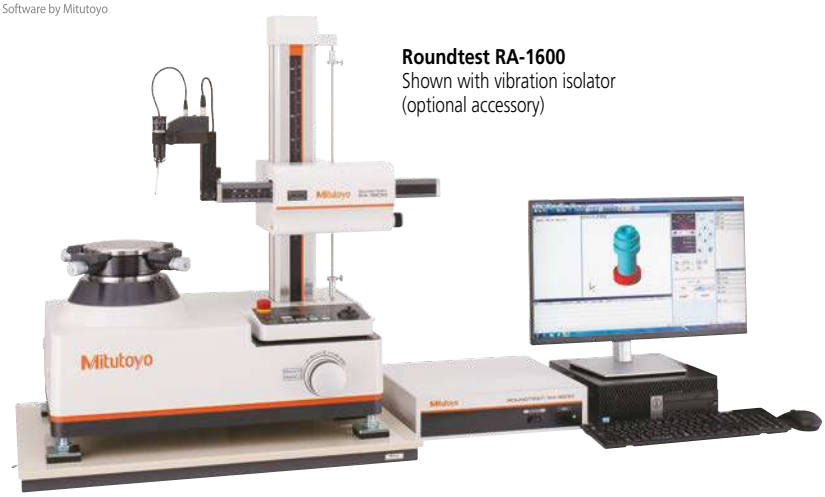
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Roundtest RA-1600

SERIES 211 – Roundness/Cylindricity Measuring System

- Our latest PC-compliant roundness and cylindrical form measuring instrument with extensive analysis features to enable measurement of a wide variety of workpieces.
- The spiral-mode measurement function combines table rotation and rectilinear action allowing cylindricity, coaxiality, and similar measurements to be performed based on whole-surface data.
- Measurement while tracing is possible through a built-in linear scale in the X axis. This type of measurement is useful when displacement due to form variation exceeds the measuring range of the detector, and X-axis motion is necessary to maintain contact with the workpiece surface.
- Continuous internal/external diameter measurement is possible without changing the detector orientation.

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Roundtest RA-1600
Shown with vibration isolator (optional accessory)

Technical Data

Vertical column (Z axis)
- Vertical travel: 300 mm
- Straightness: 0.20 µm/100 mm (narrow range), 0.30 µm/300 mm (entire range)
- Parallelism with turntable axis: 1.5 µm/300 mm
- Positioning speed: Max. 15 mm/s
- Measuring speed: 0.5, 1, 2, 5 mm/s
- Max. probing height: 300 mm (ID/OD)*
- Max. probing depth: 91 mm (over ø32), 50 mm (over ø7)

Air supply
- Air pressure: 0.39 MPa (4 kgf/cm²)
- Air consumption: 22 L/min.

Power supply: 240VAC ±10%, 50/60Hz

* Use the optional auxiliary stage (**356038**) for measuring a workpiece whose height is 20 mm or less.

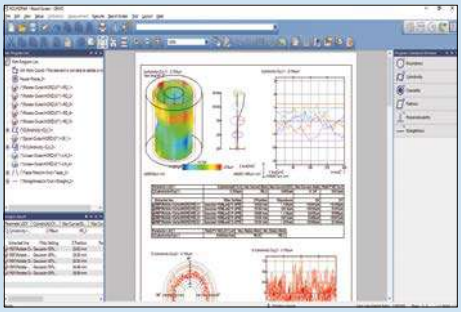
Optional Accessories

Styli refer to page L-41.
Fixture and stage accessories refer to pages L-46 to L-47.

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Software

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Provides a wide variety of parameters as standard features, including those for roundness/ cylindricity, as well as flatness and parallelism.



Safety mechanisms provided as a standard feature



A collision-sensing function has been incorporated in the detector unit (when it is in the vertical orientation) to prevent collision in the Z-axis direction. Additionally, an accidental collision prevention function, which stops the system when the detector displacement exceeds its range, has been added. When an accidental touch is detected, the dedicated analysis software (ROUNDPAK) senses the error and automatically stops the system.

Sliding detector-unit holder provided as a standard feature (option)



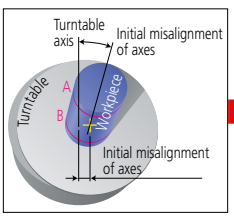
The detector-unit holder is equipped with a sliding mechanism, enabling one-touch measurement of a workpiece with a deep hole having a thick wall, which has been difficult with the conventional standard arm.

Specifications

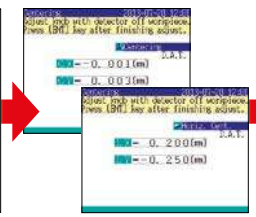
Model		RA-1600	
Code No.		**211-723E** (mm)	**211-733E** (inch/mm)
Turntable	Rotational accuracy	Radial: (0.02+6H/10000) µm, H = probing height (mm) Axial: (0.02+6X/10000) µm, X = probing radius (mm)	
	Rotational speed	4, 6, 10 rpm	
	Table diameter	150 mm	
	Centering range	±3 mm (with DAT function)	
	Levelling range	±1° (with DAT function)	
	Max. probing diameter	280 mm	
	Max. workpiece diameter	560 mm	
	Max. table loading	25 kg	
X axis (horizontal arm)	Horizontal travel	165 mm (from table axis -25 mm~ ±140 mm)	
	Positioning speed	Max. 15 mm/s	
	Measuring speed	0.5, 1, 2, 5 mm/s	
Probe and stylus	Measuring range	±400 µm/±40 µm/±4 µm	
	Measuring force	10 to 50 mN (5 level switching)	
	Standard stylus	12AAL021, carbide ball, ø1.6 mm	
	Measuring direction	Bi-directional	
	Stylus angle adjustment	±45° (with graduations)	
Dimensions (W x D x H)		890 x 490 x 840 mm	
Mass		170 kg	

DAT (Digital Adjustment Table) Function

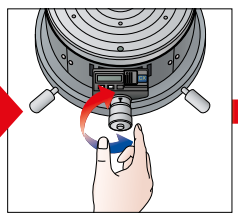
The turntable displays centering and levelling adjustments digitally, making this challenging task simple enough for even an untrained operator to perform.



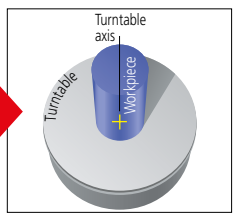
Preliminary measurement of two cross sections "A" and "B".



Following preliminary measurement, the centering and levelling adjustment values are displayed on the monitor.



By adjusting the digital micrometer heads on the rotary table, the adjustment values displayed on the monitor can be achieved.



Centering and levelling is complete. Centering range: ±3 mm, levelling (inclination) range: ±1°

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Roundtest RA-2200

SERIES 211 – Roundness/Cylindricity Measuring System

- The RA-2200 provides high accuracy, high speed and high performance roundness measurement.
- The fully-automatic AAT or semi-automatic DAT functionality aids manual workpiece centering and levelling, turning a once challenging task into something simple enough for even the untrained user and substantially reducing overall measurement time.
- The RA-2200 system comes with the powerful ROUNDPAK data analysis software, with enhanced functionality and easy operation through the use of the mouse and icon selection.
- Continuous internal/external diameter measurement is possible without changing the detector orientation.
- With extremely high rotational accuracy, both in the radial and axial directions, the turntable allows high-accuracy flatness testing to be performed in addition to roundness and cylindricity measurements.
- The system can be upgraded to CNC operation by replacing and adjusting the detector unit.*

*This task should be performed by a Mitutoyo technician.

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Roundtest RA-2200AH
Shown with vibration isolator desk and side table (optional accessories)



Specifications

Model		RA-2200AS	RA-2200DS	RA-2200AH	RA-2200DH
Code No.		**211-511-11**	**211-514-13**	**211-512-11**	**211-516-13**
Z-axis (column) vertical travel		300 mm (standard column)		500 mm (tall column)	
Turntable	Centering/levelling adjustment	AAT (automatic adjustment table)	DAT (digital adjustment table)	AAT (automatic adjustment table)	DAT (digital adjustment table)
	Rotational accuracy	Radial: (0.02+3.5H/10000) µm, H = probing height (mm) Axial: (0.02+3.5X/10000) µm, X = probing radius (mm)			
	Rotational speed	2, 4, 6, 10 rpm			
	Table diameter	235 mm	200 mm	235 mm	200 mm
	Centering range	±3 mm	±5 mm	±3 mm	±5 mm
	Levelling range	±1°			
	Max. probing diameter	300 mm			
	Max. workpiece diameter	580 mm			
	Max. table loading	30 kg			
X axis (horizontal arm)	Horizontal travel	175 mm (from table axis -25 mm~ ±140 mm)			
	Squareness with turntable axis	1.0 µm/150 mm			
	Positioning speed	Max. 30 mm/s (joystick operation)			
	Measuring speed	0.5, 1, 2, 5 mm/s			
Probe and stylus	Measuring range	±400 µm/±40 µm/±4 µm			
	Measuring force	10 to 50 mN (5 level switching)			
	Standard stylus	12AAL021, carbide ball, ø1.6 mm			
	Measuring direction	Bi-directional			
	Stylus angle adjustment	±45° (with graduations)			
Dimensions (W x D x H)		940 x 510 x 900 mm	910 x 510 x 900 mm	940 x 510 x 1100 mm	910 x 510 x 1100 mm
Mass		180 kg		200 kg	

Technical Data

Vertical column (Z axis)
- Straightness (λc2.5): 0.10 µm/100 mm, 0.15 µm/300 mm (0.25 µm/500 mm: AH, DH models)
- Parallelism with turntable axis: 0.7 µm/300 mm (1.2 µm/500 mm: AH, DH models)
- Positioning speed: Max. 50 mm/s
- Measuring speed: 0.5, 1, 2, 5 mm/s
- Max. probing height: 300 mm (OD), 300 mm (ID) [500 mm: AH, DH models]
- Max. probing depth: 85 mm for ø32 mm or more, 50 mm for ø7 mm or more

Air supply
- Air pressure: 0.39 MPa
- Air consumption: 30 L/min.

Power supply: 240VAC ±10%, 50/60Hz

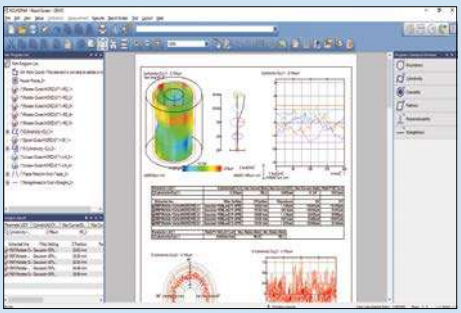
Optional Accessories

Styli refer to page L-41.
Fixture and stage accessories refer to pages L-46 to L-47.

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Standard Software

ROUNDPAK
Provides a wide variety of parameters as standard features, including those for roundness/ cylindricity, as well as flatness and parallelism.



AAT (Automatic Adjustment Table) Function

Incorporating an Automatic Adjustment Table (AAT), the top-of-the-line RA-2200AS/AH models relieve the operator of the task of workpiece centering and levelling.

DAT (Digital Adjustment Table) Function

Refer to previous page.



X-axis tracking measurement.

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Roundtest RA-H5200

SERIES 211 – Roundness/Cylindricity Measuring System

- RA-H5200AS/AH, a roundness/cylindricity measuring system developed to combine world-class accuracy with flexibility and high analysis capability.
- Continuous automatic measurement can be performed from external diameter to internal diameter without changing probe orientation. This reduces measurement time and also eliminates errors associated with probe position changes, greatly facilitating high-accuracy measurement.
- The automatic centering/levelling mechanism incorporates a high-precision glass scale on each axis of the turntable. This generates feedback preventing positioning errors from affecting centering/levelling adjustments.
- Also capable of roughness measurement if an optional roughness detector unit is incorporated into the system, measuring in the circumferential direction around the turntable axis as well as in the X- and Z-directions with the turntable stopped.
- A highly accurate, highly rigid turntable has been created through exceptional manufacturing accuracy of critical components, such as the rotor and stator. In addition, an air bearing incorporating a complex aperture provides superior rigidity and uniform pressure distribution, resulting in an industry leading (0.02+3.5H/10000) µm rotational accuracy (radial).

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Roundtest RA-H5200
Tall column type shown with side table (optional accessory)

Technical Data

Vertical column (Z axis)
- Straightness (λc2.5): 0.05 µm/100 mm, 0.14 µm/350 mm (0.2 µm/550 mm AH model)
- Parallelism with turntable axis: 0.2 µm/350 mm (0.32 µm/550 mm AH model)
- Positioning speed: Max. 60 mm/s
- Measuring speed: 0.5, 1, 2, 5 mm/s
- Max. probing height: 350 mm (OD), 350 mm (ID) [550 mm (OD/ID): AH model]
- Max. probing depth: 85 mm for ø32 mm or more, 50 mm for ø7 mm or more

Air supply
- Air pressure: 0.39 MPa
- Air consumption: 45 L/min.

Power supply: 240VAC ±10%, 50/60Hz

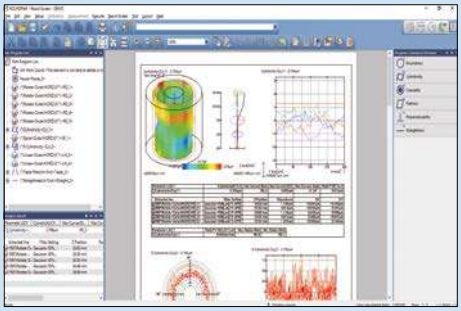
Optional Accessories

Styli refer to page L-41.
Fixture and stage accessories refer to pages L-46 to L-47.

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Software

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Safety mechanisms provided as a standard feature



A collision-sensing function has been incorporated in the detector unit (when it is in the vertical orientation) to prevent collision in the Z-axis direction. Additionally, an accidental collision prevention function, which stops the system when the detector displacement exceeds its range, has been added. When an accidental touch is detected, the dedicated analysis software (ROUNDPAK) senses the error and automatically stops the system.

Sliding detector-unit holder provided as a standard feature (option)



The detector-unit holder is equipped with a sliding mechanism, enabling one-touch measurement of a workpiece with a deep hole having a thick wall, which has been difficult with the conventional standard arm.

Specifications

Model		RA-H5200AS	RA-H5200AH
Code No. (with vibration isolator stand)		**211-531-11**	**211-532-11**
Z-axis (column) vertical travel		350 mm (standard column)	550 mm (tall column)
Turntable	Rotational accuracy	Radial: (0.02+3.5H/10000) µm, H = probing height (mm) Axial: (0.02+3.5X/10000) µm, X = probing radius (mm)	
	Rotational speed	2, 4, 6, 10 rpm (20 rpm: auto-centering)	
	Table diameter	300 mm	
	Centering range	±5 mm	
	Levelling range	±1°	
	Max. probing diameter	400 mm	
	Max. workpiece diameter	680 mm	
	Max. table loading	80 kg (65 kg: auto-centering)	
X axis (horizontal arm)	Horizontal travel	225 mm	
	Straightness (λc2.5)	0.4 µm/200 mm	
	Squareness with turntable axis	0.5 µm/200 mm	
	Positioning speed	Max. 50 mm/s	
	Measuring speed	0.5, 1, 2, 5 mm/s	
Probe and stylus	Measuring range	±400 µm/±40 µm/±4 µm	
	Measuring force	10 to 50 mN (5 level switching)	
	Standard stylus	12AAL021, carbide ball, ø1.6 mm	
	Measuring direction	Bi-directional	
	Stylus angle adjustment	±45° (with graduations)	
Dimensions (W x D x H)		1260 x 710 x 1700 mm	1260 x 710 x 1900 mm
Mass (with vibration isolator stand)		650 kg	670 kg

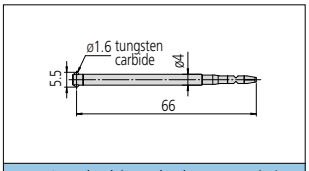
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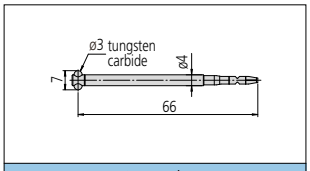
Mitutoyo

Optional Styli

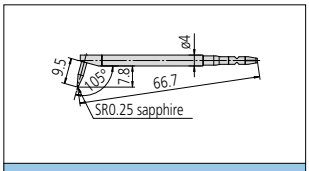
Compatible with Non-CNC Roundness Measuring Instruments



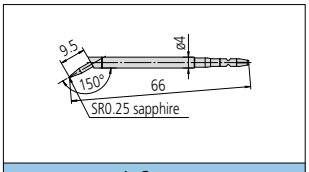
1. Standard (standard accessory)*1



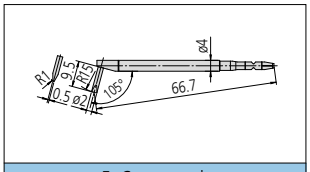
2. Notch



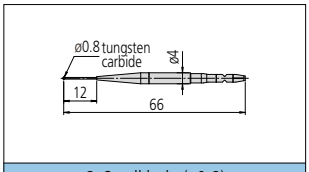
3. Deep groove



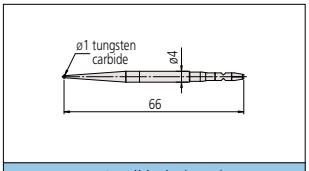
4. Corner



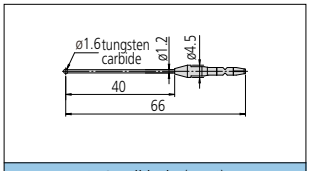
5. Cutter mark



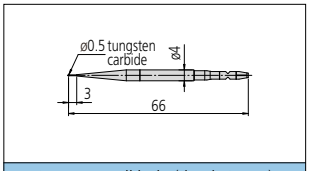
6. Small hole (ø0.8)



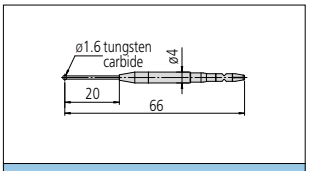
7. Small hole (ø1.0)



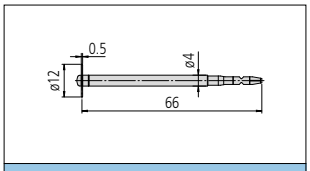
8. Small hole (ø1.6)



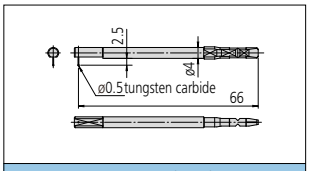
9. Extra small hole (depth 3 mm)



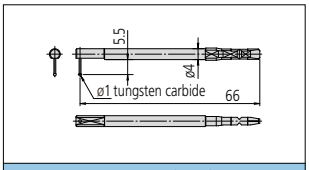
10. ø1.6 mm ball



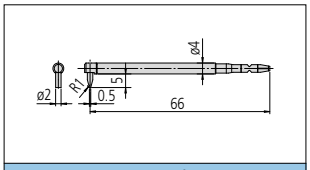
11. Disk



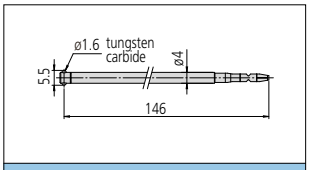
12. Crank (ø0.5)



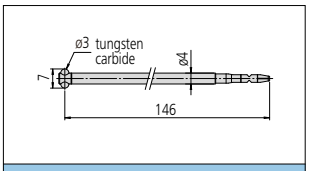
13. Crank (ø1.0)



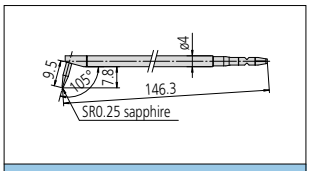
14. Flat surface



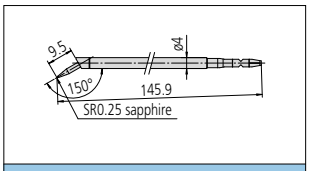
15. 2X-long type*2



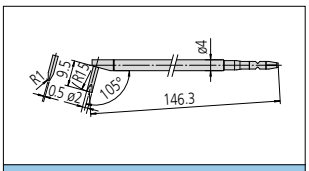
16. 2X-long type notch*2



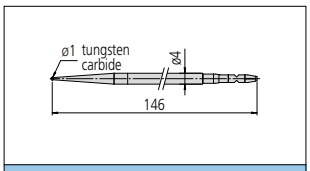
17. 2X-long type deep groove*2



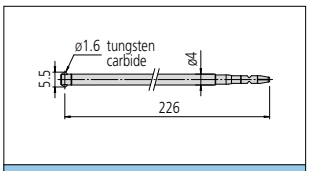
18. 2X-long type corner*2



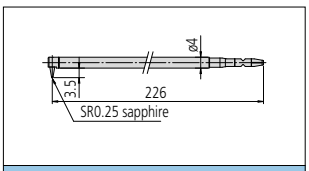
19. 2X-long type cutter mark*2



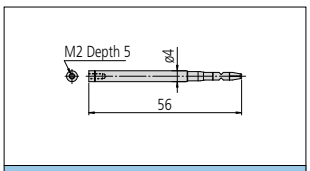
20. 2X-long type small hole*2



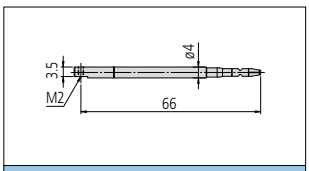
21. 3X-long type*2



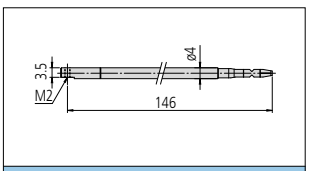
22. 3X-long type deep groove*2



23. Stylus shank



24. Stylus shank (standard groove)



25. Stylus shank (2X-long groove)*2

Unit: mm

*1 Standard accessory for all Roundtest models.
*2 Measuring is only possible in the vertical direction.
Not available for RA-120 and RA-120P.

Customized special interchangeable styli are available on request. Please contact any Mitutoyo office for more information.

Technical Data

Code No.	Description
1. Standard (standard accessory)*1	
12AAL021	ø1.6 mm tungsten carbide
2. Notch	
12AAL022	ø3 mm tungsten carbide
3. Deep groove	
12AAL023	SR0.25 mm sapphire
4. Corner	
12AAL024	SR0.25 mm sapphire
5. Cutter mark	
12AAL025	Tungsten carbide
6. Small hole (ø0.8)	
12AAL026	ø0.8 mm tungsten carbide
7. Small hole (ø1.0)	
12AAL027	ø1 mm tungsten carbide
8. Small hole (ø1.6)	
12AAL028	ø1.6 mm tungsten carbide
9. Extra small hole (depth 3 mm)	
12AAL029	ø0.5 mm tungsten carbide
10. ø1.6 mm ball	
12AAL030	ø1.6 mm tungsten carbide
11. Disk	
12AAL031	ø12 mm tungsten carbide
12. Crank (ø0.5)	
12AAL032	ø0.5 mm tungsten carbide (depth 2.5 mm)
13. Crank (ø1.0)	
12AAL033	ø1 mm tungsten carbide (depth 5.5 mm)
14. Flat surface	
12AAL034	Tungsten carbide
15. 2X-long type*2	
12AAL035	ø1.6 mm tungsten carbide
16. 2X-long type notch*2	
12AAL036	ø3 mm tungsten carbide
17. 2X-long type deep groove*2	
12AAL037	SR0.25 mm sapphire
18. 2X-long type corner*2	
12AAL038	SR0.25 mm sapphire
19. 2X-long type cutter mark*2	
12AAL039	Tungsten carbide
20. 2X-long type small hole*2	
12AAL040	ø1 mm tungsten carbide
21. 3X-long type*2	
12AAL041	ø1.6 mm tungsten carbide
22. 3X-long type deep groove*2	
12AAL042	SR0.25 mm sapphire
23. Stylus shank	
12AAL043	For mounting CMM stylus (mounting thread M2)
24. Stylus shank (standard groove)	
12AAL044	For mounting CMM stylus (mounting thread M2)
25. Stylus shank (2X-long groove)*2	
12AAL045	For mounting CMM stylus (mounting thread M2)

L

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Roundtest RA-2200 PLUS

SERIES 211 – CNC Roundness/Cylindricity Measuring System

- Mitutoyo offers innovative roundness/cylindricity measuring systems capable of automated measurement with independent/simultaneous multi-axis CNC control. In addition to high measuring accuracy and reliability, these CNC models provide excellent inspection productivity.
- Roundness and surface roughness measurements are both available from a single measuring system so workpiece resetting for roughness measurement is not required if an optional roughness detector unit is incorporated into the system, with measurement possible in the circumferential direction around the turntable axis as well as in the X- and Z-directions with the turntable stopped.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



Roundtest RA-2200 PLUS
Tall column type shown with vibration isolator desk and side table (optional accessories)

Technical Data

Vertical column (Z axis)
- Straightness (λc2.5): 0.10 µm/100 mm, 0.15 µm/300 mm (0.25 µm/500 mm)*
- Parallelism with turntable axis: 0.7 µm/300 mm (1.2 µm/500 mm)*
- Positioning speed: Max. 50 mm/s
- Measuring speed: 0.5, 1, 2, 5 mm/s
- Max. probing height: 300 mm (OD), 300 mm (ID) [500 mm (OD/ID)]*
- Max. probing depth: 104 mm (ø32 mm or more) 26 mm (ø12.7 mm or more)

Air supply
- Air pressure: 0.39 MPa
- Air consumption: 30 L/min.

Power supply: 240VAC ±10%, 50/60 Hz

*Tall-column type.

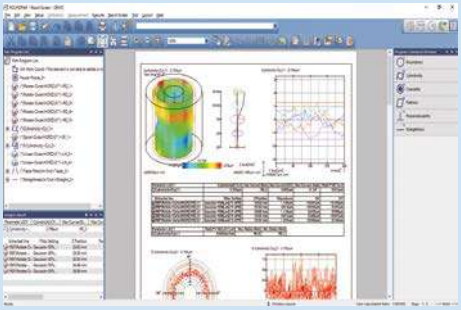
Optional Accessories

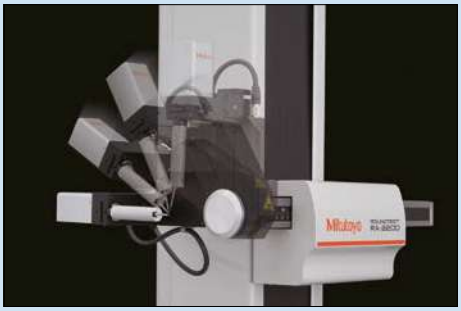
Styli refer to page L-45.
Fixture and stage accessories refer to pages L-46 to L-47.

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FORM

Software

ROUNDPAK
Provides a wide variety of parameters as standard features, including those for roundness/ cylindricity, as well as flatness and parallelism.







Specifications

Model		RA-2200 PLUS	
Code No. (with vibration isolator desk)		**211-517-11**	**211-518-11**
Z-axis (column) vertical travel		300 mm (standard column)	500 mm (tall column)
Turntable	Rotational accuracy	Radial: (0.02+3.5H/10000) µm, H = probing height (mm) Axial: (0.02+3.5X/10000) µm, X = probing radius (mm)	
	Rotational speed	2, 4, 6, 10 rpm	
	Table diameter	235 mm	
	Centering range	±3 mm	
	Levelling range	±1°	
	Max. probing diameter	256 mm	
	Max. workpiece diameter	580 mm	
	Max. table loading	30 kg	
X axis (horizontal arm)	Horizontal travel	175 mm (from table axis -25 mm~+150 mm)	
	Straightness (λc2.5)	0.7 µm/150 mm	
	Squareness with turntable axis	1.0 µm/150 mm	
	Positioning speed	Max. 30 mm/s	
	Measuring speed	0.5, 1, 2, 5 mm/s	
Probe and stylus	Measuring range	±400 µm (±5 mm: tracking range)	
	Measuring force	40 mN	
	Standard stylus	12AAE301, carbide ball, ø1.6 mm	
	Measuring direction	Bi-directional	
	Stylus angle adjustment	Fixed	
Dimensions (W x D x H)		940 x 510 x 900 mm	940 x 510 x 1100 mm
Mass		180 kg	200 kg

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Mitutoyo

Roundtest RA-H5200 PLUS

SERIES 211 – CNC Roundness/Cylindricity Measuring System

- Mitutoyo offers innovative roundness/cylindricity measuring systems capable of automated measurement with independent/simultaneous multi-axis CNC control. In addition to high measuring accuracy and reliability, these CNC models provide excellent inspection productivity.
- Roundness and surface roughness measurements are both available from a single measuring system so workpiece resetting for roughness measurement is not required if an optional roughness detector unit is incorporated into the system, with roughness measurement possible in the circumferential direction around the turntable axis as well as in the X- and Z-directions with the turntable stopped.

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Roundtest RA-H5200 PLUS
Tall column type shown with side table (optional accessory)

Specifications

Model		RA-H5200 PLUS	
Code No. (with vibration isolator stand)		**211-533-11**	**211-534-11**
Z-axis (column) vertical travel		350 mm (standard column)	550 mm (tall column)
Turntable	Rotational accuracy	Radial: (0.02+3.5H/10000) µm, H = probing height (mm) Axial: (0.02+3.5X/10000) µm, X = probing radius (mm)	
	Rotational speed	2, 4, 6, 10 rpm (20 rpm: auto-centering)	
	Table diameter	300 mm	
	Centering range	±5 mm	
	Levelling range	±1°	
	Max. probing diameter	356 mm	
	Max. workpiece diameter	680 mm	
	Max. table loading	80 kg (65 kg: auto-centering)	
X axis (horizontal arm)	Horizontal travel	225 mm	
	Straightness (λc2.5)	0.4 µm/200 mm	
	Squareness with turntable axis	0.5 µm/200 mm	
	Positioning speed	Max. 50 mm/s	
	Measuring speed	0.5, 1, 2, 5 mm/s	
Probe and stylus	Measuring range	±400 µm/±40 µm/±4 µm (±5 mm: tracking range)	
	Measuring force	40 mN	
	Standard stylus	12AAE301, carbide ball, ø1.6 mm	
	Measuring direction	Bi-directional	
	Stylus angle adjustment	Fixed	
Dimensions (W x D x H)		1260 x 710 x 1700 mm	1260 x 710 x 1900 mm
Mass (with vibration isolator stand)		650 kg	670 kg

Technical Data

Vertical column (Z axis)
- Straightness (λc2.5): 0.05 µm/100 mm, 0.14 µm/350 mm (0.2 µm/550 mm)*
- Parallelism with turntable axis: 0.2 µm/350 mm (0.32 µm//550 mm)*
- Positioning speed: Max. 60 mm/s
- Measuring speed: 0.5, 1, 2, 5 mm/s
- Max. probing height: 350 mm (OD), 350 mm (ID) [550 mm (OD / ID)]*
- Max. probing depth: 104 mm (ø32 mm or more) 26 mm (12.7 mm or more)

Air supply
- Air pressure: 0.39 MPa
- Air consumption: 45 L/min.

Power supply: 240VAC ±10%, 50/60Hz

*Tall-column type.

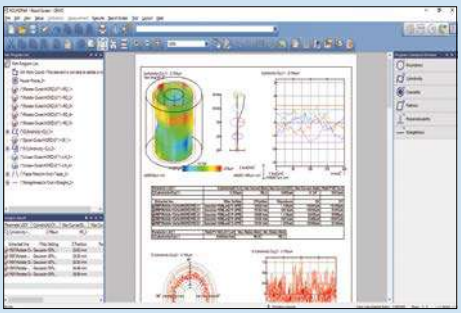
Optional Accessories

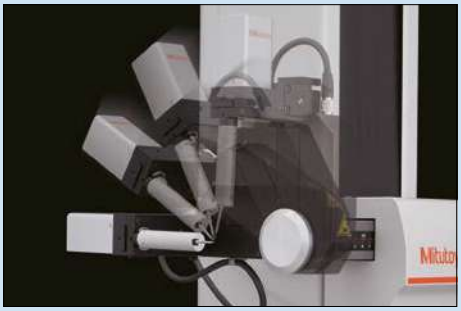
Styli refer to page L-45.
Fixture and stage accessories refer to pages L-46 to L-47.

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Roundtracer Extreme RTX-605-A

SERIES 211 – CNC Roundness/Cylindricity Measuring System

- Full-fledged CNC roundness measuring system with dramatically-enhanced measurement flexibility, measurement throughput, and measurement result reproducibility.
- A complete new system which can combine form, contour and surface roughness measurement into one device.
- Motorized detector slider.
- Stylus positioning.
- High measurement throughput.
- High reproducibility & repeatability.
- Enhanced optional measurement functions like contour & surface roughness and twist measurement.



Roundtracer Extreme RTX-605-A
Shown with side table (optional accessory)

Technical Data

Vertical column (Z axis)
- Straightness (λc2.5): 0.1 µm/100 mm, 0.25 µm/550 mm
- Parallelism with turntable axis: 1.2 µm/550 mm
- Positioning speed: Max. 100 mm/s (max. 40 mm/s joystick operation)
- Measuring speed: 0.1, 0.2, 0.5, 1, 2, 5 mm/s
- Max. probing height: 500 mm
- Max. probing depth: 115 mm (ø32 mm or more), 50 mm (ø7 mm or more)

Air supply
- Air pressure: 0.4 MPa
- Air consumption: 40 L/min.

Power supply: 240VAC ±10%, 50/60Hz

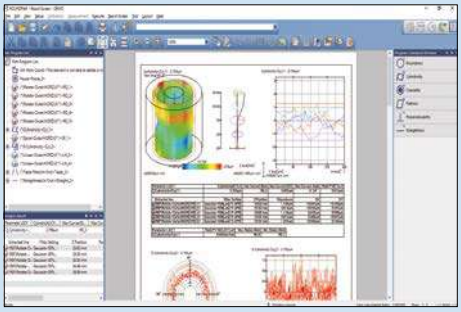
Optional Accessories

Styli refer to page L-45.
Fixture and stage accessories refer to pages L-46 to L-47.

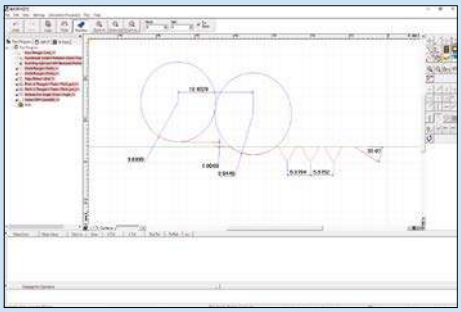
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FORM

Software

ROUNDPAK
Provides a wide variety of parameters as standard features, including those for roundness/ cylindricity, as well as flatness and parallelism.



FORMTRACEPAK-AP
Contour analysis, surface roughness analysis and the creation of inspection certificates are included as standard features.





Shown with roughness detector.

Specifications

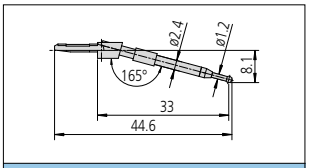
Model		RTX-605-A
Code No. (with vibration isolator stand)		**211-552-12**
Z-axis (column) vertical travel		550 mm
Turntable	Centering/levelling adjustment	AAT (automatic adjustment table)
	Rotational accuracy	Radial: (0.02+3.5H/10000) µm, H = probing height (mm) Axial: (0.02+3.5X/10000) µm, X = probing radius (mm)
	Rotational speed	2 - 30 rpm
	Centering range	±5 mm
	Levelling range	±1°
	Max. probing diameter	328 mm
	Max. workpiece diameter	680 mm
	Max. table loading	60 kg
X axis (horizontal arm)	Horizontal travel	225 mm
	Straightness (λc2.5)	0.7 µm/150 mm
	Squareness with turntable axis	2.0 µm/150 mm
	Positioning speed	Max. 100 mm/s (max. 40 mm/s joystick operation)
	Measuring speed	0.1, 0.2, 0.5, 1, 2, 5 mm/s
Probe and stylus	Measuring range	±400 µm/±40 µm/±3.6 µm
	Measuring force	10 to 50 mN (5 level switching)
	Standard stylus	12AAV342
	Measuring direction	Bi-directional
	Stylus angle adjustment	Fixed
Dimensions (W x D x H)		1282 x 730 x 1930 mm
Mass (main unit)		990 kg

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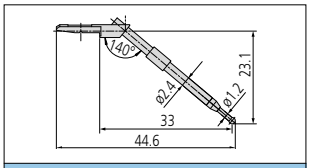
Mitutoyo

Optional Styli

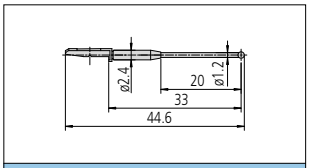
Compatible with CNC Roundness Measuring Instruments



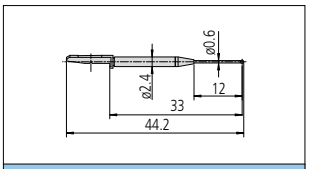
1. Standard



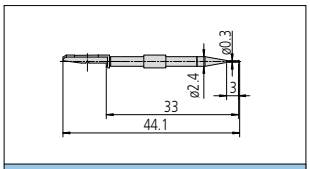
2. Flat surface



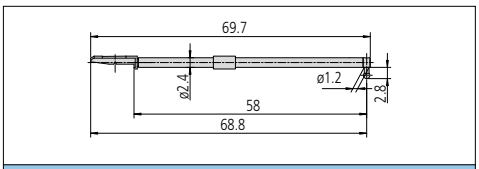
3. ø1.6 mm ball



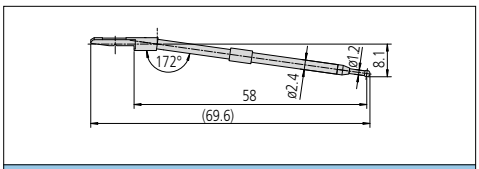
4. ø0.8 mm ball



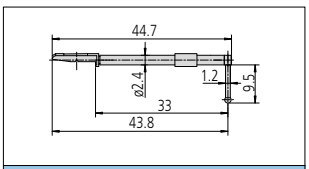
5. ø0.5 mm ball



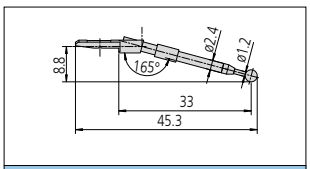
6. Deep hole A



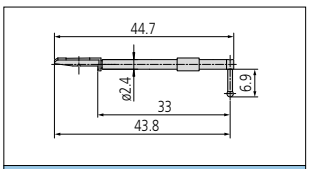
7. Deep hole B



8. Deep groove



9. Notch



10. Deep groove

Analyzing items			Models					
			RA-H5200 PLUS / RA-H5200	RA-2200 PLUS / RA-2200	RTX-605-A	RA-1600	RA-120P	RA-120
○	Roundness		✓	✓	✓	✓	✓	✓
⌭	Cylindricity		✓	✓	✓	✓	—	—
◎	Concentricity		✓	✓	✓	✓	✓	✓
◉	Coaxiality	Axis-element	✓	✓	✓	✓	✓	✓
		Axis-axis	✓	✓	✓	✓	✓	—
▱	Flatness		✓	✓	✓	✓	✓	✓
//	Parallelism		✓	✓	✓	✓	✓	✓
⊥	Perpendicularity		✓	✓	✓	✓	✓	✓
↗	Runout		✓	✓	✓	✓	✓	✓
⌰	Total runout		✓	✓	✓	✓	—	—
—	Straightness		✓	✓	✓	✓	—	—
∠	Inclination		✓	✓	✓	✓	—	—
/\	Taper		✓	✓	✓	✓	—	—

Technical Data

Code No.	Description
1. Standard	
12AAE301	ø1.6 mm tungsten carbide
2. Flat surface	
12AAE302	ø1.6 mm tungsten carbide
3. ø1.6 mm ball	
12AAE303	ø1.6 mm tungsten carbide
4. ø0.8 mm ball	
12AAE304	ø0.8 mm tungsten carbide
5. ø0.5 mm ball	
12AAE305	ø0.5 mm tungsten carbide
6. Deep hole A	
12AAE306	ø1.6 mm tungsten carbide
7. Deep hole B	
12AAE307	ø1.6 mm tungsten carbide
8. Deep groove	
12AAE308	ø1.6 mm tungsten carbide
9. Notch	
12AAE309	ø3 mm tungsten carbide
10. Deep groove	
12AAE310	ø1.6 mm tungsten carbide

Usage examples of various styli

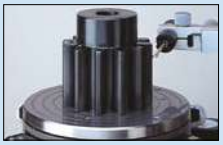

Cutter mark.


Corner.


Small hole.


Small hole.


Flatness measurement.


Notched workpiece measurement.


ID measurement.

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Optional Accessories

For Roundness Measuring Instruments

2X Extension Detector Holder

- For the measurement of deep holes with the RA-1600, RA-2200 and RA-H2000.

Code No.	12AAF203
Mass	1.1 kg
Price	**£2,470.00**

Auxiliary Detector Holder

- Enables a larger diameter workpiece to be handled by the tester than does the standard holder.

Code No.	12AAF204
Price	**£1,870.00**

3X Extension Detector Holder

- For the measurement of deep holes with the RA-H200.

Code No.	12AAF205
Price	**£2,590.00**

Sliding Detector Holder

- For the RA-1600 (supplied with RA-H5200/RA-2200 as standard).

Code No.	12AAL090
Price	**£1,790.00**

X-Axis Stop

- Used to ensure the detector is returned to the same point on the X axis for repetitive measurements.



Code No.	12AAH320
Price	**£112.00**

Centering Chuck (ring operated)

- Suitable for holding small parts with easy-to-operate knurled-ring clamping.



Code No.		211-032
Holding capacity	Internal jaws	OD: 1 - 36 mm ID: 16 - 69 mm
	External jaws	OD: 35 - 78 mm
Dimensions (D x H)		ø118 x 41 mm
Mass		1.2 kg
Price		**£1,700.00**

Centering Chuck (handle operated)

- Suitable for holding longer parts and those requiring a relatively powerful clamp such as crankshafts.



Code No.		211-014
Holding capacity	Internal jaws	OD: 2 - 35 mm ID: 25 - 68 mm
	External jaws	OD: 35 - 78 mm
Dimensions (D x H)		ø157 x 70.6 mm
Mass		3.8 kg
Price		**£893.00**

Micro-Chuck

- Used for clamping a workpiece (less than ø1 mm) that the centering chuck cannot handle.



Code No.	211-031
Holding capacity	OD: 0.1 - 1.5 mm
Dimensions (D x H)	ø107 x 48.5 mm
Mass	0.6 kg
Price	**£1,310.00**

Quick Chuck

- This chuck is useful when measuring small cylindrical workpieces, which are easily clamped by tightening the knurled ring.



Code No.	211-052
Internal jaws holding capacity	OD: 1 - 79 mm ID: 16 - 69 mm
Price	**£1,650.00**

Collet Chuck

- Used for holding parts with a collet (optional).



Code No.	211-061
Holding capacity	OD: 0.5 - 10 mm*1
Centering error	50 µm or less *2
Mass	1.4 kg
Price	**£919.00**

*1 Collets compatible with the workpiece are optional.
*2 When measured with a ø5 mm pin gauge at the measurement height of 30 mm.

Collets

- Individual collets for the Collet Chuck.*3

Code No.	Holding capacity	Price
12AAH402	OD: 0.5 - 1.0 mm	**£194.00**
12AAH403	OD: 1.0 - 1.5 mm	**£194.00**
12AAH404	OD: 1.5 - 2.0 mm	**£153.00**
12AAH405	OD: 2.0 - 2.5 mm	**£153.00**
12AAH406	OD: 2.5 - 3.0 mm	**£138.00**
12AAH407	OD: 3.0 - 3.5 mm	**£138.00**
12AAH408	OD: 3.5 - 4.0 mm	**£138.00**
12AAH409	OD: 4.0 - 5.0 mm	**£138.00**
12AAH410	OD: 5.0 - 6.0 mm	**£138.00**
12AAH411	OD: 6.0 - 7.0 mm	**£138.00**
12AAH412	OD: 7.0 - 8.0 mm	**£138.00**
12AAH413	OD: 8.0 - 9.0 mm	**£138.00**
12AAH414	OD: 9.0 - 10.0 mm	**£138.00**

*3 Collet chuck (**211-061**) is necessary to mount collets.

V-Block Jig Type A

- Made to special order to suit customer's application. Contact Mitutoyo for details.



Code No.	211-053
Price	**£1,030.00**

V-Block Jig Type B

- Made to special order to suit customer's application. Contact Mitutoyo for details.



Code No.	211-054
Price	**£1,250.00**

OD/ID Mating Jig

- Made to special order to suit customer's application. Contact Mitutoyo for details.



Code No.	211-055
Price	**£1,250.00**

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Optional Accessories

For Roundness Measuring Instruments

Origin-Point Gauge*[1]

- For zero setting the R- and Z-axes.



Code No.	998382
Price	£410.00

*[1] Supplied with RA-H5200/RA-2200 as standard.

Digital Adjustment Table

- The turntable displays centering and levelling adjustments digitally, making this challenging task simple enough for even an untrained operator to perform.



Code No.	12AAH425	12AAH426
Type	mm	inch/mm
Table diameter	150 mm	
Maximum measuring diameter	100 mm	
Price	£3,090.00	£3,090.00

Auxiliary Workpiece Stand*[2]



Code No.	356038
Loading diameter	100 mm
Dimensions (D x H)	ø105 x 25 mm
Mass	1.7 kg
Price	£471.00

*[2] Supplied with RA-H5200 as standard.

Z-Axis Scale Unit

- Useful for determining height of detector above the turntable.



Code No.	12AAH318
Price	£330.00

Recording Paper Set

- For the RA-120 thermal printer.

Code No.	12AAH181
Number of rolls	10 (25 m per roll)
Price	£92.00

Vibration Isolator

- Air suspension system for isolating a roundness tester from ground-borne vibration.



211-013

Code No.	178-025	211-013
Vibration isolation method	Diaphragm isolation system	
Applicable models	RA-1600	RA-120, RA-120P
Dimensions (W x D x H)	750 x 550 x 57 mm	615 x 515 x 51 mm
Price	£6,580.00	£4,030.00

Optional accessory used with this Vibration Isolator: Stand (**178-024**)

Stand for Vibration Isolator

Code No.	178-024
Price	£914.00

Vibration Isolator Desk



178-188

Code No.	178-188	178-189
Base type	Standard	Wide
Vibration isolation method	Diaphragm system	
Type Dimensions (W x D x H)	830 x 800 x 700 mm	1280 x 940 x 700 mm
Price	£9,970.00	£13,280.00

Optional accessories used with this Vibration Isolator Desk: Monitor arm (**12AAK120**), Side table (**179-181**).

Monitor Arm for Vibration Isolator Desk

Code No.	12AAK120
Price	£1,710.00

Side Table

- Convenient for supporting a PC, keyboard, mouse and printer (front load/ejection type). Commonly used with a Vibration Isolator Desk.



178-181



12AAV541

Code No.	178-181	12AAV541
Base type	Standard	Wide
Dimensions (W x D x H)	600 x 800 x 700 mm	958 x 580 x 786 mm
Price	£3,130.00	£5,660.00

Magnification Calibration Gauge

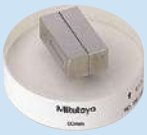
- Used for normalizing detector magnification by calibrating detector travel against displacement of a micrometer spindle.



Code No.	211-045
Max. calibration range	400 µm
Graduation	0.2 µm
Dimensions (W x D x H)	235 (max) x 185 x 70 mm
Mass	4 kg
Price	£2,720.00

Magnification Checking Kit*[3]

- A combination of gauge blocks and an optical flat.



Code No.	997090
Price	£286.00

*[3] Supplied with RA-H5200 / RA-H5200 PLUS / RA-2200 / RA-2200 PLUS as standard.

Reference Hemisphere

- Used for checking rotational accuracy and aligning the detector.



Code No.	211-016
Price	£893.00

Spacer for Reference Hemisphere

- Used for raising the Reference Hemisphere above the turntable surface.

Code No.	12AAH420
Price	£71.40

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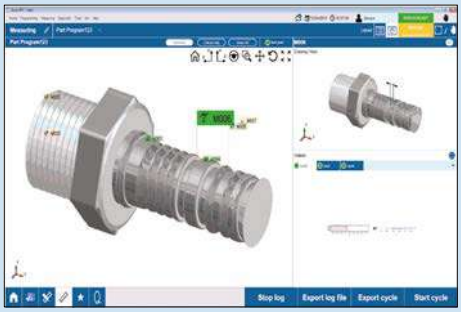
Roundtracer Flash

SERIES 211 – Roundness/Cylindricity Measuring System

- The Roundtracer Flash is a flexible optical measuring system, fast and precise. The instrument is a good solution for accurate quality control in a laboratory as well as in the production environment.
- Dimensional, position, form analysis in static or dynamic mode.
- Image sensors integrated in a fixed position across the product structure to cover the entire measurement range.
- Less mechanical stress.
- Side-by-side 2D image architecture.
- Short cycle time.
- One-click measuring cycle activation.
- Graphical user interface via touchscreen monitor.
- Easy part loading.
- Thread and camshaft measurement functionality.

Optional Accessories

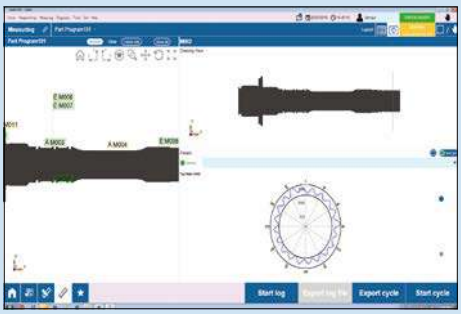
Code No.	Description	Price
12AAX425MEU	Pivoting arm for monitor	£709.00
12AAX426MEU	Industrial keyboard	£299.00
12AAX427MEU	Verification Master for S100	£4,360.00
12AAX429MEU	Verification Master for S300	£8,880.00



Intuitive user interface.



Superior setup flexibility.



Smart search function provides part detail review by images and trend visualization.



Roundtracer Flash

Specifications

Model		S100	S300
Code No.		211-581-01MEU	211-583-01MEU
Z-axis (column) vertical travel		100 mm	300 mm
Measuring range		ø60 mm	
Max. turntable loading		6 kg	
Measuring uncertainty	Length	U95 (2+L[mm]/200) µm	
	Diameter	U95 (1+D[mm]/200) µm	
Workpiece loading mode		Manual and automatic (by robot)	
Workpiece rotation		Standard	
Measuring mode		Static and dynamic	
Dimensions (W x D x H)		925 x 615 x 640 mm	925 x 615 x 840 mm

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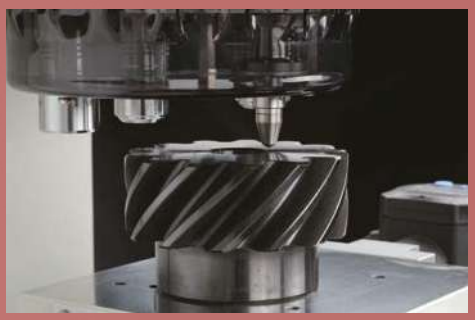
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HARDNESS TESTING



Micro-Vickers Hardness Testing Machines



Vickers Hardness Testing Machines



Rockwell Hardness Testing Machines



Portable Hardness Testing Instruments



Contents

Micro-Vickers Hardness Testing Machines	
HM-200	M-03
Vickers Hardness Testing Machines	
HV-100	M-04
Rockwell Hardness Testing Machines	
HR-600	M-05
AVPAK Software	M-06
HR-530	M-07
HR-320MS / HR-430MS	M-08
Portable Hardness Testing Instruments	
HH-V400	M-09
HH-300	M-10
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HM-200

SERIES 810 – Micro-Vickers Hardness Testing Machines

- The latest electromagnetic force motor used in the loading mechanism enables the test force to be freely selected over the wide range of 0.05 gf to 2 kgf. It is also possible to freely set the time for loading and load dwell time. Now the benefits of absolute control over the indentation size in Vickers hardness testing can be realized. The HM-200 series always offers the test force most appropriate for the specimen material and shape.
- The objectives used enable a very comfortable working distance between the objective and the specimen surface. This greatly reduces the possibility of collision between the specimen and the objective during focussing operations. (For example, for 50X objectives: 1.1 mm for conventional models; 2.5 mm for HM-200 series models.)
- Newly designed 'MH Plan' objectives are optimized for measuring indentation images. The line-up includes 6 long working distance objectives: 10X, 20X, 50X and 100X for measuring indentation images, and 2X and 5X for enabling wide-range measurement around indentations. LEDs are used in the illumination system for their advantages of longer life, lower heat generation and higher energy efficiency than the traditional incandescent bulb.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



System A



System B



System C

Specifications

Model	HM-210		HM-220	
System	A	B/C/D	A	B/C/D
Code No.	810-401-13	810-404-11	810-406-13	810-409-11
Indentation measurement	Measuring eyepiece	Automatic (AVPAK-20)	Measuring eyepiece	Automatic (AVPAK-20)
Main unit operation	Touch panel	PC	Touch panel	PC
Fixed test forces	10, 20, 30, 50, 100, 200, 300, 500, 1000 gf		0.05, 0.1, 0.2, 0.3, 0.5, 1, 2, 3, 5, 10, 20, 30, 50, 100, 200, 300, 500, 1000, 2000 gf	
Arbitrary test force	One setting can be saved, default is HV0.025 (25 gf)			
Test force control	Force generation by electromagnetic and automatic control (load, dwell, unload)			
Turret drive	Motor-driven			
Control unit	Touch screen type	—	Touch screen type	—
Indenters	A maximum of two can be installed. (One indenter shaft with diamond indenter is provided as standard in the main unit.)			
Objectives	A maximum of four can be installed in turret. (A 50X objective is provided as standard.)			
Dimensions (W x D x H)*1	315 x 671 x 595 mm	315 x 586 x 741 mm	315 x 671 x 595 mm	315 x 586 x 741 mm
Mass (main unit)	38.5 kg	37.4 kg	38.5 kg	37.4 kg
Power supply	220-240 VAC			

*1 Excluding protrusions and stage.

Technical Data

Test force range
- HM-210A: 9 steps + arbitrary test force
- HM-220A: 19 steps + arbitrary test force

Load dwell time: 0 - 999s

Max. specimen height
- System A/B: 133 mm (stage size: 25 x 25 mm)
- System C: 112 mm (stage size: 25 x 25 mm)
- System D: 72 mm (stage size: 25 x 25 mm)

Max. specimen depth: 160 mm (from the centre of indenter)

Optical path: 4-port turret, infinity-corrected objectives

Resolution: 0.1 µm when using objectives less than 50X (0.01 µm when using objectives of 50X or more)

Data output: Serial (RS-232), Digimatic and USB 2.0 interfaces

Functions: Calculation of Vickers/Knoop*2 hardness and ceramic fracture toughness based on IF method (JIS R1697), 3 display formats (standard, list, simple), GO/±NG judgement, test condition guide, curve and user correction, hardness corresponding value, statistics calculation

*2 For Knoop hardness test, Knoop indenter (optional) is required.

Optional Accessories

Code No.	Description	Price
375-056	Micro-scale	£352.00
810-013	Specimen (thin plate) holder	£370.00
810-017	Vice (100 mm)	£1,180.00
810-018	Rotary table	£976.00
810-019	Specimen tilting holder	£1,890.00
810-020	Universal specimen holder	£616.00
810-085	Adjustable specimen (thin plate) holder	£1,150.00
810-095	Rotatable specimen stage	£2,490.00
810-641	Vibration isolator stand	£5,460.00
11AAE665	Objective lens 2X	£1,430.00
11AAE666	Objective lens 5X	£873.00
11AAE667	Objective lens 10X	£911.00
11AAE668	Objective lens 20X	£1,150.00
11AAE669	Objective lens 100X	£1,600.00
11AAE670	Indenter shaft (HM-210)	£3,910.00
11AAE671	Indenter shaft (HM-220)	£6,200.00
11AAE677	Measuring eyepiece (System B, C and D)	£3,200.00

For Hardness Test Blocks refer to page M-12 for details.
For Indenters refer to page M-12 for details.

Systems

System A (HM-210A/HM-220A):
All-in-one model with simple colour touch-panel operation.

System B (HM-210B/HM-220B):
A system equipped with automatic reading function with AVPAK software.

System C (HM-210C/HM-220C):
In addition to the functions of System B, System C is equipped with an electric stage.

System D (HM-210D/HM-220D):
In addition to the functions of System B and System C, System D is equipped with the auto focus function.

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HV-100

SERIES 810 – Vickers Hardness Testing Machines

- Vickers hardness testers have a wide application in testing metals, especially small heat-treated parts, and are also suitable for making special-purpose tests such as carburized case hardness, maximum hardness of spot welds, high-temperature hardness, and fracture toughness of ceramic materials.
- Objective lenses specifically developed for hardness testing are supplied. A clear and natural view of an indentation is achieved by changing the light source of the illumination from halogen to LED.
- A new 2X lens for wide-angle observation has been added to the range. Now, magnifications of 10X, 20X, 50X and 100X for observation and gauging; and 5X and 2X for observation are available. Also, the working distance is doubled (5.9 to 11.8mm) for the 10X objective lens (in-house comparison) to minimize the risk of collision between the workpiece and the lens during operations.
- In addition to Vickers hardness testing, fracture toughness tests (IF Method: JIS R 1607) and other tests can be performed with optional accessories such as a Knoop indenter and additional indenters and a weight for Micro Brinell testing.
- Four systems are available: Basic model A; model B equipped with automatic indentation reading function; model C equipped with automatic indentation reading function and automatic XY stage; model D equipped with automatic indentation reading function, automatic XY stage, and auto-focus stage.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



System A



System B



System C

Technical Data

Test force range:	8 steps
Load dwell time:	5 - 999 s
Max. specimen height	
System A:	210 mm (using flat anvil)
System B:	181 mm (stage size: 50 x 50 mm)
System C:	172 mm
System D:	132 mm
Max. specimen depth:	170 mm (from the centre of indenter)
Optical path:	3-port objectives switching system of infinity-corrected optical system
Resolution:	0.1 µm when using objectives less than 50X (0.01 µm when using objective lens more than 50X)
Data output:	Serial interface (RS-232), Digimatic interface, USB 2.0
Functions:	Calculation of Vickers/Knoop*2/ Brinell*3 hardness and ceramic fracture toughness based on IF method (JIS R1697), 3 display format (standard, list, simple), GO/±NG judgement, test condition guide, curve and user correction, hardness corresponding value, statistics calculation

*2 For Knoop hardness testing the Knoop indenter (optional) is required.
*3 For Brinell hardness testing a Brinell indenter (optional) and additional weight are required.

Optional Accessories

Code No.	Description	Price
810-037	Round table (ø180 mm)	£612.00
810-038	Round table (ø250 mm)	£1,230.00
810-040	V-anvil (ø40 mm, 120° groove 30 mm wide, ø15 - ø60 mm)	£308.00
810-041	V-anvil ((ø40 mm, 120° groove 30 mm wide, ø3 - ø9 mm)	£255.00
810-420	Manual XY stage (25 x 25 mm)	£823.00
810-423	Manual XY stage (50 x 50 mm)	£1,660.00
11AAC697	Brinell weight (0.5 kg)	£123.00
11AAC698	Brinell weight (1.25 kg)	£123.00
11AAC699	Brinell weight (5.625 kg)	£138.00
11AAC700	Brinell weight (12.5 kg)	£168.00
11AAC702	Stand for testing machine	£1,550.00
11AAC719	Vibration isolator	£6,850.00
11AAE672	Objective lens 2X	£1,170.00
11AAE673	Objective lens 5X	£825.00
11AAE674	Objective lens 20X	£860.00
11AAE675	Objective lens 50X	£998.00
11AAE676	Objective lens 100X	£1,500.00
11AAE677	Measuring eyepiece (System B, C and D)	£3,200.00

For Hardness Test Blocks refer to page M-12 for details.
For Indenters refer to page M-12 for details.

Systems

System A (HV-110A / HV-120A):
All-in-one model with simple colour touch-panel operation.

System B (HV-110B / HV-120B):
A system equipped with automatic reading function with AVPAK software.

System C (HV-110C / HV-120C):
In addition to the functions of System B, System C is equipped with an electric stage.

System D (HV-110D / HV-120D):
In addition to the functions of System B and System C, System D is equipped with the auto focus function.

Specifications

Model	HV-110		HV-120	
System	A	B / C / D	A	B / C / D
Code No.	810-440-13	810-443-11	810-445-13	810-448-11
Indentation measurement	Measuring eyepiece	Automatic (AVPAK-20)	Measuring eyepiece	Automatic (AVPAK-20)
Main unit operation	Touch panel	PC	Touch panel	PC
Fixed test force	1, 2, 3, 5, 10, 20, 30, 50 kgf		0.3, 0.5, 1, 2.5, 5, 10, 20, 30 kgf	
Test force control	Lever method and automatic control (load, dwell, unload)			
Turret drive	Motor-driven and manual			
Control unit type	Touch screen	—	Touch screen	—
Objectives	A maximum of three can be installed in turret. (A 10X objective is provided as standard.)			
Dimensions (W x D x H)*1	307 x 696 x 786 mm	307 x 627 x 875 mm	307 x 696 x 786 mm	307 x 627 x 875 mm
Mass (main unit)	Approx. 60 kg	Approx. 58 kg	Approx. 60 kg	Approx. 58 kg
Power supply	240VAC ±10%, 50/60Hz			

*1 Excluding protrusions and stage.

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HR-600

SERIES 810 – CNC Rockwell Hardness Testing Machines

- A workpiece that cannot be placed on a tester due to its large size can be placed on the stage of this product and tested as is (maximum loading mass 100 kg).
- The motorized stage makes automatic multi-point testing at multiple places and of multiple workpieces possible.
- Plastic hardness testing is also available in addition to Rockwell/Brinell tests on metal. Brinell and Vickers indentation hardness tests which do not require vision measurement can also be performed.
- The HR-610A/620A is operable with a touch panel display (some functions are operable with AVPAK software) and the HR-620B is operable with a touch panel display and AVPAK software.
- Automatic testing by moving in the X-, Y- and Z-axis directions for workpieces with uneven surfaces or steps is made possible by adding X-axis stage and AVPAK software to HR-620B, which is equipped with a motorized Y-axis stage as standard. Also, using FORMEio software makes possible easy communication with PLCs for automation purposes, such as control of handling devices and work cells.

U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo SMS Smart Measuring System



HR-610A



HR-620B
Display unit type, shown with X-axis stage (optional accessory).

Specifications

Model		HR-610A	HR-620A	HR-620B
Code No.		810-512-23	810-522-23	810-527-21
Test force range N (kgf)		29.42 - 1839 (3 - 187.5)	9.807 - 2452 (1 - 250)	
Hardness testing methods*1	Rockwell	JIS B 7726:2017, ISO 6508-2:2015, ASTM E18-20		
	Brinell*2	JIS B 7724:2017, ISO 6506-2:2017, ASTM E10-18		
	Plastic	—	ISO 2039-1:2001	
		JIS K 7202-2:2001, ISO 2039-2:1987, ASTM D785-08		
	Indentation Brinell	VDI / VDE 2616		
	Indentation Vickers hardness	—	VDI / VDE 2616	
Initial test force N (kgf)	Rockwell	29.42 (3) 98.07 (10)		
	Plastic	—	9.807 (1)	
		98.07 (10)		
	Indentation Brinell	98.07 (10) 490.3 (50)		
	Indentation Vickers hardness	—	9.807 (1)	
Test force N (kgf)	Rockwell	147.1 (15) 294.2 (30) 441.3 (45) 588.4 (60) 980.7 (100) 1471 (150)		
	Brinell	49.03 (5) to 1839 (187.5)	9.807 (1) to 2452 (250)	
	Plastic	—	49.03 (5) 132.4 (13.5) 358.0 (36.5) 962.1 (98.1)	
		588.4 (60) 980.7 (100) 1471 (150)		
	Indentation Brinell	612.9 (62.5) 1839 (187.5)	612.9 (62.5) 1839 (187.5) 2452 (250)	
	Indentation Vickers hardness	—	294.2 (30) 490.3 (50)	
Dimensions (W x D x H)		350 x 681 x 935 mm		428 x 837 x 935 mm
Mass		176 kg	181 kg	205 kg

*1 Plastic testing may not be enabled depending on the material. For Brinell hardness, indentation Brinell hardness, and plastic hardness testing, other special accessories are required.
*2 For Brinell hardness testing, an indenter (optional) and a measurement microscope are required.
Note: No indenter is supplied with the unit. Separately purchase an indenter that conforms to the applicable standard.

Technical Data

Max. table loading: 100 kg
Load dwell time: 0 - 120 s (1 s increments)
Max. specimen height: 250 mm (165 mm with X-axis stage*3)
Max. specimen depth: 220 mm (from the centre of indenter shaft)
Data output: RS-232C, Digimatic, USB2.0
Power supply: 240VAC ±10%, 50/60Hz

*3 HR-620B only.

Optional Accessories

Code No.	Description	Price
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
810-530	160 mm X-axis stage (For A models only)	£13,090.00
810-531	300 mm X-axis stage (For A models only)	£18,620.00
810-535	160 mm X-axis stage (For B models only)	£8,710.00
810-536	300 mm X-axis stage (For B models only)	£12,900.00
936937	SPC data cable (1 m)	£42.00
02AGD600C	Thermal printer DPU-414	£838.00
02AZD790D	U-WAVE-T data cable	£77.30
02AZD880G	U-WAVE-T transmitter*4	£242.00
11AAD537	Footswitch	£152.00
11AAD668	Testing machine table (For A models)	£4,120.00
11AAD671	Testing machine table (For B models)	£4,310.00

For Hardness Test Blocks refer to page M-12 for details.
For Indenters refer to page M-12 for details.

*4 U-WAVE-R Receiver required.



HR-620B PC type, shown with X-axis stage (optional accessory).



Large workpieces such as cylinder blocks can be mounted easily.

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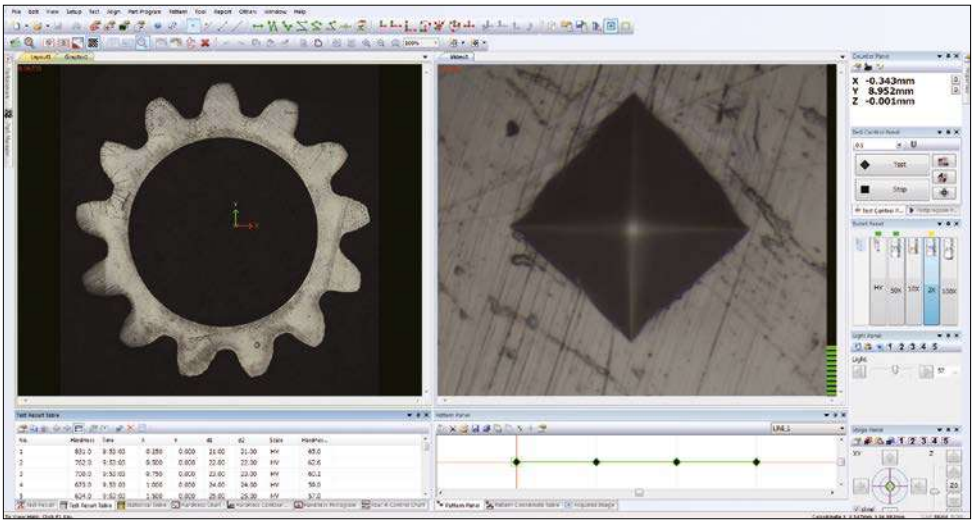
MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
TESTING

AVPAK

Software for Hardness Testing

- Enables capture of specimen images from a hardness testing machine, automatic measurement of indentations, and control of continuous automatic measurements based on a given pattern.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



Function related to capture of specimen image and pattern setting of test position

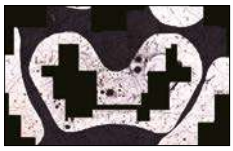
Stitching
(only for **AVPAK-20**)

Takes images of an entire rectangular field from the moving stage then combines the images.



Auto trace
(only for **AVPAK-20**)

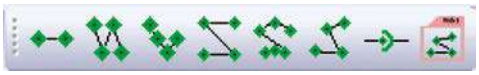
Automatically traces the shape of the sample. Takes images as the stage moves along the outer contours of the specimen then combines the images.



Contour detection
(only for **AVPAK-20**)

Detects the outline of the workpiece from combined images.

Various kinds of pattern setting
Performs time-consuming pattern setting with ease.

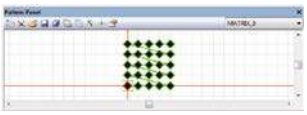
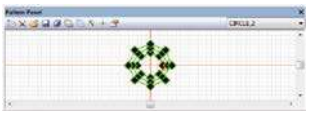


Pattern creation
This tool supports the creation of test patterns such as straight lines, zigzag lines, and teaching patterns.



Pattern pasting
This tool supports the pasting of created test patterns. It adjusts the origin, direction, etc., to paste a pattern.

Pattern panel


Handling of multiple specimens

Part program and Parts Manager functions support testing of multiple and irregular specimens.

Multi-specimen testing
Executes different part programs for each irregular specimen.



Parts Manager
Executes a common part program for specimens having the same shape.



Reading of indentations

Improvement in image-processing performance has improved the indentation measurement function.



Note: Measurement accuracy varies according to conditions.

CAUTION: The **AVPAK-20** software package is not for use within, or export to, the USA. The **AVPAK-10** software package is for the USA.

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Mitutoyo

HR-530

SERIES 810 – Rockwell Hardness Testing Machines

- Unique electronic control makes the HR-530 series of hardness testers extremely versatile by enabling Brinell hardness testing as well as load-sequence hardness testing of plastics, plus Rockwell and Rockwell Superficial hardness testing.
- This series can test the hardness of the inside wall of a ring, a test that is only possible using ordinary hardness testers by cutting the ring into pieces. (All models.)
- The touch-panel display unit can be mounted on top of the tester, providing significant convenience if the machine installation space is restricted. (All models.) Use the optional display mounting bracket to mount the unit.
- This series allows numeric display of statistical analysis results such as maximum and minimum values, mean value and graphic display of X-R control charts and histograms required for hardness evaluation.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

810-233-33



810-333-33



Specifications

Model		HR-530	HR-530L
Code No.		810-233-33	810-333-33
Preload test force		3, 10 kgf	
Test force	Rockwell Superficial	15, 30, 45 kgf	
	Rockwell	60, 100, 150 kgf	
	Brinell	6.25, 10, 15.625, 25, 30, 31.25, 62.5, 100, 125, 187.5 kgf	
Conversions to other hardness scales		HV, HK, HR (Rockwell hardness A, B, C, D, F, G / Rockwell Superficial 15T, 30T, 45T, 15N, 30N, 45N), HS, HB, tensile strength	
Functions		GO/±NG judgement, serial test (for specimen of the same thickness), cylindrical correction, spherical correction, OFFSET correction, multipoint correction, statistical calculation (maximum value, minimum value, mean value, standard deviation, upper limit, lower limit, GO count, range, NG count, graph generation (X-R control chart)	
Test force setting		By control unit	
Stage elevation		Automatic (braking and load sequence)	
Control unit		Touch-screen type	
Dimensions (W x D x H)		250 x 667 x 621 mm	300 x 667 x 766 mm
Mass		Approx. 60 kg	Approx. 69 kg

Technical Data

Load control:	Automatic (load, dwell, unload)
Load dwell time:	0 - 120 s (1 s increments)
Max. specimen height	
HR-530:	250 mm (for standard flat anvil)
HR-530L:	395 mm (for standard flat anvil)
Max. specimen depth:	150 mm (from the centre of indenter shaft)
Data output:	RS-232C, Digimatic, USB2.0
Power supply:	240VAC ±10%, 50/60Hz
Control unit	
Dimensions:	191 x 147 x 171 mm
Mass:	Approx. 1.1 kg

Optional Accessories

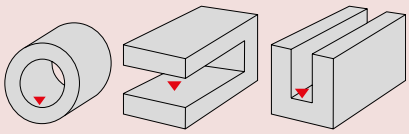
Code No.	Description	Price
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
810-029	V-anvil (400 mm long, 120° groove 50 mm wide, ø50 - ø100 mm)	£1,970.00
810-030	Spot anvil (diamond tipped type for Rockwell Superficial, ø3.5 mm)	£2,070.00
810-037	Round table (ø180 mm)	£612.00
810-038	Round table (ø250 mm)	£1,230.00
810-039	Flat anvil (ø64 mm)	£235.00
810-040	V-anvil (ø40 mm, 120° groove 30 mm wide, ø15 - ø60 mm)	£308.00
810-041	V-anvil (ø40 mm, 90° groove 6 mm wide, ø3 - ø9 mm)	£255.00
810-042	V-anvil (ø10 mm, 120° groove 8 mm wide, ø4 - ø16 mm)	£205.00
810-043	Spot anvil (ø12 mm)	£226.00
810-044	Spot anvil (ø5.5 mm)	£226.00
11AAC237	EXPAK-07 data processing program	£1,240.00

For Hardness Test Blocks refer to page M-12 for details.
For Indenters refer to page M-12 for details.



Excellent capability for testing difficult specimens

The nose-type indenter mechanism enables measurement of surfaces inside pipes and grooves.



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HR-320MS / HR-430MS

SERIES 810 – Rockwell Hardness Testing Machines

- The newly designed frame provides maximum clearance for positioning the workpiece. A table or bench is all that is needed for mounting these testing machines.
- The HR-430MS uses an automatic steering wheel brake and loading sequence to enable simple test handling.
- Provides Digimatic output for direct data transfer to the DP-1VA LOGGER Digimatic Mini-Processor, and the USB-ITN-E input tool can be used to connect to a PC for data transfer and processing.
- Brinell hardness tests can be performed by using the following optional accessories: a Brinell indenter, a weight set and a measurement microscope.

U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



810-192-31



810-194-31

Technical Data

Max. specimen height: 180 mm (100 mm if cover is attached)
Max. specimen depth: 165 mm (from indenter axis to the frame)

Optional Accessories

Code No.	Description	Price
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
810-027	Adjustable support for long workpieces	£2,250.00
810-028	Height adjustable jack rest	£2,250.00
810-029	V-anvil (400 mm long, 120° groove 50 mm wide, ø50 - ø100 mm)	£1,970.00
810-030	Spot anvil (diamond tipped type for Rockwell Superficial, ø3.5 mm)	£2,070.00
810-037	Round table (ø180 mm)	£612.00
810-038	Round table (ø250 mm)	£1,230.00
810-040	V-anvil (ø40 mm, 120° groove 30 mm wide, ø15 - ø60 mm)	£308.00
810-041	V-anvil (ø40 mm, 90° groove 6 mm wide, ø3 - ø9 mm)	£255.00
810-042	V-anvil (ø10 mm, 120° groove 8 mm wide, ø4 - ø16 mm)	£205.00
810-043	Spot anvil (ø12 mm)	£226.00
810-044	Spot anvil (ø5.5 mm)	£226.00
810-048	Steel table	£1,790.00
810-700	Stage with fine adjustment	£3,120.00
937387	SPC data cable (1 m)	£48.40
965013	SPC data cable (2 m)	£61.60
02AZD790E	U-WAVE-T data cable	£77.30
02AZD880G	U-WAVE-T transmitter*	£242.00
06AFM380E	USB Input Tool Direct USB-ITN-E (2 m)	£143.00

For Hardness Test Blocks refer to page M-12 for details.
For Indenters refer to page M-12 for details.

* U-WAVE-R Receiver required.



Export data from hardness testing machines to a computer using wireless communication with U-WAVE-T transmitter **02AZD880G** and U-WAVE-T connecting cable **02AZD790E** (optional accessories).

Specifications

Model		HR-320MS	HR-430MS
Code No.		810-192-31	810-194-31
Type of hardness test		Rockwell / Rockwell Superficial	
Standard		ISO 6508-2, JIS B 7726, ASTM E 18	
Preliminary test force, N (kgf)		29.42 (3) 98.07 (10)	
Test force, N (kgf)	Rockwell Superficial	147.1 (15) 294.2 (30) 441.3 (45)	
	Rockwell	588.4 (60) 980.7 (100) 1471 (150)	
Minimum reading		0.1HR indication	
Preload force (handling support)		Loading navigator indication	Automatic brake handle
Preload force setting		Dial switching	
Total test force setting		Weight change	Dial switching
Total test force control		Motor drive – button start	Motor drive – automatic start
Test force duration		3 - 5.5 s or manual	1 - 99 s or manual
Functions		Success or failure decision function, offset revision function, hardness conversion function	
Data output		Digimatic (SPC), RS-232C	
Power supply		240VAC ±10%, 50/60Hz	
Dimensions (W x D x H)		Approx. 235 x 512 x 780 mm	
Mass		Approx. 47 kg	Approx. 50 kg

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HH-V400

SERIES 810 – Rebound-Type Portable Hardness Tester

- The HH-V400 is a modern lightweight portable hardness testing instrument for metal workpieces. It works on the Leeb rebound hardness principle.
- The measurement is conducted with hardness value L (Leeb-value), however, conversion to any desired hardness scale can be performed.
- For a reliable test procedure, an offset value is generated and stored each individual workpiece.
- Up to 100 set-ups can be stored in the device.
- A total of 1800 measured values can be saved on the device memory.
- For best ease of use, all impact devices are automatically recognized by the software without the need for compensational measurement. So is the measuring direction angle. According to the recognized angle, the measurement value is automatically compensated.
- The display provides an intuitive menu where important information like range and average are shown.
- The durable menu buttons provide reliable use even in harsh environments.
- An environment friendly rechargeable battery pack supplies enough power for a working day on the go.
- Wired (USB cable included) or wireless data transmission accessories from the Mitutoyo U-WAVE range and the Mitutoyo SPC software MeasurLink ensure the best data evaluation options.

U-WAVE MeasurLink® ENABLED Data Management Software by Mitutoyo



810-306

Technical Data

Hardness value:	Hardness L (Leeb)
Accuracy:	830HLD ±12HL (±1.5%)
Impactor:	Impact hammer with integrated detector and carbide-ball tip
Display unit:	7-segment LCD
Functions:	Auto angle compensation, offset, GO/±NG judgement, hardness scale conversion, data storage (1800 data entries), statistical analysis (average, maximum, minimum, dispersion), eco mode, auto power-off, backlight.
Power supply:	Rechargeable battery (Ni-MH), USB-PD 2A. Up to 8 hours of operation with 100 minutes of charging. 4 VA.
Output:	Digimatic (SPC), USB
Dimensions	
Display unit:	68 x 174 x 32 mm
Impactor:	ø28 x 175 mm
Mass:	400 g

Optional Accessories

Code No.	Description	Price
264-020	USB input tool	£273.00
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
264-620	U-WAVE-TC IP67 transmitter*	£242.00
264-621	U-WAVE-TC transmitter*	£242.00
264-624	U-WAVE-TCB IP67 transmitter	£242.00
264-625	U-WAVE-TCB transmitter	£242.00
02AZG011	U-WAVE-T data cable (160 mm)	£89.00
06AGL011	SPC data cable (1 m)	£47.60
11AAE902	D type impactor ø28 x 174.5 mm (tip ø22 mm)	£1,460.00
11AAE903	DC type impactor ø18 x 86 mm (tip ø22 mm)	£1,420.00
11AAE904	D+15 type impactor ø28 x 189.5 mm (tip 12 mm)	£1,550.00
11AAE905	DL type impactor ø28 x 229 mm (tip ø4 mm)	£1,890.00
19BAA248	Support ring for convex surface of cylinder (R10-20 mm)	£37.40
19BAA249	Support ring for concave surface of cylinder (R14-20 mm)	£37.40
19BAA250	Support ring for convex surface of sphere (R10-27.5 mm)	£20.60
19BAA251	Support ring for concave surface of sphere (R13.5-20 mm)	£20.60
19BAA457	Carbide ball for D, DC, D+15 type impactors	£13.50
19BAA458	Ball shaft for DL type impactor	£462.00

For Hardness Test blocks refer to page M-12 for details.

* U-WAVE-R Receiver required.

Specifications

Model		HH-V400
Code No.		810-306
Conversion range / increment	Vickers	43 - 950HV
	Brinell	20 - 655HB
	Rockwell C	19.3 - 68.2HRC
	Rockwell B	13.5 - 101.7HRB
	Shore	30.1 to 99.5HS (ASTM), 13.2 - 98.6HS (JIS)
	Tensile strength	390 - 1999 MPa
Testable workpiece	Thickness	Min. 5 mm
	Mass	5 kg or more
Price		£2,730.00



The impactor is simply pressed against the sample surface and the button pushed to make a hardness measurement.

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HH-300

SERIES 811 – Digimatic Readout Durometers

- Digimatic Durometers are suitable for testing the hardness of non-metallic materials such as natural rubber, neoprene, polyesters, PVC, leather, Thiokol, nitrile rubber, wax, vinyl, cellulose acetates, glass, polystyrene, etc.
- Units are available reading both in both Shore A and Shore D scales to suit a wide variety of applications.
- Designed in accordance with the ASTM D 2240, ISO868, ISO 7619, DIN 53 505, JIS K 6253, and JIS K 7215 specifications.
- The Digimatic Durometer is provided with a data hold function for error-free reading.

DIGIMATIC MeasurLink® ENABLED Data Management Software by Mitutoyo



811-336-10



811-334-10

Technical Data

Functions: Data hold, zero-setting, SPC output, power ON/OFF
Power supply: SR44 silver oxide cell x 1pc.

Optional Accessories

Code No.	Description	Price
264-505E	DP-1VA LOGGER Digimatic Mini-Processor	£503.00
811-012	Test stand (Shore D)	£2,170.00
811-013	Test stand (Shore A)*1	£2,170.00
811-019	Test stand (Shore A)*2	£2,170.00
905338	SPC data cable (1 m)	£42.00
905409	SPC data cable (2 m)	£47.10
218000DMIT	Shore D reference material (3pcs.)	£270.00
218000MIT	Shore A reference material (3pcs.)	£246.00

*1 Only available for Compact Type Durometer.
*2 Only available for Long Type Durometer.

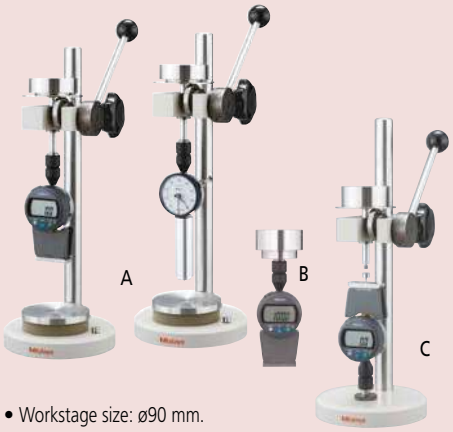
Test stand applications

These stands are used to mount Durometers. They allow constant-force hardness measurement by ensuring that the Durometer presses vertically on the workpiece surface at all times.

A Anyone can perform repeatable hardness measurement due to fewer possibilities for human error and measurement variations.

B The supplied weights can be attached directly to a Durometer and allow constant-force hardness measurement of large samples for which a stand cannot be used.

C The supplied weights are used for calibrating the spring force of Durometers.



- Workstage size: ø90 mm.
- Maximum specimen height: 90 mm.

Specifications

Model		HH-336-01	HH-332	HH-338-01	HH-334
Code No.		811-336-10	811-332-10	811-338-11	811-334-10
Scale		Shore A		Shore D	
Type		Compact	Long-leg	Compact	Long-leg
Applications		Natural rubber, soft elastomers, etc.		Hard elastomers, plastics, hard rubber, ebonite, etc.	
Resolution		0.5			
Range		HA: 10 - 90		HD: 20 - 90	
Standards	ASTM D 2240	✓	✓	✓	✓
	ISO 868	✓	✓	✓	✓
	ISO 7619	✓	✓	✓	✓
	DIN 53 505	—	✓	—	✓
	JIS K 6253	✓	✓	✓	✓
	JIS K 7215	✓	✓	✓	✓
Pressure foot size		44 x 18 mm	ø18 mm	44 x 18 mm	ø18 mm
Spring force (mN)		550+75H (Hardness reading: 10 - 90)		444.5H (Hardness reading: 20 - 90)	
Indenter		Blunt taper (tip diameter: 0.79 mm)		Sharp point (tip radius: 0.1±0.01 mm)	
Tip angle		35°±0.25°		30°±0.5°	
Indenter diameter		1.25 mm			
Indenter protrusion		2.5 mm			
Dimensions (W x D x H)		60 x 28.5 x 151 mm	60 x 29.5 x 193 mm	60 x 28.5 x 151 mm	60 x 29.5 x 193 mm
Mass		290 g	310 g	290 g	310 g
Price		**£1,380.00**	**£1,380.00**	**£1,380.00**	**£1,380.00**

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Mitutoyo

HH-300

SERIES 811 – Dial Readout Durometers

- Dial Durometers are suitable for testing the hardness of non-metallic materials such as natural rubber, neoprene, polyesters, PVC, leather, Thiokol, nitrile rubber, wax, vinyl, cellulose acetates, glass, polystyrene, etc.
- Designed in accordance with the ASTM D 2240, ISO868, ISO 7619, DIN 53 505, JIS K 6253, and JIS K 7215 specifications.
- Units are available reading both in Shore A and Shore D scales to suit a wide variety of applications.
- The Dial Durometer is provided with a peak retaining hand for error-free reading.



811-337-10



810-331-10

Specifications

Model		HH-335-01	HH-331	HH-337-01	HH-333
Code No.		811-335-11	811-331-10	811-337-11	811-333-10
Scale		Shore A		Shore D	
Type		Compact	Long-leg	Compact	Long-leg
Applications		Natural rubber, soft elastomers, etc.		Hard elastomers, plastics, hard rubber, ebonite, etc.	
Resolution		1			
Range		HA: 10 - 90		HD: 20 - 90	
Standards	ASTM D 2240	✓	✓	✓	✓
	ISO 868	✓	✓	✓	✓
	ISO 7619	✓	✓	✓	✓
	DIN 53 505	—	✓	—	✓
	JIS K 6253	✓	✓	✓	✓
	JIS K 7215	✓	✓	✓	✓
Pressure foot size		44 x 18 mm	ø18 mm	44 x 18 mm	ø18 mm
Spring force (mN)		550+75H (Hardness reading: 10 - 90)		444.5H (Hardness reading: 20 - 90)	
Indenter		Blunt taper (tip diameter: 0.79 mm)		Sharp point (tip radius: 0.1±0.01 mm)	
Tip angle		35°±0.25°		30°±0.5°	
Indenter diameter		1.25 mm			
Indenter protrusion		2.5 mm			
Dimensions (W x D x H)		68 x 34 x 146 mm	68 x 35 x 188 mm	68 x 34 x 146 mm	68 x 35 x 188 mm
Mass		300 g	320 g	300 g	320 g
Price		**£677.00**	**£781.00**	**£781.00**	**£781.00**

Technical Data

Functions: Peak retaining hand

Optional Accessories

Code No.	Description	Price
811-012	Test stand (Shore D)	£2,170.00
811-013	Test stand (Shore A)*1	£2,170.00
811-019	Test stand (Shore A)*2	£2,170.00
218000DMIT	Shore D reference material (3pcs.)	£270.00
218000MIT	Shore A reference material (3pcs.)	£246.00

*1 Only available for Compact Type Durometer.
*2 Only available for Long Type Durometer.

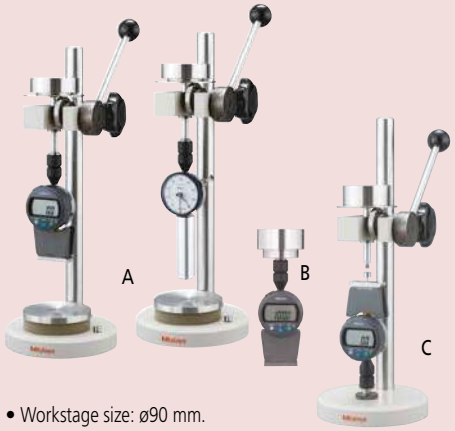
Test stand applications

These stands are used to mount Durometers. They allow constant-force hardness measurement by ensuring that the Durometer presses vertically on the workpiece surface at all times.

A Anyone can perform repeatable hardness measurement due to fewer possibilities for human error and measurement variations.

B The supplied weights can be attached directly to a Durometer and allow constant-force hardness measurement of large samples for which a stand cannot be used.

C The supplied weights are used for calibrating the spring force of Durometers.



- Workstage size: ø90 mm.
- Maximum specimen height: 90 mm.

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Optional Accessories

For Hardness Testing Machines

Indenters

Code No.	Description	Price
For HM-210		
19BAA058	Vickers diamond indenter	**£639.00**
19BAA061	Knoop diamond indenter	**£416.00**
For HM-220		
19BAA059	Vickers diamond indenter	**£639.00**
19BAA062	Knoop diamond indenter	**£416.00**
For HV-100 Series		
19BAA060	Vickers diamond indenter	**£416.00**
19BAA063	Knoop diamond indenter	**£416.00**
For all HR Series		
19BAA072	Rockwell diamond indenter (standard)	**£390.00**
19BAA073	Rockwell diamond indenter (ISO 6508-3)	**£390.00**
19BAA162	Brinell carbide ball only (5 mm)	**£68.70**
19BAA163	Brinell carbide ball only (10 mm)	**£93.50**
19BAA277	Brinell carbide ball indenter (1 mm)	**£333.00**
19BAA279	Brinell carbide ball indenter (2.5 mm)	**£333.00**
19BAA280	Brinell carbide ball indenter (5 mm)	**£288.00**
19BAA281	Brinell carbide ball only (1 mm)	**£16.30**
19BAA283	Brinell carbide ball only (2.5 mm)	**£18.60**
19BAA284	Brinell carbide ball indenter 10 mm)	**£369.00**
19BAA504	Rockwell carbide ball indenter (3.175 mm)	**£333.00**
19BAA505	Rockwell carbide ball indenter (6.35 mm)	**£345.00**
19BAA506	Rockwell carbide ball indenter (12.7 mm)	**£369.00**
19BAA507	Rockwell carbide ball only (1.5875 mm)	**£33.90**
19BAA508	Rockwell carbide ball only (3.175 mm)	**£36.90**
19BAA509	Rockwell carbide ball only (6.35 mm)	**£59.20**
19BAA510	Rockwell carbide ball only (12.7 mm)	**£176.00**
19BAA515	Rockwell carbide ball indenter (1.5875 mm)	**£309.00**

Hardness Test Blocks

Code No.	Calibrated hardness	Applicable Hardness Testing Machines						Price
		HM-210 HM-220	HV-110 HV-120	HR-600	HR-530 HR-530L	HR-320MS HR-430MS	HH-411	
19BAA001	100HMV	✓						**£654.00**
19BAA002	200HMV	✓						**£654.00**
19BAA003	300HMV	✓						**£654.00**
19BAA004	400HMV	✓						**£654.00**
19BAA005	500HMV	✓						**£654.00**
19BAA006	600HMV	✓						**£654.00**
19BAA007	700HMV	✓						**£654.00**
19BAA008	800HMV	✓						**£654.00**
19BAA009	900HMV	✓						**£654.00**
19BAA011	HV5/200HV		✓					**£469.00**
19BAA012	HV5/300HV		✓					**£469.00**
19BAA013	HV5/400HV		✓					**£469.00**
19BAA014	HV5/500HV		✓					**£469.00**
19BAA015	HV5/600HV		✓					**£469.00**
19BAA016	HV5/700HV		✓					**£469.00**
19BAA017	HV5/800HV		✓					**£469.00**
19BAA018	HV5/900HV		✓					**£469.00**
19BAA028	32HRB			✓	✓	✓		**£286.00**
19BAA029	42HRB			✓	✓	✓		**£286.00**
19BAA030	52HRB			✓	✓	✓		**£286.00**
19BAA031	62HRB			✓	✓	✓		**£286.00**
19BAA032	72HRB			✓	✓	✓		**£286.00**
19BAA033	82HRB			✓	✓	✓		**£286.00**
19BAA034	92HRB			✓	✓	✓		**£286.00**
19BAA035	100HRB			✓	✓	✓		**£286.00**
19BAA036	20HRC			✓	✓	✓		**£286.00**
19BAA037	30HRC			✓	✓	✓		**£286.00**
19BAA038	40HRC			✓	✓	✓		**£286.00**
19BAA039	50HRC			✓	✓	✓		**£286.00**
19BAA040	60HRC			✓	✓	✓		**£286.00**
19BAA041	70HRC			✓	✓	✓		**£286.00**
19BAA042	41HR30N			✓	✓	✓		**£286.00**
19BAA043	50HR30N			✓	✓	✓		**£286.00**
19BAA044	60HR30N			✓	✓	✓		**£286.00**
19BAA045	73HR30N			✓	✓	✓		**£286.00**
19BAA046	83HR30N			✓	✓	✓		**£286.00**
19BAA047	75HR15N			✓	✓	✓		**£286.00**
19BAA048	85HR15N			✓	✓	✓		**£286.00**
19BAA049	90HR15N			✓	✓	✓		**£286.00**
19BAA051	42HR30T			✓	✓	✓		**£286.00**
19BAA053	62HR30T			✓	✓	✓		**£286.00**
19BAA054	72HR30T			✓	✓	✓		**£286.00**
19BAA055	78HR15T			✓	✓	✓		**£286.00**
19BAA056	82HR15T			✓	✓	✓		**£286.00**
19BAA243	880HLD						✓	**£1,120.00**
19BAA244	830HLD						✓	**£1,120.00**
19BAA245	730HLD						✓	**£1,120.00**
19BAA246	620HLD						✓	**£1,120.00**
19BAA247	520HLD						✓	**£1,120.00**

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COORDINATE MEASURING MACHINES



Coordinate Measuring Machines



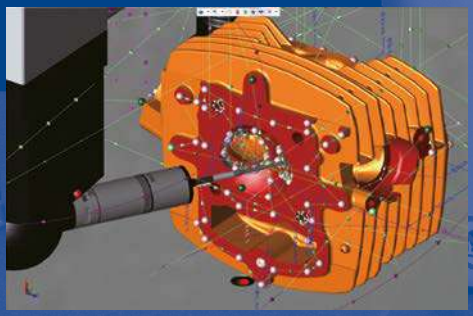
Probes and Styli



eco-fix



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CRYSTA-Apex V PLUS

SERIES 191 – Standard CNC CMM

- The Crysta-Apex V Plus is the next generation of Mitutoyo's industry standard, compact, economical, high-performance CNC Co-ordinate Measuring Machine for versatile applications.
- Designed for high accuracy even in varying environmental conditions.
- High accuracy, speed and acceleration.
- Temperature compensation from 15° to 30°C*, includes workpiece sensors for stable results in production environments.
- ABS scale, saves time and provides high resistance to environmental conditions.
- UC480 controller, service monitor enabled for Smart Factory deployment.
- Air reduction feature, it automatically reduces air supply during standby to lower usage and environmental impact.

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SMS Smart Measuring System



CRYSTA-Apex V PLUS574

Specifications

Model		CRYSTA-Apex V PLUS			
		544	**574**	**776**	**7106**
Measuring range	X	500 mm		700 mm	
	Y	400 mm	700 mm	700 mm	1000 mm
	Z	400 mm		600 mm	
Resolution		0.1 µm			
Accuracy*	$E_{0,MPE}$	±(1.8+0.3L/100) µm			
	$P_{FTU,MPE}$	±1.8 µm			
	MPE_{THP}	±2.4 µm (50 s)			
Work table	Material	Granite			
	Size	638 x 860 mm	638 x 1160 mm	880 x 1420 mm	880 x 1720 mm
	Tapped insert	M8 x 1.25 mm			
	Max. loading	180 kg		800 kg	1000 kg
Max. workpiece height		545 mm		800 mm	
Mass (main unit)		542 kg	691 kg	1810 kg	2063 kg

Model		CRYSTA-Apex V PLUS					
		9106	**9108**	**9166**	**9168**	**9206**	**9208**
Measuring range	X	900 mm					
	Y	1000 mm		1600 mm		2000 mm	
	Z	600 mm	800 mm	600 mm	800 mm	600 mm	800 mm
Resolution		0.1 µm					
Accuracy*	$E_{0,MPE}$	±(1.8+0.3L/100) µm					
	$P_{FTU,MPE}$	±1.8 µm					
	MPE_{THP}	±2.4 µm (Z: 600 = 50 s, Z: 800 = 60 s)					
Work table	Material	Granite					
	Size	1080 x 1720 mm		1080 x 2320 mm		1080 x 2720 mm	
	Tapped insert	M8 x 1.25 mm					
	Max. loading	1200 kg		1500 kg		1800 kg	
Max. workpiece height		800 mm	1000 mm	800 mm	1000 mm	800 mm	1000 mm
Mass (main unit)		2267 kg	2287 kg	2969 kg	2999 kg	4052 kg	4082 kg

* According to ISO 10360-2/4/5 methods when using the SP25M probe system with a ø4 x 50 mm stylus and with thermal compensation operating over the temperature range 18 - 22°C. L: measuring length (mm).

Technical Data

Length standard:	High-accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	519 mm/s
Air pressure:	0.4 MPa
Air consumption:	50 L/min (500 series) 60 L/min (700, 900 series)

Guaranteed accuracy temperature environment

Temperature range		18 - 22°C	15 - 30°C
Temperature change	Per hour	2.0 K	
	Per 24 hours	2.0 K	5.0 K
Temperature gradient	Vertical	1.0 K/m	
	Horizontal	1.0 K/m	

Application Examples



Gear measurement using a MRT320 rotary table.



Laser scanning with SurfaceMeasure 201FS.

Automation Example



Since highly accurate measurements can be performed in a wide range of temperature environments, a dedicated measuring room is not required, and in-line and line-side measurements can be automated during the manufacturing process (line). This significantly reduces measurement time and improves efficiency.

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CRYSTA-Apex V

SERIES 191 – Standard CNC CMM

- The latest generation CRYSTA-Apex coordinate measuring machines, the new CRYSTA-Apex V Series, is packed with state-of-the-art technology, necessary for performing very accurate measurements at high speed.
- All new, using Mitutoyo's world-renowned ABS scales, the CRYSTA-Apex V series has a high resistance to environmental conditions and does not require to perform homing upon start-up.
- SMS capability enables status and service monitoring, ready for use in a Smart Factory environment.
- A future proof investment, the CRYSTA-Apex V is capable of tackling any task you might have in the future thanks to its ability to change or add probe systems and software with ease.

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SMS Smart Measuring System



CRYSTA-Apex V122010

Technical Data

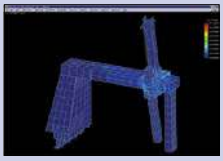
Length standard:	High-accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	693 mm/s
Air pressure:	0.4 MPa
Air consumption:	60 L/min (700, 900 series)

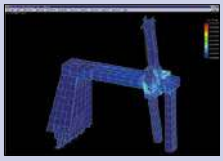
Guaranteed accuracy temperature environment

Temperature range		18 - 22°C	16 - 26°C
Temperature change	Per hour	2.0 K	
	Per 24 hours	2.0 K	5.0 K
Temperature gradient	Vertical	1.0 K/m	
	Horizontal	1.0 K/m	



Workpiece thermal compensation system temperature sensors.





The machine structure has been optimized using FEM (Finite-Element Method) and modal analysis.



All machines are supplied with a multifunction controller unit.

Specifications

Model		CRYSTA-Apex V		
		121210	122010	123010
Measuring range	X	1200 mm		
	Y	1200 mm	2000 mm	3000 mm
	Z	1000 mm		
Resolution		0.1 µm		
Accuracy*1	$E_{0,MPE}$	±(2.3+0.3L/100) µm, ±(2.3+0.4L/100) µm*2		
	$P_{FTU,MPE}$	±2.0 µm		
	MPE_{THP}	±2.8 µm (50 s)		
Work table	Material	Granite		
	Size	1420 x 2165 mm	1420 x 2965 mm	1420 x 3965 mm
	Tapped insert	M8 x 1.25 mm		
	Max. loading	2000 kg	2500 kg	3000 kg
Max. workpiece height		800 mm [1000 mm]		1200 mm
Mass (main unit)		4050 kg	6150 kg	9110 kg

Model		CRYSTA-Apex V					
		162012	163012	164012	162016	163016	164016
Measuring range	X	1600 mm					
	Y	2000 mm	3000 mm	4000 mm	2000 mm	3000 mm	4000 mm
	Z	1200 mm			1600 mm		
Resolution		0.1 µm					
Accuracy*1	$E_{0,MPE}$	±(3.3+0.45L/100) µm, ±(3.3+0.55L/100) µm*2			±(4.5+0.55L/100) µm, ±(4.5+0.65L/100) µm*2		
	$P_{FTU,MPE}$	±5.0 µm			±6.0 µm		
	MPE_{THP}	±6.0 µm (150 s)			±7.0 µm (150 s)		
Work table	Material	Granite					
	Size	1800 x 3205 mm	1800 x 4205 mm	1800 x 5205 mm	1800 x 3205 mm	1800 x 4205 mm	1800 x 5205 mm
	Tapped insert	M8 x 1.25 mm					
	Max. loading	3000 kg	3500 kg	4500 kg	3000 kg	3500 kg	4500 kg
Max. workpiece height		1400 mm			1800 mm		
Mass (main unit)		9300 kg	10600 kg	14800 kg	9350 kg	10650 kg	14850 kg

Note: Further sizes are available up to measuring range (X:Y:Z) 2000 : 4000 : 1600 mm.
*1 According to ISO 10360-2/4/5 methods when using the SP25M probe system with a ø4 x 50 mm stylus and with thermal compensation operating over the temperature range18 - 22°C. L: measuring length (mm).
*2 Guaranteed accuracy temperature range: 16 - 26°C.

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STRATO-Active

SERIES 355 – High Accuracy CNC CMM

- The bridge type CNC CMM offers both high-performance and cost-effective measurements.
- Thermal compensation is equipped as standard to guarantee the outstanding accuracy specification over the temperature range 18°C to 22°C.
- The high drive speed and acceleration guarantee top scanning performance in a machine that also offers high-accuracy measuring in the 1.2 µm class.
- SMS capability enables status and service monitoring, ready for use in a Smart Factory environment.
- Suitable for measuring medium-sized workpieces accurately.

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SMS Smart Measuring System

STRATO-Active 9166



Specifications

Model		STRATO-Active			
		776	7106	9106	9166
Measuring range	X	700 mm		900 mm	
	Y	700 mm	1000 mm	1000 mm	1600 mm
	Z	600 mm			
Resolution		0.05 µm			
Accuracy*1	$E_{0,MPE}$	±(1.2+0.3L/100) µm *2			
	$P_{FTU,MPE}$	±1.5 µm			
	MPE_{THP}	±2 µm (50 s)			
Work table	Material	Granite			
	Size	876 x 1420 mm	876 x 1720 mm	1076 x 1720 mm	1076 x 2320 mm
	Tapped insert	M8 x 1.25 mm			
	Max. loading	800 kg	1000 kg	1200 kg	1500 kg
Max. workpiece height		800 mm			
Mass (main unit)		1900 kg	2150 kg	2350 kg	3050 kg

*1 According to ISO 10360-2/4/5 methods when using the SP25M probe system with a ø4 x 50 mm stylus and with thermal compensation operating over the temperature range 18 - 22°C. L: measuring length (mm).
*2 Guaranteed accuracy temperature range: 18 - 22°C.

Technical Data

Length standard:	High-accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	519 mm/s
Air pressure:	0.4 MPa
Air consumption:	60 L/min

Guaranteed accuracy temperature environment

Temperature range		18 - 22°C
Temperature change	Per hour	1.0 K
	Per 24 hours	2.0 K
Temperature gradient	Vertical	1.0 K/m
	Horizontal	1.0 K/m

Application Examples



Gear measurement using a MRT320 rotary table.



4-axis nominal scanning of a turbine blade surface.



Laser scanning with SurfaceMeasure 201FS.

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STRATO-Apex

SERIES 355 – High Accuracy CNC CMM

- Thermal compensation is equipped as standard to guarantee the outstanding accuracy specification over the temperature range 18°C to 22°C.
- The high drive speed and acceleration guarantee top scanning performance in a machine that also offers high-accuracy measuring in the 1 µm class.
- High speed and accuracy in measurement is ensured by a redesign of the machine body that has improved rigidity of the structure, and by a remodelled guide mechanism.
- High-performance scanning measurement has been achieved through the improved structural rigidity and incorporation of a newly developed compensation technology.
- Ultra-high precision scales are used on each axis to provide a higher resolution and accuracy that complements the improved overall performance.

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SMS Smart Measuring System



STRATO-Apex 9106

Technical Data

Length standard:	Ultra-high-accuracy linear encoder (glass scale with virtually zero thermal expansion coefficient)
Guide system:	Air bearing
Max. drive speed:	519 mm/s (1600 series: 606 mm/s)
Max. acceleration:	2598 mm/s² (1600 series: 1350 mm/s²)
Air pressure:	0.4 MPa
Air consumption:	120 L/min (1600 series: 250 L/min)

Guaranteed accuracy temperature environment

Series No.		574	700/900
Temperature range		18 - 22°C	19 - 21°C
Temperature change	Per hour	0.5 K	1.0 K
	Per 24 hours	1.0 K	2.0 K
Temperature gradient	Vertical	1.0 K/m	
	Horizontal	1.0 K/m	



Dust-resistant high-precision glass scales.



Controller positioned at rear of machine.



STRATO-Apex 574

Specifications

Model		STRATO-Apex				
		574	776	7106	9106	9166
Measuring range	X	500 mm	700 mm		900 mm	
	Y	700 mm		1000 mm		1600 mm
	Z	400 mm	600 mm			
Resolution		0.05 µm	0.02 µm			
Accuracy*	$E_{0,MPE}$	±(0.7+0.25L/100) µm				
	$P_{FTU,MPE}$	0.7 µm	0.9 µm			
	MPE_{THP}	1.3 µm (40 s)	1.8 µm (45 s)			
Work table	Material	Granite				
	Size	700 x 1420 mm	880 x 1420 mm	880 x 1720 mm	1080 x 1720 mm	1080 x 2320 mm
	Tapped insert	M8 x 1.25 mm				
	Max. loading	180 kg	500 kg	800 kg		1200 kg
Max. workpiece height		560 mm	770 mm			
Mass (main unit)		1530 kg	1895 kg	2180 kg	2410 kg	3085 kg

Model		STRATO-Apex			
		162012	162016	163012	163016
Measuring range	X	1600 mm			
	Y	2000 mm		3000 mm	
	Z	1200 mm	1600 mm	1200 mm	1600 mm
Resolution		0.05 µm			
Accuracy*	$E_{0,MPE}$	±(2.5+0.4L/100) µm	±(3+0.4L/100) µm	±(2.5+0.4L/100) µm	±(3+0.4L/100) µm
	$P_{FTU,MPE}$	2.3 µm			
	MPE_{THP}	2.5 µm (60 s)			
Work table	Material	Granite			
	Size	1850 x 3280 mm		1850 x 4280 mm	
	Tapped insert	M8 x 1.25 mm			
	Max. loading	3500 kg		4000 kg	
Max. workpiece height		1350 mm	1750 mm	1350 mm	1750 mm
Mass (main unit)		11150 kg	11200 kg	15300 kg	15350 kg

* According to ISO 10360-2/4/5 methods when using the SP25M probe system with a ø4 x 50 mm stylus and with thermal compensation operating. L: measuring length (mm).

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LEGEX-Takumi

SERIES 356 – Ultra-High Accuracy CNC CMM

- The breakthrough CMM created through integration of cutting-edge technology and Takumi's* skills.
- Unsurpassed point-to-point measuring accuracy has been achieved in the LEGEX-Takumi CNC CMM by rigorous analysis of all possible error-producing factors and elimination, or minimization, of their effects and the use of ultra-high-accuracy crystallized-glass scales with a thermal expansion coefficient of practically zero on each axis.
- Thermal compensation is equipped as standard to guarantee the outstanding accuracy specification over the temperature range 19°C to 21°C.
- Premium scanning performance with the MPP-310Q probe is guaranteed by the fixed bridge architecture and precision air bearings running on highly rigid guideways that together ensure superior dynamic motion stability.
- Machines in this series are suitable for complex, small- to medium-sized workpieces such as gears, bearings, lenses, dies and scroll rotors which must be inspected to exceptionally high dimensional accuracy.
- UC480 controller supporting Multi-sensor and SMS functionality (Smart Measuring System).

* Takumi is a Japanese word meaning "artisan" with superb craftmanship.

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SMS Smart Measuring System



LEGEX-Takumi 9106

Specifications

Model		LEGEX-Takumi			
		574	**774**	**776**	**9106**
Measuring range	X	500 mm	700 mm	700 mm	900 mm
	Y	700 mm			1000 mm
	Z	450 mm		600 mm	
Resolution		0.01 µm			
Accuracy*1	$E_{0,MPE}$*2	±(0.23+0.7L/1000) µm			
Work table	Material	Cast iron			
	Size	550 x 750 mm	750 x 750 mm		950 x 1050 mm
	Tapped insert	M8 x 1.25 mm			
	Max. loading	250 kg	500 kg		800 kg
Max. workpiece height		700 mm		850 mm	
Mass (main unit)		3500 kg	5000 kg	5100 kg	6500 kg

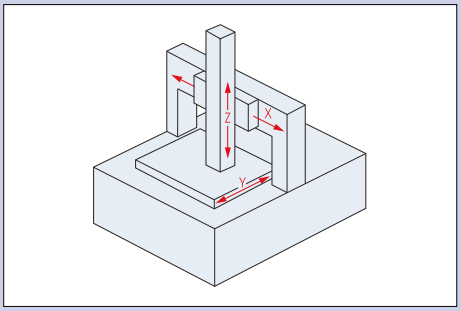
*1 According to ISO 10360-2/4/5 methods when using the MPP-310Q probe system and with thermal compensation operating. L: measuring length (mm).
*2 Guaranteed accuracy temperature range: 19-21°C.

Technical Data

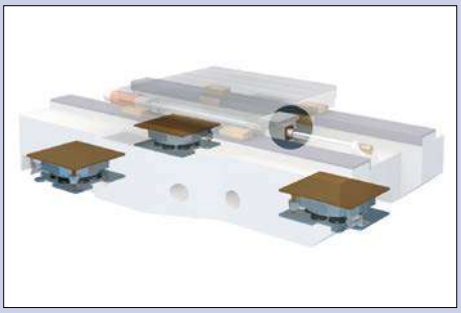
Length standard:	High-accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	200 mm/s
Max. acceleration:	980 mm/s²
Air pressure:	0.4 MPa
Air consumption:	150 L/min

Guaranteed accuracy temperature environment

Temperature range		19-21°C
Temperature change	Per hour	0.5 K
	Per 24 hours	1.0 K
Temperature gradient	Vertical	1.0 K/m
	Horizontal	1.0 K/m



Fixed-bridge design with measuring table Y-axis movement in the base structure.



Actively controlled, integrated, vibration damping measuring table.



Mitutoyo has introduced the Takumi Meister System to pass on outstanding skills of artisans.



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MiSTAR

SERIES 357 – Shop Floor CNC CMM

- High performance/cost ratio in a compact CMM featuring high environmental resistance and maintainability.
- Hardened for shop floor use by special precautions to protect moving parts and scales against ingress of dust.
- Built-in thermal compensation provides excellent accuracy even when the CMM is subject to temperature variations as extreme as 10°C to 40°C.
- Installation is eased by the small footprint together with no requirement for an air supply.
- Compact design locates controller and PC in stand. Monitor and keyboard may be mounted on an arm attached to the base (option).
- Ideal for inspection of small- to medium-size workpieces and offers a wide range of measurement probes including touch trigger, optical and contact scanning types.

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Data Management Software by Mitutoyo

SMS Smart Measuring System



MiSTAR 555
(arm shown is optional)

Technical Data

Length standard: High-accuracy linear encoder
Guide system: Linear guide
Max. drive speed (3D): 606 mm/s
Max. acceleration (3D): 2700 mm/s^2

Guaranteed accuracy temperature environment

Temperature range		18 - 22°C	10 - 30°C	10 - 40°C
Temperature change	Per hour	2.0 K		
	Per 24 hours	2.0 K	5.0 K	10.0 K
Temperature gradient	Vertical	1.0 K/m		
	Horizontal	1.0 K/m		

Specifications

Model		MiSTAR 555	MiSTAR 575
Measuring range	X	570 mm	
	Y	500 mm	700 mm
	Z	500 mm	
Resolution		0.1 µm	
Accuracy	18 - 22°C	±(2.2+0.3L/100) µm*	
	10 - 30°C	±(2.9+0.45L/100) µm*	
	10 - 40°C	±(3.8+0.8L/100) µm*	
Work table	Material	Granite	
	Tapped insert	M8 x 1.25 mm	
	Max. loading	120 kg	

* Using an SP25M probe; stylus: ø4 x 50 mm.

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MACH Ko-Ga-Me

SERIES 357 – The Agile CNC CMM

- Compact, 3D CNC measuring system that can flexibly configure to almost any production process, with built-in thermal compensation that provides excellent accuracy even when the CMM is subject to shop floor temperature variations as extreme as 10°C to 35°C.
- Small-sized, requiring only a minimal installation envelope.
- Agile and easy for a customer to mount using either an available fixed base or mounting system of your own design.
- Can be used in stand-alone applications or integrated into work cells; no air supply is required.
- Ideal for inspection of small workpieces and can be used with a wide range of measurement probes including touch trigger, optical and contact scanning types.

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SMS Smart Measuring System



MACH Ko-Ga-Me

Technical Data

Length standard:	Linear encoder
Guide system:	Straight-motion hard bearing
Max. drive speed:	340 mm/s
Max. acceleration:	6750 mm/s^2



Fixed-base installation.



Optional stand.

Specifications

Model		MACH Ko-Ga-Me
		KGM12128-C
Measuring range	X	120 mm
	Y	120 mm
	Z	80 mm
Resolution		0.02 µm
Accuracy*	19 - 21°C	(2.4+5.7L/1000) µm
	15 - 25°C	(2.7+6.4L/1000) µm
	10 - 30°C	(3.1+7.2L/1000) µm
	10 - 35°C	(3.4+7.9L/1000) µm

* TP200 stylus: ø3 x 10 mm, SP25M stylus: ø4 x 50 mm.



Touch trigger probe MTP-001.



Scanning probe MPP-001.

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MACH-3A

SERIES 360 – In-Line CNC CMM

- High speed for manufacturing. The ideal replacement for your mechanical gauges.
- Designed for shopfloor conditions with built-in thermal compensation that provides excellent accuracy even when the CMM is subject to temperature variations as extreme as 5°C to 40°C.
- The exceptional performance of the MACH-3A is due to a horizontal-ram architecture that enables phenomenal acceleration and drive speed that provides the potential to keep pace with production rates even with a 100% inspection requirement.
- Designed for automated processes with a touchscreen for easy operation and monitoring.
- Choose from the full range of Mitutoyo CMM accessories including styli, jigs, loading systems and indexing heads, all designed to enhance convenience and production efficiency.

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SMS Smart Measuring System



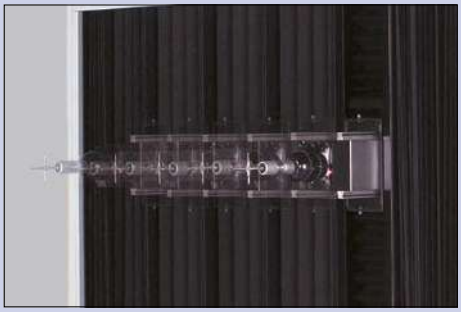
MACH-3A 653

Technical Data

Length standard:	High-accuracy linear encoder
Guide system:	Linear guide
Max. drive speed:	1212 mm/s
Max. acceleration:	11880 mm/s²

Guaranteed accuracy temperature environment

Temperature range		5 - 40°C
Temperature change	Per hour	2.0 K
	Per 24 hours	10.0 K
Temperature gradient	Vertical	1.0 K/m
	Horizontal	1.0 K/m



Enclosed design for best environmental resistance.

Specifications

Model			MACH-3A 653
Measuring range	X		600 mm
	Y		500 mm
	Z		280 mm
Resolution			0.1 µm
Accuracy*	$E_{0,MPE}$	19 - 21°C	±(2.5+0.35L/100) µm
		15 - 25°C	±(2.8+0.42L/100) µm
		10 - 30°C	±(3.2+0.50L/100) µm
		5 - 35°C	±(3.5+0.57L/100) µm
		5 - 40°C	±(3.9+0.65L/100) µm
	$P_{FTU,MPE}$		±2.5 µm

* According to ISO 10360-2/4/5 methods when using the TP7M probe system with a ø4 x 20 mm stylus and with thermal compensation operating. L: measuring length (mm).

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MACH-V

SERIES 360 – In-Line CNC CMM

- The MACH-V maximizes machining performance by performing in-line, high-speed coordinate measuring in conjunction with your CNC machine tools.
- Designed for shopfloor conditions with built-in thermal compensation that provides excellent accuracy even when the CMM is subject to temperature variations as extreme as 5°C to 35°C.
- These high-throughput machines are designed to be incorporated right into the manufacturing line and can provide pre/post-machining feedback to your machine tool for process adjustments.

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SMS Smart Measuring System



MACH-V

Specifications

Model			MACH-V
			9106
Measuring range		X	900 mm
		Y	1000 mm
		Z	600 mm
Resolution			0.1 µm
Accuracy*	$E_{0,MPE}$	19 - 21°C	±(2.5+0.35L/100) µm
		18 - 22°C	±(2.7+0.38L/100) µm
		15 - 25°C	±(2.9+0.43L/100) µm
		5 - 35°C	±(3.6+0.58L/100) µm
	$P_{FTU,MPE}$		±2.5 µm (±2.2 µm: using SP25M)

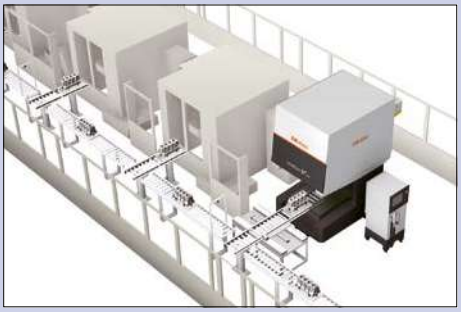
* According to ISO 10360-2/4/5 methods when using the TP7M probe system with a ø4 x 20 mm stylus and with thermal compensation operating. L: measuring length (mm)

Technical Data

Length standard:	High-accuracy linear encoder
Guide system:	Linear guide
Max. drive speed:	866 mm/s
Max. acceleration:	8480 mm/s²

Guaranteed accuracy temperature environment

Temperature range		5 - 35°C
Temperature change	Per hour	2.0 K
	Per 24 hours	10.0 K
Temperature gradient	Vertical	1.0 K/m
	Horizontal	1.0 K/m



Built for integration with a production line.



Frame design allows unobstructed throughput.



Compatible with overhead transfer systems.

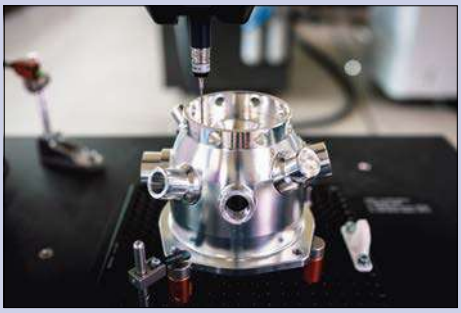
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SmartMeasure-AL

Automatic Quality Control System

- Efficient measurement: The operator simply needs to place the workpiece on the pallet, configure some measurement parameters, and let the system run autonomously.
- Easy to operate: With our Space4Win software and an easy and user-friendly GUI, an operator without knowledge of the system can easily run the whole setup.
- Re-measure: With help of the user-friendly software, the operator can easily re-measure parts that are NOT OK without having to run the whole sequence again.
- Result display: The measurement result is displayed via an indicator light on the HMI (green light for OK, red light for NOT OK).
- Program selection: The part program can be automatically selected by reading the RFID tag mounted on the pallet and by using the RFID reader mounted on the robot gripper.
- Flexible configuration:The combination of RFID tag and the part program can be modified simply by editing the settings file.
- Connectivity : Once measurement is completed, measurement results can be sent to statistical software or even to external software. Moreover, results can be send directly to CNC machines for tool correction with our Space4Win software.



Picture from part fixed to a CMM.



Anti-collision sensor.



RFID sensor.



Turnkey Solution

Smart Connectivity

Modular Configuration

24/7 Operation





The SmartMeasure-AL is designed for ease of use: modern technology like the RFID and anti-collision sensor makes the SmartMeasure-AL a compact and reliable solution.

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STRATO-Apex G

SERIES 355 – High Accuracy Large Gantry CNC CMM

- The STRATO-Apex G Series are CNC CMMs that use Mitutoyo's standard structure for large machines which are designed to be used for measuring large and heavy workpieces with high accuracy. The picture below gives a good idea of how large the machine is.
- The measuring accuracy and drive speed are the world's highest in the X-axis measuring range of 2000 mm and 3000 mm.
- High-accuracy linear encoders (manufactured in-house) are built into the length measuring units used for position detection. Their excellent position detection capability is what makes the control of these high-accuracy devices possible.
- The series also applies a multitude of technologies regarding structure, control, component processing, assembly, and other aspects that enable large CMMs to deliver high-accuracy measurements.
- These series are equipped with a system to automatically restore accuracy deterioration (MOVAC) caused by foundation deformation as a standard feature.
- Equipped with a temperature compensation system that guarantees the specified accuracy within the wide range of 18 to 22 °C under certain environmental conditions, although high-accuracy CMMs should ideally be installed in a temperature controlled room.
- Safety devices such as a Z-axis beam sensor, tape switch, and area sensor are available as options.

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SMS Smart Measuring System

STRATO-Apex 3000G Series



Technical Data

Length standard:	High-accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	520 mm/s

Guaranteed accuracy temperature environment

Temperature range		18 - 22°C
Temperature change	Per hour	1.0 K
	Per 24 hours	2.0 K
Temperature gradient	Vertical	1.0 K/m
	Horizontal	1.0 K/m

Specifications

Model		STRATO-Apex		
		2000G	3000G	4000G
Measuring range	X	2000 mm	3000 mm	4000 mm
	Y	3000 mm / 4000 mm / 5000 mm / 6000 mm		
	Z	1200 mm / 1600 mm / 2000 mm		
Accuracy*	MPE_E	±(3.5+4L/1000) µm		±(5+5.5L/1000) µm

* When using the SP25M probe system and with thermal compensation operating. L: measuring length (mm).

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CRYSTA-KM 565

SERIES 196 – Manual-Floating CMM

- The new CRYSTA-KM 565 manual coordinate measuring machine delivers reliable results without complexity.
- No programming. No automation. Just pure measurement precision – in your hands.
- Built for environments where speed, accessibility, and precision matter most, this manual CMM offers a smart, entry-level approach to dimensional inspection across various industries from mechanical engineering and automotive to medical technology.

Technical Data

Length standard: High-accuracy linear encoder
Guide system: Air bearing
Max. drive speed: 520 mm/s

Guaranteed accuracy temperature environment

Temperature range		18 - 22°C
Temperature change	Per hour	0.5 K
	Per 24 hours	2.0 K
Temperature gradient	Vertical	1.0 K/m
	Horizontal	1.0 K/m







CRYSTA-KM 565



Specifications

Model		CRYSTA-KM 565
Measuring range	X	500 mm
	Y	600 mm
	Z	500 mm
Accuracy*	MPE$_E$	±(3.2+5L/1000) µm

* When using the MH20i-TP20 probe system and with thermal compensation operating. L: measuring length (mm).

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Rotary Tables

Rotating Part System for CNC Coordinate Measuring Machines

- Rotary tables expand the scope of applications, simplify the measurement procedure, and reduce measurement time via the scanning mode.
- This additional axis allows the use of simple stylus combinations and extends the available measurement range. The programming of the parts to be measured is simplified since the paths of the CMM are shorter.
- Rotary tables are used for the measurement of various parts but their main use is to considerably simplify the measurement of parts of revolution presenting periodically repeating geometries, such as gears, rotors, turbines, etc.
- All angles are immediately available and allow easy access to the measurement of elements inaccessible by an adjustable head or a fixed measuring head. The flexibility doesn't stop there. Mitutoyo measuring machines also allow an indexed swivel head to be coupled to Mitutoyo MRT240 / MRT320 rotary tables.
- The elements to be measured, whether they have known or unknown trajectories, will be easily programmable thanks to the functionalities of the CMM software, MCOSMOS.



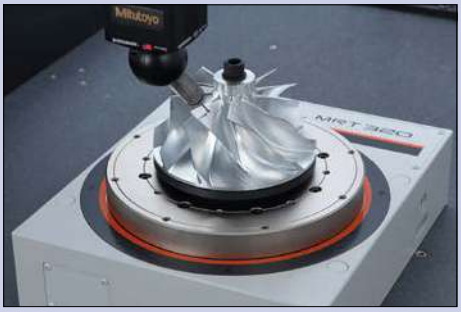
MRT240



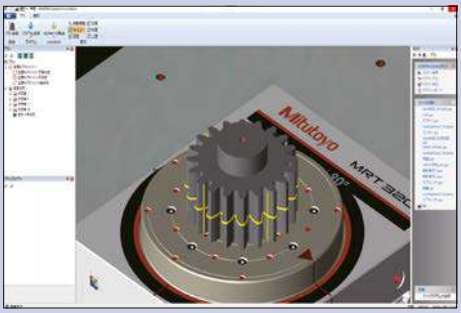
MRT320

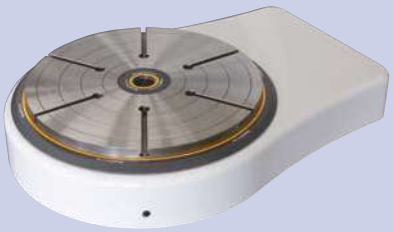
Technical Data

Rotation speed: 6 rpm
Guide system: Air bearing











Large table options are available on request.

Specifications

Model		MRT240	MRT320
Work table size		ø240 mm	ø320 mm
Dimensions (W x D x H)		327 x 250 x 105 mm	470 x 400 x 150 mm
Resolution		0.000025° (0.09")	
Accuracy	Indexing	±0.7"	
	Axial directional deflection of the rotation axis	0.4 µm	
	Radial directional deflection of rotation axis	0.4 µm	
Maximum load		40 kg	100 kg

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Probe Heads

Probe Head Systems for CNC Coordinate Measuring Machines



PH10M / PH10MQ

Motor-drive indexing type.

Allows automatic control of positioning (up to 720 directions) of the mounted probe. It is possible to mount not only a touch-trigger probe but also any scanning probe, vision probe, laser probe, etc. Auto-changing is available (optional).



REVO

High speed 5-axis scanning-head type.

Laser position-sensing technology ensures high accuracy measurement from this scanning head even with long styli up to 500 mm in length. Combined with high-speed operation, 5-axis simultaneous control with a CMM and non-step indexing this probe provides unmatched performance.



PH20

5-axis control touch-trigger type.

Thanks to the unique *head touch* capability, it is possible to measure purely by movement of the probe head instead of the CMM elements. Also, measuring time can be shortened significantly by means of the probe's 5-axis concurrent control and infinite angular-positioning capabilities.



MPP-310Q

Ultra-high accuracy and low measuring force type.

This ultra-high-precision probe contains micro-miniature scales to track relative movement in 3 dimensions. Equally suitable for scanning measurement, ultra-high-precision point measurement or centre-alignment applications.



SP80

High accuracy type (available with 500 mm long extension).

A highly accurate probe able to use long styli of up to 500 mm. Equally suitable for scanning measurement, high-precision point measurement or centre-alignment applications.



MIH

Manual indexing type.

This probe head allows manual positioning (up to 720 directions) of the mounted probe (for TP200/TP20). A probe extension up to 300 mm in length can be attached.



MH20i

Compact type.

This touch-trigger probe equipped with manual probe head is designed for use with manual CMMs. The probe head section may be manually indexed to 168 positions.



PH1

Simple type.

This probe head is designed for use with the TP200/ TP20. It is possible to manually change positioning of the attached probe to the desired orientation.

Note: Probes shown mounted on these probe heads are optional.

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Probes

Probe Systems for CNC Coordinate Measuring Machines

Contact Probe Sensors



SP25M

Compact, high-accuracy type.

Compact and highly accurate, this probe is only ø25 mm diameter, ideal for working in restricted spaces. Equally suitable for scanning measurement, high-precision point measurement or centrealignment applications. Can be attached to a probe head (PH10M/10MQ) for automatically changing the orientation to enable more flexible measurements.



TP7M

High-accuracy type.

This touch-trigger probe has high repeatability (at the 2σ level) of 0.25 µm for use with premium quality CMMs. A long stylus up to 150 mm can be installed.



TP20

Compact type.

This compact touch-trigger probe is only ø13.2mm outside diameter, which allows working in very restricted spaces. Styli auto-changing (optional) is supported when mounted on a CNC CMM.



TP200

Compact and high-accuracy (stylus change) type.

This compact, high accuracy, touch-trigger probe is only ø13.5 mm outside diameter, which allows working in very restricted spaces. Styli auto-changing (optional) is supported when mounted on a CNC CMM.



Micro Touch Probe

UMAP-CMM.

The extremely small styli used by this probe (ø0.1 or ø0.3 mm) have made possible highly accurate measurement of minute features not previously possible with a contact method. Mounts on the PH10MQ head.

Non-Contact Probe Sensors



SurfaceMeasure

Laser scanning type.

This compact, high accuracy, non-contact type laser probe is designed for use with CNC CMMs. The probe automatically adjusts to workpiece surface characteristics to deliver highly efficient measurements. Automatic laser intensity and camera sensitivity adjust according to the environment and the workpiece material for simpler programming.



QVP

Video type.

Gives a CMM the vision capability to measure very small features, thin-walled workpieces (prone to deflection by contact probing) as well as parts made from soft, easily deformed materials. Integrated white-light LED system for optimum workpiece illumination. Uses VISIONPAK software that runs under standard MCOSMOS.



SurfaceMeasure probe scanning a complex surface.



QVP probe inspecting a PCB.

Probe for Roughness Measurement



SURFTEST Probe

Surface roughness measurement type.

Mounting of this probe on a CMM enables surface roughness measurement and analysis to be included in fully automatic CNC measurement cycles. This probe is compatible with the automatic probe changer, and therefore can be automatically replaced with another type of probe for 3D coordinate measurement within the same measuring cycle. A wide variety of roughness analyses can be performed using the dedicated evaluation software.



SURFTEST probe measuring surface roughness.

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Styli

Styli for Manual/CNC Coordinate Measuring Machines

- Mitutoyo offers a wide range of styli and accessories to suit practically any application. A bespoke styli design and manufacture service is also available.
- With nearly 30 years' experience in manufacturing styli, and based on its cutting-edge materials development, Mitutoyo can offer a wide range of styli made from materials to suit your application.

Sample Sets













The Materials we use for Contact Points

Ruby

- As the hardest of all probe element materials, ruby is the perfect all-rounder when it comes to manufacturing styli contact points.
- Spherical contact points made of ruby have been used as tried and tested equipment for most standard applications for decades.
- The low specific density of ruby enables the mass of the stylus to be kept as small as possible for best dynamic performance.

Zirconium oxide

- The specific surface properties of balls made of zirconium oxide – a ceramic compound – makes this stylus suitable for aggressive scanning of abrasive surfaces, such as cast iron.
- Zirconium oxide has virtually the same hardness and wear-resistant properties as ruby.

Silicon nitride

- Silicon nitride is extremely hard and superbly wear-resistant, with the least surface roughness of all styli materials.
- It has the specific advantage that it is not attracted by aluminium and therefore 'picks up' to a much lesser extent than ruby or zirconium oxide when scanning or touching aluminium alloy workpieces.



Ruby.



Zirconium oxide.



Silicon nitride.

The Materials we use for Bases and Styli Stems

Steel

- The material of choice for high-strength precision styli for very accurate measuring tasks.
- The high strength and stiffness makes steel an excellent choice of material for manufacturing styli or reference probe elements.

Aluminium alloy

- Lightweight and stable, and therefore frequently used for probe extensions.
- Styli stems or extensions made of aluminium alloy perform best in measuring labs with stable temperatures and, accordingly, the lowest possible temperature gradients.

Tungsten carbide

- Bend-resistant styli stems made of tungsten carbide are ideal for virtually all standard applications in the measuring lab with its stable ambient temperature.
- A durable material that has proved its worth.

Titanium

- Titanium is remarkably stiff yet has a relatively low density.
- Probe components made of titanium offer the outstanding characteristics of being extremely rigid and stable, yet surprisingly lightweight.
- Mitutoyo uses the material primarily for bases, connecting pieces and extensions for measuring styli.

Carbon fibre

- The highest-quality material with an expansion coefficient of virtually zero at ambient temperatures up to 45°C.
- Carbon fibre is very lightweight and extremely stiff, making it particularly suitable for the manufacture of long styli.
- Mitutoyo uses carbon fibre tube for probe extensions and styli with sophisticated configurations.

Ceramic

- Very lightweight and extremely stiff. The ideal material, especially for long stems.
- Low thermal expansion makes ceramic styli suitable for use in the production environment.

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Mitutoyo

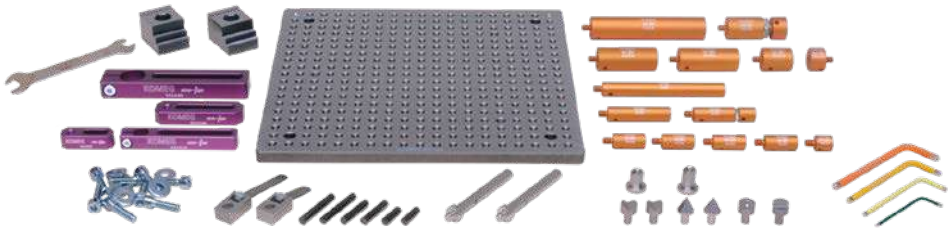
CMM Fixturing Kits

Modular Clamping System for Coordinate Measuring Machines

- The modular clamping system eco-fix allows efficient working in many ways.
- Functions and colours unite in a practice-oriented concept for time-saving, economical working and confusion-proof handling.
- Eco-fix concentrates on accomplishing nearly every clamping task in a cost- and performance-optimising way.
- Fits all CMM brands.
- Mitutoyo offers three fully comprehensive sets containing new and convenient accessories for even more efficiency.
- Smaller kits are also available and all items can be purchased individually to expand your existing kit.

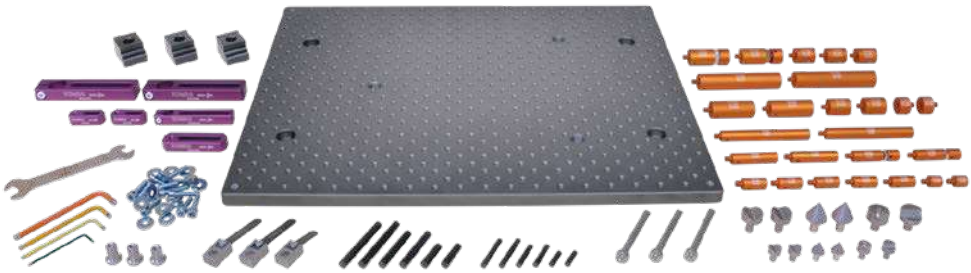
eco-fix Kit S

- Fixture kit for small- to mid-size workpieces.
- Base plate 250 x 250 mm.
- Includes 58 eco-fix clamping parts, e.g. brackets, location pins, spring clips.



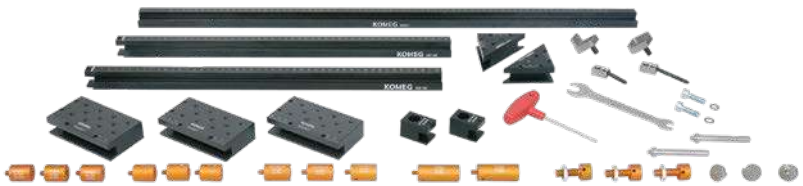
eco-fix Kit L

- Fixture kit for mid- to large-size workpieces.
- Base plate 500 x 400 mm.
- Includes 97 eco-fix clamping parts, e.g. brackets, location pins, spring clips.



Quick-Rail Kit

- Quick-rail is the perfect choice for quickly clamping a wide variety of workpieces from large to small.
- It is made up of 3 rails (1x 800 mm, 2x 500 mm) for fixing to the CMM's table and carrying the clamping elements.
- 21 eco-fix clamping parts (e.g. brackets, location pins, spring clips) are used to establish a three-point support of the workpiece.
- In addition, quick rail could perfectly be combined with the eco-fix series to establish reproducible positioning for workpieces of the same type.



Specifications

Order No.	Model	Description
551048	**eco-fix Kit S**	Fixture kit for small- to mid-size workpieces
551049	**eco-fix Kit L**	Fixture kit for mid- to large-size workpieces
550914	**eco-fix Quick-Rail Kit**	Rail kit for attaching clamping elements and large workpieces

Optional Accessories

Positioning Rail Kits S and L

Longer rails for fixing larger workpieces. Rails are clamped to the CMM table with 3 x M8 screws.

Rail kit L.



Handles Set for eco-fix

The eco-fix handles allow easy and comfortable carrying of the main plate. The handles are foldable in horizontal posture, making for the best possible access to the probing area.



Masterball Adaptor (M6/M8)

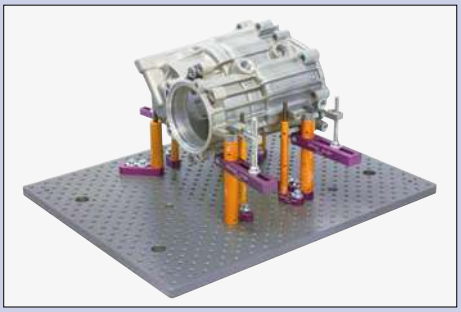
An M8-threaded masterball can be mounted on the M6-threaded eco-fix plate, or other brackets, by using this adapter.



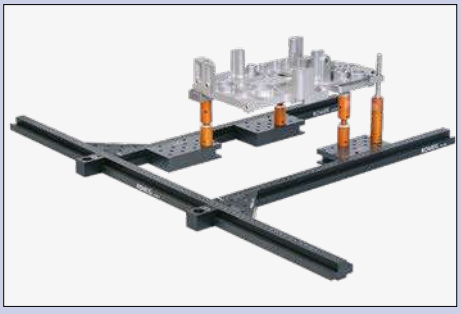
Application Examples



eco-fix kit S.



eco-fix kit L.



Quick-rail kit.

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MiCAT
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the standard in world metrology software
cmm

Module included	GEOPAK	CAT1000P	CAT1000S	SCANPAK
MCOSMOS 1	✓	—	—	—
MCOSMOS 2	✓	✓	✓	—
MCOSMOS 3	✓	✓	✓	✓

Software

MCOSMOS CMM Software Suite

- MCOSMOS has three module configurations, from the basic MCOSMOS 1 to the advanced MCOSMOS 3, which enables you to choose the appropriate functionality for current measurement applications now and expand, if needed, in the future.
- Designed to cover every aspect of measurement: geometry, scanning, digitising, file transfer and conversion, graphical aids and analysis, statistics and output.

MCOSMOS 1

GEOPAK, operating under the MCOSMOS system, is the latest and most advanced CMM analysis and programming module available for geometry measurement. GEOPAK is fully programmable and has sophisticated reporting functions. Includes *PartManager* for program management and security.

MCOSMOS 2

Includes MCOSMOS 1 plus...

CAT1000P is the ultimate in CAD to inspection software and runs in conjunction with GEOPAK, either on-line for optimum CMM control or off-line to maximise CMM up-time. Features include simple program generation by 'single click' element measurement, automatic probe path generation and simulation with collision detection.

CAT1000S is an advanced 3D-freeform-surface program that allows tolerance comparisons between measured points and the corresponding points on a CAD model, allowing operators to instantly see problem areas on a measured component. Deviations from nominal are colour coded and displayed graphically.

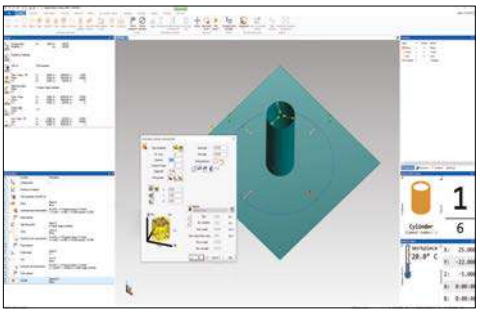
The standard *STEP* CAD format is provided with CAT1000. The optional formats of IGES, CATIA, Parasolid, PRO/E, SolidWorks, Unigraphics (NX) and Auto CAD Inventor are also available.

MCOSMOS 3

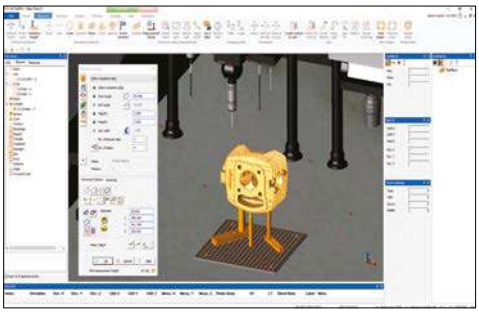
Includes MCOSMOS 1 and 2 plus...

Scanning and Profile Analysis software providing measurement and analysis of profiles.

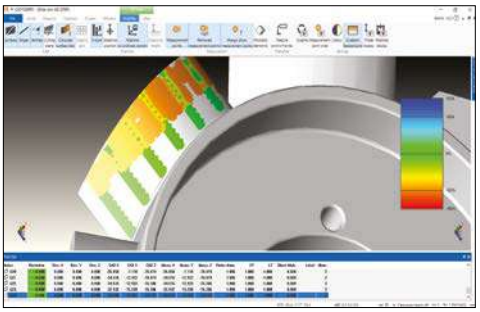
High speed contact scanning probes can be utilised to maximise data collection speed. Profiles can then be compared to nominal, output to CAD or used for subsequent analysis. Geometric components can also be computed from scanned results.



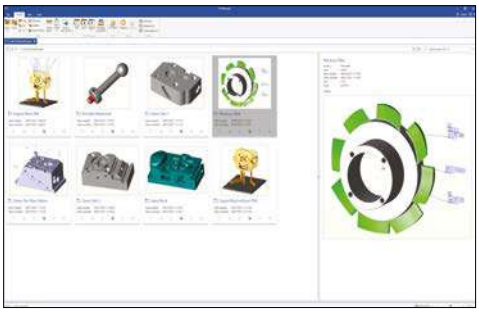
GEOPAK screenshot.



CAT1000P screenshot.



CAT1000S screenshot.



PartManager screenshot.

N

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Mitutoyo

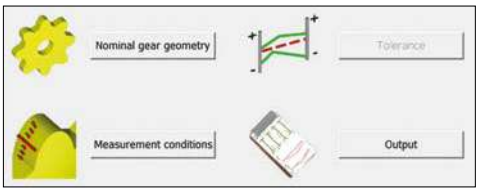
Software

MCOSMOS CMM Software Modules

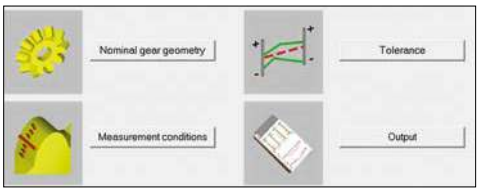
Gear Measurement

The gear measurement modules.

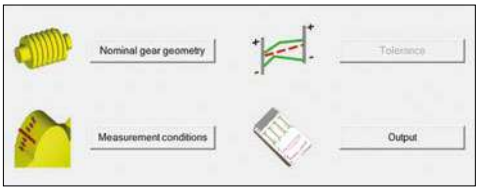
GEARPAK is the module in MCOSMOS specializing in the measurement and evaluation of involute gear profiles. It is used for the rapid generation of measurement programs of gears, evaluations, and reports.



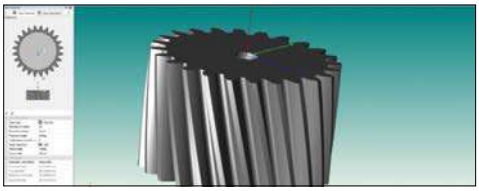
GEARPAK Cylindrical.



GEARPAK Bevel/Hypoid.



GEARPAK Worm.



GEARPAK Express.

MSURF

Point cloud data processing software

This is a package of point cloud data processing software that allows you to perform operations from measurement to evaluation on the same platform when using the MSURF non-contact laser probe SurfaceMeasure.

MSURF-S

Calculates point cloud data measured by CNC CMM with SurfaceMeasure. Scanning paths can be created by simply defining three items: the scanning starting point, the scanning length, and the scanning width.

MSURF-I

Conducts analysis or comparison verification of measured point cloud data in reference to nominal data (supporting CAD data import).

MSURF-G

MSURF-G is off-line version of MSURF-G. It allows users to previously create measurement macros using CAD data. Therefore, users can start measurement immediately at the time a real workpiece is ready.

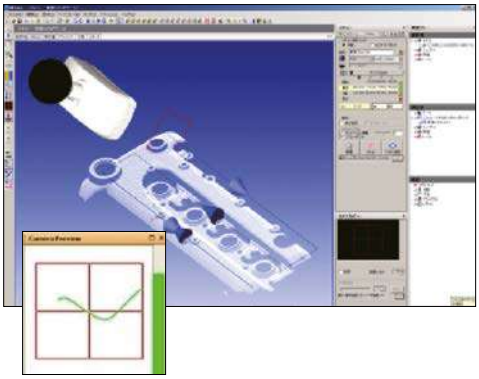
MSURF-MESH PRO

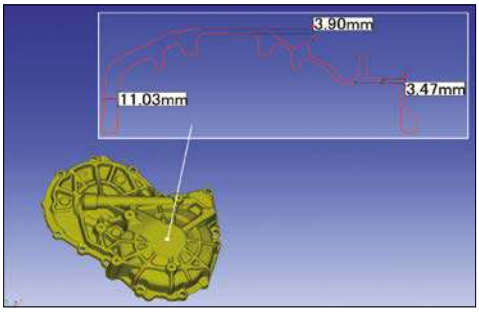
This software is provided with various functions such as filtering point cloud data and mesh data. The software is enhanced by adding functions to standard ones. It also enables functions such as mesh data thinning-out, highlighting, interpolation, and outlier removal that are unavailable as standard.

MSURF-PLANNER

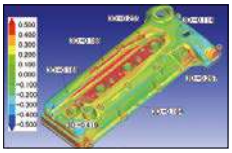
MSURF-PLANNER is software to automatically create measurement macros (surface form, feature form) for the laser probe from 3D CAD data. Optimized data (travel path, number of probe head revolutions, etc.) of a measurement path will contribute to improvements in productivity.

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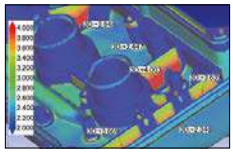




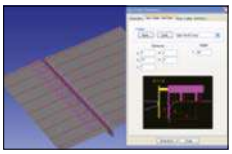
Cross-sectional evaluation (dimension computation).



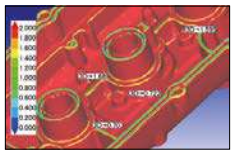
Colour map of errors.



Colour map of wall thickness.



Evaluation of steps and gaps.

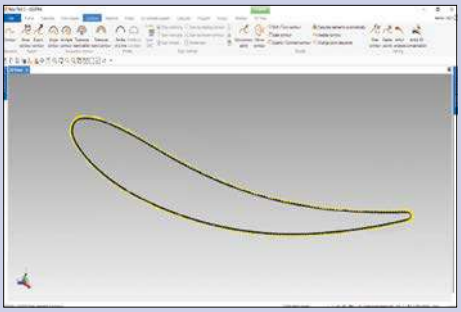


Evaluation of surface curvature.

MAFIS

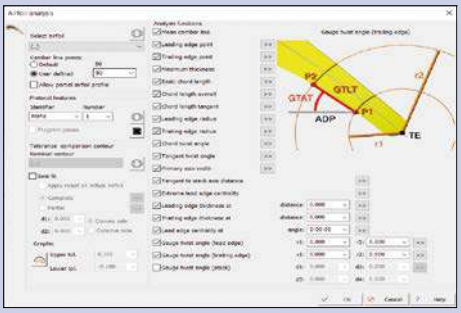
The airfoil inspection module

MAFIS stands for 'Mitutoyo Airfoil Inspection Software' and enables the calculation of all significant bearing surface parameters, e.g. of turbine blades on airplane engines or even pump blades. It works in association with the MCOSMOS module SCANPAK, for the automatic scanning of workpiece forms.



- Easy-to-use with self-explanatory pictograms.
- Evaluation of all significant bearing surface parameters.
- Support of all output functions of MCOSMOS*.
- Contours can be entered via SCANPAK.

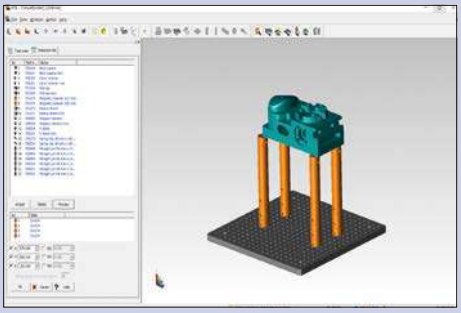
* Output Functions: Screen output, text output, ProtocolDesigner, and MeasurLink.



Fixture Builder

The fixture assembly tool

The Fixture Builder Software from Mitutoyo allows you to quickly and easily create virtual CAD models of the clamping fixtures needed for your workpiece. This software can be operated both automatically and manually, for both speedy and specialized setups.



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the standard in world metrology software
cmm

Software

MiCAT Planner CMM Software

- MiCAT Planner uses 3D CAD models with tolerance information to automatically generate CMM measurement programs, potentially with just one mouse click, thereby reducing part-programming time by up to 95%.
- Identifies tolerance information (GD&T) in 3D models and uses your CMM configuration to automatically generate an MCOSMOS program to measure features of the imported CAD model.
- Customisable rules ensure that measurements are executed in the same consistent way.
- Programming paths are optimised automatically for the shortest measurement time with the minimum of probe and tool changes.
- For design models that do not contain tolerance information, MiCAT Planner has a GD&T Wizard that allows you to simply annotate design models prior to program generation.
- MiCAT Planner screen setups offer simple interfaces such as 3D view and plan view, thereby enabling intuitive operation. The placement and window sizes of the interfaces can be freely customized.

3D View

Full-colour graphics showing:
- Measuring machine details.
- CAD model with tolerances.
- Measurement points and measurement paths.
- Measurement animations.

Plan View

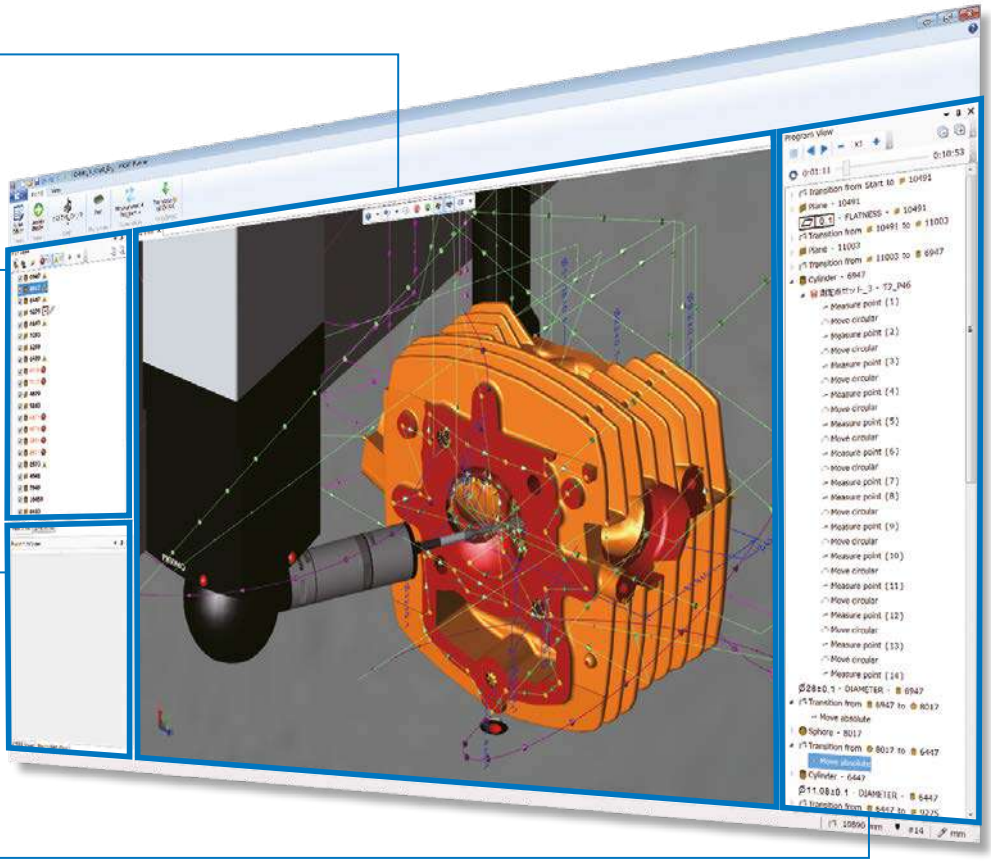
- Shows lists such as measurement parameters and tolerances.
- Lets you flag measurements and assessments using check boxes.
- The parameters are set in the order of the measurements.
- You can prioritise the order of measurement.

Properties View

You can change the names of parameters, tolerance items and measurement points, and edit measurement points for individual parameters.

Program View

- Shows measurement details and measurement estimation times.
- Enables animation of measurement programs in 3D.



Easy

Simply load a CAD model and generate a CMM program with a single mouse click.

Fast

Automatic generation is enabled by the input of CAD, tolerance information and measurement environment. Cycle times are automatically optimised to produce the fastest measurement routine.

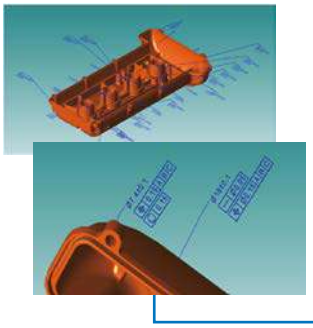
Automatic

User-defined rules enable automatic feature measurement.

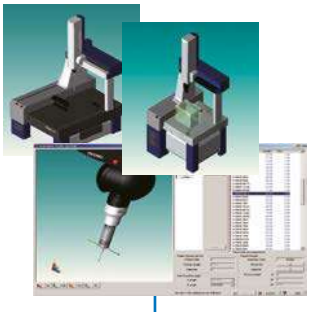
Reliable

Eliminates potential for user error, misinterpretation of design intent, collisions.

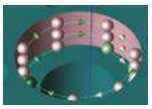
CAD data with tolerance information



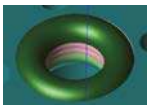
CMM system structural information



User defined measurement rules
Number of locations to measure CAD data with tolerance information and sampling method, etc.



Example of sampling method: touch measurement.



Example of sampling method: scanning measurement.

Instantly and automatically creates a measurement program



Output a measurement program for MCOSMOS

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Mitutoyo

SUPPORT & SERVICES





Support & Services

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Company Profile

Our leading position is built on many years of success



The future of measuring technology at Mitutoyo is growing on a solid grounding of more than 90 years of success.

The corporation that has now become a global leader in the field, offering more than 5,000 high-tech measuring tools, started out in 1934 by manufacturing just one single product: the mechanical outside micrometer.

Once company founder Yehan Numata had managed to turn the outside micrometer he had developed and manufactured into an extremely successful reference product, his focus expanded to include further measuring technology components.

Over the course of subsequent years and decades the company developed into one of the leading Japanese manufacturers of length and production measurement technology devices, and even back then offered the widest range of products of anyone in the sector.

The beginning of the 1960s – entry into the North American market having been successfully accomplished – marked the company's entry into Europe.

The company was therefore internationally and strategically in a prime position to face a new era in metrology driven by the advance of solid-state electronics technology, which gained increasingly in importance in the 1970s. As with their predecessors, the new electronically controlled form, surface and contour measuring devices, vision measuring systems and coordinate measuring machines bearing the Mitutoyo logo won over users around the globe.

The company then demonstrated its claim to leadership in the development and realization of innovative products once more by taking the next step in measuring device evolution – CNC technology.

Now, more than 90 years after the company was founded, the name Mitutoyo stands for the most comprehensive range of length measurement technology products and the most important internationally active full-range provider in this sector of industry.



Mitutoyo's founder, the Rev. Dr. Yehan Numata (1897-1994).

Mitutoyo Corporate Philosophy

Our name and logo

To become a complete man, one must acquire Wisdom, Benevolence and Valour. With Wisdom only, one tends to be cold. Benevolence alone makes one weaker. With Valour only, one may reach beyond his capabilities. When the three qualities are combined however, one will become a complete man. Similarly, success in enterprise lies in the knowledge of Heaven, Earth and Man. Business will succeed only when these three factors, 'heaven sent' chances, natural opportunities, and harmony of man are present. Without even one factor, success is remote.

In Buddhism, Butsu (Buddha), Po (Doctrine) and So (Priest) are three principle treasures for the promotion of teaching. In Christianity, God, Bible, and Minister. The word MITUTOYO signifies three abundances. 'Mitsu' means three, while 'Toyo' stands for state of abundance. The name MITUTOYO was selected with a sincere wish to see more complete men, to create a prosperous enterprise and to introduce righteous religion to all, along with the lasting wish for a peaceful world and fulfilment of meaningful life.

Mitutoyo

The Mitutoyo Corporate Philosophy is essentially the perpetual 'core values' that our organization and employees shall uphold. It unites all the Mitutoyo Companies and their employees throughout the world in a common understanding and commitment.

Our Founding Spirit

- To contribute to people's welfare through support of the advancement of Buddhist understanding.
- To see that Mitutoyo excels in its field of expertise and in its business conduct throughout the world.

Our Corporate Motto

'*Good environment, good people, good technique*'

Our Guiding Precepts

'*Sincerity, thoughtfulness, determined spirit*'

Our Management Principles

To contribute to the wellbeing of society through precision measurement technologies. We shall conduct our business based on the following values to:

- Provide solution engineering to support our client business development.
- Contribute globally to the advancement of industrial measurement capability.
- Cultivate healthy relationships and common prosperity with trading partners.
- Support and promote global peace, human happiness and harmony with the environment.
- Apply business practices that reflect the integrity of Mitutoyo and our world-leading brand.
- Nurture a vibrant corporate culture that inspires a passion in our personnel to do their best... to be the best.

Mitutoyo UK Facilities

Established in the UK for over 40 years







Andover HQ

Mitutoyo UK Headquarters is located in Andover, Hampshire. This purpose-built facility is well positioned to serve the south of England and features an impressive Metrology Showroom that displays many of the latest Mitutoyo instruments and is equipped with state-of-the-art audio-visual technology.

Andover is also home to our National Distribution Facility, Service Base, Spares and Repairs Centre, and a Regional Training Centre, as well as our main Sales and Administrative Support Functions.

Coventry

Serving the Midlands, the Coventry site houses our UKAS accredited Calibration Laboratory, along with a dedicated workshop for our Sub-Contract Measurement services. Alongside a modern Metrology Showroom, our Metrology Training Centre provides three classrooms offering the widest range of specialist Quality Control and Metrology Training available in the UK.

Coventry is also home to the Mitutoyo Gauging Technology division that provides a bespoke measurement solutions service.

Halifax

Our Halifax site located in Elland supports the North of England with a purpose-built Metrology Showroom, Training Facilities, Service Base and a dedicated workshop for our Sub-Contract Measurement services specializing in turbine-blade metrology.

East Kilbride

Customers in Scotland are supported by our Metrology Showroom located in East Kilbride, where a wide range of our products is displayed.



Contact Details

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East Kilbride Showroom
The Baird Building, Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride G75 0QF
///pillow.sands.guard
T +44 (0)1355 581170



Services For Increasing Profitability

Profitability in manufacturing operations naturally depends on the effective deployment of the available resources, both in equipment and personnel.

In times of normal demand this is well regulated but occasional unplanned surges can stretch those resources to breaking point. This is where third-party help may be called on to bridge the gap but there is often a reluctance to engage outside organisations in production operations: technical expertise, culture differences, confidentiality and perceived cost are just a few of the concerns raised, all of which are real and not to be discounted.

However, engaging assistance from a specialist organisation committed to becoming a partner in maintaining and enhancing your company's reputation and profitability can be the most sensible option available in times of stress. And even operating under normal conditions the decision to sub-contract out some part of the measurement burden can be the most cost-effective route to maintaining profitability.

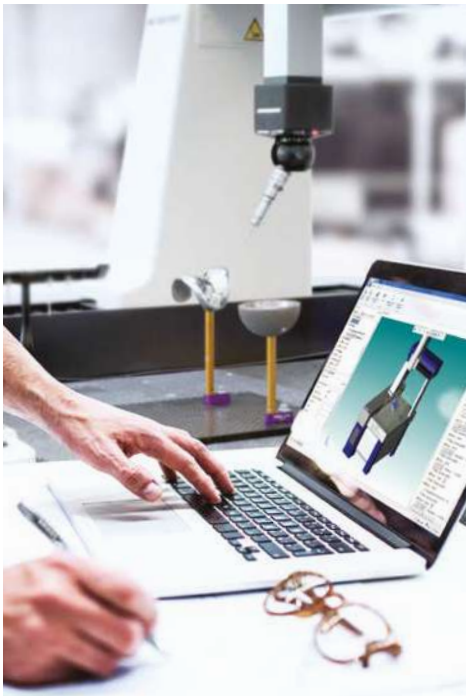


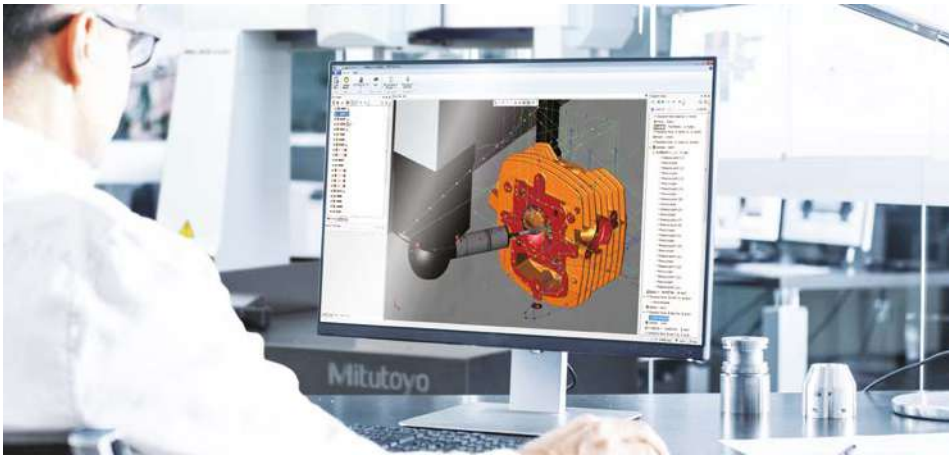
Mitutoyo provides such measurement services at the company's Coventry and Halifax sub-contract measurement centres where a full range of expert, confidential, measurement and reporting and programming services is offered that you can take full advantage of for increasing your current inspection capacity, assisting with the CMM programming load, investigating non-conformance issues and validating other inspection methods. The most demanding components can be measured, profiled, analysed, scanned, programmed or compared to CAD data. In fact, any QC, QA production or SPC function can be carried out on your behalf with speed and precision, providing maximum support to your overall project plans. Use the world-renowned expertise of Mitutoyo to enhance your production operations and derive maximum benefit from the use, rather than ownership, of a valuable resource.

Component Inspection

Working close to the production limit there is often little scope for a sudden increase in component measuring capacity, and even if extra equipment and trained staff could be found at short notice it makes little sense to invest in capital equipment and personnel that may only be needed for a relatively short period. This is where Mitutoyo's Contract Measuring Service can be of great value to you. It's like having a door you can open to reveal an extension to your shop floor, already filled with the highest grade CMMs and some of the most knowledgeable, skilled and productive people available anywhere – all ready to be quickly brought online to help cope with a surge in production that would otherwise leave your regular inspection staff under intense pressure, and possibly unable to cope.

But that's only half the story. When, or if, that surge dies down then you can just close the door again and revert to normal operations, without all the heavy costs and disruption involved in reducing machine inventory and, especially, staffing levels. Like all third-party services it may look expensive at first sight, but taking into consideration the cost savings outlined above it is easily seen that this is the most cost-effective solution for absorbing temporary fluctuations in measuring capacity.





MCOSMOS Program Creation

The MCOSMOS software system is very powerful in terms of functions that enhance the efficiency of measurement on Mitutoyo CMMs. To make the most of the system's features the programmer needs to know the system inside out, especially the possibilities that can make a significant difference to cycle time. Mitutoyo's Measurement Services department is staffed by expert MCOSMOS programmers whose services are available to you whenever it is felt that extra, or specialist, assistance is wanted. Part-programs for any of your Mitutoyo CMMs can be quickly written and delivered to you fully tested and verified remotely – or by site visit if appropriate.

This service can be an extremely cost-effective solution when production needs are outstripping in-house programming capacity, enabling the QA department to seamlessly switch from one job to the next with minimum changeover time. It can even be used to help build your library of part-programs in the background in anticipation of meeting the needs of a planned expansion of measuring capacity or workload.

On-Site Services

If required we can provide medium- to long-term placement of a CMM programmer on your site to assist when the workload exceeds your programming capacity. This gives you the breathing space necessary to determine whether the workload has permanently increased or is just a temporary fluctuation, allowing you the freedom to make an unhurried and considered decision about committing to bringing extra permanent staff on board, or not.

Assistance with helping organise your measurement systems and optimising the performance of your Mitutoyo CMMs is a speciality of our highly trained and knowledgeable staff. Efficiency gains can be substantial and in almost all cases without needing heavy investment. Impact on the bottom line is immediate and payback time is short.

Expert training is vital to enable your staff to deliver the maximum benefit from your capital investment and this applies more to CMM operations than practically any other aspect of the QA function. Mitutoyo's training service is flexible, tailored around your needs, and delivered by an experienced CMM programmer at Coventry or Halifax – or on-site, as required.

MGT

MITUTOYO GAUGING TECHNOLOGY



Mitutoyo Gauging Technology provides a specialist service that aims to meet the increasing need for customised measurement solutions to support manufacturers' quality assurance operations. From one-off fixtures to a fully automated measurement system, Mitutoyo Gauging Technology can help you meet the simplest or the most complicated measurement challenge.

A Specialist Service

Most measurement tasks encountered in the manufacturing industries are relatively straightforward and can be successfully handled by off-the-shelf products that are used as is, possibly with accessories from a standard range, or augmented by simple fixturing. These products are the end result of many years' experience and development and are, in many cases, extremely refined measuring instruments that incorporate the latest advances in mechanics, optics, electronics and software techniques.

However, many companies find that even these highly developed products do not fully meet their measurement needs for certain classes of workpiece and which therefore present – because of characteristics such as complex topology, dimensions or handling sensitivity, for example – a significant challenge to a company's engineering resources in devising a one-off, customised measurement solution.

The optimum solution often involves standard, high performance metrology products supported by a system incorporating a combination of mechanical, pneumatic, optical, hydraulic or electronic subsystems.

For many organisations, even if they have the expertise for this kind of task, it is simply not a sensible business proposition to take on this specialist task in-house. Competitive pressures dictate a strong focus on maintaining and improving core process efficiency and peripheral activities such as designing, building, testing and developing a bespoke measuring system can only be a cost-ineffective distraction.

This is where Mitutoyo Gauging Technology can be of immense service. The combination of a unique knowledge of the broadest line of measuring products in the world from a leader in measurement technology, together with wide-ranging expertise in materials handling and control system design means Mitutoyo Gauging Technology can offer you custom-built metrology for practically any measurement application in almost any industry.

Staffed by experts in many engineering disciplines who are dedicated to meeting your needs, Mitutoyo Gauging Technology can be your best partner in developing effective metrology solutions. High-precision instruments from the unrivalled Mitutoyo product portfolio, together with custom-built fixtures and automated systems are incorporated in the most cost-effective way possible. A turnkey solution, tailor-made to suit your exact requirements, is conceived, designed, built, developed and delivered to your premises with the minimum of disruption to your operations.



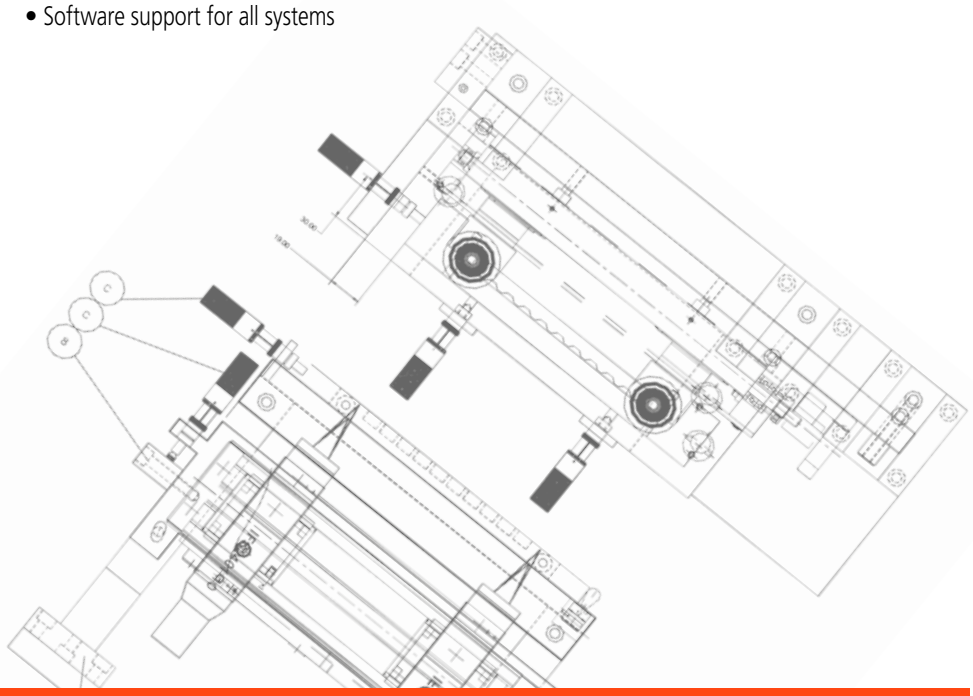




A Winning Combination

This unique blend of expertise backed by unrivalled experience and knowledge of the finest products means that you can benefit by becoming more efficient and productive. Gauging Technology offers a complete range of systems and services that will meet any requirement, including:

- All dimensional measurement applications including off-the-shelf measurement systems or custom-built specials
- All testing applications – Torque, Force, Pressure, Temperature and Sound
- Individual fixturing as stand-alone products or special systems designed to support existing Mitutoyo products
- Automated measurement systems
- All types of gauging and probing requirements
- Software support for all systems



Making the Impossible, Possible

Using a combination of sophisticated CAD programming and years of experience with some of the best technical expertise around, Gauging Technology can cater for many different industries and applications. Every measurement requirement will be considered and no application is impossible.

Industry portfolio:

- Engineering
- Aerospace
- Printing
- Automotive
- Medical
- Transport
- Packaging
- Electronics
- Pharmaceutical
- Food

Mitutoyo

Service and Maintenance Contract

Peace of mind for your quality standards.





Signing up for a Mitutoyo Service and Maintenance Contract will provide both benefits and security for your measuring equipment and processes. Allowing you to anticipate your maintenance costs and provide savings on future upgrades to your system.

PREMIUM

STANDARD

Premium Contract

This is a comprehensive contract that includes maintenance, and accuracy inspection - including the issue of a certificate of calibration, and adjustment if required. Premium contract customers also benefit from prioritized unlimited repair visits.

Standard Contract

This is a value-for-money contract that includes maintenance, and accuracy inspection - including the issue of a certificate of calibration, and adjustment if required.

If you choose not to opt for a Service and Maintenance Contract, we can offer individual services on a per-call basis. Contact your nearest service office for further details and availability for accuracy inspection, adjustment, repair, relocation, training, etc.

Mitutoyo Group Service Branches

This extensive worldwide infrastructure means that our customers enjoy the assurance of local support and worldwide technical advice and logistical backup to keep their vital measuring equipment in effective and profitable operation with the minimum of downtime, wherever they are.



Contract Benefits

Summary of contract benefits for both options.

SERVICE AND MAINTENANCE CONTRACT		PREMIUM	STANDARD
Breakdown support	On-site repair	✓	—
	Labour costs	✓	—
	Priority call-out	✓	—
Preventive maintenance	Service visit	✓	✓
	Machine service	✓	✓
Calibration	Planned calibration dates	✓	✓
	Accuracy check and adjustments	✓	✓
	Issue of calibration certificate	✓	✓
15% discount	Consumables	✓	✓
	Accessories*	✓	✓
	Software updates	✓	✓
	Spare parts	✓	✓

* Excluding products from third-party providers.



Calibration

In order to continuously achieve the best Calibration and Measurement Capability, Mitutoyo invests in calibration tools with the lowest possible uncertainty. This is part of our continuous effort to provide the best service to our customers. Mitutoyo performs inspections and issues calibration certificates for various measuring machines to the latest ISO or Mitutoyo standard.

Benefits of using Mitutoyo calibration services:

- With our accuracy adjustment, your machine remains in an optimal condition.
- Our preventive maintenance helps to minimize chances of machine breaking down.
- We provide consultation service on machine usage.



Calibration

Regular calibration ensures accuracy and repeatability



UKAS CALIBRATION
0332



Calibration is an essential part of the activities of any company if quality control is taken seriously.

Measurement to a consistently high level of accuracy can only be achieved if instruments are periodically calibrated against traceable standards. Mitutoyo can provide a full range of services to meet this requirement at its environmentally controlled calibration laboratory in the Coventry Metrology Centre, which has full UKAS accreditation and is equipped to handle every conceivable dimensional measurement need. It is recognised as one of the finest facilities of its kind in Europe.

Mitutoyo offers two types of service: a laboratory based Calibration Service at Coventry for portable measuring instruments, and an On-site Calibration Service for the larger type of instrument.

Our customers are assured of a fast turnaround on all calibration requirements involving dimensional instrumentation.





The scope of our Laboratory Calibration Service includes:

- Vernier, Dial and DIGIMATIC Calipers
- Inside, Outside and Depth Micrometers
- Gauge Blocks
- Masterballs (1 or 3 roundness)
- Bore Gauges
- Setting Rings
- Setting Standards
- Optical Parallels
- Height Gauges
- Dial Gauges – lever and plunger type
- And much more. To see the full range visit *www.mitutoyo.co.uk/calibration*

Our On-Site Calibration Service includes:

- Surface Tables
- Surface Plates
- Microscopes
- Projectors
- CMMs

Our Traceable In-House Calibration Service includes:

- Roughness Reference Specimens
- Calibration Testers
- Linear Height Gauges

U

Spares, Repairs and IT Support

Dedicated product support

Spares and Repairs

Mitutoyo is well known for high-quality customer support and this is all down to our highly qualified and experienced staff. The Spares and Repairs department at our Andover headquarters deals with hundreds of items every year, and the services that this facility offers are extensive.

Our purpose-built workshop and calibration room is home to our team of trained technicians who share a wealth of skills from hand lapping to electronic fault diagnostics. Direct end-user contact is encouraged on all spares/repairs to enable a fast and cost-effective service – our dedicated customer support call centre team is always on hand for assistance.







IT Support

Powerful, efficient and reliable measurement and analysis software underpins operation of Mitutoyo's advanced form and coordinate measuring equipment. Correct operation of these dedicated, highly versatile software packages in turn depends on effective installation plus on-going support from a range of Mitutoyo's IT professionals, technical specialists and service personnel.

A new installation is comparatively straightforward. Mitutoyo IT Support supplies and installs the recommended software on a PC and ensures correct operation with the equipment. Networking arrangements can be implemented as required.

In contrast, essential maintenance, software upgrade or hardware replacement is more critical as downtime must be minimised. Some downtime is, of course, inevitable with complex machines, but any operation that involves taking equipment offline must be carefully planned and quickly performed so that the effect on production is minimised. Rest assured that Mitutoyo IT Support has the knowledge, expertise and resources to get the job done with the minimum impact on your operations.

Data preservation and transfer is absolutely vital and our experts will advise on what must be backed up and transferred to an upgraded installation and can also do that on the customer's behalf, if required.

When the inevitable problem does eventually arise you can rely on Mitutoyo for backup simply via telephone support or, more powerfully, by allowing use of our remote-control facility that lets a Mitutoyo expert take control of equipment over an internet link. This last-mentioned capability enables highly effective assistance to be offered when the difficulty is more involved than can be efficiently addressed over the phone, and can be a real time and money saver by avoiding the need for a specialist to make an on-site call.

IT Support is just one of the many aspects of Mitutoyo's service that is renowned throughout the manufacturing industries, and is an indispensable resource that is always there to help ensure your investment in the highest quality metrology equipment available is utilised to the utmost.

Training

The future of UK industry depends on our ability to train and educate today – for the needs of tomorrow



Our commitment towards the raising of standards in measurement education starts from courses covering the fundamentals of precision measurement through to the most sophisticated of subject matter and product use/application.

We offer a wide range of training courses, all delivered by highly skilled Instructors who are specialists in their field and who have been carefully selected both for their academic record and industry experience. From Micrometers to CMMs there's probably a course to suit your needs or, if there isn't one that fits your exact requirements just ask, and we will design one to suit your specific demands.

Each of our courses is based on over 35 years of experience in offering help, advice and education to the manufacturing industries in the field of dimensional metrology. Designed to equip our trainees not only with theoretical knowledge but also to provide extensive *hands on* practical experience, great importance is attached to the practical communication of the contents.

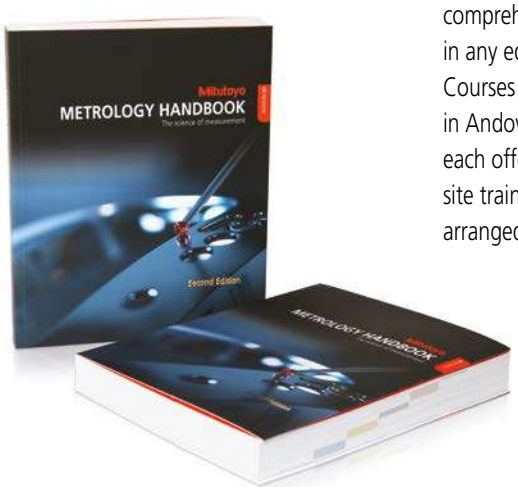


We currently offer 43 different training courses from the *Fundamentals of Dimensional Metrology* to advanced machine programming.

We at Mitutoyo are justifiably proud of our extensive resources and experience in the field of metrological training. Our facilities are second to none, and offer the most modern and comprehensive range of equipment to be seen in any educational establishment in our field. Courses are held at our four main training centres in Andover, Coventry, Halifax and East Kilbride, each offering superb facilities for Trainees. On-site training at Customers' premises can also be arranged.

Every trainee receives a selection of educational material when attending a course. To complement this material, Mitutoyo has exclusively produced the *Metrology Handbook - The Science of Measurement*. This 398-page reference book is primarily intended for anyone interested in gaining an understanding of the fundamentals of dimensional metrology and covers the basics of the subject right through to an overview of the most sophisticated and accurate inspection and calibration equipment available today. It is also a comprehensive reference resource for any reader whether you are a skilled engineer working in the field of metrology, an engineering apprentice or a student just starting out.

The *Metrology Handbook* is also available to purchase, priced £25.00, by calling our Sales Team on 01264 353123.



European Network

Mitutoyo in Europe



Mitutoyo Europe GmbH



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www.mitutoyo.eu

Since opening up the European market in the early sixties, Mitutoyo has been continuously consolidating its presence in this economically important region.

We had been preparing for the expansion of the European market well in advance of it becoming reality. As a result, a close network of production, sales and service facilities in more than 85 establishments in 33 countries is available to the customer.

In January 2010 Mitutoyo synchronised and strengthened the concerted pan-European activities by the establishment of a European headquarters at Neuss, near Dusseldorf, Germany.

Mitutoyo Europe GmbH oversees all the activities of Mitutoyo's sales, service and production facilities throughout Europe and adjacent markets, including business strategies of European operations.

A Mitutoyo Europe GmbH key objective is to promote coordination amongst its European Group Companies in order to optimise its sales and technical support services in the best interests of customer satisfaction.

Terms and Conditions of Business

Business to Business Supplies

1 Definitions

In these Terms and Conditions certain phrases shall be understood to have the following meanings:

"the Seller" means Mitutoyo (UK) Limited.

"Goods" means any product, Software* and/or technology which is to be sold (or licensed out) by the Seller.

"the Buyer" means any person, company or organisation which buys or has agreed to buy Goods from the Seller on a 'business to business' basis whereby the purchased Goods are for business use. These terms are not applicable to 'consumer' purchases.

"Contract" means the written agreement between the Buyer and the Seller specifying the offer under which the Buyer agrees to buy and the Seller agrees to sell Goods.

*Software is supplied on the basis of an End-User Licence Agreement (EULA) where title does not pass and use is non-transferable. In relation to all other conditions herein Software is treated the same as purchased/sold "Goods".

2 Acceptance of Order

2.1 These Terms and Conditions shall form part of every Contract of sale of Goods entered into by the Seller and no alteration shall be effective unless in writing, signed by an authorised officer of the Seller and referring to these Terms and Conditions.

2.2 The placing of an order by the Buyer, whether or not based upon a quotation, shall not be binding on the Seller, unless accepted by the Seller in writing.

2.3 No representations or undertakings made or given on the Seller's behalf prior to Contract shall be binding on the Seller, unless incorporated expressly in writing into the Contract.

2.4 Goods ordered by the Buyer which are out of stock will be placed on back-order unless the Buyer shall specify Ex-stock or Cancel the order.

2.5 The Seller shall have no obligation to accept the return of Goods which shall be surplus to the Buyer's requirements or ordered in error. Any decision by the Seller to accept the return of Goods for credit shall not affect the Buyer's obligation to pay the price thereof on the due date for payment and such credit shall not exceed 90% of the price of the Goods and shall be conditional upon the Goods and packaging being returned without any damage or marking within 30 days of the Seller's invoice.

2.6 If the Buyer shall require any change in the terms, conditions or arrangements for the performance of the Contract the Buyer shall inform the Seller promptly and shall not implement any change without the Seller's written consent.

3 Specification

3.1 All specification, drawings and data contained in the Seller's catalogues or otherwise supplied by the Seller are approximate only, unless otherwise stated in writing.

3.2 The Seller reserves the right without prior notice to effect modifications and design changes and to discontinue manufacture of any Goods as part of a continuous programme of product development.

4 Selection/Representation

4.1 The Buyer shall be responsible for determining whether the Goods ordered are suitable and sufficient for the intended purpose.

4.2 The Seller shall have no liability for the failure of the Goods to perform in accordance with specification when such failure shall be caused by their operation in environmental conditions that shall be unsuitable, unless the Buyer shall have stated in its order that such environmental conditions would apply and the Seller shall have accepted such stipulation in writing.

4.3 The Seller shall offer support to representing buyer Distributors in ensuring correct product specifications are furnished to satisfy End-user invitations to tender for the supply of Goods within its scope. However, the seller is not obliged to support a buyer Distributor if it shall fail to professionally present the Seller's Goods, in all essential features, particularly against an alternative offer and thus give cause to place a business opportunity at risk. In such circumstances the Seller reserves the right to facilitate direct End-user supply.

5 Prices

5.1 Prices quoted by the Seller are based upon its prices ruling at the date of quotation and the Seller reserves the right to adjust its prices at the time of acceptance of order to reflect any increase in the cost of supplying the Goods or the publication of a new price list occurring after quotation.

5.2 Unless otherwise agreed in writing, all prices quoted are: (i) Incoterm EXW Seller's premises, (ii) exclusive of any applicable taxes, which shall be payable in addition; and (iii) subject to variation and may be replaced with those prevailing at the date of delivery.

5.3 The Buyer shall not be entitled to make any deduction from the price by way of set-off or counterclaim.

6 Payment

6.1 In the absence of agreed credit terms, payment shall be made in full in advance of delivery.

6.2 The Seller's credit terms are payment by the end of month following the month of invoice (tax point date).

6.3 Payment made by means of a cheque, bill or documentary credit shall be deemed to be effected when honoured and all costs of discounting and encashing shall be borne by the Buyer.

6.4 Time for payment shall be of the essence of the Contract.

6.5 In the event of delay in payment the Seller shall be entitled to charge interest at 4% per annum above HSBC plc base rate, without prejudice to the Seller's other rights.

6.6 During any such period of default and at any time when the Seller shall have reasonable grounds for doubting that any payment due from the Buyer will be made on the agreed date, the Seller shall be entitled to suspend work and withhold deliveries, without prejudice to its right to payment for Goods delivered and work done and expenses incurred in connection with undelivered Goods which shall become immediately due and payable.

6.7 If such default or other circumstances shall continue for a period of 14 days, the Seller shall be entitled to terminate the Contract by written notice to the Buyer, without prejudice to the Seller's other rights.

6.8 The granting by the Seller to the Buyer of time or other indulgence shall not prejudice or constitute a waiver of the Seller's rights under subclauses 6.6 and 6.7.

6.9 The Seller shall have a general lien over any Goods of the Buyer in the Seller's possession for all money due to it from the Buyer. If any lien is not satisfied within 14 days of such money becoming due, the Seller may sell the Goods as agent for the Buyer and apply the proceeds, after deducting the expenses of sale, towards the monies due and the balance (if any) shall be paid to the Buyer.

7 Delivery Times

7.1 The time for delivery shall be calculated from the date of acceptance of order by the Seller or from the date of its receipt of all information required to fulfil the order, if later.

7.2 The time for delivery shall not be of the essence of the Contract.

7.3 The Seller shall be entitled to make partial deliveries and this condition shall apply to each delivery.

7.4 The Seller shall endeavour to meet the Buyer's delivery requirements but shall not be liable for any loss or damage caused by delay in delivery and the Buyer shall not be entitled to cancel the Contract because of such delay.

8 Delivery

8.1 Unless otherwise agreed, delivery shall be effected at the premises of the Buyer or other place specified in the Contract for delivery and the method of carriage and choice of carrier shall be determined by the Seller.

8.2 The minimum carriage-paid order value (excluding VAT) shall be £250 nett for delivery in the UK mainland and £500 nett for delivery in the Republic of Ireland.

8.3 The Buyer shall be responsible for paying the Seller's carriage charges unless the Buyer shall make its own arrangements with the agreement of the Seller prior to the Seller arranging carriage. If the Goods shall be collected by the Buyer or by a carrier pursuant to arrangements made by the Buyer, delivery shall be deemed to take place on collection.

8.4 Upon the Seller notifying the Buyer that the Goods are ready for delivery, the Buyer shall agree to accept delivery. The Buyer shall be responsible for ensuring good access to the delivery site and providing such cranage and other assistance for unloading as may be specified in the Contract. If the Buyer should fail to give proper delivery instructions or to accept delivery when tendered or to provide such access or assistance, it shall be liable for all additional costs incurred by the Seller.

8.5 If delivery should be delayed at the request of the Buyer the Seller may place the Goods in store at the Buyer's risk and the Buyer shall pay such storage cost and other costs incurred by the Seller as a result of such delay.

9 Installation

9.1 If the Seller shall undertake the installation of the Goods, the Buyer shall be responsible for ensuring that all necessary power, plant and labour and other facilities specified by the Seller shall be available when required and that the Seller shall be able to undertake such work, without interruption, during normal business hours.

9.2 Upon completion of the installation the Seller shall test the Goods. The Buyer shall be given the opportunity to attend such tests, but such test shall not be delayed in the event of the Buyer failing to attend.

9.3 The installation of the Goods shall be deemed to be satisfactory unless the Buyer shall give notice of any fault within 3 days of the testing of the Goods.

9.4 The provisions of subclauses 7.4 and 12.2 shall apply mutatis mutandis in respect of delays or defects in installation.

9.5 The Seller shall have no liability for redecoration or repair arising from the siting or installation of the Goods.

10 Title and Risk

10.1 Title to the Goods shall remain in the Seller until payment in full is made by the Buyer.

10.2 The provisions of subclause 10.1 shall not prevent the Buyer from fixing the Goods to any other product or selling the Goods in the normal course of business but in the event of sale to the extent of the Buyer's indebtedness to the Seller in respect of the Goods, the Buyer shall hold the proceeds of sale or the right to receive the same on trust for the Seller and shall, at the Seller's request, either (i) place the proceeds of sale in a separate account of the Buyer in such a way as to be identifiable as in the beneficial ownership of the Seller, or (ii) assign the right to receive the proceeds of sale to the Seller.

10.3 If the Buyer shall default in payment for any Goods and at any time when the Seller shall have reasonable grounds for doubting that payment for the Goods will be made on due date, the Seller, without prejudice to its other rights, may enter any land or premises where the Goods may be, to detach them if fixed and to recover possession of them.

10.4 The risk in the Goods shall pass to the Buyer on delivery or placing in store in accordance with subclause 8.5.

11 Damage in Transit

11.1 The Seller shall have no liability in respect of Goods lost or damaged in transit unless the Buyer or its agent notes such loss or damage on the delivery receipt and gives notice thereof in writing to the Seller and the carrier within 7 days of delivery or such shorter period as may be required by the carrier's conditions of carriage or, in the case of the whole consignment failing to arrive, gives notice thereof in writing to the Seller within 7 days of receipt of the Seller's invoice or despatch note or the estimated date of delivery, if later.

11.2 The Seller's liability in respect of Goods lost or damaged in transit shall be limited to repairing or replacing such Goods.

12 Warranty

12.1 Subject to Clause 3, the Seller warrants that the Goods will comply with specification and will be of merchantable quality but not that they shall be fit for any particular purpose.

12.2 The Seller will repair or replace any Goods which under proper use prove to be defective within the period of 12 months from the date of delivery due to faulty materials or bad workmanship or, subject to Clause 3, the Seller's failure to supply Goods of the specification or quality ordered, provided as follows: (i) that in the case of defects which would have been apparent on reasonable inspection on delivery, the Buyer shall notify the Seller of the defect in writing within 7 days of the date of delivery; (ii) that in the case of any other defect, the Buyer shall notify the Seller of the defect in writing within 10 days of the date when the defect became apparent and, in any event, within 12 months from the date of delivery; (iii) that the Buyer and any user of the Goods shall have

complied with the instructions of the Seller or manufacturer of the Goods as to the maintenance and operation; (iv) that the Buyer shall give to or procure for the Seller the opportunity to inspect and test the Goods and, if requested, shall return the Goods to the Seller, carriage paid, such carriage charges to be refunded by the Seller if the defect shall constitute a valid claim under this Clause.

12.3 Subject to any statutory provision to the contrary, the liability of the Seller under this Clause shall be in lieu of and to the exclusion of any other condition, warranty, or other term, whether express or implied by law, as to the quality of the Goods or their fitness for any particular purpose or otherwise and, subject as aforesaid, the Seller shall have no liability, whether arising in Contract, tort or otherwise, in respect of any defect in the Goods or any injury, damage or loss resulting from such defect.

13 Indemnity

Subject to any statutory provision to the contrary, the Seller shall have no liability for any loss or damage suffered by any third party caused directly or indirectly by the Goods, whether as the result of their operation or use or otherwise and whether as the result of any defect therein or otherwise and the Buyer shall indemnify the Seller from any claim arising from any such loss or damage.

14 Force Majeure

The Seller shall not be liable for any loss or damage sustained by the Buyer by reason of any act of God, war, riot, fire, strike, lock out, governmental control or regulation, abnormal weather conditions, accident, breakdown or any other circumstances beyond the Seller's control and in such event, insofar as the Contract shall not have been performed, the Seller may either terminate the Contract and return any advance payment received or delay delivery for such period as may be necessary.

15 Confidentiality

15.1 All drawings, documents and artefacts supplied by one party to the other shall remain the copyright and property of the party supplying the same and may not be copied or reproduced without its consent and such documents shall be returned in the event of the Contract not being made or completed.

15.2 Any trade secret or confidential information supplied by either party to the other shall be kept confidential and shall not be disclosed to any third party without the consent of the party supplying the same. The Seller shall take all reasonable measures not to disclose such confidential information during the course of performing physical examination, calibration or a measurement activity when an artefact may be visually exposed.

16 Infringement

16.1 The Buyer shall notify the Seller immediately of any circumstances coming to its attention which may be likely to give rise to any claim that the Goods infringe the rights of any third party and shall permit the Seller to conduct any action or negotiations in respect thereof in the name of the Buyer but at the Seller's expense.

16.2 In the event of any such claim being successful, the Seller shall indemnify the Buyer against any liability it may sustain to such third party, but shall have no other liability to the Buyer in respect thereof.

17 Notices

Any notice to be given by either party to the other shall be properly given if sent by email, fax or post to the party to be served at its head office or last known address and shall be deemed to have been served, in the case of postal delivery, when in the normal course of post it would have been delivered.

18 Export/Import/Movement Control/Goods and Technologies

18.1 Export: the Buyer shall inform the Seller of any Goods to be purchased, or licensed, or technical information sought, that is intended for export as the Terms and Conditions herein are primarily for the UK home market. It is the responsibility of the Buyer to declare to the Seller the intended final destination, the end-user and nature of use of all such Goods. The Seller shall then offer advice on its Goods known to be subject to export controls. The Buyer is ultimately responsible for ensuring that all such exports comply fully with the UK Department of International Trade (DIT) Export Control Joint Unit (ECJU) and any related legislation that may apply following the UK leaving the EU (Brexit). The Seller will not entertain the service or support of any Goods that have been exported without due evidence of export control compliance. The Seller will report to the appropriate authorities any known or suspected violation of export control requirements that may come to its attention.

18.2 Movement Control: the Seller has certain Goods that are classed as "Dual-use", i.e. may be used for civil or military application. The Buyer shall purchase the Goods on the understanding that they are equipped with a "movement sensor" that will disable operation should excessive vibration or movement be detected. Resetting of the sensor may be undertaken, at no charge to the Buyer, subject to the Seller being afforded advance notice of the intended move or event that may trip the sensor. In the event of the Goods relocation, the Buyer must ensure the destination and use shall not contravene applicable export controls.

18.3 Goods and Technologies: technology is defined in terms of "information relating to controlled Goods or Software" and may be transferred by various means such as drawings, emails, manuals and instructions etc. Such transfer of technology is also subject to export control where it is required for the development, production or use of listed Goods or Software. Technical assistance for repair, training or consultancy is not deemed as technology transfer but relating documentation and "relevant use" of the technologies may be subject to licensing. The Buyer should therefore make the Seller aware of any intended or consequential overseas transfer of technology in relation to the Seller's provision of Goods and technologies. The Buyer shall be bound by the assurance (as per Clause 19) given to the Seller as an integral part of these Terms and Conditions of business. This shall cover all of the Seller's Goods and technologies, their permitted use and the strict adherence to export controls. The Seller may seek additional assurances from the Buyer as the Seller and Control Authorities deem necessary.

18.4 Import: the majority of the Seller's Goods do not require an export licence from the country of manufacture or an import licence into the UK. However, where certain Goods do require licensing, supply will be conditional on the Buyer's ability to fulfil the criterion used by the Seller, and the appropriate authorities, to determine the ability to meet the licence conditions. This may include the completion of detailed information relative to the status of the Buyer, the end-user, destination of use and application of the Goods. The Buyer shall be bound by the assurance (as per Clause 19) and where certain Goods do require a specific Export Licence from the country of manufacture, the Buyer may also need to furnish to the Seller an individual "Letter of Assurance" and "End user" undertaking in order to satisfy licence application requirements. Furthermore, any Buyer supplying Goods directly or indirectly to the UK Defence Industry or to any body where use is connected with a military application will need to satisfy the Seller's additional security control assessment procedures as demanded by the Export/Import Control Authorities. This shall include evidence detailing the status of the Buyer's customer, related supply approvals and details, in so far as confidentiality will permit, of the products or services to which they are contracted to supply. Disclosure of insufficient information to satisfy the requirements of the licensing authorities will result in the export licence application being declined. The Seller is unable to accept any liability in the event of this decision.

19 Assurance

The Buyer, in entering into a business transaction with the Seller does so on the Terms and Conditions herein including this assurance that as a Company, person or organisation, responsibility shall be accepted for ensuring strict adherence to the Seller's Export/Import control compliance procedures and the UK Export Control Act 2002 (and subsequent amendments) as well as those related to 'controlled goods' for any destination following the UK leaving the EU. The Buyer will actively support all measures to combat terrorism and promote global peace and harmony. The Buyer will not use or deliver, directly or indirectly, any Goods, Software and/or technology ("Goods") acquired from the Seller and/or any of its affiliated or subsidiary Companies to any customer and/or to any party that are, to the best of the Buyer's knowledge, involved or engaged in development, production, utilisation, application, enhancement, or distribution of nuclear, chemical or biological weapons, and/or transportation for such weapons of mass destruction. Furthermore, the Buyer commits to observing the independent embargo measures for combating international terrorism so as to ensure that it shall not deliver, directly or indirectly, the Goods to any party or any body listed by the U.S. "Denied Persons List", U.S. "Entity List" and EU "List of terrorists". The Buyer acknowledges that prohibitions and restrictions concerning the combating of terrorism have to be observed and followed. The Buyer, as a Company, person or organisation, shall be required to immediately inform the responsible authorities of any knowledge acquired concerning transactions involving the Goods with Companies or individuals mentioned in the above respective lists. The Buyer recognises that supply of certain Goods will be subject to the completion and verification of "end-user" and "end-use" particulars, as will be sought by the Seller. The Buyer accepts that facts to be provided must be to the satisfaction and acceptance of the Seller and the Ministry of Economy, Trade and Industry, Japan (Export Control Authority). Following installation of the Goods, the Buyer shall notify the Seller of any subsequent change of the Goods location or transfer of ownership. The Buyer is fully responsible for seeking authorisation from the UK Department of International Trade (Export Control Joint Unit) ECJU in the event off the need for transfer or export from the UK mainland of the Goods. The Buyer must notify the Seller of any such requirements and the Seller will provide advice and relocation assistance (including the resetting of any applied movement sensor) when evidence of the appropriate authorisation has been attained.

20 Bribery Act 2010

The Seller, as part of its ethics policy, is committed to prevention, detection and elimination of all forms of corrupt business practise. The Seller will not tolerate any form of bribery or corruption and expects its business partners and buyers to comply with the Act and follow the principles of good business conduct.

21 Equal Opportunities/Equality and Diversity

The Seller applies an equal opportunity/equality and diversification policy and will not discriminate either directly or indirectly on the grounds of race, nationality, ethnic origin, gender, marital status, pregnancy, age, disability, sexual orientation, ethnicity, culture or religious beliefs. The seller shall not engage with any buyer, individual or organisation known to contradict this policy.

22 GDPR

The Seller currently complies with the EU General Data Protection Regulation (GDPR) and shall treat all personal data accordingly. The UK Data Protection Act 2018 remains in place however following the UK leaving the EU it is intended to bring GDPR directly into UK law with most principles, rights and obligations remaining the same. Personal Information submitted by the Buyer and contact details will only be used to communicate in relation to the subject matter and should any further personal information be sought or need to be used it will be on the basis of receiving the persons explicit consent.

23 Law

The Contract shall be governed by English law and the English courts shall have jurisdiction to determine any dispute between the parties in relation thereto.

E&OE. Although every care has been taken the company cannot warrant that the information provided in this catalogue is complete or without error. If a particular product feature is important to your purchase of that product then please verify the exact product specification with the Sales Team at the time of placing an order. Illustrations and specifications given in this catalogue are not binding, as design and construction of measuring instruments and gauges may be influenced by further development. Reprint of text and illustrations, complete or in parts, is not allowed without explicit permission in writing from Mitutoyo (UK) Ltd.

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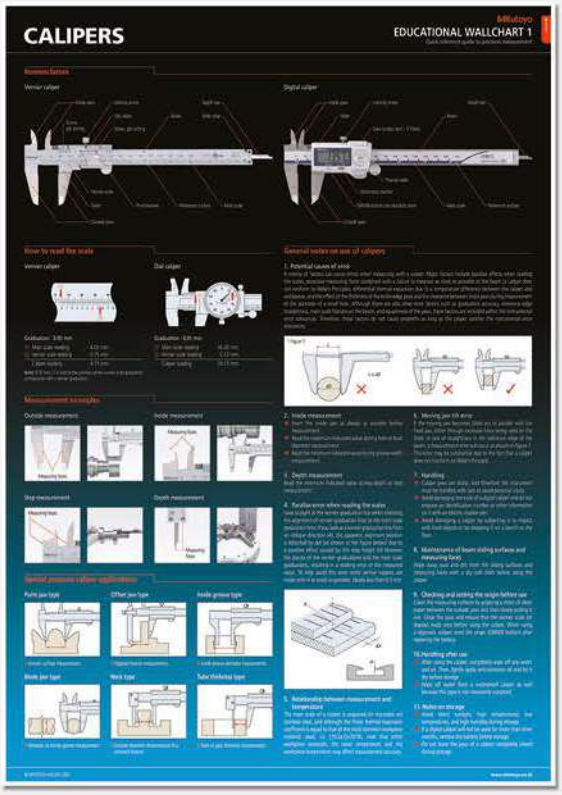
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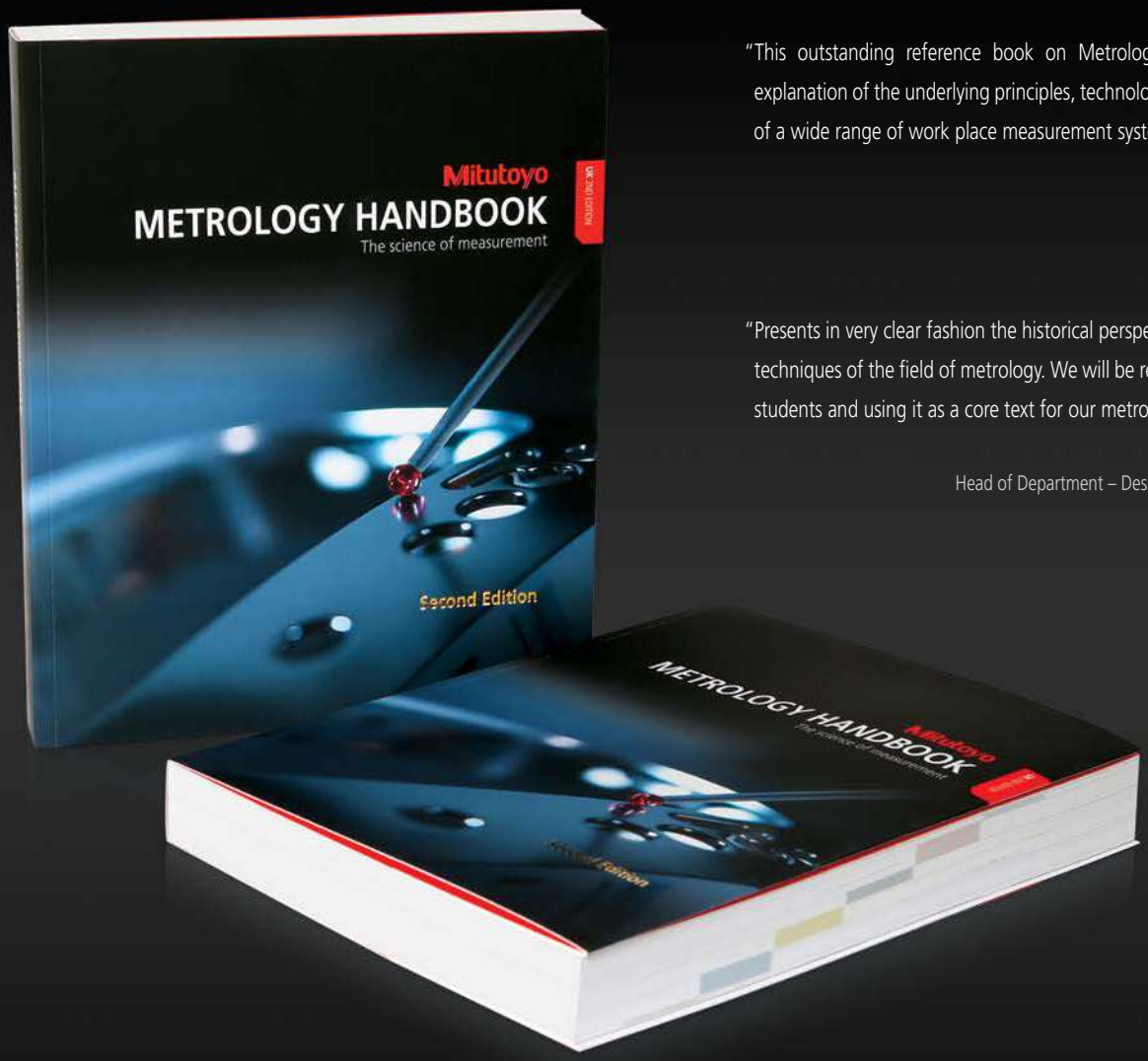
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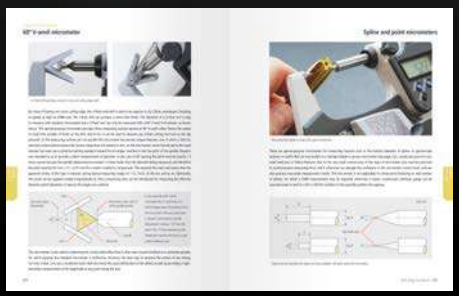
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