

U-WAVE

Wireless Data Collection System

What is the U-WAVE Series?

- The **U-WAVE** Wireless Measurement Data Communication System quickly collects accurate measurement data from the on-site inspection process to help perform detailed analysis.
- Measurement results can be sent wirelessly and saved on a PC, smartphone or tablet. This is a smart system not requiring handwriting or manual input from a keyboard.

Acquire measurement data from various Digimatic gages equipped with U-WAVE.

Instantly transfer data wirelessly to your PC, smartphone or tablet.



You can choose from a variety of products and applications.

Stable communication is possible up to a maximum communication distance of 16-20 m*. Efficiency is greatly improved by being able to work without worrying about cable length or snags, etc.

- Freedom of movement
- Human error during manual input is eliminated
- Flexible layout of measurement site
- Stable wireless communication



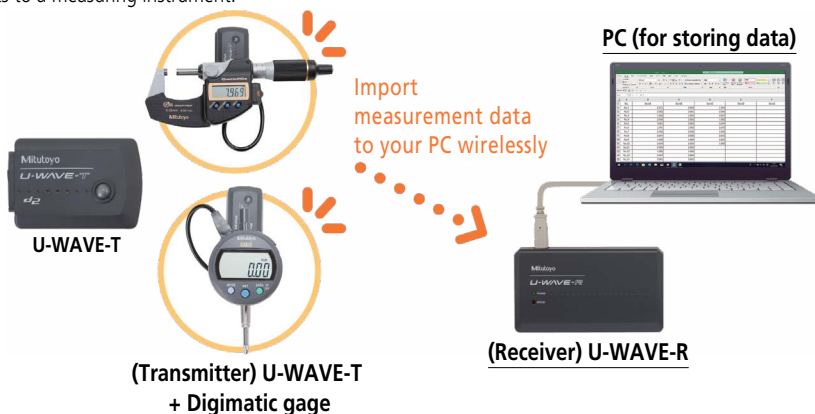
*May be affected by the electromagnetic environment.

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

The following three types are currently available.

U-WAVE Wireless

The system consists of a “U-WAVE-R” receiver that connects to a PC and a “U-WAVE-T” transmitter that connects to a measuring instrument.



Function comparison table

	U-WAVE Wireless	U-WAVE Bluetooth
Communication protocol	Mitutoyo Original <based on IEEE80a2.15.4>	Bluetooth® 4.2
Communication distance	Approx. 20 m (line of sight)	Approx. 16 m (line of sight)
Communication frequency	2.405 to 2.475 GHz	2.402 to 2.480 GHz
Selectable frequency	Yes	Frequency hopping spread spectrum
Selectable control key	Yes (enter, tab, left, right, up, down)	No (simulates enter key only)
Battery life	Approx. 400,000 transmissions	Approx. 50,000 to 200,000 transmissions
Operating system	Windows	Windows, iOS, Android
U-Wave-R compatible	Required (P/N: 02AZD810D)	No
Maximum number of connections	100	7 (PC) 3 (mobile devices)
Operation modes	Keyboard emulator or VCP	
Measurement modes	Button or event driven (data request from PC or on timed interval)	
Long button press	Cancel data command	
LED	Data confirmation and low battery warning	
Data export	Microsoft® Excel® or SPC software applications	
Durability	Dust/waterproof and shop-hardened with proprietary fiber-reinforced plastic housing	
Dedicated application/software	U-WAVEPAK (included with U-WAVE receiver) USB-ITPAK	U-WAVEPAK-BW U-WAVE Navi USB-ITPAK



Find a Distributor

U-WAVE

Wireless Data Collection System

U-WAVE TIB

The all-in-one Bluetooth transmitter dedicated to the SJ-220 supports bidirectional communication. See section J for more details



With Wireless Unit for Measuring Instrument U-WAVE-TIB installed

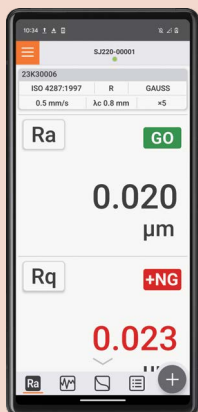


Wireless Unit for Measuring Instrument U-WAVE-TIB

Bluetooth®
(Bluetooth® 5.0)

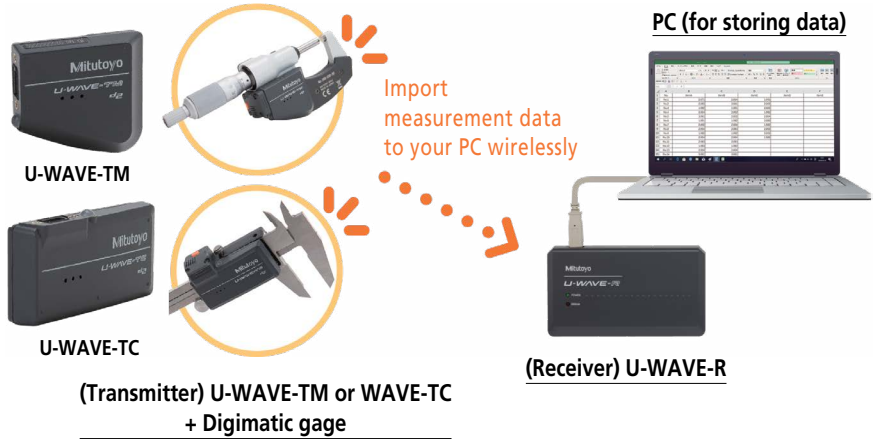


Bidirectional communication
(BLE communication)



U-WAVE fit

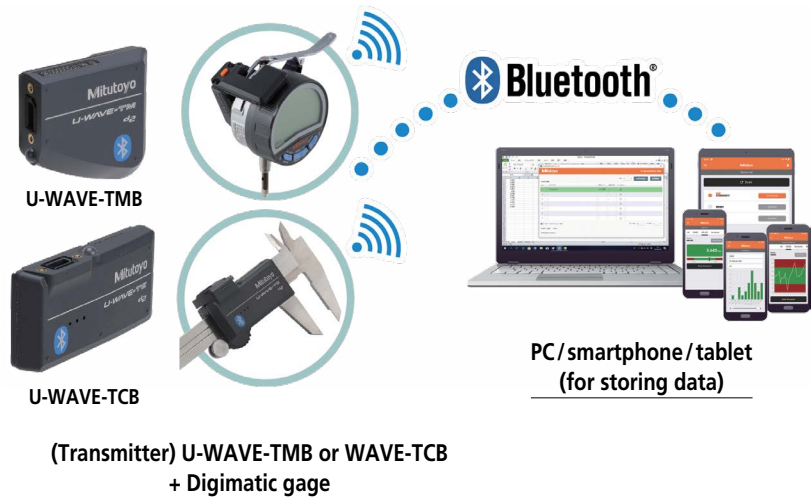
Part of the **U-WAVE** Wireless system, these transmitters are smaller and thinner, and have improved operability, being designed specifically for use with small Digimatic gages.



U-WAVE Bluetooth®

This is a **Bluetooth®** version of **U-WAVE fit**. It can connect to a **Bluetooth®** enabled device such as a PC, smartphone, or tablet without going through a **U-WAVE-R** or similar dedicated receiver.

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



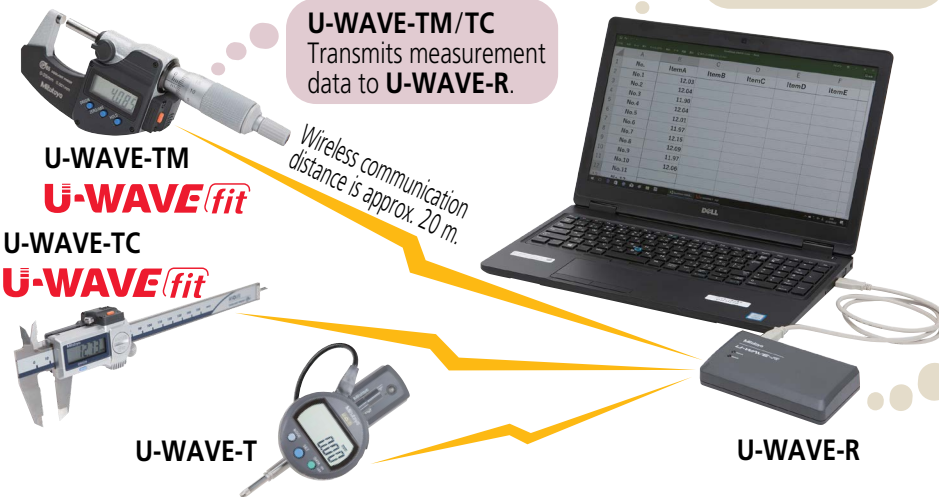
U-WAVE Wireless

Wireless Data Collection System

U-WAVE-TM/TC (U-WAVE fit)

- **U-WAVE fit** models are now smaller and thinner with improved operability, designed specifically for use with small Digimatic gages.
- The system using our proprietary transmission method features stable communication and low power consumption, resulting in improved work efficiency.
- The wireless system without cabling can keep the workplace tidy and increase workability during measurement.
- Up to 100 Digimatic gages can be registered to a single **U-WAVE-R**, and wireless communication distance is approx. 20 m. Therefore the measurement data can be managed centrally on the shop floor.
- Installing the optional **USB-ITPAK V3.0** software enables the use of Excel to improve measurement efficiency. It makes it possible to populate the data from multiple measuring instruments into separate spreadsheets or input the data collectively at the same time.

U-WAVE fit system configuration



U-WAVE-TM/TC (U-WAVE fit) System Communication Specifications

• Wireless communication

Wireless specifications	Original <based on IEEE802.15.4 (2.4 GHz)>
Wireless communication distance	Approx. 20 m (line of sight)
Wireless communication speed	250 kbps
Transmission output	2.5 mW (4 dBm) or less
Modulation method	DS-SS (Direct Sequence - Spread Spectrum) Resistant to interfering signals and noise
Communication frequency	2.405-GHz band (ISM band: Universal frequency)
Used band	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz) The noise search function avoids interference with other communication devices.

A maximum of 100 Digimatic gages can be connected. Loads the data received from **U-WAVE-TM/TC/T** to a PC via USB.

Main specifications of U-WAVEPAK

- 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



Need Support?

U-WAVE-R

Model	U-WAVE-R
Order No.	02AZD810D
Power source	USB bus power system
Number of U-WAVE-R units that can be connected to one PC	Up to 15
Number of U-WAVE-T units that can be connected	Up to 100
External dimensions (mm)	140×80×31.6
Mass (g)	130

U-WAVE-R main unit



USB2.0 cable (1 m) attached

U-WAVEPAK



U-WAVEPAK software (standard accessory)

System Environment:

- Compatible OS
- 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*
- Windows 11 Version 1022B or later
- * 32-bit, 64-bit OS supported
- <Versions confirmed operational on Windows 10>
- **U-WAVEPAK Version1.020** or later

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

Note: Cannot be connected to a device other than a PC (such as **DP-1VA LOGGER**, sequencer etc.).

U-WAVEPAK software can be downloaded here.



U-WAVE Wireless

Wireless Data Collection System

Typical applications



U-WAVE-TM (264-622)



U-WAVE-TC (264-620)

Fit Transmitter/connecting unit



264-622



O2AZF310



264-621



O2AZF300

SPECIFICATIONS

IP67 type is resistant to water and dust ingress. Buzzer type notifies data reception by buzzer sound and LED.

Connectable measuring instruments	Micrometer		Caliper	
	U-WAVE-TM (IP67 type)	U-WAVE-TM (buzzer type)	U-WAVE-TC (IP67 type)	U-WAVE-TC (buzzer type)
Model	264-622	264-623	264-620	264-621
Order No.	264-622	264-623	264-620	264-621
Protection Rating	IP67	N/A	IP67	N/A
Data reception indication	LEDs	Buzzer and LEDs	LEDs	Buzzer and LEDs
Power source	Lithium battery CR2032x1			
Battery life	Approx. 400,000 times continuous data transmission			
External dimensions (mm)	41.9x12.9x38.8		56x11.45x30.4	
Mass (g)	18			

Fixed to transmission unit and inserted into output connector of Digimatic gage.

Order No.	O2AZF310	O2AZF300	O2AZF960	O2AZF700
Protection level	IP67	N/A	IP67	N/A
Mass (g)	6		10	
Connectable transmitter	U-WAVE-TM/TC (IP67 type)	U-WAVE-TC (for standard type)	U-WAVE-TM (for QuantuMike*)	ID-CNX/ID-FNX (12.7mm type only)

Note 1: **O2AZF310** ensures water-proof performance only when attached to measuring instruments of IP67 type.

For information on supported connecting units, please contact your local Mitutoyo sales office.

Note 2: Water-proof performance is ensured only when attached to measuring instruments of IP67 type.

* **O2AZF960** is applicable to new models (293-14X-40/293-18X-40).

Compatibility of measuring tool and unit

Digimatic gage	Connecting unit/connecting cable	Transmitter	Receiver
Digimatic Micrometers	Standard type 	Buzzer type U-WAVE-TM 264-623	 U-WAVE-R 02AZD810D Design registered in Japan
	QuantuMike* 	IP67 type U-WAVE-TM 264-622	
Digimatic Calipers	Standard type 	Buzzer type U-WAVE-TC 264-621	
	Coolant-proof type 	IP67 type U-WAVE-TC 264-620	
Digimatic Indicators and Others	ID-CNX/ID-FNX Series (12.7 mm type only) 	Buzzer type U-WAVE-TM 264-623	
	Other 	IP67 type U-WAVE-TM 264-622	
		Buzzer type U-WAVE-T 02AZD880G	
		IP67 type U-WAVE-T 02AZD730G	

* **O2AZF960** is applicable to new models (293-14X-40/293-18X-40).

U-WAVE Wireless

Wireless Data Collection System

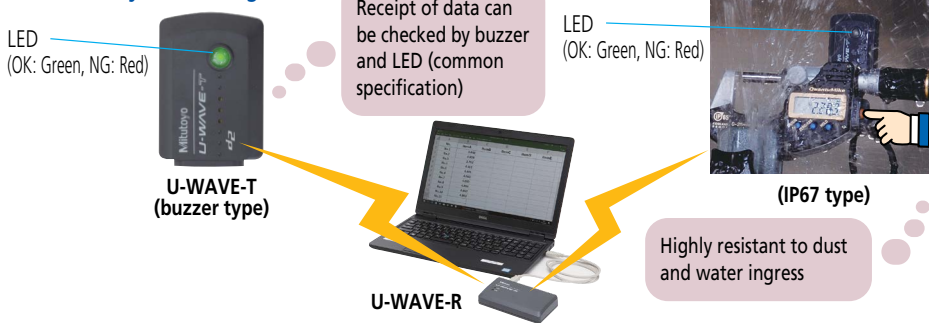
U-WAVE-T

- The system using our proprietary communication method features stable communication and low power consumption, resulting in improved work efficiency.
- It can be connected to various types of tools using optional special connection cables.

Model	U-WAVE-T (IP67 type)	U-WAVE-T (buzzer type)
Order No.*	02AZD730G	02AZD880G
Protection Rating	IP67	None
Data reception indication	LEDs	Buzzer and LEDs
Power source	Lithium battery CR2032x1	
Battery life	Approx. 400,000 transmissions	
Dimensions (mm)	44x29.6x18.5	
Mass (g)	23	

* To use this product, conformity to the applicable radio law in each country is required. Code number differs depending on the destination country. Please contact your nearest M³ Solution Center.

U-WAVE-T system configuration

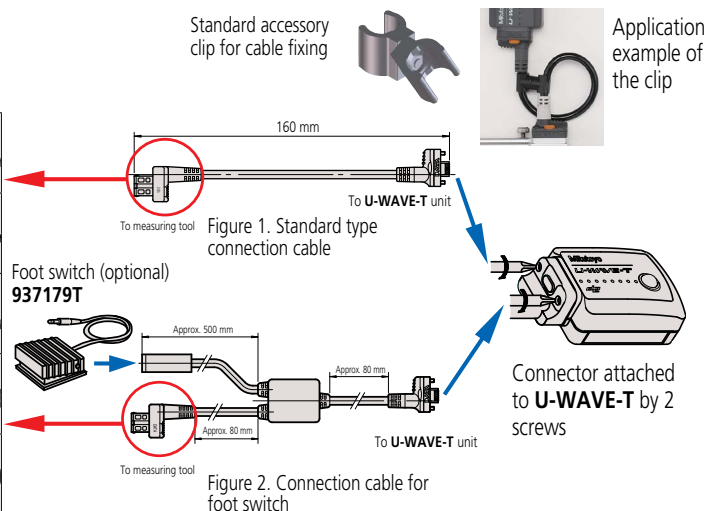
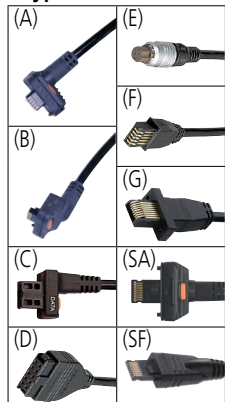


U-WAVE-T dedicated connection cable

A dedicated cable connects a Digimatic gage to **U-WAVE-T**. Check the connector (A to G, SA and SF) compatible with the Digimatic gage to be used and select either standard type (figure 1) or foot switch type (figure 2) according to your application. Refer to Pages A-28 through A-30 for connector tool type.

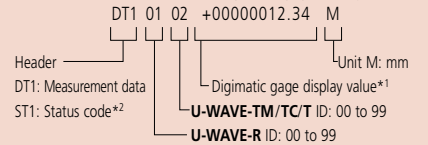
Type	Standard connection cable	Connection cable for foot switch
	Order No.	Order No.
(A) Water-proof model with output button	02AZD790A	02AZE140A
(B) Water-proof model with output button	02AZD790B	02AZE140B
(C) With data-out button	02AZD790C	02AZE140C
(D) 10-pin plain type	02AZD790D	02AZE140D
(E) 6-pin round type	02AZD790E	02AZE140E
(F) Plain type straight	02AZD790F	02AZE140F
(G) Plain type straight water-proof model	02AZD790G	02AZE140G
(SA) Water-proof straight model with data output button	02AZF960	02AZF960
(SF) Straight standard type	02AZG011	02AZG021

9 types of connector



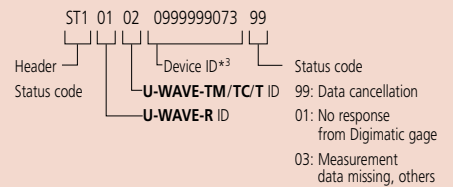
Data format

Example of format when the Digimatic gage displays 12.34



*1 Data interface function is switchable to "Measurement value only" e.g.) 12.34

*2 Example of status code format



*3 Unique number assigned to **U-WAVE** at shipment

Notes on Identification of Measurement Data and Multiple Systems Operation

Following the above format, the **U-WAVE** data format starts with a 4-digit code where the first two digits represent receiver channels and the last two are transmitter channels. The large number of transmitter/receiver combinations possible with this scheme ensures that the receivers in a factory measurement system only accept data from the intended transmitters, even when several receivers are all within communication range of different transmitters using the same channel. Different frequency bands (up to 15 available) may also be used to further ensure that there are no communication problems between adjacent **U-WAVE-R** units.

U-WAVE-T (U-WAVE fit) System Communication Specifications

Wireless communication

Wireless specifications	Original <based on IEEE802.15.4 (2.4 GHz)>
Wireless communication distance	Approx. 20 m (line of sight)
Wireless communication speed	250 kbps
Transmission output	0 mW (1 dBm) or less
Modulation method	DS-SS (Direct Sequence - Spread Spectrum) Resistant to interfering signals and noise
Communication frequency	2.405 to 2.475 GHz
Used band	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz) The noise search function avoids interference with other communication devices.

U-Wave Wireless

Wireless Data Collection System

Optional Accessories for U-WAVE

U-WAVE-T mounting bracket

Supports the **U-WAVE-T** on a Digimatic gage by detachable fastener. Batteries can be replaced without needing to detach the **U-WAVE-T** from the gage.

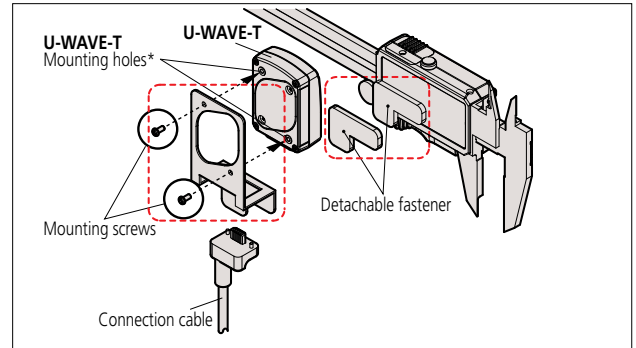


U-WAVE-T mounting bracket
02AZE200

Standard accessories

- Detachable fasteners: 1 set
- Mounting screw: 2 pcs.

Mounting diagram (02AZE200)



Note: In order to avoid loss of adhesion, do not allow oil or coolant to come into contact with the bonding surfaces of the detachable fasteners.

U-WAVE-TM/TMB mounting bracket for Digimatic indicator

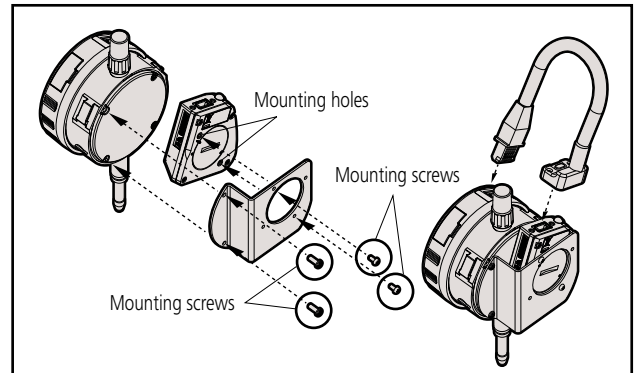
U-WAVE-TM/TMB mounting bracket for Digimatic indicator **02AZF670/02AZF675**

Standard accessories

- Mounting screw: 4 pcs.



Mounting diagram (02AZF670)



Find a Distributor

U-WAVE Bluetooth

Wireless Data Collection System

Wireless Measurement Data Communication System

U-WAVE-TMB/TCB (U-WAVE fit Bluetooth®)

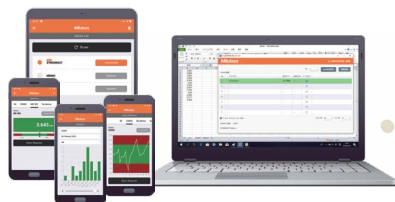
- Bluetooth® communication allows for wireless transmission of measurement data from Digimatic micrometers and calipers to PCs, smartphones, tablets and other such terminals.
- Bluetooth® communication does not require a conventional receiver unit (**U-WAVE-R**) which improves operability and reduces costs. Use in outdoor locations where PCs cannot be used can now be easily realized.

- **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.
<https://www.mitutoyo.co.jp/eng/contact/products/u-wave/>

U- WAVEPAK-BM



U-WAVE fit Bluetooth® system configuration



No receiver is required, and one PC can connect up to seven units of U-WAVE fit Bluetooth®.

For Digimatic micrometers
U-WAVE-TMB



For Digimatic calipers
U-WAVE-TCB



Example of attaching the Digimatic indicator

Measurement Navigation Application Mitutoyo U-WAVE Navi

- The application is for designing measurement procedures that use **U-WAVE fit Bluetooth®**.
- Allows setting of measuring points, methods (which tool to use), cautions in each measuring process. 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.

Master how to use both applications according to your purpose.

	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/No-go judgement) Navigate a measurement procedure Manage/transfer a measurement procedure Display a list of measurement results Transfer a measurement result	Judgment Data logging Graphical display of measurement result Display the histogram of measurement results Transfer a measurement result (log data)
Display language	Japanese/English (Depends on the OS settings)	English
Compatible OS	Android 7.0 or later (iOS not supported)	Android 7.0 or later/iOS 10.0 or later

U-WAVE-TMB/TCB (U-WAVE fit Bluetooth®) System Communication Specifications

• Wireless Communication Specifications

Wireless communication	Bluetooth® 4.2 Low Energy
Wireless communication distance	Approx. 16 m (line of sight) Approx. 10 m (in a factory environment)
Transmission output	2.5 mW (5 dBm) or less (Class2)
Modulation method	FH-SS (Frequency-hopping spread spectrum)
Communication frequency	2.4 GHz band

Note 1: Connectivity of **U-WAVE-TMB/TCB** to every single Bluetooth® device is not guaranteed.

Optional Accessories

Model	USB-ITPAK V3.0
Order No.	06AGR543 (USB dongle only)
Compatible OS (Windows)	Windows 10 and 11 (64 bit only)
Compatible Excel version	Excel 2010, 2013, 2016, Microsoft 365

Note: Applicable only when **U-WAVEPAK-BW** is used.

USB-ITPAK V3.0



USB dongle



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

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Where to Buy

U-WAVE Bluetooth

Wireless Data Collection System

Typical applications



U-WAVE-TMB (264-626)



U-WAVE-TCB (264-625)

Transmitter / Receiver



SPECIFICATIONS

	For Digimatic micrometers		For Digimatic calipers	
Model	U-WAVE-TMB (IP67 type)	U-WAVE-TMB (buzzer type)	U-WAVE-TCB (IP67 type)	U-WAVE-TCB (buzzer type)
Order No.	264-626	264-627	264-624	264-625
Protection level	IP67	N/A	IP67	N/A
Data reception indication	LED	LED, buzzer	LED	LED, buzzer
Power source	Lithium battery CR2032x1			
Battery life	Windows OS: Approx. 3 months, iOS/Android: Approx. 1 year			
Mass (g)	18			

Choose a connecting unit compatible with your gage.

Order No.	02AZF310	02AZF300
Protection level	IP67	N/A
Mass (g)	6	
Connectable transmission unit	U-WAVE-TMB/TCB (IP67)	U-WAVE-TCB (for standard type)

Note: Water-proof performance is ensured only when attached to measuring instruments of IP67 type.

Compatibility of measuring tool and unit

Digimatic gage	Assembled appearance (Front/Back)	Connecting unit	Transmission unit
Micrometer	Standard	02AZF310	264-627 U-WAVE-TMB (buzzer type)
	Quantu-Mike ¹	02AZF960	264-626 U-WAVE-TMB (IP67 type)
Caliper	Standard	02AZF300	264-625 U-WAVE-TCB (buzzer type)
	Coolant-proof type	02AZF310	264-624 U-WAVE-TCB (IP67 type)
Digimatic indicator	ID-C, ID-F Series (new type only) Type SF connector (for ID-C Series 12.7 mm type)	02AZF700	264-627 U-WAVE-TMB (buzzer type) 264-626 U-WAVE-TMB (IP67 type)
	Others	Connection cable Mounting bracket	02AZD880G U-WAVE-T (buzzer type) 02AZD730G U-WAVE-T (dust/water-proof type)

¹ 02AZF960 is applicable to new models (293-14X-40/293-18X-40).