

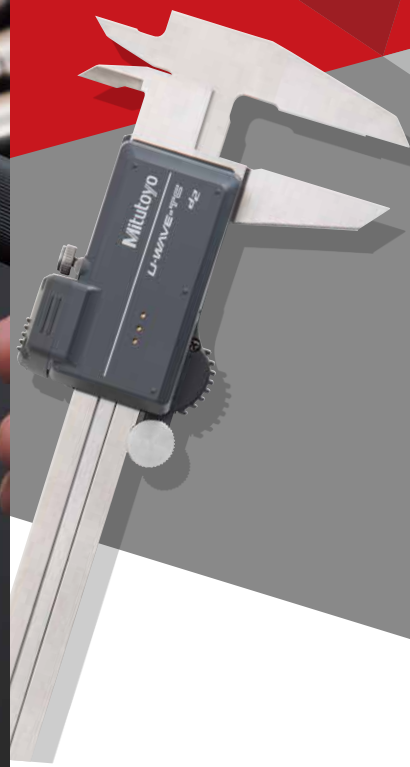
Measurement Data Wireless Communication System U-WAVE

SMALL TOOL INSTRUMENTS
AND DATA MANAGEMENT

U-WAVE



U-WAVE fit



What is the U-WAVE Series?

"U-WAVE", the measurement data wireless communication system, collects data in the inspection process swiftly and accurately, and increases a company's competitiveness based on detailed data analysis.

In addition, together with MeasurLink, "IoT of Quality Control envisioned by Mitutoyo" can be achieved.

Achieve Smart Measurement

Measurement Data Wireless Communication System

U-WAVE

This is a system that transmits data from Mitutoyo Digimatic gages to software such as Excel or Notepad via wireless communication. It saves time and eliminates misinput, helps achieve cost reductions and better efficiency while maintaining excellent operability.

From a Digimatic gage connected with U-WAVE

Data is obtained via wireless communication and sent to commercial software such as Excel



See video from here

	A	B	C	D	E	F
1	No.	ItemA	ItemB	ItemC	ItemD	ItemE
2	No.1	2.071	2.002	1.996		
3	No.2	2.083	2.013	2.070		
4	No.3	1.982	1.940	2.011		
5	No.4	2.004	1.965	1.921		
6	No.5	2.061	2.051	2.004		
7	No.6	1.991	2.031	2.060		
8	No.7	2.002	2.072	2.102		
9	No.8	2.020	2.005	2.004		
10	No.9	1.952	1.985	1.983		
11	No.10	1.998	2.057			
12	No.11	2.026	2.046			
13	No.12	2.026	2.011			

Advantages of Introducing U-WAVE

Higher Efficiency

Data can be input by single button operation! Since there is no need for manual input misinput does not occur. Efficiency is greatly improved!

Centralized Data Management

Measurement data can be managed centrally!
"Visualization of quality" helps prevent the generation of defective products!

Cost Reduction Effect

Easily connected to the Digimatic gage* currently in use!
A system configuration reducing the initial and running cost is possible.

* Some models of U-WAVE-TM/TC are not applicable.

U-WAVE resolves measuring process issues!

Issue

Manual input of measurement data is inefficient and frequently generates misinput.

Solution

U-WAVE immediately transmits the measurement data to your PC. Misinput due to manual input can be eliminated, and therefore data reliability and operational efficiency is improved.

Issue

Loading measurement data via wireless is seen as desirable but justifying any high initial investment is difficult.

Solution

No high initial investment required because U-WAVE can be inexpensively connected to your existing Digimatic gages. No need to purchase replacements.

Issue

Since multiple operators use Digimatic gages, it takes a long time for data collection and Pass/fail judgment.

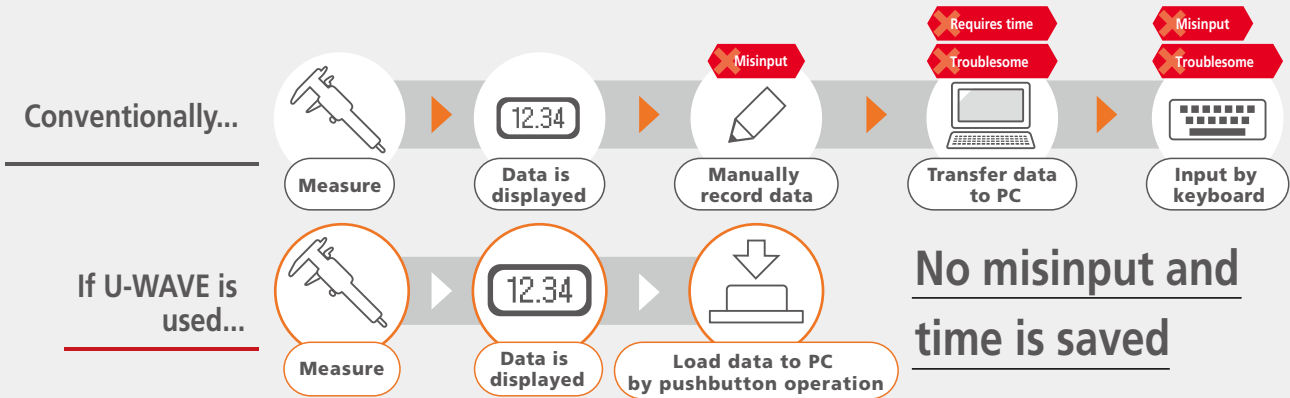
Solution

Up to 100 Digimatic gages can be registered to a single U-WAVE receiver on the PC side. The data is automatically entered separately in the Excel sheet. Therefore, data collection and Pass/fail judgment are easily performed.



Speedy and Reliable Data Collection and Pass/fail Judgment Improves Manufacturing Competitiveness

< Higher Efficiency >



LED or a buzzer notifies data reception

Confirmation that data was successfully received.

Note: The buzzer sound is only available with the buzzer equipped model.

Patented in Japan



- Normally received: green LED blinks
- Buzzer sounds twice briefly



- Reception failed: red LED blinks
- Buzzer sounds once

Dustproof and water resistant IP67 model

The water-proofed transmitter is resistant to water and dust.



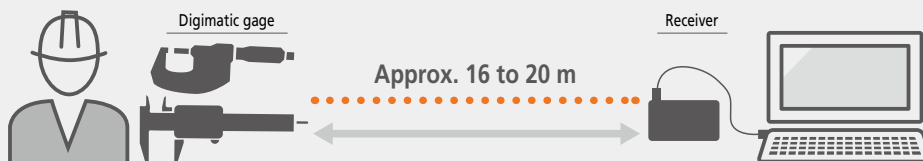
IP67

Cordless enables freedom of movement

Flexible layout of measurement site

Misinput generated by manual input is eliminated

Stable wireless communication



Advantage

< Centralized Data Management >

Operation in an Excel sheet

The data can be directly written into an Excel sheet.



Digitalization enables easy data collection and analysis

The measurement data from each process can be stored and managed centrally.



Multiple gages can be connected at the same time

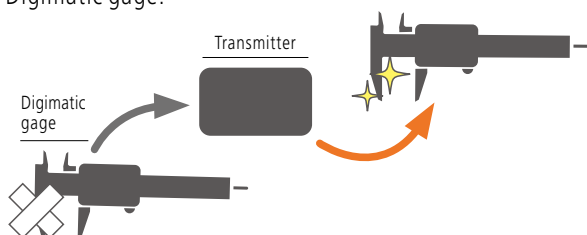


Note: Receiver not necessary when using with Mitutoyo Bluetooth® U-WAVE fit

< Cost Reduction Effect >

If a Digimatic gage is damaged, operation can be continued using a different gage

The transmitter can be reconnected to a different Digimatic gage.



Connectable to any of your existing Digimatic gages

No need to buy a replacement if your tool is equipped with the Digimatic function.

Approximately 400,000 continuous data transmissions are possible

Just one CR2032 lithium battery provides power for about 400,000 data transmissions.

* When the battery is used with U-WAVE-TM/TC/T. The battery life is approx. one year under normal use when used with U-WAVE-TMB/TMC.

Type of U-WAVE

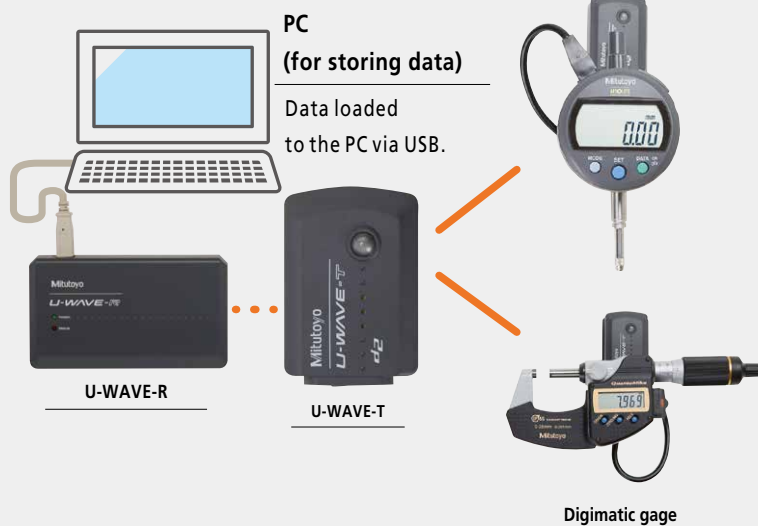
Convenient data collection tool and quality control software

The following three types are currently available.

U-WAVE

U-WAVE

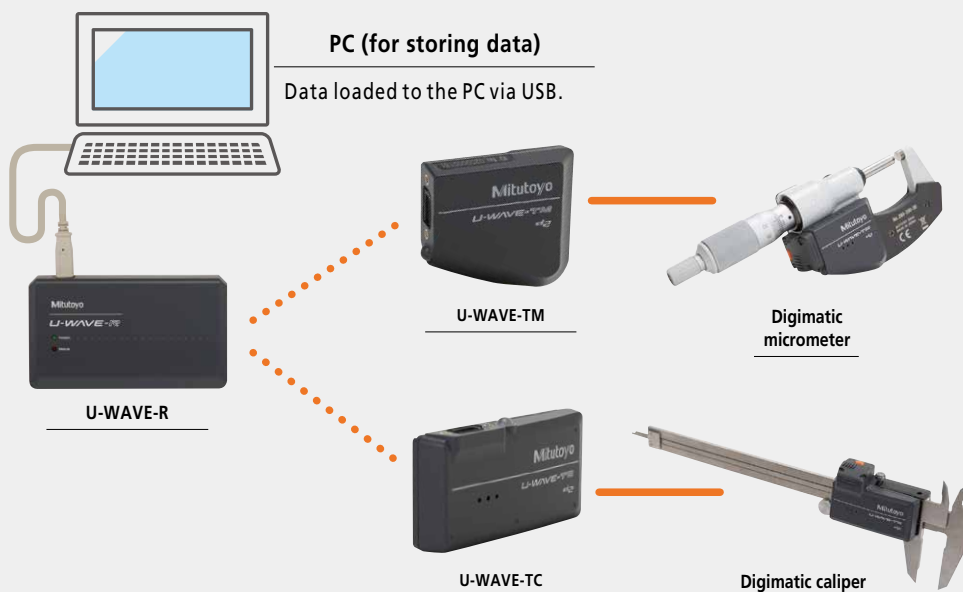
Comprises of a receiver (U-WAVE-R) that connects to a PC and a transmitter (U-WAVE-T) that connects to a Digimatic gage.



U-WAVE fit

U-WAVE fit

Dedicated for Digimatic calipers and Digimatic micrometers, it inherits the functions and performance of U-WAVE but is more compact, thinner, and with improved operability.

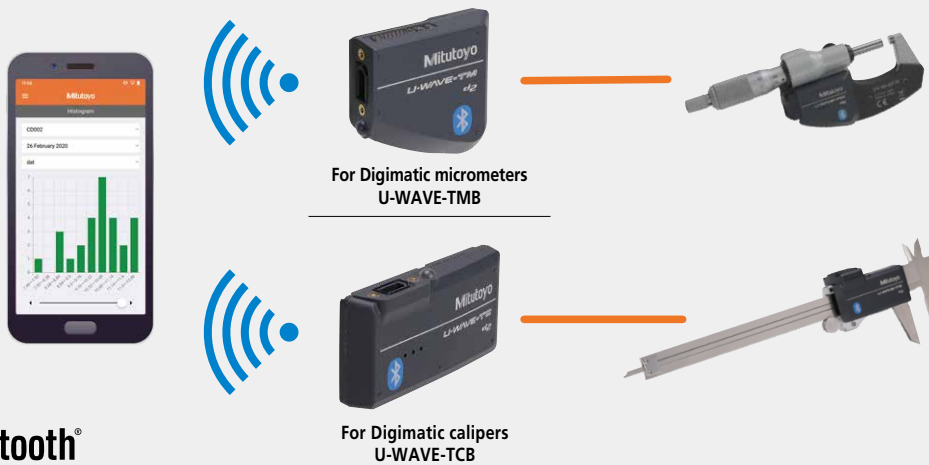


Mitutoyo Bluetooth® U-WAVE fit

U-WAVE fit

U-WAVE fit with Bluetooth® capability. It can not only connect to a PC, but also other devices that support Bluetooth®, such as a smartphone or tablet without the need for an external receiver unit.

Note: Connectivity of the dedicated Mitutoyo Bluetooth® U-WAVE application and U-WAVE-TMB/TCB to every single Bluetooth® device is not guaranteed.



Function comparison table

	U-WAVE	U-WAVE fit*1	Bluetooth® U-WAVE fit*1
Transmission method	Original <based on IEEE802.15.4 (2.4 GHz)>		Bluetooth® 4.2
Communication distance	Approx. 20 m (line of sight)		Approx. 16 m (line of sight)
Connectible model	Digimatic gages	Digimatic calipers, micrometers and indicators	
Dedicated application/software	U-WAVEPAK (included with U-WAVE receiver) USB-ITPAK*2		U-WAVEPAK-BW U-WAVEPAK-BM U-WAVE Navi USB-ITPAK*2

*1 Please check the list of compatible models since the unit may not be attachable to some models.

*2 Please note that USB-ITPAK may not be recognized if your computer's OS build is old.

Typical Measuring Issues Solved

In combination with application software USB-ITPAK V2.1, better efficiency in quality assurance can be achieved.

Case 1

Standard sequential measurement input

Issue

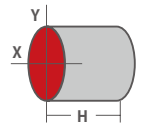
To record the measurement results, on a chart, from three points on a mass-produced product measured using two gages.

Solution

If you set the procedure of inputting data to the Excel sheet with USB-ITPAK V2.1, the measurement data is automatically entered.

*Please refer to "Option" at the bottom of this page.

- Measure the workpiece dimensions, X and Y, with a micrometer. Then, measure H with a caliper. Finally, visually check the appearance and judge OK or NG. Perform the above for 5 workpieces consecutively.



Point Measurements in order

The designated table will be created by measuring and transmitting data for X and Y of 5 workpieces, measuring and transmitting data of H, and then entering the result of visual check.

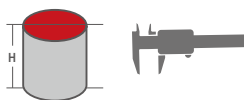
Point Set the sequential measurement input order

Designate the Excel sheet, select the data loading range, loading order, and allocate the ID for each cell.

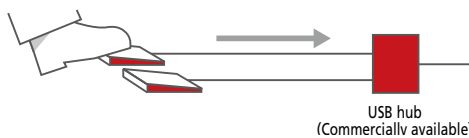
- 1 Measure X and Y for 5 workpieces with a micrometer.



- 2 Measure H for 5 workpieces.



- 3 Enter "OK" or "NG" for the visual check.



Designated Excel sheet

	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			

Input range of micrometer
Input range of caliper
Input range of visual judgment

Data will be input one by one in the registered order to the cells of the Excel sheet designated beforehand.

Option

USB-ITPAK V2.1



USB dongle



A USB dongle must be connected to the PC running the software.

Measurement Data Collection Software

USB-ITPAK V2.1

USB-ITPAK V2.1 is optional software to be installed in the PC connected with U-WAVE-R. It enables setting up the procedure to input the measurement data received from U-WAVE-R to the Excel sheet and to achieve greater inspection efficiency and enhanced credibility.

The combined use with U-WAVE will improve the operational efficiency of the inspection work.

Best suited for recording data in mass-production inspections where the procedure is repeated every day.

Case Study

Case
2

Data input by multiple operators

Issue

To sort data into separate Excel sheets per Digimatic gage in the inspection process.

Solution

The data collected by multiple operators can be individually set to be input to the designated cells in the Excel sheet.

■ Input data of each Digimatic gage in order into the designated cells of the separate Excel sheet.

Point

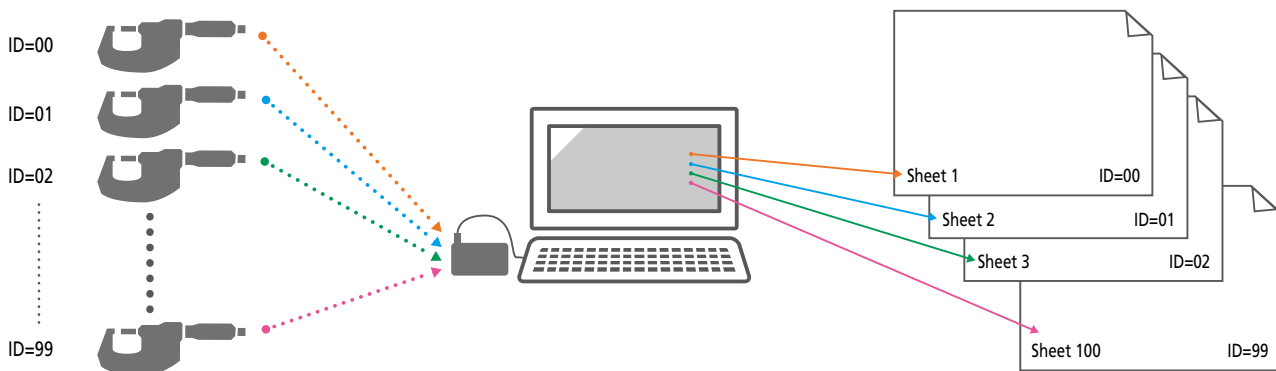
Up to 100 Digimatic gages can be registered

100 Digimatic gages at maximum can be registered to a receiver and the same number of Excel sheets can be designated.

Point

Designate the Excel sheet per Digimatic gage

Using USB-ITPAK, designate the Excel sheet per Digimatic gage. Then, same as the sequential measurement, select the data loading range, loading order, and allocate the IDs.



Multiple measurement data (via U-WAVE-TM/TC/T) can be sorted into the separate Excel sheets without requiring you to program macros.

■ Features of USB-ITPAK V2.1

The measuring methods can be configured, such as sequential measurement, batch measurement, individual measurement and more.

Data can be canceled by a single operation of the foot switch or function key.

Input range can be specified per Digimatic gage, which reduces the chance of a misinput.

Data input or cancellation can be instructed globally in multiple-point simultaneous measurement.

The Excel sheet can be automatically called for data input.

The cursor movement after data input can be set to enable automatic input.

Case Study

Case 3

Batch measurement using timer

Issue

To measure displacement using multiple Digimatic gages and automatically obtain data in a certain input interval.

Solution

Batch timer input is available using the USB-ITPAK batch measurement function and the optional timer input function.

Specify the interval for measuring the displacement of the workpiece and collect data at once.

Point Batch measurement with all the Digimatic gages

Data can be obtained globally by a foot switch operation.

Point Timer input option

Using USB-ITPAK, the data request interval can be set by hours, minutes, and seconds (0.0 sec. to 24 hrs.).

Point Batch timer input

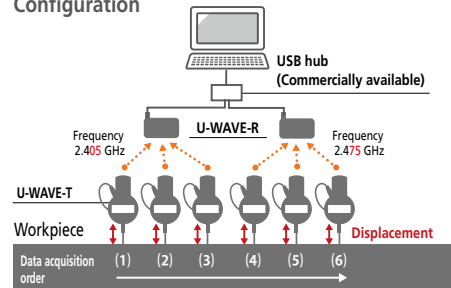
Data can be obtained at the desired interval using the timer input function in batch measurement.

	A	B	C	D	E	F	G
1	Displacement (1)	Displacement (2)	Displacement (3)	Displacement (4)	Displacement (5)	Displacement (6)	Measurement date/time
2	0.281	0.162	0.121	0.051	0.011	-0.001	2013/4/1 7 30 00
3	0.279	0.152	0.133	0.064	0.018	-0.003	2013/4/1 7 30 05
4	0.265	0.149	0.142	0.089	0.021	-0.007	2013/4/1 7 30 10
5							
6							

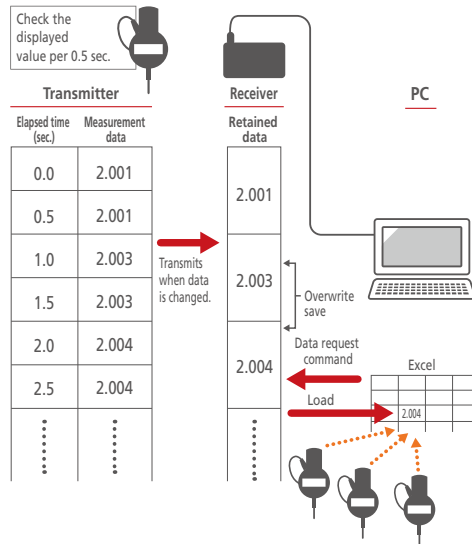
After 5 sec.
After 5 sec.
After 5 sec.

- To perform simultaneous measurement using U-WAVE, a special order software U-WAVEPAK (event drive) is required.
- Since the data refresh interval of the event drive is fixed at 0.5 seconds, the setting range is from 0.5 seconds to 24 hours.

Configuration



Event driven mode



Two modes for flexible measurements

"Button driven mode" and "Event driven mode"

Button driven mode

By pushing the Data button of digimatic gage/dedicated cable for U-WAVE/connecting unit, indicated values can be transferred to the receiver.

Event driven mode

- 1) U-WAVE-TM/TC/T checks the displayed value of the Digimatic gage at 0.5 sec. intervals, and transfers data if the value is changed.
- 2) U-WAVE-R overwrites data in the storage.
- 3) Sends data responding to the data request command.

Enables automatic data load

Without operating the send button of the Digimatic gage, data can be obtained automatically from multiple Digimatic gages.

- The battery life of the U-WAVE-TM/TC/T is shortened (20 days in continuous operation).
- U-WAVE is equipped with a function to avoid radio wave interference, and enables successful simultaneous data transmission of three U-WAVE-T units per U-WAVE-R. To perform simultaneous data transmission with more than three units of U-WAVE-T, an additional U-WAVE-R and set different frequencies (15 channels) to assure reliable wireless communication.
- "Event driven mode" is not available for U-WAVE-fit Bluetooth® within USB-ITPAK.

U-WAVE

U-WAVE fit

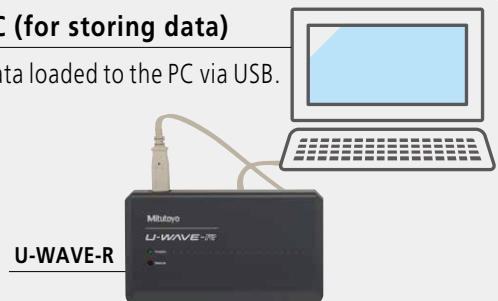
Receiver

U-WAVE-R

- Receives measurement data and transmits to the PC via USB.
- Since USB bus power system is used, a battery or adapter is not required.
- The identification ID and frequency to be used can be set using supplied software U-WAVEPAK.
- The data load function to Excel, etc. is supplied as a standard accessory.

PC (for storing data)

Data loaded to the PC via USB.



Transmitters

U-WAVE-TM/TC/T

- Transmits the measurement data displayed on the gage to U-WAVE-R.
- Compact, cable-less design provides a better fit with the Digimatic gage and better operability.



Connecting unit/connecting cable

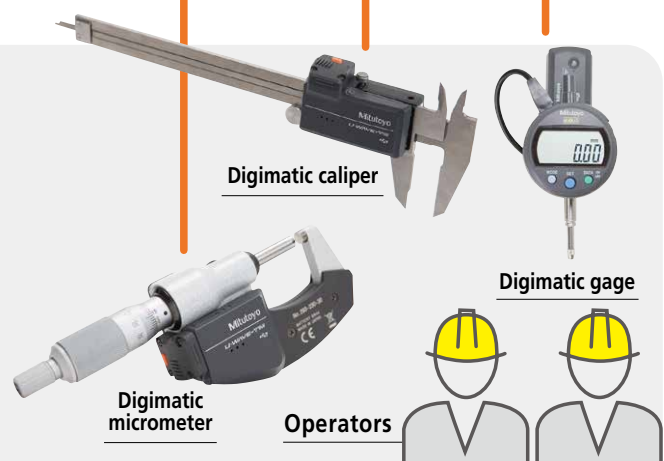
- A compact connecting unit connects the U-WAVE-TM/TC/T transmitter to the Digimatic gage.
- A dedicated cable connects the U-WAVE-T transmitter to the Digimatic gage.



Digimatic gages

Compatibility

- U-WAVE-TM/TC can be used with most of the calipers and micrometers equipped with the Digimatic output function.
- U-WAVE-T can be used with all the Digimatic gages equipped with the Digimatic output function.



U-WAVE^{fit}

With functions and performance inherited from U-WAVE-T, a compact and thinner design provides a neater solution by eliminating cabling around the Digimatic gage and thus better operability!



U-WAVE-TM for micrometers and U-WAVE-TC for calipers are available, both the buzzer type and IP67 type. The buzzer type notifies the normal reception of data by LED and buzzer sound. The dust/water-proof IP67 type is designed for a harsh environment and as such is only equipped with LED notification of data reception.

Connecting compatible micrometers, calipers and other Digimatic gages to U-WAVE

Gage	Assembled appearance		Connecting unit/connecting cable
For digimatic micrometers	Standard	Front Back	02AZF310
	Dust/water-proof	IP65 Front Back	
For calipers	Standard	Front Back	02AZF300
	Dust/water-proof	IP67 Front Back	
Digimatic gages			Connecting cable*

Type of Transmission Unit

U-WAVE

This product successfully introduced U-WAVE to the market.

For digimatic micrometers, calipers, indicators and micrometer heads



U-WAVE-T is connected to a Digimatic gage with a dedicated cable that mates with the data connector on that particular gage.

The buzzer type and IP67 type are available. The buzzer type notifies the normal reception of data by LED and buzzer sound. The IP67 type is designed for a harsh environment and as such is only equipped with LED notification of data reception.

Transmitter			Receiver
	U-WAVE-TM With buzzer 264-623		 U-WAVE-R 02AZD810D Design registered in Japan
	U-WAVE-TM Dust/water-proof 264-622		
	U-WAVE-TC With buzzer 264-621		
	U-WAVE-TC Dust/water-proof 264-620		
	U-WAVE-T With buzzer 02AZD880G		
	U-WAVE-T Dust/water-proof 02AZD730G		

Note: Select according to the Digimatic gage to be connected. Refer to pages 24 and 25 for connecting cables.

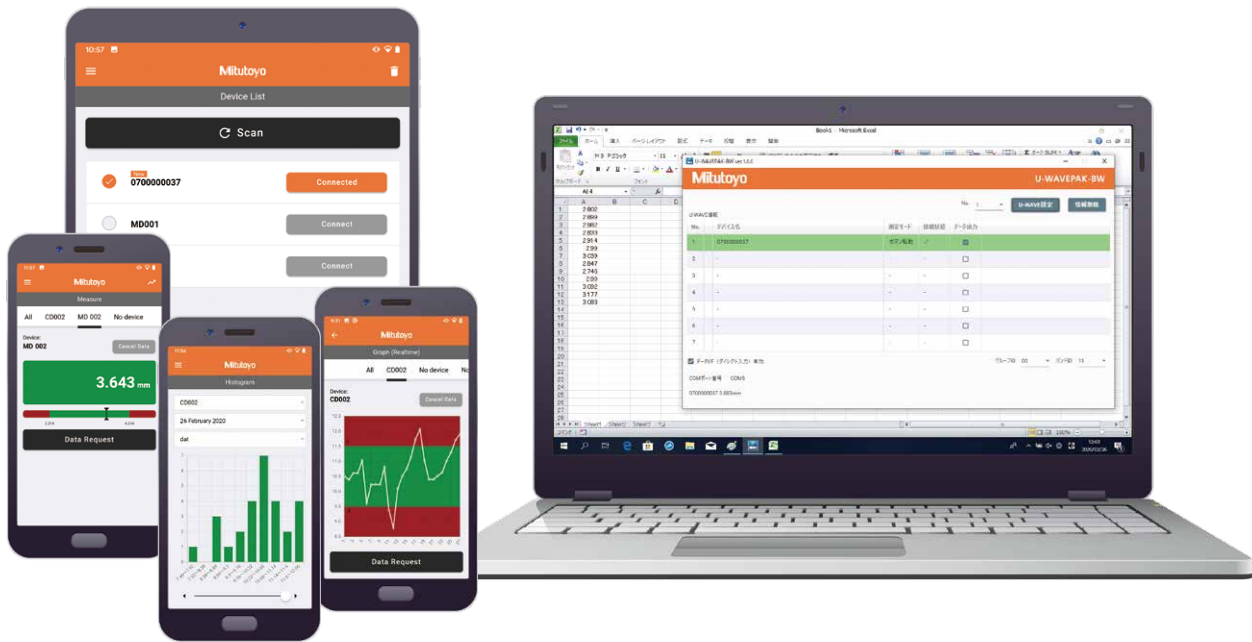


Manage Measurement Data Centrally and Wirelessly on a Smartphone, Tablet or PC

Mitutoyo Bluetooth® U-WAVE fit

U-WAVE-TMB/TCB

More compact and thinner for a better fit with Digimatic gages, and featuring improved operability and performance inherited from its predecessor, U-WAVE-TMB/TCB is now available with Bluetooth® wireless technology. No receiver is required, and one PC can connect up to seven units of Mitutoyo Bluetooth® U-WAVE fit. Dust /water-proof models are also available for arduous shop floor usage.



For Digimatic micrometers
U-WAVE-TMB



For Digimatic calipers
U-WAVE-TCB



Note: Connectivity of this application software and U-WAVE-TMB/TCB to every single Bluetooth® device is not guaranteed.

Major Advantages of Introducing Mitutoyo Bluetooth® U-WAVE fit



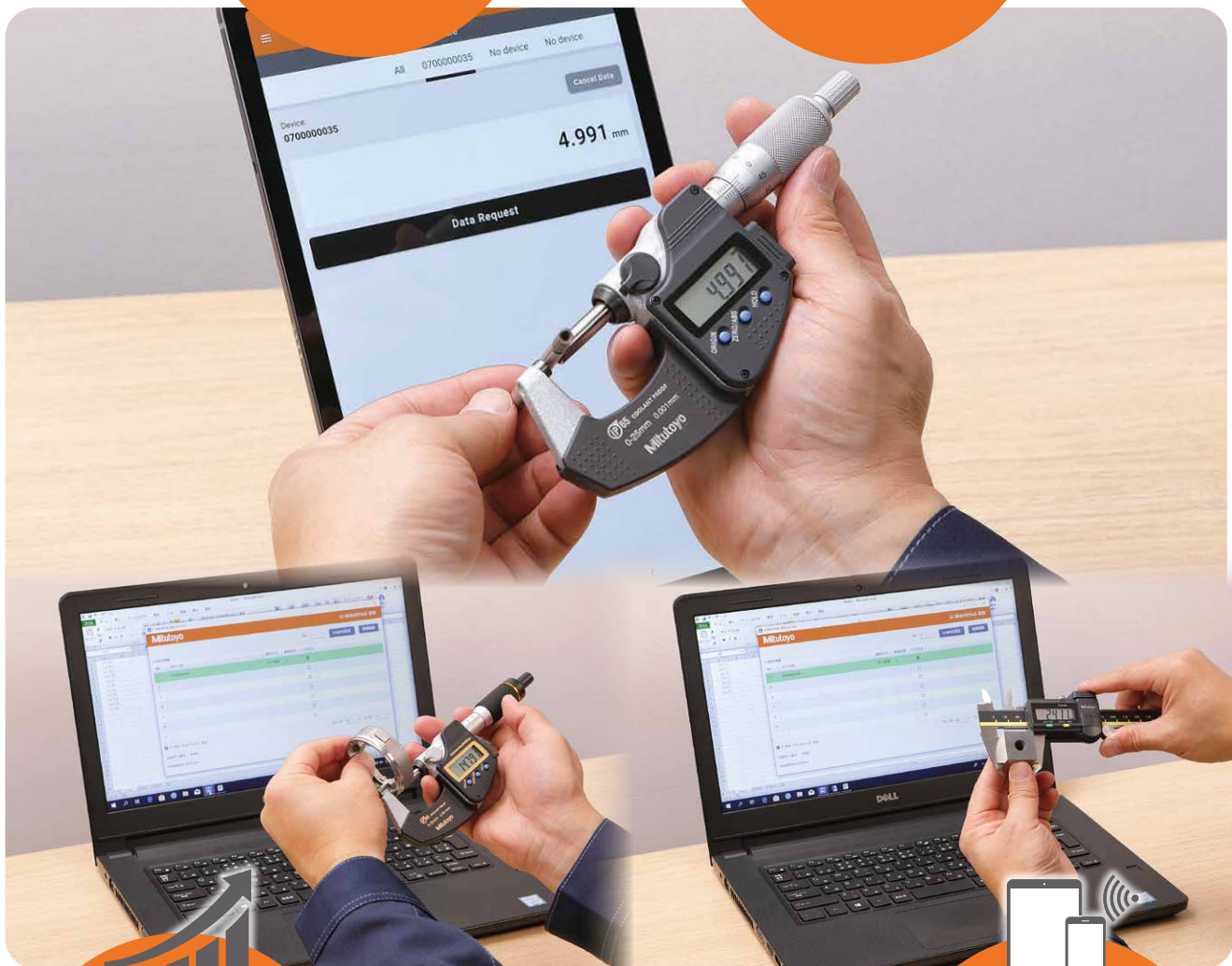
Does Not Require a Receiver

Measurement data can be transmitted to PCs, tablets and smartphones without a receiver if they are equipped with Bluetooth® wireless technology.



Cost Reduction Effect

System can be configured at reduced cost, just by connecting to an existing Digimatic gage.



Higher Efficiency

Data can be input by single button operation. Since there is no need for manual input misinput does not occur. Efficiency is greatly improved.



Centralized Data Management

Measurement data can be managed centrally. "Visualization of quality" helps prevent the generation of defective products.



Easy Data Saving

Measurement data can be saved to smartphones and tablets independently of the measurement site.

You can use with confidence since it is labeled with the wireless certification number acquired in the country of purchase.



With Bluetooth® wireless technology for Easy Pairing with Your Digimatic Micrometer or Caliper

U-WAVE-TMB/ TCB is compatible with most Digimatic micrometers and calipers.
 Refer to pages 28 to 42 for attachable digimatic gages



Digimatic micrometers



Digimatic calipers

Digimatic gage, connecting unit and transmitter combinations

		Assembled appearance	Connecting unit	Transmitter
For micrometers	Buzzer type		No.02AZF310	U-WAVE-TMB No.264-627
	Dust/water-proof type			U-WAVE-TMB No.264-626 IP67
For calipers	Buzzer type		No.02AZF300	U-WAVE-TCB No.264-625
	Dust/water-proof type		No.02AZF310	U-WAVE-TCB No.264-624 IP67

Purpose	<p>Using the application, create a measurement procedure, display and navigate the measurement, and manage the measurement results</p>	<p>Measure a workpiece to perform a simple trend management</p>	<p>Up to seven units of U-WAVE-TCB/TMB can be set up. Measuring results can be transferred to Excel spread sheet.*</p>
Possible actions (Functions)	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Judgment • Data logging • Graphical display of measurement result • Display the histogram of measurement results • Transfer a measurement result (log data) 	<p>U-WAVEPAK-BW enables you to identify the unit sending the data by transmitter device ID. This function is not possible in the normal use of Bluetooth®.</p>
Display language	Japanese / English (Depends on the OS settings)	English	Japanese / English (Depends on the OS settings)
Compatible OS	<p>Android 7.0 or later (iOS not supported)</p> <p>available from Google Play for free download.</p>	<p>Android 7.0 or later / iOS 10.0 or later</p> <p>U-WAVEPAK-BM (English version only), the communication software for transferring measurement data to smartphones and tablets is available at app stores for free download.</p> <p>U-WAVEPAK-BM</p>	<p>Windows10 Pro 64bit</p> <p>■ DL from the following URL</p> <p>https://www.mitutoyo.eu/en_us/downloads/software-and-updates</p>

Note1: We cannot guarantee the operation of this application and U-WAVE TMB/TCB with all Bluetooth equipped devices.

Note2: Google Play and the Google Play logo are trademarks of Google LLC. Apple and the Apple logo are trademarks of Apple Inc.

* By enabling the direct input feature within U-WAVEPAK-BW the results can be written directly to Excel. The results do not include the transmitter device ID. Use of our optional USB-ITPAK or MeasurLink software allows for data sorting by individual transmitter IDs.

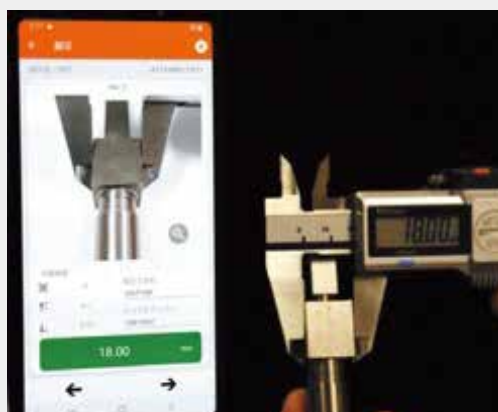
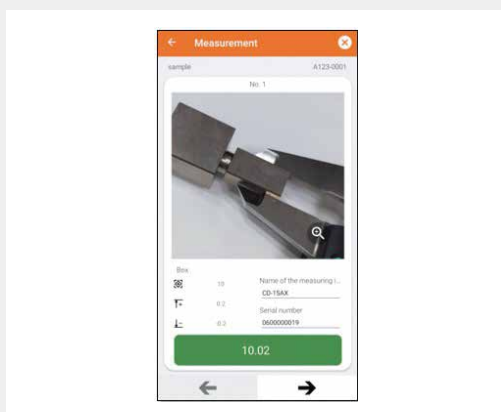
Measurement Navigation Application Mitutoyo U-WAVE Navi



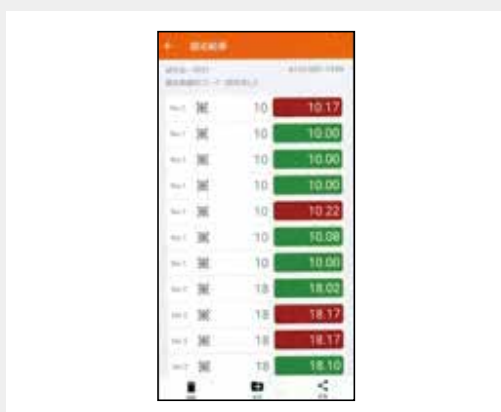
Navigates your measurements easily and steadily

Mitutoyo *Bluetooth*[®] U-WAVE fit allows you to start measurements with your smartphone.

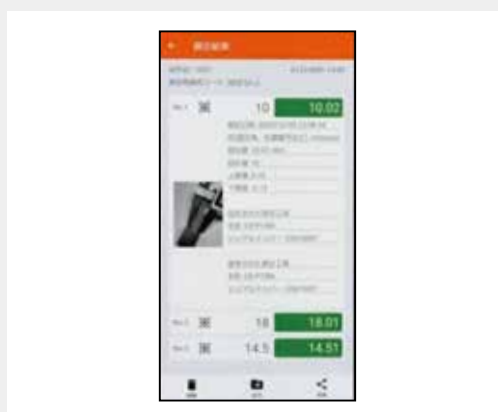
Images and text can be used to build a clear step by step measurement procedure. The app guides you how to measure and also shows you GO/NG judgment.



Easy data management



Data export to PC



Mitutoyo U-WAVE Navi is available at Google Play for free download.

Note: Google Play and the Google Play logo are trademarks of Google LLC.



MeasurLink

Achieve "Visualization of Quality"

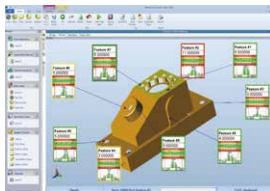
Collecting the measurement data

Measurement Data Wireless Communication System
U-WAVE

IoT of Quality Control

Measurement Data Network System
MeasurLink

Configure the measurement network system MeasurLink using U-WAVE as a base



What is MeasurLink®?

MeasurLink is an IoT platform for quality management that realizes "Visualization of Quality" by enabling real-time data collection from the networked Digimatic gages and global control and analysis. U-WAVE supports MeasurLink as an infrastructure that collects and controls data.

Preventing defectives

Collects data from the Digimatic gages on the network and performs statistical process control (SPC) to warn of possible generation of defectives.

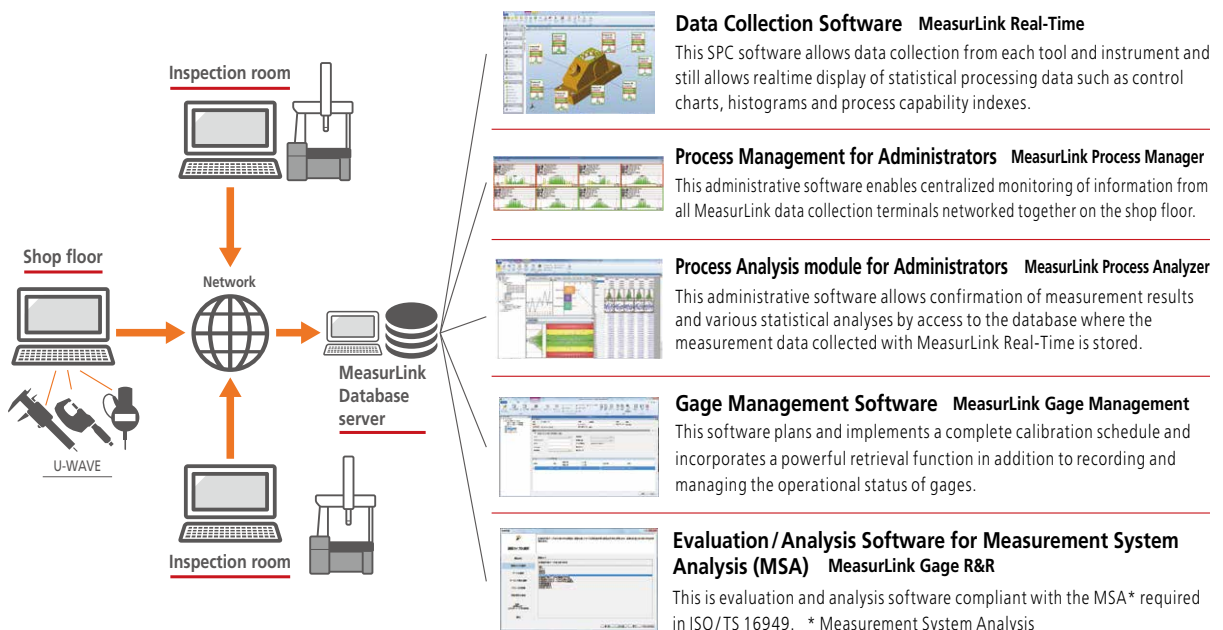
Diagnosis by data analysis

Checking measurement results by accessing the data base and performing various analyses helps investigate and resolve process performance concerns.

Simply start achieving IoT

In addition to conventional data storage, the network can be configured in steps to simply start IoT of Quality Control.

Linkage between U-WAVE and MeasurLink



Note: MeasurLink® is a registered trademark of Mitutoyo Corporation in Japan and Mitutoyo America Corporation in the United States.

■ Specifications

Wireless Communication Specifications

Product name	Wireless communication	Wireless communication distance	Transmission output
U-WAVE-T/TM/TC	Original (based on IEEE802.15.4)	Approx. 20 m (line of sight)	U-WAVE-T: 1 mW (0 dBm) or less U-WAVE-TC/TM: 2.5 mW (4 dBm) or less
U-WAVE-TMB/TCB	Bluetooth® 4.2 Low Energy	Approx. 16 m (line of sight) Approx. 10 m (on shop floor)	3.2 mW 5 dBm) or less (Class2)

Note 1: This product is a radio equipment classified in the 2.4 GHz Wide-band Low Power Data Communication System.


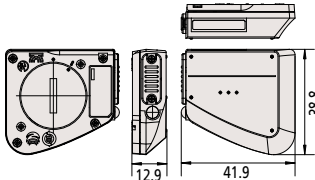


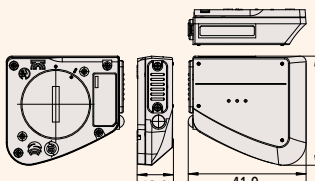


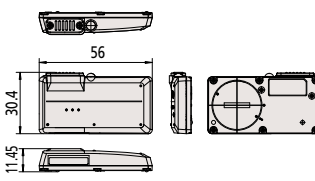


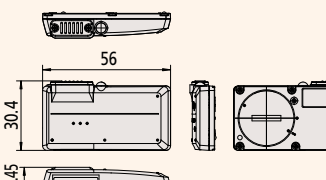


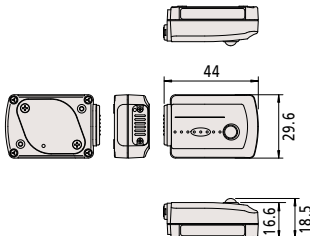

To use this product, conformity to the radio law of each country is required. Please contact your dealer or nearest Mitutoyo sales office.

Note 2: Not compatible with the conventional Mu-WAVE, for which communication specifications are different.

Transmitter (Refer to pages 12 and 13 for combinations.)

Product name	Model	Order No.	Protection level	Data reception indication	Power supply
U-WAVE-TM (for micrometers)	Buzzer type	264-623	N/A	LED, buzzer	Lithium battery CR2032×1
	Dust/water-proof type	264-622	IP67	LED	
U-WAVE-TMB (for micrometers)	Buzzer type	264-627	N/A	LED, buzzer	
	Dust/water-proof type	264-626	IP67	LED	
U-WAVE-TC (for calipers)	Buzzer type	264-621	N/A	LED, buzzer	
	Dust/water-proof type	264-620	IP67	LED	
U-WAVE-TCB (for calipers)	Buzzer type	264-625	N/A	LED, buzzer	
	Dust/water-proof type	264-624	IP67	LED	
U-WAVE-T	Buzzer type	02AZD880G	N/A	LED, buzzer	
	Dust/water-proof type	02AZD730G	IP67	LED	


Modulation method	Communication frequency	Used band
DS-SS (Direct Sequence - Spread Spectrum) Resistant to interfering signals and noise	2.4 GHz band	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz)
FH-SS Frequency-Hopping Spread Spectrum	2.4 GHz band	in accordance with FH-SS 2.400 2.483GHz

Battery life	Mass	Appearance	External dimensions
Approximately 400,000 transmissions in continuous use	18 g		 <p>Unit: mm</p>
	18 g		
Approximately 1 year under normal conditions of use, but varies according to usage.	18 g		 <p>Unit: mm</p>
	18 g		
Approximately 400,000 transmissions in continuous use	18 g		 <p>Unit: mm</p>
	18 g		
Approximately 1 year under normal conditions of use, but varies according to usage.	18 g		 <p>Unit: mm</p>
	18 g		
Approximately 400,000 transmissions in continuous use	23 g		 <p>Unit: mm</p>
	23 g		


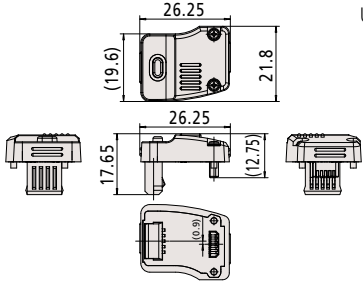

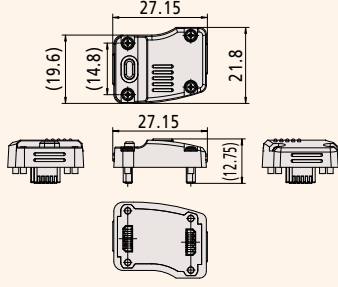
Connecting unit (Refer to pages 12 and 13 for combinations.)

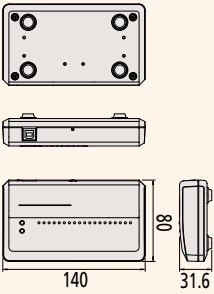
Product name	Model	Order No.	Protection level
Connecting unit	For standard type	02AZF300	N/A
	For dust/water-proof type	02AZF310	IP67

Receiver (Refer to pages 12 and 13 for combinations.)

Product name	Model	Order No.	Power supply	Connectable U-WAVE-R units (per PC)	Connectable U-WAVE-T units	Mass	Appearance
U-WAVE-R	U-WAVE-R	02AZD810D	USB bus power system	Up to 15	Up to 100	130 g	

Note: U-WAVEPAK software is packed together with the U-Wave receiver. If your computer has no DVD drive then please download and install U-WAVEPAK from our website.

Mass	Appearance	External dimensions
6 g		 <p>Unit: mm</p>
6 g		 <p>Unit: mm</p>

External dimensions	Standard accessory: U-WAVEPAK software		
	System Environment: Compatible OS	Main specifications	Data format
<p>Unit: mm</p> 	<p>Windows 2000 Professional (SP4 or later)* Windows XP Home Edition (SP2 or later)* Windows XP Professional (SP2 or later)* Windows Vista* Windows 7* Windows 8/8.1* Windows 10*</p> <p>Note: Windows 10 Mobile is not supported. * 32-bit, 64-bit OS supported</p> <p><Versions confirmed operational on Windows 10> U-WAVEPAK Ver. 1.020 or later</p> <p><Connectability confirmed for tablet PC> Microsoft Surface Pro 6 (the version whose operation on Windows 10 Professional is confirmed) Required environment: DVD drive (required for installation), USB port x2 ports or more</p>	<p>Setup of dedicated driver software (USB and virtual COM port) Initial setting of ID number and frequency selection (required only once for the first time) Load data to Microsoft Excel or Notepad through the data interface function</p>	<p>Example of format when the Digimatic gage displays 12.34</p> <p>DT1 01 02 +00000012.34</p> <p>Header DT1: Measurement data ST1: Status code</p> <p>Digimatic gage display value¹ U-WAVE-TC/TM/T ID: 00 to 99 U-WAVE-R ID: 00 to 99</p> <p>Unit M: mm</p> <p>*1 Data interface function is switchable to "Measurement value only"</p> <p>Example of status code format</p> <p>ST1 01 02 0999999073 99</p> <p>Header Status code U-WAVE-R ID U-WAVE-TC/TM/T ID</p> <p>Device ID² Status code 99: Data cancellation 01: No response from Digimatic gage 03: Measurement data missing, others</p> <p>*2 Unique number assigned to U-WAVE at shipment</p>

Dedicated cable for U-WAVE-T (Refer to pages 12 and 13 for combinations.)

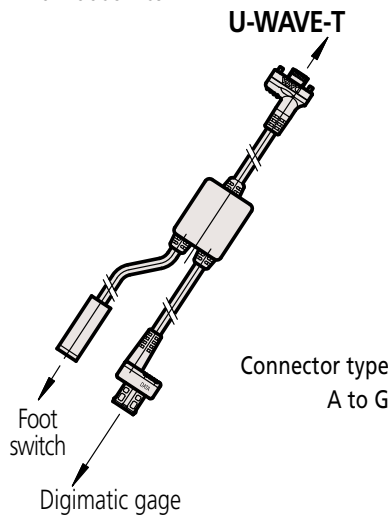
Product name	Connecting cable			Gage connectors on data cable	
	Connector type	Order No.		Picture of gage connector	Data switch
		Standard	For foot switch		
Dedicated cable for U-WAVE-T	A Water-proof type with output button	02AZD790A	02AZE140A		✓
	B Water-proof type with output button	02AZD790B	02AZE140B		✓
	C Straight type with output button	02AZD790C	02AZE140C		✓
	D Flat 10-pin type	02AZD790D	02AZE140D		—
	E Round 6-pin type	02AZD790E	02AZE140E		—
	F Flat straight type	02AZD790F	02AZE140F		—
	G Flat straight water-proof type	02AZD790G	02AZE140G		—

Standard



Connector type A to G

For foot switch



Connector type A to G

Foot Switch (optional)



Order No.937179T

Digimatic ports on gage	
Picture of Digimatic port	Applicable models
	<p>[Digimatic caliper] 500-712-20/500-713-20, etc. 550-301-20/550-331-20, etc. 551-301-20/551-331-20, etc. 552-302-10/552-303-10, etc. 552-150-10/552-151-10, etc. 552-155-10/552-156-10, etc. 552-181-10/552-182-10, etc.</p> <p>[Digimatic special application caliper] 573-601-20/573-602-20, etc. [Digimatic depth gage] 571-251-20/571-252-20, etc. [Digimatic scale unit] 572-600, 572-601, etc.</p>
	<p>[Digimatic micrometer] 293-140-30/293-141-30, etc. 293-230-30 etc. 340-251-30/340-252-30 293-666-20/293-667-20, etc. 227-201-20/227-203-20, etc. 227-205-20/227-206-20, etc. 227-221-20 etc. 227-223-20 etc. [Dedicated micrometers for Digimatic] 422-230-30/422-231-30, etc. 406-250-30/406-251-30, etc. 343-250-30/343-251-30, etc. 369-250-30/369-251-30, etc.</p> <p>[Digimatic special application caliper] 573-601-20/573-602-20, etc. [Digimatic depth gage] 571-251-20/571-252-20, etc.</p> <p>[Digimatic micrometer head] 350-251-30/350-261-30, etc. [Digimatic holtest] 468-161/468-162, etc. [Digimatic depth gage] 329-250-30/329-251-30, etc.</p>
	<p>[Digimatic caliper] 500-150-30/500-151-30, etc. 500-500-10/500-501-10, etc. 500-443 etc.</p> <p>[Digimatic special application caliper] 573-718-20/573-719-20, etc. 573-716-20/573-717-20, etc. 573-191-30/573-291-30 573-181-30/573-182-30, etc. [Digimatic depth gage] 571-201-30/571-202-30, etc.</p> <p>[Digimatic micrometer head] 164-163/164-164 [Digimatic scale unit] 572-203-10/572-213-10 572-300-10/572-301-10, etc.</p>
	<p>[Digimatic indicator] ID-H ID-F (Note)</p> <p>[High-precision height gage] QM-Height</p>
	<p>[Hardness testing machines] HM-100, HM-200, HV-100, HR-300/400/500, HH-411</p>
	<p>[Digimatic indicator] ID-CX, ID-C (Peak-Value Hold Type), ID-C (Calculation type), ID-C (Bore Gage Type), ID-U (Note), ID-SS (Note), ID-SX (Note) [Digimatic height gage] 192-663-10/192-613-10/570-322/570-227, etc. (Flat L-shape, cable outlet is right) [ABS borematic] 568-361/568-362, etc. [Digimatic bore gage] 511-501/511-502, etc.</p> <p>[Scale unit] 572-460/572-560/572-480-10/572-580-10, etc. [Hardness testing machines] HH-300 [Digimatic depth gage] Digimatic type (ID-CX)</p>
	<p>[Digimatic indicator] ID-N, ID-B</p>

Note: If your digimatic gage doesn't have a DATA button, use the button on U-WAVE-T connection or connect it to a foot switch by using the optional foot switch connecting cable.

Optional Products

Application system

Product name	Model	Compatible OS: Windows ^{*1}	Compatible Excel version ^{*2}	Order No.
USB-ITPAK	06AFM386	2000 SP4 XP SP2 or later Vista 7 8 8.1 10	2002 2003 2007 2010 2013 2016 365	USB-ITPAK V2.1

*1 32-bit, 64-bit OS supported Windows 10 Mobile is not supported. *2 The operation with Excel for MAC OS is not guaranteed.

Installation bracket Kit for U-WAVE

Product	Type	Order No.	Application example	Attachable unit	Accessory
Bracket for U-WAVE-T	standard	02AZE200		U-WAVE-T	Detachable fastener: 2pcs. (mirror imaged) Mounting screws for U-WAVE: 2 pcs.
Bracket for QM-Height	dedicated for QM-Height	02AZE990		U-WAVE-T	Mounting screws for back plate: 2 pcs. Mounting screws for U-WAVE: 2 pcs.
Bracket for digimatic indicator ID-S / ID-C	dedicated for ID-S and ID-C digimatic indicator	02AZF670		U-WAVE-TM/TMB	Mounting screws for back plate: 2 pcs. Mounting screws for U-WAVE: 2 pcs.
Bracket for digimatic indicator ID-N	dedicated for ABS coolant proof digimatic indicator ID-N	02AZF675		U-WAVE-TM/TMB	Mounting screws for back plate: 2 pcs. Mounting screws for U-WAVE: 2 pcs.

• Application examples of the mounting plate

Digimatic Indicator ID-C with 02AZE200



• Image of fastener attachment to main gage

In the case of an indicator



ID-C

A back plate without a center lug is recommended. If a lug is present, attach fastener after cutting away material to clear the lug.

Height Gauge QM-Height with 02AZE990



Digimatic Indicator ID-C with 02AZF670



Attachable to ID-C in the various positions



U-WAVE-TM/TMB compatible Digimatic micrometers/heads

* Current product

Order No.	Product name	Unit	Connecting unit	
293-140	QuantuMike	mm	02AZF310	
*293-140-30				
293-141				
*293-141-30				
293-142				
*293-142-30				
293-143				
*293-143-30				
293-180				
*293-180-30				
293-181				
*293-181-30				
293-182				
*293-182-30				
293-183				
*293-183-30				
293-230		Coolant proof micrometer		mm
*293-230-30				
293-231				
*293-231-30				
293-232				
*293-232-30				
293-233				
*293-233-30				
293-234				
*293-234-30				
293-235				
*293-235-30				
293-236				
*293-236-30				
293-237				
*293-237-30				
293-238				
293-250				
293-250-10				
*293-250-30				
293-251				
293-251-10				
*293-251-30				
293-252				
293-252-10				
*293-252-30				
293-253				
293-253-10				
*293-253-30				
293-254				
293-254-10				
*293-254-30				
293-255				
293-255-10				
*293-255-30				
293-256				
293-256-10				
*293-256-30				

* Current product

Order No.	Product name	Unit	Connecting unit
293-257	Coolant proof micrometer	mm	02AZF310
293-257-10			
*293-257-30			
293-330			
*293-330-30		inch/mm	
293-331			
*293-331-30			
293-332			
*293-332-30			
293-333			
*293-333-30			
293-334			
*293-334-30			
293-335			
*293-335-30			
293-336			
*293-336-30			
293-350			
293-350-10			
*293-350-30			
293-351			
293-351-10			
*293-351-30			
293-352			
293-352-10			
*293-352-30			
293-353			
293-353-10			
*293-353-30			
293-354			
293-354-10			
*293-354-30			
293-355			
293-355-10			
*293-355-30			
293-356			
293-356-10			
*293-356-30			
293-357			
293-357-10			
*293-357-30			
293-960	mm		
*293-960-30			
293-961			
*293-961-30			
293-962			
*293-962-30			
293-963			
*293-963-30			
293-964			
293-965			
293-966			
*293-966-30			

* Current product

Order No.	Product name	Unit	Connecting unit
314-251	V-anvil micrometer	mm	02AZF310
314-251-10			
*314-251-30			
314-252			
314-252-10			
*314-252-30			
314-253			
314-253-10			
*314-253-30			
314-261			
314-261-10			
*314-261-30			
314-262			
314-262-10			
*314-262-30			
314-351		inch/mm	
314-351-10			
*314-351-30			
314-352			
314-352-10			
*314-352-30			
314-353			
314-353-10			
*314-353-30			
314-361			
314-361-10			
*314-361-30			
314-362			
314-362-10			
*314-362-30			
317-251	Uni-micrometer	mm	
*317-251-30			
317-252			
*317-252-30			
317-351			
*317-351-30			
317-352			
*317-352-30			
323-250		mm	
*323-250-30			
323-251			
*323-251-30			
323-252			
*323-252-30			
323-253			
*323-253-30			
323-350	inch/mm		
*323-350-30			
323-351			
*323-351-30			
323-352			
*323-352-30			
323-353			
*323-353-30			

* Current product

Order No.	Product name	Unit	Connecting unit
324-251	Gear tooth micrometer	mm	02AZF310
324-251-10			
*324-251-30			
324-252			
324-252-10			
*324-252-30			
324-253			
324-253-10			
*324-253-30			
324-254			
324-254-10			
*324-254-30			
324-351		inch/mm	
324-351-10			
*324-351-30			
324-352			
324-352-10			
*324-352-30			
324-353			
324-353-10			
*324-353-30			
324-354			
324-354-10			
*324-354-30			
326-251	Screw thread micrometer	mm	
326-251-10			
*326-251-30			
326-252			
326-252-10			
*326-252-30			
326-253			
326-253-10			
*326-253-30			
326-254			
326-254-10			
*326-254-30			
326-351		inch/mm	
326-351-10			
*326-351-30			
326-352			
326-352-10			
*326-352-30			
326-353			
326-353-10			
*326-353-30			
326-354			
326-354-10			
*326-354-30			
329-250	Depth micrometer	mm	
329-250-10			
*329-250-30			
329-251			
329-251-10			
*329-251-30			
329-350	inch/mm		

* Current product

Order No.	Product name	Unit	Connecting unit
329-350-10	Depth micrometer	inch/mm	02AZF310
*329-350-30			
329-351			
329-351-10			
*329-351-30			
331-251	Spline micrometer	mm	
*331-251-30			
331-252			
*331-252-30			
331-253			
*331-253-30			
331-254			
*331-254-30			
331-261			
*331-261-30			
331-262			
*331-262-30			
331-263			
*331-263-30			
331-264			
*331-264-30			
331-351		inch/mm	
*331-351-30			
331-352			
*331-352-30			
331-353			
*331-353-30			
331-354			
*331-354-30			
331-361			
*331-361-30			
331-362			
*331-362-30			
331-363			
*331-363-30			
331-364			
*331-364-30			
340-251	Outside micrometer	mm	
340-251-10			
*340-251-30			
340-252			
340-252-10			
*340-252-30			
340-351		inch/mm	
340-351-10			
*340-351-30			
340-352			
340-352-10			
*340-352-30			
342-251	Point micrometer	mm	
*342-251-30			
342-252			
*342-252-30			
342-253			

* Current product

Order No.	Product name	Unit	Connecting unit
*342-253-30	Point micrometer	mm	02AZF310
342-254			
*342-254-30			
342-261			
*342-261-30			
342-262			
*342-262-30			
342-263			
*342-263-30			
342-264			
*342-264-30			
342-271			
*342-271-30			
342-351	Point micrometer	inch/mm	
*342-351-30			
342-352			
*342-352-30			
342-353			
*342-353-30			
342-354			
*342-354-30			
342-361			
*342-361-30			
342-362			
*342-362-30			
342-363			
*342-363-30			
342-364			
*342-364-30	Crimp height micrometer		
342-371			
*342-371-30	Caliper type outside micrometer	mm	
343-250			
*343-250-30			
343-251			
*343-251-30			
343-252			
*343-252-30			
343-253			
*343-253-30			
343-350		inch/mm	
*343-350-30			
343-351			
*343-351-30			
343-352			
*343-352-30			
343-353			
*343-353-30			
345-250			Caliper type inside micrometer
345-250-10			
*345-250-30			
345-251	inch/mm		
345-251-10			
*345-251-30			
345-350			

* Current product

Order No.	Product name	Unit	Connecting unit
345-350-10	Caliper type inside micrometer	inch/mm	
*345-350-30			
345-351			
345-351-10			
*345-351-30			
350-251	Digimatic micrometer head	mm	02AZF310
350-251-10			
*350-251-30			
350-252			
350-252-10			
*350-252-30			
350-253			
350-253-10			
*350-253-30			
350-254			
350-254-10			
*350-254-30			
350-261			
350-261-10			
*350-261-30			
350-271			
350-271-10			
*350-271-30			
350-272			
350-272-10			
350-272-20			
*350-272-30			
350-273			
350-273-10			
*350-273-30			
350-274			
350-274-10			
350-274-20			
*350-274-30			
350-281			
350-281-10			
*350-281-30			
350-282			
350-282-10			
*350-282-30			
350-283			
350-283-10			
*350-283-30			
350-284			
350-284-10			
*350-284-30			
350-351	inch/mm		
350-351-10			
*350-351-30			
350-352			
350-352-10			
*350-352-30			
350-353			
350-353-10			

* Current product

Order No.	Product name	Unit	Connecting unit
*350-353-30	Digimatic micrometer head	inch/mm	
350-354			
350-354-10			
*350-354-30			
350-357-10			
*350-357-30			
350-361			
350-361-10			
*350-361-30			
350-381			
350-381-10			
*350-381-30			
350-382			
350-382-10			
*350-382-30			
350-383			
350-383-10			
*350-383-30			
350-384			
350-384-10			
*350-384-30	Disk micrometer	mm	02AZF310
369-250			
*369-250-30			
369-251			
*369-251-30			
369-252			
*369-252-30			
369-253			
*369-253-30			
369-350			
*369-350-30			
369-351			
*369-351-30			
369-352			
*369-352-30			
369-353			
*369-353-30	Sheet metal micrometer	mm	02AZF310
389-251			
*389-251-30			
389-252			
*389-252-30			
389-261			
*389-261-30			
389-262			
*389-262-30			
389-271			
*389-271-30			
389-272			
*389-272-30			
389-351			
*389-351-30			
389-352			
*389-352-30			
389-361	inch/mm		

* Current product

Order No.	Product name	Unit	Connecting unit
*389-361-30	Sheet metal micrometer	inch/mm	02AZF310
389-362			
*389-362-30			
389-371			
*389-371-30			
389-372			
*389-372-30			
395-251	Tube micrometer	mm	02AZF310
*395-251-30			
395-252			
*395-252-30			
395-253			
*395-253-30			
395-254			
*395-254-30			
395-261			
*395-261-30			
395-262			
*395-262-30			
395-263			
*395-263-30			
395-264			
*395-264-30			
395-271			
*395-271-30			
395-272			
*395-272-30			
395-273			
*395-273-30			
395-274			
*395-274-30			
395-351		inch/mm	
*395-351-30			
395-352			
*395-352-30			
395-353			
*395-353-30			
395-354			
*395-354-30			
395-362			
*395-362-30			
395-363			
*395-363-30			
395-364			
*395-364-30			
395-371			
*395-371-30			
395-372			
*395-372-30			
395-373			
*395-373-30			
395-374			
*395-374-30			

* Current product

Order No.	Product name	Unit	Connecting unit		
406-250	Outside micrometer, non-rotating spindle	mm	02AZF310		
*406-250-30					
406-251					
*406-251-30					
406-252					
*406-252-30					
406-253					
*406-253-30					
406-350				inch/mm	
*406-350-30					
406-351					
*406-351-30					
406-352					
*406-352-30					
406-353					
*406-353-30					
422-230		Blade micrometer, non-rotating spindle			mm
*422-230-30					
422-231					
*422-231-30					
422-232					
*422-232-30					
422-233					
*422-233-30					
422-260	inch/mm				
*422-260-30					
422-261					
*422-261-30					
422-270					
*422-270-30					
422-271					
*422-271-30					
422-330				mm	
*422-330-30					
422-331					
*422-331-30					
422-332					
*422-332-30					
422-333					
*422-333-30					
422-360			inch/mm		
*422-360-30					
422-361					
*422-361-30					
422-370					
*422-370-30					
422-371					
*422-371-30					

U-WAVE-TC/TCB compatible Digimatic caliper/depth gage

* Current product

Order No.	Product name	Unit	Connecting unit
500-150-20	ABS Digimatic caliper	mm	02AZF300
*500-150-30			
500-151-20			
*500-151-30			
500-152-20			
*500-152-30			
500-153			
*500-153-30			
500-154-20			
*500-154-30			
500-155-20			
*500-155-30			
500-156-20			
*500-156-30			
500-157-20			
*500-157-30			
500-158-20			
*500-158-30			
500-161-21			
*500-161-30			
500-162-21			
*500-162-30			
500-167			
*500-167-30			
500-168			
*500-168-30			
500-170-20			
*500-170-30			
500-171-20			
*500-171-30			
500-172-20			
*500-172-30			
500-173			
*500-173-30			
500-174-20			
*500-174-30			
500-175-20			
*500-175-30			
500-176-20			
*500-176-30			
500-177-20			
*500-177-30			
500-178-20			
*500-178-30			
500-201-21			
*500-201-30			
500-202-21			
*500-202-30			
500-203-21			
*500-203-30			
500-204-21			
*500-204-30			
500-205			
*500-205-30			
		inch/mm	
		mm	
		inch/mm	
		mm	
		inch/mm	
		mm	

* Current product

Order No.	Product name	Unit	Connecting unit	
500-233-21	ABS Digimatic caliper	mm	02AZF300	
*500-233-30				
500-234-21				
*500-234-30				
500-235-21				
*500-235-30				
500-236-21				
*500-236-30				
500-443				
500-444				
500-445				
500-463				inch/mm
500-464				
500-465				
571-201-20				Depth gage
*571-201-30				
571-202-20				
*571-202-30				
571-203-20				
*571-203-30	inch/mm			
571-211-20				
*571-211-30				
571-212-20				
*571-212-30				
571-213-10	mm	02AZF310		
*571-213-30				
573-191-20				
*573-191-30				
573-291-20			inch/mm	
*573-291-30				
500-712-10	ABS coolant proof caliper	mm	02AZF310	
*500-712-20				
500-713-10				
*500-713-20				
500-714-10				
*500-714-20				
500-716-11				
*500-716-20				
500-717-11				
*500-717-20				
500-718-11				
*500-718-20				
500-719-10				
*500-719-20				
500-720-11				inch/mm
*500-720-20				
500-721-10		mm		
*500-721-20				
500-722-10				
*500-722-20				
500-723-10				
*500-723-20				
500-724-10				
*500-724-20				

* Current product

Order No.	Product name	Unit	Connecting unit
500-727-11	ABS coolant proof caliper	mm	02AZF310
*500-727-20			
500-728-11		inch/mm	
*500-728-20			
500-735-10		inch/mm	
500-735-20			
500-736-10			
*500-736-20			
500-737-10			
*500-737-20			
500-738-10			
*500-738-20			
500-762-10			
*500-762-20			
500-763-10			
*500-763-20			
500-764-10			
*500-764-20			
500-769-10			
*500-769-20			
550-301-10	ABS Digimatic caliper, nib style jaws		mm
*550-301-20			inch/mm
550-311-10		mm	
*550-311-20		inch/mm	
550-331-10		inch/mm	
*550-331-20			
551-301-10	ABS Digimatic caliper, nib style and standard jaws	mm	
*551-301-20		inch/mm	
551-311-10		mm	
*551-311-20		inch/mm	
551-331-10		mm	
*551-331-20		inch/mm	
551-341-10		mm	
*551-341-20			
571-100-20	mm		
*571-200-20			
571-251-10	mm		
*571-251-20			
571-252-10			
*571-252-20			
571-253-10			
*571-253-20			
571-254-10			
*571-254-20			
571-255-10			
*571-255-20			
571-261-10		inch/mm	
*571-261-20			
571-262-10			
*571-262-20			
571-263-10			
*571-263-20			

* Current product

Order No.	Product name	Unit	Connecting unit	
571-264-10	Depth gage	inch/mm	02AZF310	
*571-264-20				
571-265-10				
*571-265-20		mm		
571-301-10				
*571-301-20				
571-302-10		inch/mm		
*571-302-20				
571-311-10				
571-311-20		Dedicated caliper		mm
571-312-10				
*571-312-20				
573-601				
*573-601-20				
573-602				
*573-602-20				
573-604				
*573-604-20				
573-605				
*573-605-20				
573-606				
*573-606-20				
573-608				
*573-608-20				
573-611				
*573-611-20				
573-612				
*573-612-20				
573-614				
*573-614-20				
573-615				
*573-615-20				
573-616				
*573-616-20				
573-618				
*573-618-20				
573-621				
*573-621-20				
573-622				
*573-622-20				
573-625				
*573-625-20				
573-626				
*573-626-20				
573-634				
*573-634-20				
573-635				
*573-635-20				
573-645				
*573-645-20				
573-646				
*573-646-20				
573-647				
*573-647-20				

* Current product

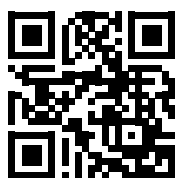
Order No.	Product name	Unit	Connecting unit	
573-648	Dedicated caliper	mm	02AZF310	
*573-648-20				
573-651				
*573-651-20				
573-652				
*573-652-20				
573-653				
*573-653-20				
573-654				
*573-654-20				
573-661				
573-661-20				
573-662				
*573-662-20				
573-676				
*573-676-20				
573-677				
*573-677-20				
573-679				
*573-679-20				
573-701				inch/mm
*573-701-20				
573-702				
*573-702-20				
573-704				
*573-704-20				
573-705				
*573-705-20				
573-706				
*573-706-20				
573-708				
*573-708-20				
573-721				
*573-721-20				
573-725				
*573-725-20				
573-734				
*573-734-20				
573-745				
*573-745-20				
573-746				
*573-746-20				
573-751				
*573-751-20				
573-752				
*573-752-20				
573-761				
*573-761-20				



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Mitutoyo

Mitutoyo Europe GmbH

Borsigstraße 8-10

41469 Neuss

Tel. +49 (0) 2137-102-0

info@mitutoyo.eu

www.mitutoyo.eu