New wireless system improves efficiency by eliminating the need for data cables when sending measurements to a PC
The U-WAVE system enables easy wireless data communication from a measuring tool to a PC using the Digimatic protocol. Measurement efficiency is improved by eliminating the long and cumbersome data cables. The user-friendly interface allows data to be loaded into any software product that accepts keyboard input, such as Excel* or Notepad.

*Excel is a registered trademark of Microsoft Corporation.

Note: In accordance with wireless regulations the use of this product is permitted in Japan, Europe (a total of 32 countries including 27 EU members, 4 EFTA members and Turkey), U.S.A. and Canada. This product must not be used in other countries or areas.

**Easy loading in Excel format**

The U-WAVEPAK, U-WAVE-R standard package features a keyboard interface function. This allows measurement data to be easily entered into Excel, Notepad or other format that accepts numeric value input via a keyboard.

In addition, a virtual COM driver allows measurement data to be input to a program that supports RS-232C serial communication. The communication speed (baud rate) is fixed to 57,600 bps.

**Dustproof and water resistant IP67 model**

IP67-type U-WAVE-T (No.02AZD730C) has an IP67-level dust/water-proof function. This model can be used in combination with devices such as a coolant-proof caliper, micrometer or indicator.

**Approximately 400,000 Data Transmissions**

One commercially available CR2032 lithium battery will support about 400,000 data transmissions. Assuming that the device is used twenty days a month, sending data 2,000 times a day, one battery will last for about ten months.
Up to 100 measuring tools can be connected to one U-WAVE-R unit

Up to 100 U-WAVE-T units can be registered with one U-WAVE-R unit, and up to 16 U-WAVE-R units can be connected via a commercially available USB hub.

MUX-10F
(up to 4 wired channels)

U-WAVE
(up to 100 wireless channels)

Data communication range up to 60ft possible

The maximum reliable communication range is approximately 60ft*. Even when multiple U-WAVE-R units are used within the range of 60ft, interference does not occur since an ID (00 to 99) is assigned to each unit. Radio interference between U-WAVE-R units can also be avoided by setting different frequencies (selected from 15 bands).

*Actual range depends on the local radio transmission characteristics.

Different frequencies ensure no radio interference

Cordless operation improves efficiency in measurement data recording

Measurement on surface plate
With a cordless device, the surface plate and PC desk no longer need to be adjacent, allowing flexible layout in the inspection room.

Measurement of large workpieces
With U-WAVE, operators can perform measurement freely around the workpiece with no cable constraints.

Measurement using long measuring tools
U-WAVE eliminates cable constraints, making the use of hard-to-handle, long measuring tools easier.

Lower price than existing Mu-WAVE models

Design enhancements offer a variety of functional improvements and a price lower than existing Mu-WAVE models.
Just press a button to send measurements to your PC. Purchase the following four products (n1 to n4) to send data to your PC.

- **Mitutoyo Measuring Tool with Digimatic Output**
  - This product can be connected to a measuring tool that provides Digimatic data output. Digimatic output is Mitutoyo's proprietary output format. The Digimatic specifications remain unchanged since the first Digimatic measuring tool was released. Therefore, any tool having a Digimatic port can be used, regardless of age. Connectors on some older instruments are not compatible with connectors used on the above-listed cables. See cable list on page 7.

- **U-WAVE-T/tool connection**
  - A short cable is used to connect a measuring tool to its U-WAVE-T unit. Select the appropriate cable from A to G below (7 types) to suit the measuring tool. Detailed information on cable suitability is given on page 7.

<table>
<thead>
<tr>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>02AZD790A</td>
</tr>
<tr>
<td>B</td>
<td>02AZD790B</td>
</tr>
<tr>
<td>C</td>
<td>02AZD790C</td>
</tr>
<tr>
<td>D</td>
<td>02AZD790D</td>
</tr>
<tr>
<td>E</td>
<td>02AZD790F</td>
</tr>
<tr>
<td>F</td>
<td>02AZD790G</td>
</tr>
<tr>
<td>G</td>
<td>02AZD790G</td>
</tr>
</tbody>
</table>

- **U-WAVE-T**
  - Registered Design (Japan)
  - U-WAVE-T sends measurement data to U-WAVE-R.

<table>
<thead>
<tr>
<th>Actual size</th>
<th>Major specifications of U-WAVE-T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>U-WAVE-T (IP67 model)</td>
</tr>
<tr>
<td>Order No.</td>
<td>02AZD730D*</td>
</tr>
<tr>
<td>Protection Rating</td>
<td>IP67</td>
</tr>
<tr>
<td>Data reception indication</td>
<td>LEDs</td>
</tr>
<tr>
<td>Power supply</td>
<td>Lithium battery CR2032 x 1</td>
</tr>
<tr>
<td>Battery life</td>
<td>Approx. 400,000 transmissions</td>
</tr>
<tr>
<td>External dimensions</td>
<td>1.73&quot; x 1.17&quot; x .73&quot; (44 x 29.6 x 18.5 mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>.05 lbs (23 g)</td>
</tr>
</tbody>
</table>

- **Example Digimatic measuring tools pictured with connecting cables. Instrument models/cable product numbers are listed below.**

- **Super Caliper**
  - CD67-515PM
  - No.02AZD790A

- **QuantuMike**
  - MDE-25MJ
  - No.02AZD790B

- **ABS Digimatic Caliper**
  - CD-15CX
  - No.02AZD790C

- **Digimatic Indicator**
  - ID-H0530
  - No.02AZD790D
When the data input button is pressed, the value displayed on the measuring tool is entered into the active cell of Excel followed by “Enter” key input. The cursor movement direction after input (up, down, left or right) can be set in Excel.

Once the U-WAVEPAK data interface function has been started, received data is converted into a keyboard input and entered into the active cell.

Communication distance of approximately 60ft
(in a good transmission/reception location)

*Refer to page 6 for wireless communication specification

### Major Specifications of U-WAVE-R

<table>
<thead>
<tr>
<th>Model</th>
<th>U-WAVE-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>02AZD810D*</td>
</tr>
<tr>
<td>Power supply</td>
<td>USB bus power system</td>
</tr>
<tr>
<td>Number of U-WAVE-R units that can be connected to one PC</td>
<td>Up to 16</td>
</tr>
<tr>
<td>Number of U-WAVE-T units that can be connected</td>
<td>Up to 100</td>
</tr>
<tr>
<td>External dimensions</td>
<td>5.51&quot; x 3.15&quot; x 1.24&quot; (140 x 80 x 31.6mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>.29 lbs (130g)</td>
</tr>
</tbody>
</table>

*Detailed information on conformity standards of wireless communication specification is given on page 6.
*Refer to page 6 for specification of U-WAVEPAK (setup software)
Before using U-WAVEPAK for the first time, IDs, frequencies, and other software setup must occur. The data interface function allows measurement data to be sent to a PC into Excel, Notepad or other software that accepts keyboard input.

Data can also be sent to a program that supports RS-232C serial communication using the virtual COM driver.

1) Operating environment
- Supported OS: Windows 2000 Professional (SP4 or higher), Windows XP Home Edition (SP2 or higher), Windows XP Professional (SP2 or higher), Windows Vista
- Other information: USB port needed

2) Initial setup procedure
- Install U-WAVEPAK (setup software).
- Connect the U-WAVE-R main unit to the PC with a USB 2.0 cable.
- Install the dedicated USB driver and virtual COM driver.
- Set IDs and frequencies for U-WAVE-R and U-WAVE-T with U-WAVEPAK.
- Press the DATA button of U-WAVE-T once to write settings into U-WAVE-T main unit memory.

3) Data interface function
Data is entered into an Excel or Notepad file as keyboard-input data.
- Control key (terminal code)
  Codes to be suffixed to measurement data can be switched.
  - ENTER (default), TAB, up, down, left, right
- Data send mode
  Two data formats are available.
  - Measurement data only (default) Example +00000012.34
  - All data Example DT1 01 02 +00000012.34 M
- Header: measurement data measurement data
  U-WAVE-R ID: 00 to 99 U-WAVE-T ID: 00 to 99
  Unit: M: millimeter I: inch
- Used band
  15 channels (2.405 to 2.475GHz at intervals of 5MHz)
  The noise search function can avoid interference with other communication devices.

Specifications of wireless communication
- Conformity standards
  - European conformity standards*
    EN 50371:2002
    EN 300 440-1 V1.3.1
    EN 301 489-03 V1.4.1
  - U.S.A. conformity standards
    47 CFR Part 15.247 (Subpart C)
    47 CFR Part 15.247 (Subpart B)
  - Canada conformity standards
    RSS 210 (issue 7)
    RSS Gen (issue 2)

- Used band
  15 channels (2.405 to 2.475GHz at intervals of 5MHz)
  The noise search function can avoid interference with other communication devices.

Note: In accordance with wireless regulations the use of this product is permitted in Japan, Europe (a total of 32 countries including 27 EU members, 4 EFTA members and Turkey), U.S.A. and Canada. This product must not be used in other countries or areas.

This product is not compatible with the conventional Mu-WAVE, for which communication specifications are different.

* Japan conformity standards: ARIB ST10-R68

U-WAVE-R
Receives data from U-WAVE-T and sends it to a PC via a USB connection

<Specifications of U-WAVEPAK (setup software)>
Before using U-WAVEPAK for the first time, IDs, frequencies, and other software setup must occur. The data interface function allows measurement data to be sent to a PC into Excel, Notepad or other software that accepts keyboard input. Data can also be sent to a program that supports RS-232C serial communication using the virtual COM driver.

1) Operating environment
- Supported OS: Windows 2000 Professional (SP4 or higher)
  - Windows XP Home Edition (SP2 or higher)
  - Windows XP Professional (SP2 or higher)
  - Windows Vista
- Other information: USB port needed

2) Initial setup procedure
- Install U-WAVEPAK (setup software).
- Connect the U-WAVE-R main unit to the PC with a USB 2.0 cable.
- Install the dedicated USB driver and virtual COM driver.
- Set IDs and frequencies for U-WAVE-R and U-WAVE-T with U-WAVEPAK.
- Press the DATA button of U-WAVE-T once to write settings into U-WAVE-T main unit memory.

3) Data interface function
Data is entered into an Excel or Notepad file as keyboard-input data.
- Control key (terminal code)
  Codes to be suffixed to measurement data can be switched.
  - ENTER (default), TAB, up, down, left, right
- Data send mode
  Two data formats are available.
  - Measurement data only (default) Example +00000012.34
  - All data Example DT1 01 02 +00000012.34 M
- Header: measurement data measurement data
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  Unit: M: millimeter I: inch
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* Japan conformity standards: ARIB ST10-R68

Mitutoyo
## List of U-WAVE-T Connecting Cables

Select one from cables A to G, referring to the part number of connecting cable for wired connection in your measuring tool catalog or manual. If you are unsure which cable is appropriate, check the cable connectors, the shapes of terminal on the measuring tool side, or the codes of compatible measuring tool for cables A to G below. It is not possible to connect to EF and EH counters.

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Description</th>
<th>Connector shape on the measuring tool side</th>
<th>Socket shape on the measuring tool</th>
<th>Codes of major compatible measuring tools and instruments</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Connector shape on the measuring tool side</th>
<th>Codes of major compatible measuring tools and instruments</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1m</td>
<td>Reference Order No. of connecting cable</td>
</tr>
<tr>
<td>02AZD790A</td>
<td>05CZA624</td>
</tr>
<tr>
<td>02AZD790B</td>
<td>05CZA662</td>
</tr>
<tr>
<td>02AZD790C</td>
<td>959149</td>
</tr>
<tr>
<td>02AZD790D</td>
<td>936937</td>
</tr>
<tr>
<td>02AZD790E</td>
<td>937387</td>
</tr>
<tr>
<td>02AZD790F</td>
<td>905338</td>
</tr>
<tr>
<td>02AZD790G</td>
<td>21EAA194</td>
</tr>
<tr>
<td>2m</td>
<td>Reference Order No. of connecting cable</td>
</tr>
<tr>
<td>02AZD790A</td>
<td>05CZA625</td>
</tr>
<tr>
<td>02AZD790B</td>
<td>05CZA663</td>
</tr>
<tr>
<td>02AZD790C</td>
<td>959150</td>
</tr>
<tr>
<td>02AZD790D</td>
<td>965014</td>
</tr>
<tr>
<td>02AZD790E</td>
<td>965013</td>
</tr>
<tr>
<td>02AZD790F</td>
<td>905409</td>
</tr>
<tr>
<td>02AZD790G</td>
<td>21EAA190</td>
</tr>
</tbody>
</table>

## Note on Wireless Communication Environment
Although the communication range for U-WAVE is approximately 60ft line-of-sight, performance may be affected by obstacles or environmental factors.

### Items that may cause communication errors

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete wall</td>
<td>Communication is not possible into a room completely enclosed.</td>
</tr>
<tr>
<td>Metal partition</td>
<td>Communication speed may drop or communication may be interrupted.</td>
</tr>
<tr>
<td>Wireless LAN, communication device such as ZigBee, Bluetooth, and microwave oven</td>
<td>Communication speed may drop or communication may be interrupted. Maintain the set frequency and installation distance if at all possible.</td>
</tr>
<tr>
<td>Medical instrument</td>
<td>Do not use this product near a medical instrument such as a laser knife or electronic scale.</td>
</tr>
</tbody>
</table>

## Cautions: Safety Caution
- Do not use this device near medical equipment that might malfunction due to radio interference.
- Caution on radio law: This device is certified as a 2.4 GHz band wide-band low-power data communication system based on the Radio Regulations in Japan, Europe, U.S.A. and Canada. It is prohibited by law to disassemble or modify this device or peel off the certification label from it.
MeasurLink® V6.1
Combining the U-WAVE system with commercially available data measurement software allows the user to perform SPC and data analysis. New functions have been added to MeasurLink including U-WAVE ID identification and data cancellation.

Measurement Data Network System — MeasurLink® V6.1 Real-Time PLUS

When data is input, MeasurLink displays a variety of statistical processing results including GO/NG judgment, process capability, Xbar-R control chart and histogram on the screen in real time. For details, refer to Bulletin No. 1717.

Other Highlights
- Alarm function: tolerance judgment, control limit value, series, tendency, etc.
- Report output: statistical calculation result, chart, measured value, etc.
- Comment addition and per-layer function: It is possible to add history information (such as inspector, machine tool, lot number, serial number, and cause of failure) to data as comment so that it can be checked when a problem occurs or used as a keyword to search for or narrow down data.
- File import function: Text, PocketML or other file
- File output: Excel, text or other format

Association between U-WAVE-T ID and the Measured Item
When there is a one-to-one relationship between the measuring tool and the measured item, data randomly measured by the operator can be automatically input into the associated measured item. When a single measuring tool measures multiple items, determine the measurement order in advance since a single ID cannot identify measured items.

V6.0 or earlier version
It is necessary to upgrade to V6.1 to support data cancellation and other new functions of the U-WAVE. The V6.1 upgrade for V6.0 users is at no cost. A service pack can be downloaded from the Support section of the MeasurLink website. www.measurlink.com
U-WAVE®

U-WAVE’s New Function (Common):
Data Cancellation Function Activated by Holding Down the Button

Release the button when the U-WAVE-T LED starts blinking orange.

Hold down the DATA button for five seconds.

Data Input Screen

Detailed statistical charts can be arbitrarily displayed.

**Individual item chart**
- Xbar-R control chart (a)
- Xbar-S control chart
- X-Rs control chart
- EWMA control chart
- Histogram (b)
- Run chart
- Pre-control chart (c)
- Tier chart

**All item chart**
- Multivariate control chart
- Column indicator
- All item Cpk sheet
- Multivariate defect ratio (bar graph)
- Manager display (4 columns x 3 rows)
  (Histogram, meter, box and whisker plot, Cpk)

**Statistics**
- Maximum value
- Minimum value
- Average
- Standard deviation
  S, Rbar/d2
- Process capability
  Co, Cpk, Po, Ppk
- Defect ratio
  Average ±3σ/4σ/6σ etc.

**Measured value**
- Measured value data sheet
- Parts data sheet
Central Management of Quality Information through Construction of Measurement Data Network System

MeasurLink can be expanded to a network system of server and clients. This software consolidates and centrally manages measurement data generated across the factory (handheld measuring tools to CMMs) to support quality information sharing.

Operating Environment (Recommended)

<MeasurLink V6.1 Real-Time PLUS>
OS: Windows 2000/XP Vista
CPU: Pentium IV 1GHz
Memory: 1 GB or more
Hard disk: 2 GB or more free space
I/O: USB port (required for U-WAVE-R connection)
Media drive: CD-ROM (required at installation)
PDA Navi
Remotely view data input into MeasurLink Real-Time Plus (sold separately)

Measurement Navigation Program — PDA Navi

PDA Navi is a measurement navigation program that allows data input to MeasurLink Real-Time Plus on a PC to be viewed using a commercially available PDA* via a wireless LAN. This means that even when you make measurements at a station remote from your PC the measurement data can still be sent to the PC with U-WAVE, loaded into MeasurLink and the results fed back to PDA Navi for viewing at your remote station. GO/NG judgment results, statistical processing results, next point to be measured and other data can all be verified.

Operating Environment for PDA Navi

<table>
<thead>
<tr>
<th>Supported OS</th>
<th>Microsoft Windows Mobile 5.0 for Pocket PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported PDA</td>
<td>PDA equipped with above OS and wireless LAN Recommended memory: ROM: 192 MB or more, RAM: 64 MB or more Certified model: “iPAQ hx 2490b2” (from HP)</td>
</tr>
<tr>
<td>Supported MeasurLink</td>
<td>Real-Time Plus or STAT-Measure Plus V6.1 or higher (required when using PDA Navi)</td>
</tr>
</tbody>
</table>

Order No. 64AASPDAAN**

PDA Navi Measurement Screen Example

Major Specifications of PDA Navi

- Inspection lot: New, Open, Close, Switch
- Measurement display: Starts measurement using the graphic screen.
- Measurement result display: GO/NG judgment result is displayed color-coded.
- Specification of next measured item
- Chart display: control chart, histogram, run chart, etc.
- Data collection: key input of data, data cancellation, key input of serial number

* PDA stands for Personal Digital Assistant and refers to a personal mobile information terminal.
**PDA device not included

Communication range: approximately 60ft (line of sight)
Note: All information regarding our products, and in particular the illustrations, drawings, dimensional and performance data contained in this printed matter as well as other technical data are to be regarded as approximate average values. We therefore reserve the right to make changes to the corresponding designs. The stated standards, similar technical regulations, descriptions and illustrations of the products were valid at the time of printing. In addition, the latest applicable version of our General Trading Conditions will apply. Only quotations submitted by ourselves may be regarded as definitive.

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We reserve the right to change specifications and prices without notice.