

Measurement Data Management

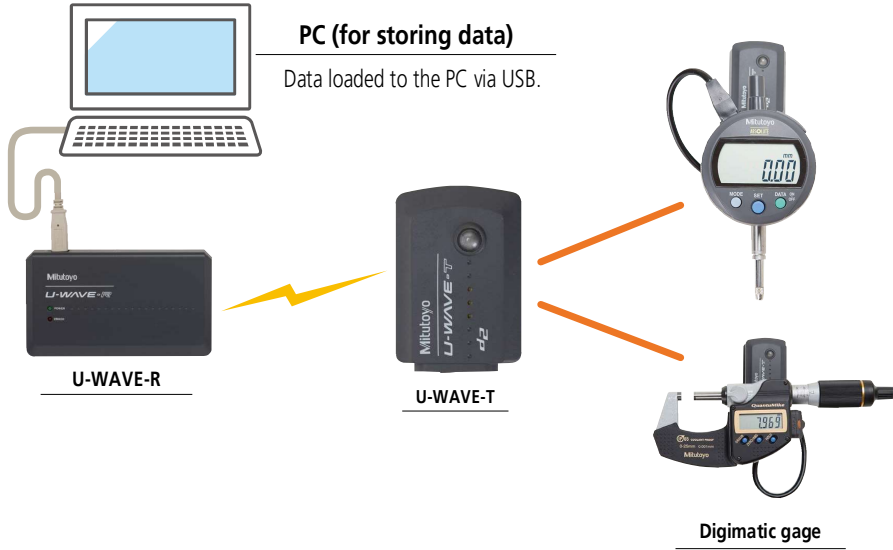
What is the U-WAVE Series?

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- A "Measurement Data Wireless Communication System" that, with simple operations, allows you to send data from Digimatic gages to a PC, etc. via wireless communication. The following three types are currently available.

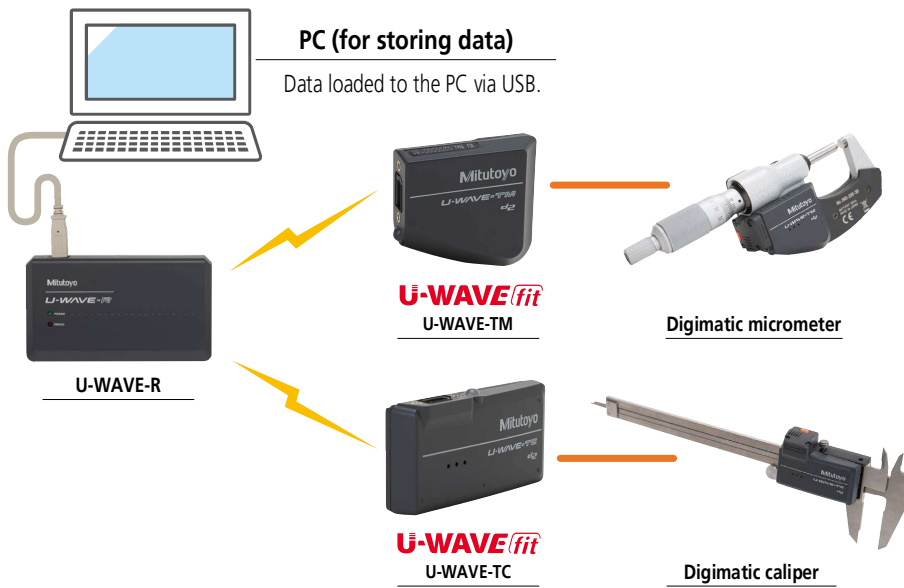
1) U-WAVE

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



2) U-WAVE fit

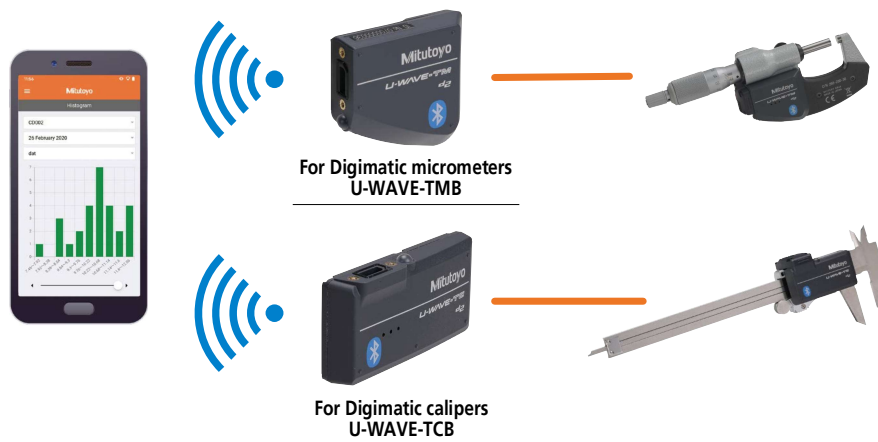
Dedicated for Digimatic calipers and Digimatic micrometers, it inherits the functions and performance of **U-WAVE** but is more compact, thinner, and with improved operability.



Refer to the Measurement Data Wireless Communication System **U-WAVE** Brochure (E12000) for more details.

3) Mitutoyo Bluetooth® U-WAVE

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	Mitutoyo Bluetooth® U-WAVE*1
Transmission method	Original <based on IEEE802.15.4 (2.4 GHz)>		Bluetooth®
Communication distance	Approx. 20 m (line of sight)		Approx. 16 m (line of sight)
Connectible model	Digimatic gages	Digimatic calipers and micrometers	
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.



Refer to the Measurement Data Wireless Communication System **U-WAVE** Brochure (E12000) for more details.

Measurement Data Management

Measurement Data Wireless Communication System U-WAVE-TMB/TCB (Mitutoyo Bluetooth® U-WAVE)

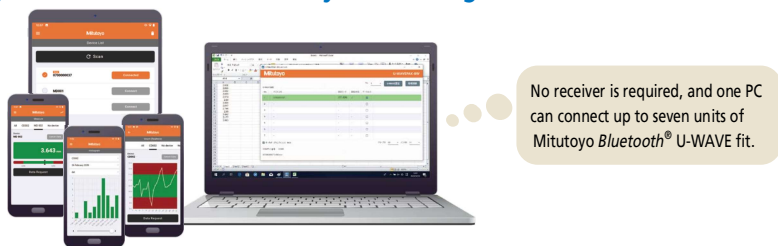
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- Bluetooth® communication allows for wireless transmission of measurement data from digimatic micrometers and calipers to PCs, smartphones, tablets and other such terminals.
- Bluetooth® communication not only allows cost reduction, as it does not 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.
<https://www.mitutoyo.co.jp/eng/contact/products/u-wave/>

Mitutoyo Bluetooth® U-WAVE fit system configuration



Measurement Navigation Application Mitutoyo U-WAVE Navi

A new application tool for **Mitutoyo Bluetooth® U-WAVE** is now available. It allows to set 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/NG 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 (Mitutoyo Bluetooth® U-WAVE) 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	3.2 mW (5 dBm) or less (Class2)
Modulation method	FH-SS (Frequency-hopping spread spectrum)
Communication frequency	2.4 GHz band

- Note 1: To use **U-WAVE-TMB/TCB**, conformity to the radio law of each country is required. Please contact your dealer or nearest Mitutoyo sales office.
- Note 2: **U-WAVE-TMB/TCB** is not compatible with **U-WAVE fit**, for which communication specifications are different.
- Note 3: Connectivity of **U-WAVE-TMB/TCB** to every single Bluetooth® device is not guaranteed.

Optional Accessories

Model No.	USB-ITPAK V2.1/V3.0
Order No.	06AFM386/06AGR543
Compatible OS (Windows)	USB-ITPAK V2.1: Windows 2000 SP4 to Windows 10 USB-ITPAK V3.0: Windows 10 64 bit only
Compatible Excel version	USB-ITPAK V2.1: Excel 2002, 2003, 2007, 2010, 2013, 2016, Microsoft 365 USB-ITPAK V3.0: Excel 2010, 2013, 2016, Microsoft 365

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

USB-ITPAK V2.1/V3.0



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

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Refer to the Measurement Data Wireless Communication System **U-WAVE** Brochure (E12000) for more details.

Measurement Data Wireless Communication System U-WAVE-TMB/TCB (Mitutoyo Bluetooth® U-WAVE)

Transmitter/Receiver



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

Order No.	Model name	Unit	Measurement range
264-626	Standard	mm	0-25
264-627			
264-624	Standard	mm	0-150
264-625			
264-626	Coolant-proof type	mm	0-25
264-627			
264-624	Coolant-proof type	mm	0-150
264-625			

For model compatibility information, refer to a separate sheet provided with **Catalog No. E12000**: Measurement Data Wireless Communication System **U-WAVE**.

SPECIFICATIONS

Order No.	For Digimatic micrometers		For Digimatic calipers	
	264-626*	264-627*	264-624*	264-625*
Model	U-WAVE-TMB (IP67 type)	U-WAVE-TMB (buzzer type)	U-WAVE-TCB (IP67 type)	U-WAVE-TCB (buzzer type)
Protection level	IP67	N/A	IP67	N/A
Data reception indication	LED	LED, buzzer	LED	LED, buzzer
Power supply	Lithium battery CR2032x1			
Battery life	Approx. 1 year under normal conditions of use, but varies according to usage.			
Mass (g)	18			

* Order No. differs depending on the destination country. Add the following suffix to the order No.: K for Korea, B for Brazil and Argentina.



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 (for dust/water-proof type)	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

		Assembled appearance	Connecting unit	Transmitter
For micrometers	Standard		02AZF310	264-627 U-WAVE-TMB (buzzer type)
	QuantuMike		02AZF310	264-626 U-WAVE-TMB (IP67 type)
For calipers	Standard		02AZF300	264-625 U-WAVE-TCB (buzzer type)
	Coolant-proof type		02AZF310	264-624 U-WAVE-TCB (IP67 type)

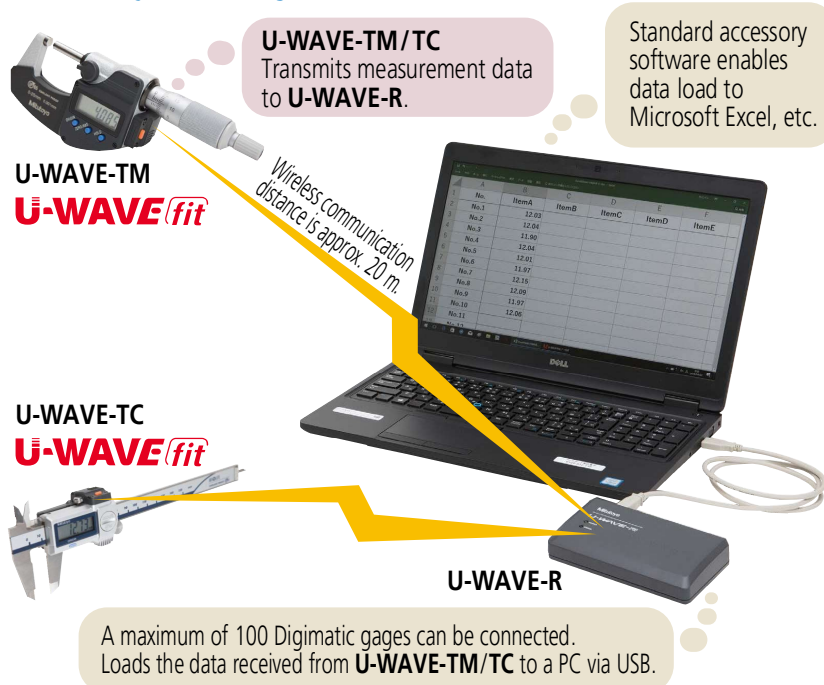
Measurement Data Management

Measurement data wireless communication system U-WAVE-TM/TC (U-WAVE fit)

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- The transmitter is designed to fit in the space behind the display, and the connecting cable has been replaced by a rigid connector.
- Data from digimatic tools can be sent to a PC via wireless communication.
- Connecting the **U-WAVE-R** to the PC and starting **U-WAVEPAK** (software), enables data input to spreadsheet such as Excel, memo pad, etc.
- Optional software **USB-ITPAK** is available. (refer to page A-15)

U-WAVE fit system configuration



U-WAVE-R

Model	U-WAVE-R
Order No.*	02AZD810D/02AZD810E/02AZD810F
Power supply	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	140×80×31.6 mm
Mass (g)	130

* Order No. differs depending on the destination country.

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*

* 32-bit, 64-bit OS supported
<Versions confirmed operational on Windows 10>
• **U-WAVEPAK Version 1.020** 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 ×2 ports or more

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

Note 2: Also available for download (free) from our company's website.

U-WAVE-R main unit



USB 2.0 cable (1 m) attached

U-WAVEPAK



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.

Note: To use **U-WAVE-TM/TC**, the conformity to the radio law of each country is required. If you use this product outside the country of purchase, please contact your dealer or nearest Mitutoyo sales office.



Refer to the Measurement Data Wireless Communication System **U-WAVE** Brochure (**E12000**) for more details.

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

Measurement data wireless communication system U-WAVE-TM/TC (U-WAVE fit)

Type of transmission unit



264-622



264-621

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	
	Order No.	Model	Order No.	Model
	264-622*	U-WAVE-TM (IP67 type)	264-620*	U-WAVE-TC (IP67 type)
	264-623*	U-WAVE-TM (Buzzer type)	264-621*	U-WAVE-TC (Buzzer type)
Protection Rating	IP67	N/A	IP67	N/A
Data reception indication	LEDs	Buzzer and LEDs	LEDs	Buzzer and LEDs
Power supply	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			

* Order No. differs depending on the destination country. Add the following suffix to the order No.: K for Korea, B for Brazil and Argentina.



02AZF310



02AZF300

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

Order No.	02AZF310	02AZF300
Protection level	IP67	N/A
Mass (g)	6	
Connectable transmission unit	U-WAVE-TM/TC (for dust/water-proof type)	U-WAVE-TC (for standard type)

Note 1: 02AZF310 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.

Compatibility of measuring tool and unit

Digimatic gage		Assembled appearance (Front/Back)	Connecting unit	Transmission unit
Micrometer	Standard		02AZF310	264-623* U-WAVE-TM (buzzer type) U-WAVE fit
	QuantuMike			264-622* U-WAVE-TM (IP67 type) U-WAVE fit
Caliper	Standard		02AZF300	264-621* U-WAVE-TC (buzzer type) U-WAVE fit
	Coolant-proof type			264-620* U-WAVE-TC (IP67 type) U-WAVE fit

* Order No. differs depending on the destination country. Add the following suffix to the order No.: K for Korea, B for Brazil and Argentina.

Measurement Data Management

Measurement Data Wireless Communication System

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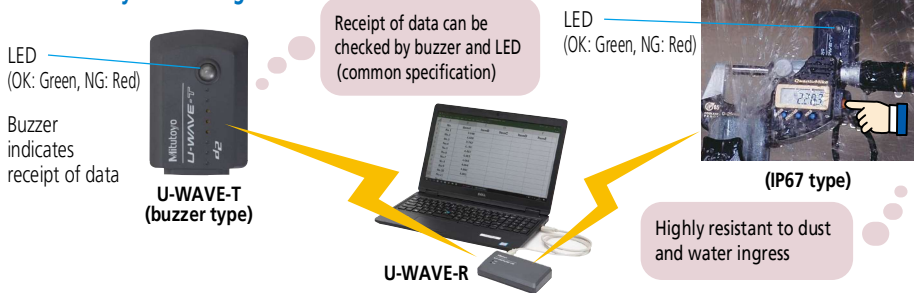
U-WAVE-T

Transmits measurement data to **U-WAVE-R**. Select IP67 or buzzer type, according to your application. **U-WAVE-R** can be connected to Digimatic gages by dedicated cable for **U-WAVE-T** (optional). It also allows the attachment of digital measuring instruments with data output port, such as the **SJ-200** Series.

Model	U-WAVE-T (IP67 type)	U-WAVE-T (Buzzer type)
Order No.*	02AZD730G / 02AZD730H / 02AZD730J	02AZD880G / 02AZD880H / 02AZD880J
Protection Rating	IP67	None
Data reception indication	LEDs	Buzzer and LEDs
Power supply	Lithium battery CR2032x1	
Battery life	Approx. 400,000 transmissions	
Dimensions (mm)	44x29.6x18.5	
Mass (g)	23	

* Order No. differs depending on the destination country.

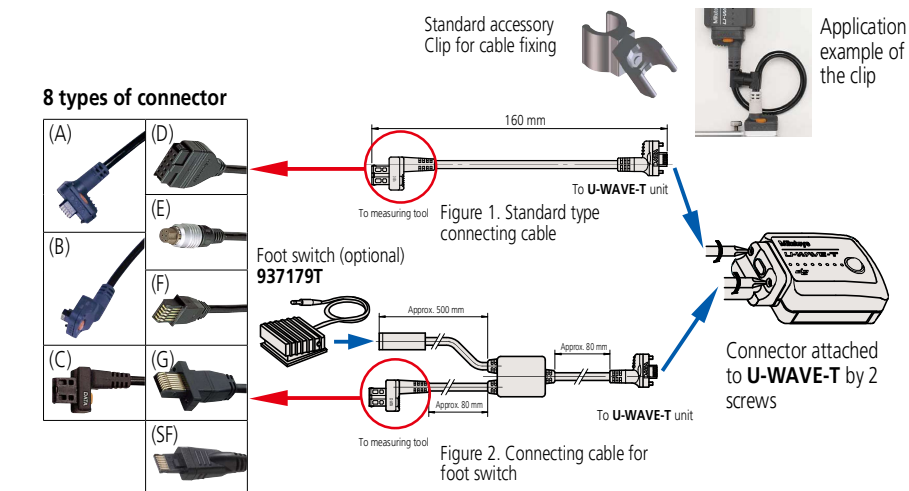
U-WAVE-T system configuration



U-WAVE-T dedicated connection cable

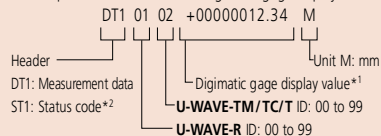
A dedicated cable connects a Digimatic gage to **U-WAVE-T**. Check the connector (A to G and SF; refer to pages A-21 and A-22 for details) compatible with the Digimatic gage to be used and select either standard type (figure 1) or foot switch type (figure 2) according to your application.

Type	Standard connecting cable	Connecting 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
(SF) Straight standard type	02AZG011	02AZG021



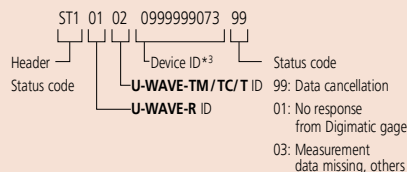
Data format

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

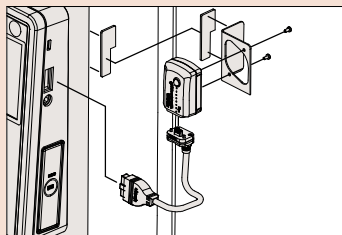
Following the above format, the **U-WAVE** data format starts with a 4-digit code where the first two digits represent receiver channels and the last two are transmitter channels. The large number of transmitter/receiver combinations possible with this scheme ensures that the receivers in a factory measurement 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 mounting plate for QM-Height 02AZE990

Standard accessories

- Detachable fastener, 2 pcs. (mirror-imaged)
- Mounting screw: 2 pcs.

Mounting Diagram for QM-Height (02AZE990)



Refer to the Measurement Data Wireless Communication System **U-WAVE** Brochure (E12000) for more details.

Measurement Data Wireless Communication System U-WAVE

Optional Accessories for U-WAVE

U-WAVE-T mounting plate

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.

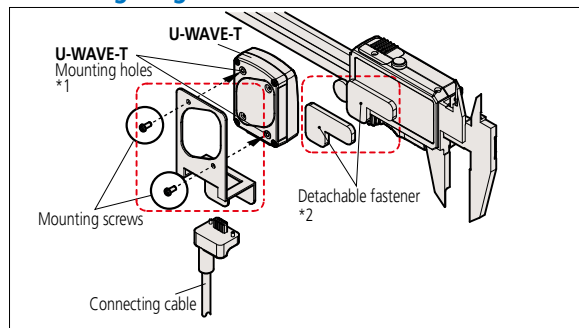


U-WAVE-T mounting plate 02AZE200

Standard accessories

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

Mounting diagram (02AZE200)



- *1 To avoid damaging the threaded holes in the plastic body of the **U-WAVE-T** unit, the mounting screws should be tightened only just sufficiently to grip. Repeated removal of these screws should also be avoided for the same reason.
- *2 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.

Typical applications of the mounting plate

QuantuMike MDE-25MX



Front view



Rear view

Digimatic Indicator ID-C112XB



Front view



Rear view

Measurement Data Management

Measurement Data Collection Software

USB-ITPAK V2.1/V3.0 (IT-016U/IT-020U/USB-ITN/U-WAVE/DP-1VA LOGGER connectable)

A

• **USB-ITPAK V2.1/V3.0** creates a procedure to input data from gages equipped with Digimatic output to Excel sheets via **USB-ITN** or **U-WAVE**. This optional software facilitates the daily inspection work for mass-produced products.

The combined use with Input Tool or U-WAVE will improve the operational efficiency of repetition inspection work. Best suited for keeping track of inspection data of mass-produced products.

- Automatically calls Excel sheet.
- Cursor moves can be specified.
- Input range can be specified per Digimatic gage, which reduces improper input.
- The last data input can be canceled by a single operation (foot switch, function key etc.)
- Data input or cancellation can be performed at once in multiple-point simultaneous measurement.

Main features of USB-ITPAK V2.1/V3.0

- **Setting of Microsoft Excel input:**
Designation of where to input (workbook, worksheet, cell range), cursor move (right, down), and others.
- **Selection of measuring method (3 modes available)**
1) Sequential measurement 2) Simultaneous measurement 3) Individual measurement (refer to page A-17 for details).
- **Control item and instruction at data input**

Control item	Mouse operation	Function key	Foot switch + USB-FSW	Data switch when using U-WAVE	Data switch other than U-WAVE
Data output request	✓*1	✓*1	✓	✓*2	✓
Data cancel	✓*1	✓*1	✓	✓ Press and hold*2	
Data skip	✓*1	✓*1	✓		
Character input (example: OK or NG etc.)			✓ Pre-registered character strings		

*1 Not available during individual measurement.

*2 Not available during simultaneous measurement in the event driven mode.

• Number of connectable gages

Available devices	Maximum number of connection (total of (1), (2), and (3))	Others
1) IT-020U/USB-ITN	For Windows 2000/XP Up to 100 units*3 For Windows Vista/7/8/8.1/10 Up to 20 units*3 (For U-WAVE-R , plus 100 per unit in terms of available gages.)	• Maximum registration (total of (1), (2), and (3)) 400 units • Control/identification of connecting gage VCP (Virtual COM port) Switch from HID to VCP for (1) and (2). The VCP driver software is supplied with USB-ITPAK .
2) USB-FSW		
3) U-WAVE-R (Up to 100 gages connectable to each U-WAVE-R . U-WAVE-T ID: 00 to 99)		

• **Data loading time:** when using **IT-020U/USB-ITN**, 0.2 s to 0.3 s per gage unit
U-WAVE event driven mode: 0.5 s data refresh interval

• **Timer input function** (only in simultaneous measurement)

Input interval (time): 0.1 s*4 to 24 hours at maximum

• **Measurement date/time display function** (available in sequential and simultaneous measurements)

The display format is subject to the setting of the Excel sheet.

*3 The actual number can be less depending on the system configuration.

*4 If a shorter time is set, a priority is given to the longer time compared with the actual communication time.

Optional Accessories for USB-ITPAK

USB Foot Switch Adapter USB-FSW

This USB adapter for connecting a PC is required when using the Foot Switch (**937179T**) in **USB-ITN**.

A dedicated VCP driver for this adapter is included in **USB-ITPAK**.

Main specification

- With **USB-ITPAK**, application of the foot switch can be set.
- Data control: "Data request", "Data cancel", "Data skip"
- Character string input (e.g. GO/NG, etc.)

Note: **USB-FSW** is used for installation of the VCP driver.



Order No.

Model No.	USB-ITPAK V2.1/V3.0
Order No.	06AFM386/06AGR543

Upgrading from V1.0/V2.0 is not supported.

USB-ITPAK V2.1/V3.0 USB dongle



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

Operating environment

Compatible OS*1	USB-ITPAK V2.1: Windows 2000 SP4 Windows XP SP2 or later Windows Vista Windows 7 Windows 8 Windows 8.1 Windows 10 USB-ITPAK V3.0: Windows 10 (64 bit only)
Supported Excel versions*2	USB-ITPAK V2.1: 2002, 2003, 2007, 2010, 2013, 2016 Microsoft 365 USB-ITPAK V3.0: 2010, 2013, 2016 Microsoft 365
Hard disk	USB-ITPAK V2.1: Free space of more than 10 MB USB-ITPAK V3.0: Free space of more than 15 MB
CD-ROM drive	For program installation
USB port*3	2 ports or more
Monitor resolution	USB-ITPAK V2.1: 800x600, 256 colors or more USB-ITPAK V3.0: 1024x768, 256 colors or more

*1 32-bit, 64-bit OS supported

*2 Operation with Excel for MAC OS is not guaranteed.

*3 A commercially available hub can be used.
(USB certified product is recommended)

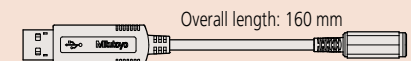
Language support

- Operation language (15 languages)
Japanese, English, German, French, Spanish, Italian, Czech, Swedish, Turkish, Polish, Hungarian, Russian, Korean, Chinese (traditional/simplified)
- Operation manual (PDF file)
Japanese, English, German

Order No.

Model No.	USB-FSW
Order No.	06ADV384

Foot Switch Adapter USB-FSW



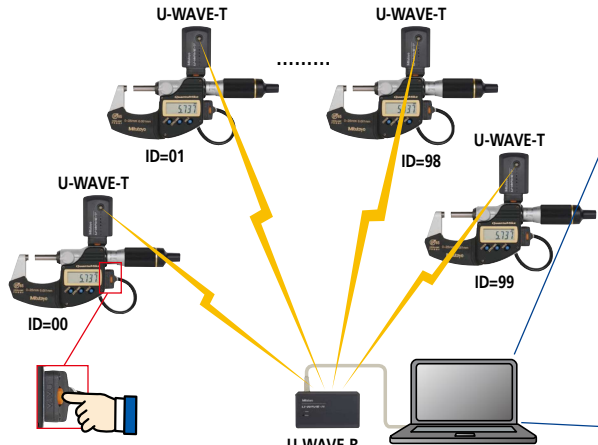
Measurement Data Management

USB-ITPAK V2.1/V3.0 (IT-016U/IT-020U/USB-ITN/U-WAVE/DP-1VA LOGGER connectable)

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Example of measurement using the U-WAVE Series wireless communication system
 <Data sorting of individual measurements>

Data from multiple Digimatic gages (U-WAVE-T, U-WAVE-TM/TC) sent to separate Excel sheets



Loading data from multiple Digimatic gages (U-WAVE-T) into separate Excel sheets is now available without the need for macro programming.

USB-ITPAK V2.1/V3.0 (Individual measurement ID=99)

	A	B	C
1	2.341	2.274	2.007
2	2.039	1.963	
3	1.996	2.152	

Sheet 99

Sheet 98

Sheet 00

Sheet 01

ID=98

ID=99

ID=00

ID=01

The last data input may be canceled by pressing and holding the data switch

Up to 100 gages can be handled by one U-WAVE-R unit

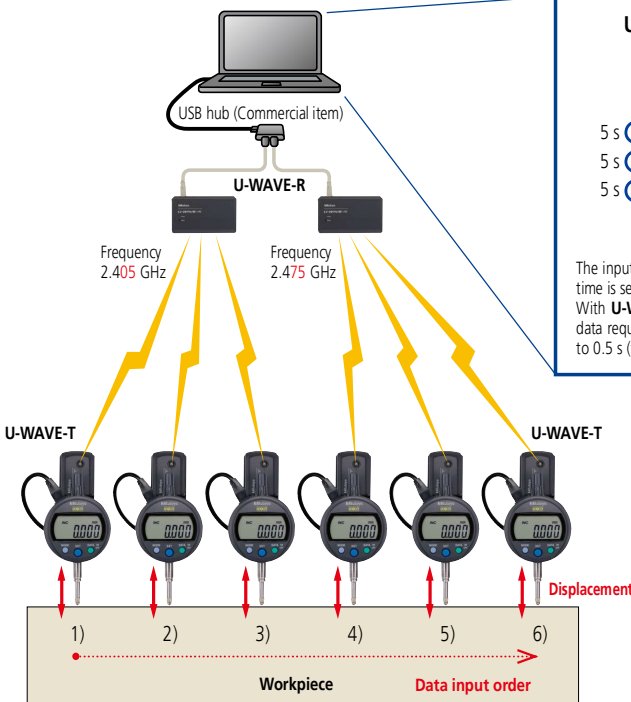
Note: U-WAVE-TM/TC can also be applicable.

- Entry point can be specified per gage (by U-WAVE-T ID).
- Specifying an Excel file: Excel Book (full path) +sheet name
 - Specifying data input cells (example: A1: C3)
 - Specifying cursor move (right or down)

Example of measurement using the U-WAVE wireless communication system — timer input + measurement date/time display during simultaneous measurement

Automatically obtains displacement data in a certain input interval

If using USB-ITPAK V2.1/V3.0 supporting U-WAVE event driven, arbitrary timer input is allowed without the need for macro programming.



USB-ITPAK V2.1/V3.0 simultaneous measurement + timer input (example: 5 s interval)

	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	2013/4/17 30 00
3	0.279	0.152	0.133	0.064	0.018	-0.003	2013/4/17 30 05
4	0.265	0.149	0.142	0.089	0.021	-0.007	2013/4/17 30 10
5							
6							

The input interval can be arbitrarily set by 0.1 s intervals up to 24 hours. If a smaller value than the data loading time is set, the actual measurement time will be the input interval. With U-WAVE, an error (no data) may occur if less than 0.5 s is set for the input interval. This is because the data request signal is issued before the data comes in, based on the event driven data refresh interval that is set to 0.5 s (fixed).

Measurement Data Management

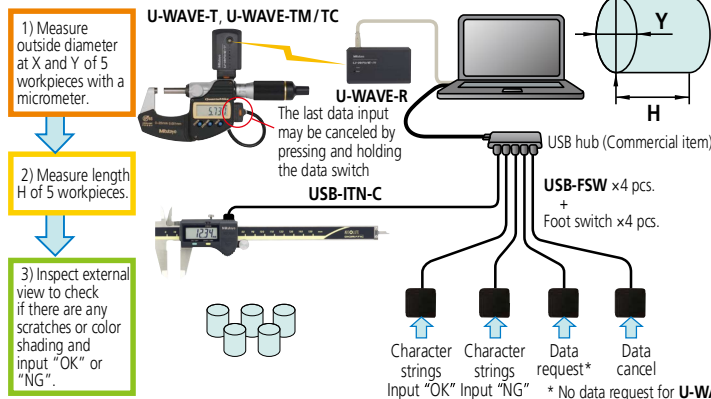
A

You can set up the procedure to input the measurement data to the Excel sheet in combination with USB-ITPAK V2.1/V3.0 and IT-016U/IT-020U/USB-ITN/U-WAVE

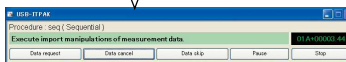
Measurement applications of USB-ITPAK V2.1/V3.0 (Three examples of how USB-ITPAK V2.1/V3.0 can be deployed are shown below)

Sequential measurement Measurement values are input one by one according to a procedure previously defined by using one or more Digimatic gages (via IT-016U/IT-020U/USB-ITN or U-WAVE).

(Measurement example – see figure at right)



When a measuring procedure is executed, a window (as below) is displayed. "Data request*", "Data cancel*", "Data skip*", "Aborting", "Complete" can be specified. * These operations can be allocated to the function key or foot switch (via USB-FSW).



	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		

Cell movement direction after inputting data (down and right)

Carriage return (Low, column)

Microsoft Excel sheet previously specified

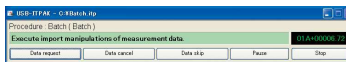
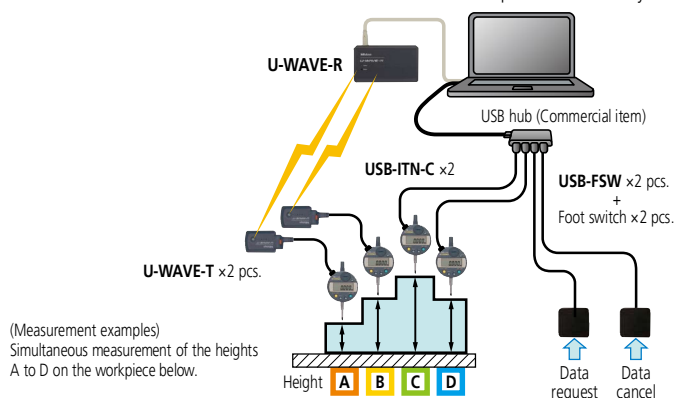
Input range of micrometer (B2 to F3)

Input range of caliper (B4 to F4)

Input range of visual judgment (B5 to F5)

Cell that will receive next input is highlighted in green

Simultaneous measurement Measurement values are input simultaneously from several Digimatic gages (via IT-016U/IT-020U/USB-ITN, U-WAVE)



	A	B	C	D	E
1		Height A	Height B	Height C	Height D
2	1	5.02	8.03	9.96	6.03
3	2	4.98	8.02	10.01	5.99
4	3	4.97	8.04	10.07	5.96
5	4				
6	5				

First measurement (finished)

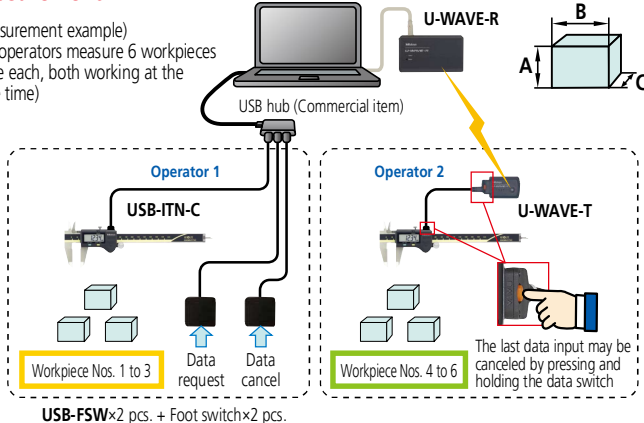
Second measurement (finished)

Third measurement (finished)

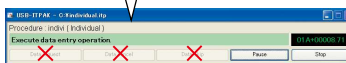
Fourth measurement (Wait for next input)

Individual measurement Several operators input measurement data asynchronously according to individually defined procedures (where to input, move direction, etc.) from each Digimatic gage via IT-016U/IT-020U/USB-ITN or U-WAVE.

(Measurement example) Two operators measure 6 workpieces (three each, both working at the same time)



Since several individual operators perform measurement simultaneously, an operation key and a function key in the window below cannot be used at the same time. The only effective input device in this case is the foot switch (via USB-FSW).



	A	B	C	D	E	F	G
1	Setting	1	2	3	4	5	6
2	Dimension A	10.02	10.03	9.96	10.15	10.23	10.04
3	Dimension B	9.98	10.01	10.07	9.99	9.78	
4	Dimension C	10.15	10.14		9.96	10.27	

Cell that will receive next input Operator 1

Cell that will receive next input Operator 2

Notes on using USB-ITPAK V2.1/V3.0:

Do not merge the cells in the specified range as a measurement data input.

During measurement, the Microsoft Excel worksheet cannot be modified in any way apart from entering data. If you need to modify the sheet, it is necessary to abort or finish the measurement.

Mitutoyo Bluetooth® U-WAVE and U-WAVE ZigBee cannot be used together.