



Wireless Communication System for Measurement Data

U-WAVE-TC/TM

Prior to using this product, first read the U-WAVE Setup Manual included with the Mitutoyo U-WAVE-R (option) to install the software and specify the communication settings.

This product connects with the connection unit (option) to a measuring tool with Digimatic output (including Digimatic 2 compliant models) and sends measurement data wirelessly to a U-WAVE-R device. There are two models: "IP67 type" and "buzzer type". To obtain the highest performance and the longest service life from this product, carefully read this manual thoroughly prior to use. After reading this manual, keep it close at hand for future reference.

Tips To refer to the instructions for use in Chinese, please see our website (<https://manual.mitutoyo.co.jp/manuals/search>).

Safety Precautions

To ensure operator safety, use this instrument in accordance with the directions and specifications given in this User's Manual. Not following the instructions may compromise safety.

WARNING

- Always keep batteries out of reach of children, and if swallowed, consult a physician immediately.
- Batteries should never be short-circuited, disassembled, or deformed, come into contact with extreme heat or flames, be subjected to excessive force, nor left in environments with excessively high temperatures or excessively low pressure.
- If battery alkaline liquid comes in contact with the eyes, flush eyes immediately with clean water and consult a physician. If battery alkaline liquid comes in contact with the skin, flush the exposed area thoroughly with clean water.

CAUTION

Never attempt to charge the primary battery or reverse the positive-negative terminals when mounting. Improper battery handling or mounting may cause the battery to explode, cause battery leakage and/or serious bodily injury or malfunctioning.

NOTICE

- Do not use this product near medical equipment that may malfunction due to radio waves.
- This product uses radio waves. Even within the communication range of the radio waves, communication may be interrupted due to factors such as external noise. In this case, take sufficient preventative measures (security measures).
- Take sufficient preventative measures (security measures) to guard against the possibility of this product malfunctioning.

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Precautions regarding Export Regulations

This product is categorized as a good or program that falls into the Catch-All-Controlled Goods regulations under Category 16 of Appended Table 1 of the Export Trade Control Order or under Category 16 of the Appended Table of Foreign Exchange Control Order, based on the Foreign Exchange and Foreign Trade Act of Japan. This User's Manual also falls into technology categorized under the Catch-All-Controlled Goods regulations. Consult with Mitutoyo prior to exporting this product, transferring this product overseas, providing this technology to a non-resident, etc. An export license or written application and certificate for permission for service transactions may be required from the Ministry of Economy, Trade and Industry.

Precautions regarding Radio Law

This product can be used only in the countries where the wireless certification is acquired and in a purchased country. When using this product outside the purchased country, please contact the nearest Mitutoyo's sales office.

NOTICE

- This product uses radio waves. Use this product in accordance with the relevant regulations stipulated in the country of use.
- Do not disassemble or modify this product. These actions are prohibited by law.
- Do not peel off the certification label affixed to this product. Use of this product without a certification label is prohibited.
- Always remove the battery from this product when boarding an aircraft, and never use this product while on board. The use of wireless devices inside of aircrafts is prohibited by law.

Precautions regarding Wireless Communication Environments

Be aware that obstructions, etc., in the environment may degrade the performance of this product. Refer to the tables below for a list of potential obstructions.

1) Possibility that this product will not be able to communicate

Item	Description
Concrete walls	Communication is not possible in a completely shielded state.
Metallic partitions, etc.	The communication speed may deteriorate or communication may be blocked.
Wireless LAN, Zigbee, Bluetooth, and other communication devices as well as microwave ovens	The communication speed may deteriorate or communication may be blocked. Use this product by either installing it as far away from these devices as possible or changing the communication channel (band ID).
Machine tools, etc.	The communication speed may deteriorate or communication may be blocked in a workplace where machine tools, such as electrical discharge machines, carrying cranes, and arc welding equipment, are operated.
If this product is held and covered by the hands	The communication speed may deteriorate or the communication distance may be decreased. Use this product as close as possible to the installation location of the U-WAVE-R device.

2) Possibility that this product will affect nearby equipment

Item	Description
Medical devices	Do not use this product near laser scalpels, health meters, or other medical devices.

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Precautions regarding Dust and Water Proofing

Observe the points below to obtain the highest performance from the IP67-type U-WAVE-TC/TM.

NOTICE

- Dust and water proofing is guaranteed when the connection unit and battery cover are mounted correctly. When this product is not in use, mount all the covers to prevent water and oil from getting inside and store this product.
- Fully tighten the battery cover using the battery cover key when inserting the battery to obtain sufficient protective performance (IP67) against water and dust. In addition, make sure the packing is attached correctly.
- Mounting the connection unit with the packing removed or caught on something, may result in damage because the water proofing of this product cannot be ensured.
- Be very careful when using this product not to let particles, debris, etc., damage the packing. In the event the packing has been damaged, send this product for replacement or repair immediately because the dust and water proofing will have been lost.
- Materials such as the rubber used in the packing are not impervious to the wide range of coolants, chemicals, etc. Contact the nearest Mitutoyo service center if these materials become significantly deteriorated.
- This product is constructed in a way such that it cannot be disassembled, due to the application of sealing in each area. Therefore, the specified performance cannot be obtained if this product is disassembled.
- Do not use this product submerged in water. This product cannot prevent the penetration of coolant and other chemicals.

Tips Refer to IEC 60529 for more information about the IP67 protection level.

EU **Hg**

Disposal of waste batteries and accumulators (applicable in the European Union and other European countries with separate collection systems)
Batteries and accumulators containing heavy metals such as mercury, lead, and cadmium may contaminate the environment if improperly discarded. When incinerated, certain chemicals are released into the air or concentrated in the ash residue from the combustion process. These may lead to health risks to humans and animals, and also damage the environment in general. In compliance with legal requirements, the symbol of a 'crossed-out wheeled bin' is either applied on the battery or on its packaging. This symbol indicates that disposal of the batteries as household wastes is strictly prohibited. Instead, the batteries must be disposed according to separate collection and recycling rules. Additional marking identifies that heavy metal content (i.e. Cd =cadmium, Hg = mercury, Pb = lead) marked within the battery is over prescribed levels. End users are obliged by law to comply with the discarding procedure for waste batteries. At Mitutoyo facilities, or at its appointed distributors, receptacles will be provided to accept the disposal of previously supplied batteries at no charge.

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Other Precautions

Be aware that the actions or circumstances below can cause failure or malfunction.

NOTICE

- Do not subject this product to sudden impacts, such as dropping it, nor apply excessive force.
- If this product will not be used for three or more months, remove the battery from it and store it. This product may become damaged by liquid leaking from the battery.
- Avoid using or storing this product in places with direct sunlight or in excessively hot or cold places.
- Avoid using or storing this product in places where it may come into contact with solutions or organic solvents such as acid and alkali.
- Electronic parts may be damaged if a high-voltage device such as an engraving pen is used.
- Be careful not to apply undue force to or excessively bend the connection unit.
- When the remaining power in the battery becomes low, replace it as soon as possible before operation becomes unreliable.

Electromagnetic Compatibility (EMC)

This product complies with the EU EMC Directive. Use of this product in environments with electromagnetic interference exceeding the EMC requirements defined in this directive is outside the scope of the warranty and requires appropriate countermeasures.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and Other European Countries with Separate Collection Systems)

This symbol included on the product or the packaging indicates that this product should not be disposed of with general household waste for disposal in EU countries. Please reuse and recycle products to decrease the volume of Waste Electrical and Electronic Equipment (WEEE) in landfills and reduce the environmental impact. For more information about disposal procedures, please contact your dealer or nearest Mitutoyo sales office.

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1. Included Accessories

Size 0 screwdriver	Lithium battery	Battery cover key	Manual and accessory documentation - U-WAVE-TC/TM User's Manual (this document) (No. 99MAL116B) - Certification and Regulation (No. 99MAL124W) - Warranty card - Declaration of conformity document (copy) (No. 02AZF223)
No. 05CZA619	CR2032	No. 06AEY282	

2. Name and Function of Each Part

- U-WAVE-TC

- U-WAVE-TM

No.	Name	Function
1	Certification label	Includes the code number and wireless certification number for this product.
2	LED indicator	Blinks or turns off according to the communication status.
3	Connector cover	Remove this cover to access the connector for connecting the connection unit.
4	Buzzer holes ^{*1}	Buzzes according to the communication status.
5	Device ID label	Includes the identification number for this product. The identification number is used when registering the settings of this product to U-WAVEPAK.
6	Battery cover	Remove the battery cover to replace the battery.

*1 Buzzer type only

Tips The LED indicator blinks red if the battery is out of power, and a warning message is sent to the U-WAVE-R device. Replace the battery immediately. (The buzzer type provides a warning both with a blinking LED and a buzz.)

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3. Using This Product

3.1. Operation When Sending Measurement Data

This product has two measuring modes: button-driven mode and event-driven mode.

Tips For more information about the measuring modes, refer to "1.7.4 Measuring Modes" in "U-WAVEPAK User's Manual".

• Types of communication operations
Use the [DATA] switch on the connection unit to perform the communication operations below. The [DATA] switch is disabled when operating in event-driven mode.

Description of communication	Length of time to press the [DATA] switch ^{*1}	LED indicator
Transmission of measurement data ^{*2}	Less than 2 seconds	Blinks green (operating normally) Blinks red (error)
Notification to the U-WAVE-R device of a cancel request for the previously transmitted measurement data	2 seconds or more and less than 5 seconds	Blinks orange in intervals of 0.1 seconds
Search for a U-WAVE-R device available for communication ^{*3}	5 seconds or more and less than 10 seconds	Blinks orange in intervals of 0.3 seconds

- *1 If you pressing this switch for 10 seconds or more, the LED indicator turns off and communication operations are disabled. Perform the operation again.
- *2 This operation can also be performed using the [DATA] switch on a measuring tool that supports data output.
- *3 If the device ID of this product is registered in the U-WAVE-R device to search for, the devices connect automatically.

• Verification of communication results
The communication results with the U-WAVE-R device can be verified by the operational status of the LED indicator or buzzer on this product.

Communication results	LED indicator	Buzzer ^{*1}
- Wireless communication ended normally.	Blinks green ^{*2}	2 short buzzes
- Wireless communication failed. - An error occurred.	Blinks red	1 long buzz

- *1 Buzzer type only.
- *2 If in event-driven mode, this does not blink in green.

3.2. Initializing the Settings

You can reset the settings of this product to the factory default values. If this product stops communicating and communication is not re-established even after performing the countermeasures in "5. Troubleshooting", initialize the settings with the procedure below.

- Remove the battery from this product. For more information about removing the battery, refer to "4. Replacing the Battery".
- While pressing and holding the [DATA] switch on the connection unit, insert the battery, wait 2 seconds or more, and then release the [DATA] switch. >> The settings of this product are initialized.
- Mount the battery cover.

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4. Replacing the Battery

The same procedure is used to replace the battery in U-WAVE-TC and U-WAVE-TM devices. The instructions in this section use a U-WAVE-TC device as an example.

- Remove the battery cover on the back of the main body using the supplied battery cover key.
- Insert a tool such as a small flathead screwdriver between the battery and battery clasp, and then remove the battery using the tool as lever.
- Insert the new battery into the "+" battery terminal, and then press the opposite side of the battery into the battery clasp.

4 Make sure that the packing (circular) is attached.

5 Mount the battery cover and tighten it using the supplied battery cover key.

CAUTION

- Always use a CR2032 battery (lithium battery) for this product. There is a risk of explosion if a different type of battery is used.
- When disposing of the battery, follow any applicable ordinances and regulations.

NOTICE

- Do not remove the packing attached to the battery cover.
- Be careful not to apply undue force and break or bend the battery terminals when replacing the battery. A fragment of a broken battery terminal in particular can cause damage if the fragment gets inside of this product.

5. Troubleshooting

Try the countermeasures included in this section when trouble occurs during use of this product. Contact a Mitutoyo service center listed in the "U-WAVEPAK User's Manual" if the trouble cannot be resolved.

Tips For more information about the issues and countermeasures of trouble related to the U-WAVE-R device, refer to "4. Troubleshooting" in the "U-WAVE-R User's Manual".

Issue	
Data transmission fails and the LED indicator blinks red.	
Check point	Countermeasure
Is the LCD of the measuring tool in the counter-display state?	Communication cannot be performed if the display of the measuring tool that is connected is turned off or is in a state for setting a value. Set the LCD to the counter display.

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Is the battery out of power?	Measurement data cannot be sent if the battery is out of power. Replace the battery with a new battery.
Is this product correctly attached to the measuring tool?	Make sure that this product and the measuring tool are fully connected with the connection unit. In particular, always insert the [DATA] switch side of the connection unit into the measuring tool when using the connection unit (02AZF310).
Does U-WAVEPAK show that the ID number indicated on the device ID label of this product is connected?	Communication cannot be performed if U-WAVEPAK does not show that the device is connected. Make sure that [c] is displayed in the [S] column on the [U-WAVEPAK Setup] screen of U-WAVEPAK. "4.3.2. U-WAVE-TTC/TM Settings" in the "U-WAVE Setup Manual"

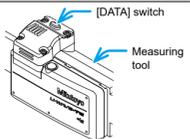
The settings for this product cannot be completed because this product cannot communicate with the U-WAVE-R device.

Has communication been established between this product and the U-WAVE-R device?

Establish communication using the procedure below.

- Make sure that the connection unit has been attached in the correct direction.

When using the connection unit (02AZF310), connect the measuring tool on the [DATA] switch side and this product on the opposite side.



- Execute the search for the U-WAVE-R device.
 - Start U-WAVEPAK, and then display the [U-WAVEPAK Setup] screen.
 - Press and hold the [DATA] switch for 5 to 10 seconds.

The LED indicator of this product will start blinking orange. Release the [DATA] switch after the indicator starts blinking slowly.

Tips If you press the [DATA] switch for 10 seconds or more, the LED indicator will turn off and the search operation will be disabled. Press and hold the switch again until the LED indicator blinks slowly.

- Check the [S] column and the comment of the [U-WAVEPAK Setup] screen.

If [c] is displayed in the [S] column, communication has been established. If an ID number is displayed in the comment, proceed to Step **3**.



- Register the settings again after initializing the settings of this product.
 - Initialize the settings of this product.
 - "3.2. Initializing the Settings"
 - Register the settings of this product.
 - "4.3. Registering the Settings" in the "U-WAVE Setup Manual"

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Issue	
Data transmission is not stable and errors occur frequently.	
Check point	Countermeasure
Is this product being used in an environment where communication is obstructed?	Check whether there is a problem with the usage environment. "Precautions regarding Wireless Communication Environments"

6. Specifications

6.1. Basic Specifications

Item	U-WAVE-TC		U-WAVE-TM	
	IP67 type	Buzzer type	IP67 type	Buzzer type
Code No.	264-620	264-621	264-622	264-623
Certification number	007-AE0185 (Japan)		007-AE0185 (Japan)	
Protection level	IP67	None	IP67	None
Equipped with buzzer	No	Yes	No	Yes
Transmission output	2.5 mW (4 dBm) or less			
Communication range	Approx. 20 m (line of sight distance in an office environment)			
Standards conformance	Japan: ARIB STD-T66 Europe: Radio: EN 300 328 V2.1.1 Safety: EN 62368-1:2014+A11 EN IEC 63000			
Wireless specifications	Proprietary (IEEE802.15.4 base)			
Communication frequency	2.405 GHz-2.475 GHz			
Transmission band	15 ch (5 MHz interval)			
Modulation method	Direct-Sequence Spread Spectrum (DSSS)			
Wireless communication speed	250 kbps			
LED display	Green/orange/red three-color display			
Communication with measuring tool	Digimatic (6 digits), Digimatic 2 (8 digits) *Automatic identification			
Battery	CR2032 (3 V): 1 battery			
Battery life	Approx. 400,000 times(button-driven mode) ^{*1}			
Operating temperature (humidity)	0 °C-40 °C (20 % RH-80 % RH with no condensation)			
Storage temperature (humidity)	-10 °C-60 °C (20 % RH-80 % RH with no condensation)			
External dimensions	56 × 30.4 × 11.5 (mm)		41.9 × 38.7 × 12.9 (mm)	
Main body weight	Approx. 20 g			

*1 The current consumption significantly increases when operating in event-driven mode.

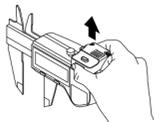
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6.2. Connection Unit (Option)

Part No. Model	Compatible measuring tool	
	Series No.	Compatible measuring tool
02AZF300 Standard type	500	ABS Digimatic caliper CD-AX/SC
02AZF310 Water-proof type	500 293 293	ABS coolant proof caliper..... CD-PM Coolant proof micrometer MDC-MX Coolant proof micrometer MDE-MX

- To remove the connection unit (02AZF310)
Remove the screws using the supplied size 0 screwdriver, and then remove the connection unit.

- To remove the connection unit (02AZF300)
Pinch both sides of the connection unit with your fingers, and then firmly pull straight up to remove it.



NOTICE

- Do not hold the part indicated in the figure. Doing so may damage the connection unit or the measuring tool.



- When removing, be careful not to injure yourself on the ends of the caliper jaws.

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