MEASURING TOOLS
MEASURMENT DATA MANAGMENT

INPUT TOOL

USB Input tool Direct	A-004
Input Tool IT-016U/IT-007R	A-005

U-WAVE

U-WAVE-TC/TM (U-WAVE fit)	A-006-007
U-WAVE-R	A-008
U-WAVE-T	A-009
Accessories	A-010
Software	A-011-013

Mini-Printer Equipped

DP-1VR LOGGER	A-014

Multiplexer

MUX-10F	A-015

MeasurLink

Real-Time	A-017
Process Analyzer	A-018
Gage R&R	A-018
Process Manager	A-019
Gage Management	A-019
Workgroup and site License Packages	A-020
Floating License	A-020

Digimatic Data Cable Selector **A-022-024**

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Example of Measurement Data Management System Design

A system for recording and analyzing measurement results from various Mitutoyo measuring instruments for quality assurance purposes.

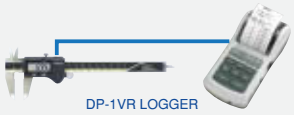
Implementation Step 1

Recording measurement results

- **No more transcribing**

  Measurement data can be easily printed.

  Data can be output to a PC for statisticscalculations.



A-014

- **Direct data input to a PC**

  Connecting cable-integrated USB-ITN

USB Input Tool Direct

A-004

Lineup of three models with different output specifications IT-012U/IT-016U/IT-007R

Input Tool Series

A-005

Connect to a RS-232C interface PC with 4 channels and a sequencer

Multiplexer MUX-10F

A-015

- **Wireless**

U-WAVE

A-006

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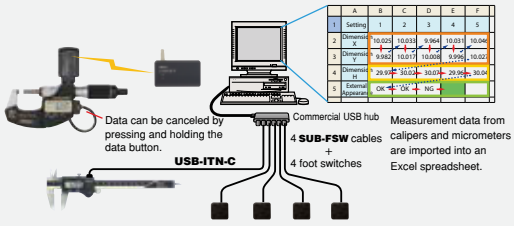
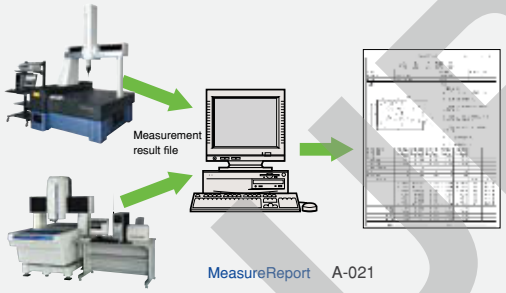
Implementation Step 2

Software dedicated to inspection and quality control

• Inspection certificate creation

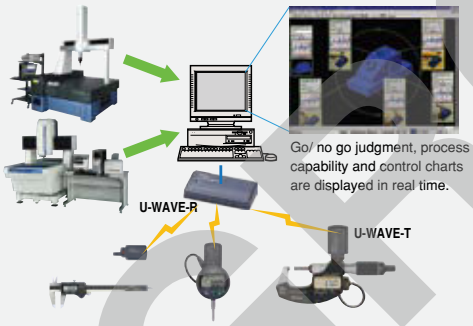


USB-ITPAK A-012



MeasureReport A-021

• Statistical Process Control

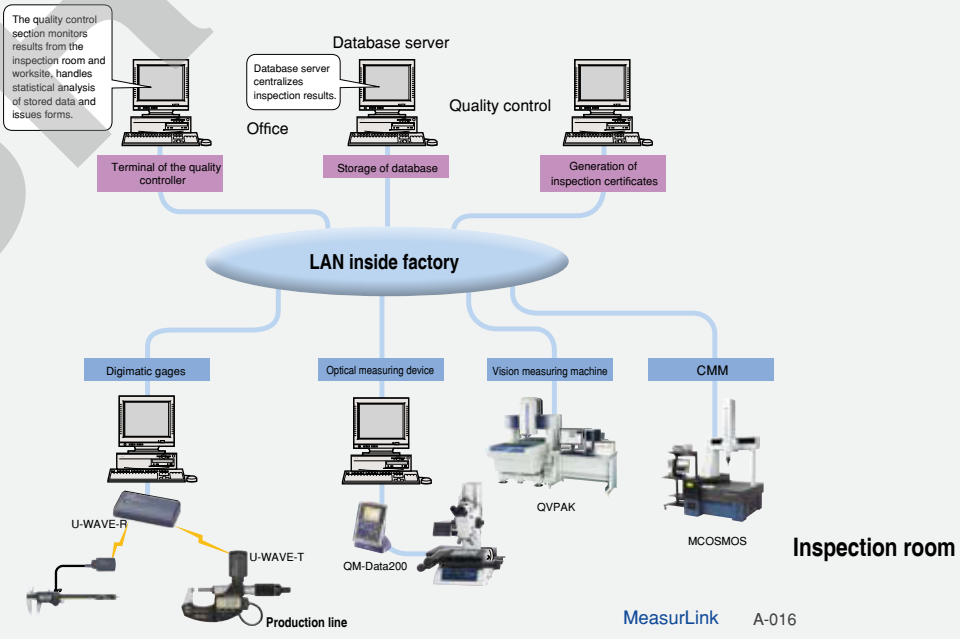


MeasurLink A-016

Implementation Step 3

Creating a quality control network covering a wide area within the factory

• Unify management of the quality test using the network in the factory



MeasurLink A-016

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Digimatic Gage / PC Data Input Device
USB Input Tool Direct

A data collection tool that offers simple and popular operability (HID connection) and optional software to input data to Microsoft Excel at a reasonable price. A more sophisticated way to improve operational efficiency.

Use USB-ITN standalone as a dedicated interface for digimatic indicators compatible with HID keyboard devices.

In common with the popular model IT-016U, this device is capable of entering measurement data to Microsoft Excel or a memo pad. Application example: using USB-ITN standalone to input data while selecting the data entry point flexibly during a measurement whose procedures cannot be determined in advance (such as the inspection of items or trial products with few measurements or without repeated procedures).

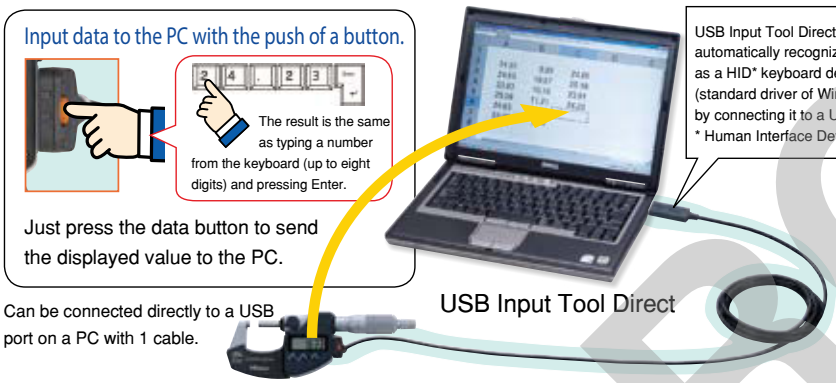
Using USB-ITN in combination with dedicated options

If you need more than just the ability to load the measurement data to Excel, the optional software USB-ITPAK can create a data input procedure to an Excel sheet to improve the operational efficiency of repeated inspections. Application example: using USB-ITN in combination with USB-ITPAK V2.1 to improve the operational efficiency of daily inspections such as sampling tests or complete inspections of mass-produced product.

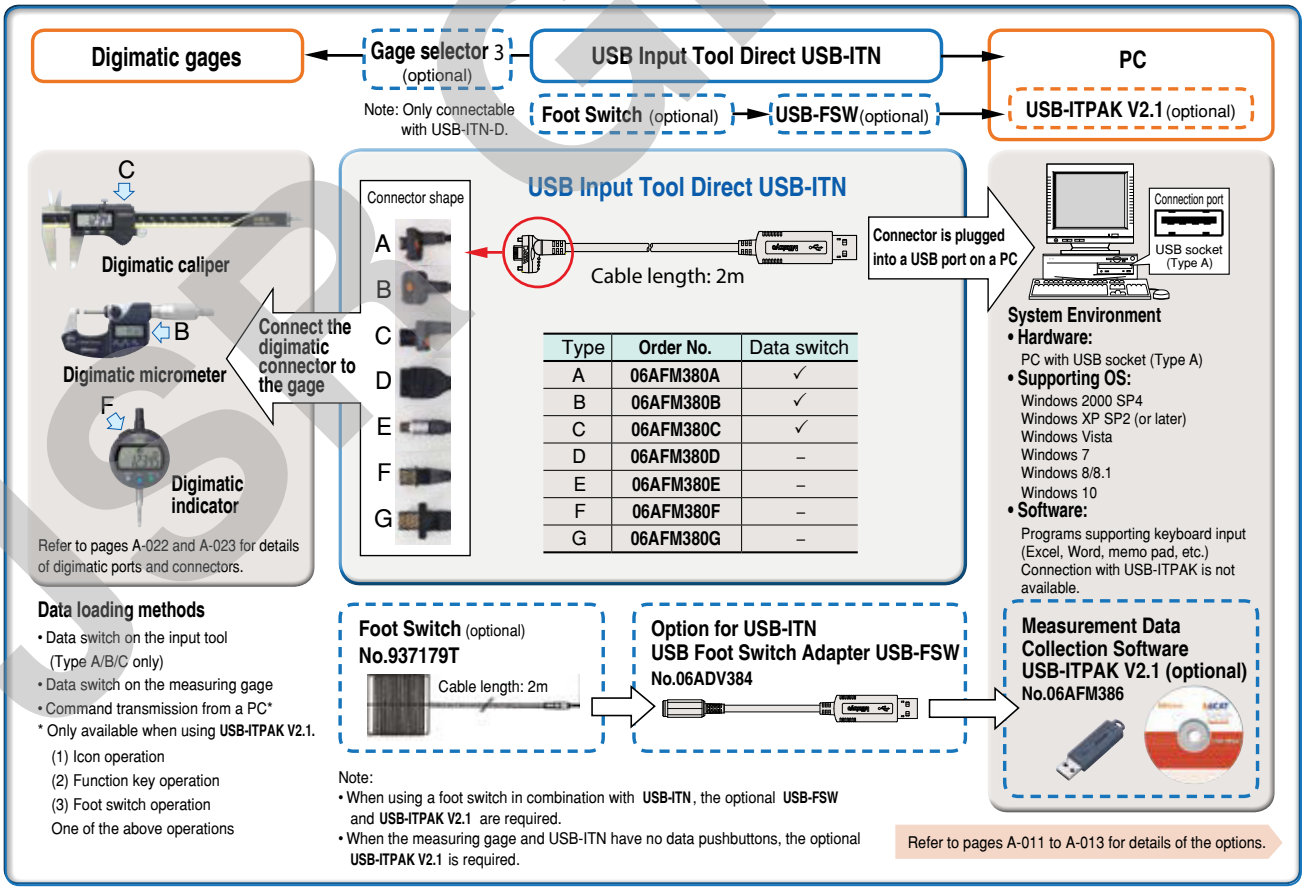
Main specification

- Output compatibility: USB1.1 and USB2.0
- Supporting driver software: Switchable between 2 items below
  (1) When using standalone: HID keyboard device*
  (2) When using with USB-ITPAK V2.1: Virtual COM port (VCP)
- Communication speed: 12Mbps (Full Speed)
- Power supply: USB bus power
- Mass: 59g
- USB 2.0 certificate

* Since this device is compatible with Windows standard driver software, dedicated driver software is not required.



System Configuration



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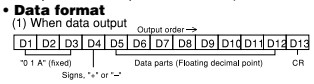
Measurement Data Input Unit
Input Tool SERIES IT-016U / IT-007R

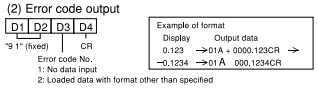
Specifications of IT-007R RS-232C Communication

• Output specification: RS-232C compliant
Communication method: Full duplex
Communication speed: 2400bps (fixed)
Bit configuration: Start bit 1
Data length 8
(Most significant bit, 0 (fixed))
Parity, None
Stop bit 1
Flow control: None
Home position: DCE (modem definition)

• Data format
(1) When data output



(2) Error code output



• Data request signal
Data can be output by transmitting a character from the PC.

• Connector specification and power supply from the PC

This product operates while accumulating the power supplied from the PC. A second or more input interval is required.

Pin No.	Symbol	in/out	Description of function
1	(N.C.)	-	No connection
2	RXD	OUT	Data output from this product to the PC
3	TXD	IN	Data input from the PC to this product
4	DTR	IN	+12V power supply from the PC*
5	GND	-	Ground
6	DSR	OUT	Not used
7	RTS	IN	+12V power supply from the PC*
8	CTS	OUT	Not used
9	(N.C.)	-	No connection

* "4" and "6", "7" and "8" are short-circuited with each other inside this product.
* When connecting to a sequencer, a power supply is required.
Input voltage: Supplied in the range 6 V - 16 V
Power supply terminal: Supplied to pins 4 and 7

USB Keyboard Signal Conversion Type IT-016U / IT-007R

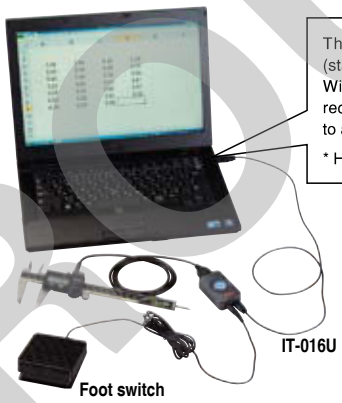
The IT-016U, a popular USB input tool that enables easy data recording. Allows you to perform inspection work more efficiently

The IT-016U is equipped with a connector socket for a push-button or switch-foot operation.
Functional improvements include:
• A bigger, easy-to-press data switch. Size increased from ø4mm to ø18mm.
Durability of the push button increases from 1 million to 10 million operations.
• May be used with optional software USB-ITPAK V2.1
Enables efficient routine inspection work, for example, in mass production.

RS-232C Communication Conversion Type IT-007R

Input tool for RS-232C communication best suited for communication control of the software!

Control is available by transmitting data request commands via RS-232C.
For example, production engineers can create communication programs to load the measurement data by transmitting a command from the PC. This product is a compact and low-cost RS-232C communication interface, which is convenient when it is installed in a machine tool or dedicated device to feed back measurement data.

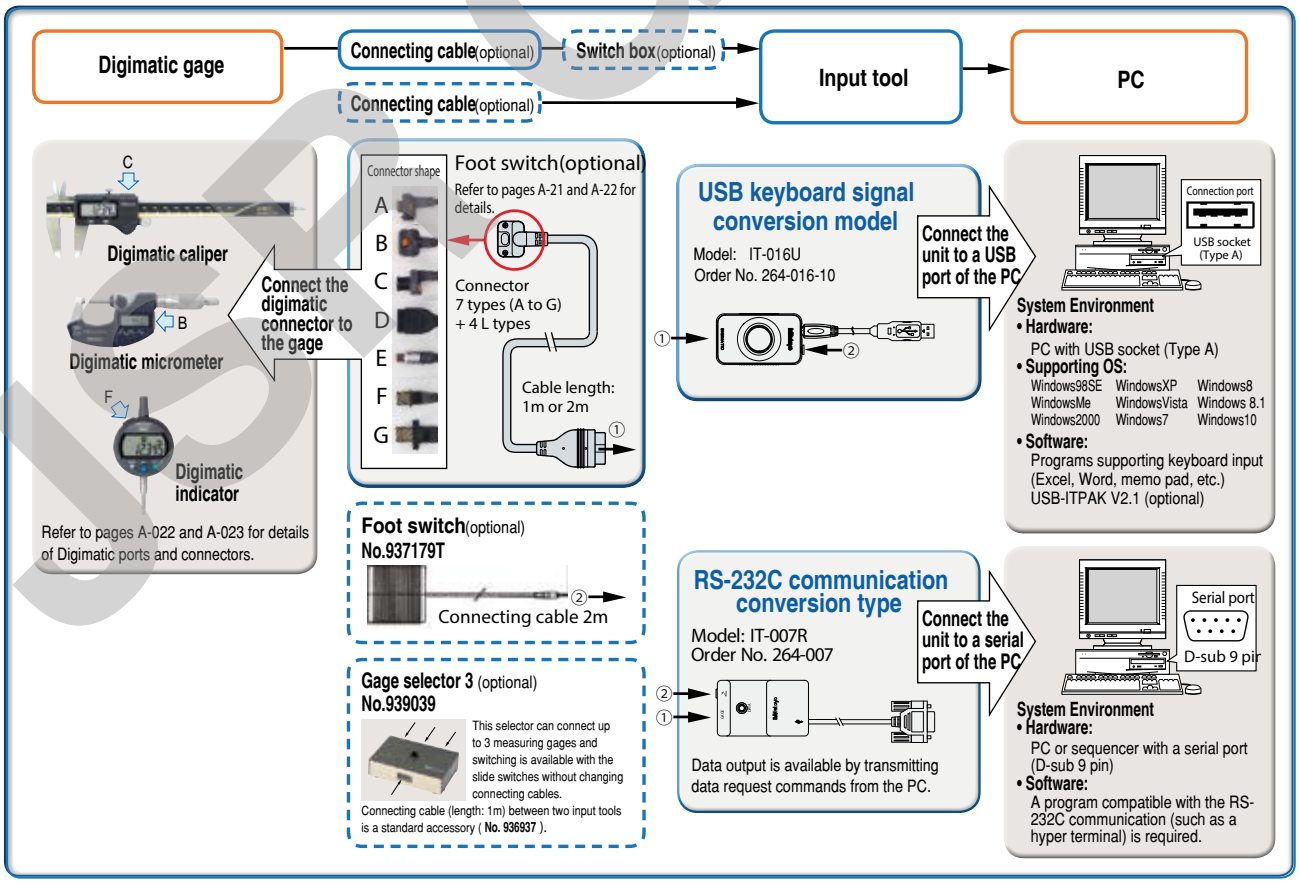


The HID keyboard device (standard driver software for Windows) is automatically recognized when connected to a USB port.
* HID (Human Interface Device)

Main Specifications of IT-016U

Supported driver software:
Changeable between two types
Output specification: USB2.0 or USB1.0
(1) Stand-alone: HID keyboard device*
(2) Using USB-ITPAK V2.1: Virtual COM port (VCP)
Communication speed: 12Mbps (Full Speed)
Power supply: USB bus power
USB2.0 certificate
Conforms to EMC Directives
* This product is compatible with the standard driver software for Windows. No dedicated driver software is required.

IT-016U/IT-007R System Configuration



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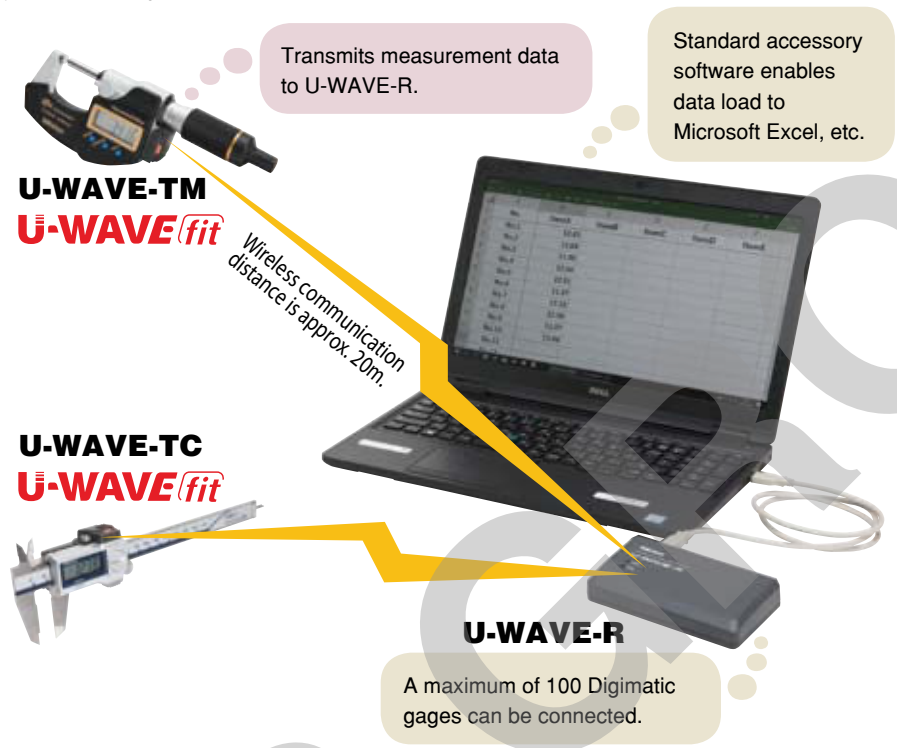
Measurement data wireless communication system
U-WAVE-TC / TM (U-WAVE fit)

- Data from tools with Digimatic output function can be sent to a PC via wireless communication.
- With functions and performance inherited from U-WAVE-T, the compact thinner design provides better fitting to an instrument and improved operability, which enables further improvement of efficiency.
- The Data Interface Function of the U-WAVE-R standard accessory software enables data input to commonly available software by keyboard input (Microsoft Excel*, Notepad, etc.).
- USB-ITPAK V2.1 supports U-WAVE !
  Loading multiple measurement data into separate Excel sheets, or simultaneous measurement using the special event drive is now available without the need for macro programming.
  (Automatic loading in a certain interval is available with the timer function.)



U-WAVE fit (U-WAVE-TC/TM) System communication specifications

• Wireless communication

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

Use of U-WAVE is allowed in the following countries:
This product is a radio equipment classified in the 2.4GHz Wide-band Low Power Data Communication System. To use this product, conformity to the radio law of each county is required.
For use tn countries other than those below, please contact your dealer or nearest Mitutoyo sales office.
To use in countries other than the country where you purchased the product, please contact your dealer or nearest Mitutoyo sales office.

Applicable models	264-620/1/2/3
Asia	Japan, China, Vietnam
North American	US, Canada
Europe	28 EU member nations (UK, France, Germany, Italy, Netherlands, Belgium, Luxembourg, Spain, Portugal, Austria, Sweden, Finland, Denmark, Bulgaria, Cyprus, Czech, Slovakia, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, Croatia) 4 EFTA member nations (Norway, Switzerland, Iceland, Liechtenstein) Turkey

As of August, 2018

U-WAVE-R
Receives data from U-WAVE-TC / TM and loads to a PC via USB.

Model	U-WAVE-R
Order No.	02AZD810D
Power supply	USB bus power system
Number of U-WAVE-R unit that can be connected to one PC	Up to 15
Number of U-WAVE-T unit that can be connected	Up to 100
External dimensions	140x80x31.6mm
Mass	130g

U-WAVE-R main unit

USB 2.0 cable (1m) 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*

*Revision history (U-WAVEPAK)
Ver1.010 or later is compatible with 32/64-bit OS.
Ver1.020 or later is compatible with Windows 8.
Ver1.021 or later is compatible with Windows 8.1.
Ver1.002 or later is compatible with Windows 10.

Main specifications
- Setup of dedicated driver software (USB and virtual COM port)
- Initial setting of ID number and frequency selection (required only once for first time)
- Load data to Microsoft Excel or Notepad through data interface function
- Note: Cannot be connected to a device other than a PC (such as DP-1VR LOGGER, PDA, or controller).

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Type of transmission unit

264-622

264-621

Transmits measurement data to U-WAVE-R. Select IP67 or buzzer model according to your application.

Connectable measuring instruments	Micrometer		Caliper	
Order No.	264-622	264-623	264-620	264-621
Model	U-WAVE-TM (IP67 type)	U-WAVE-TM (Buzzer type)	U-WAVE-TC (IP67 type)	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	41.9x12.9x38.8 mm		56x11.45x30.4 mm	
Mass	18g			

Note: IP67 model is water/dust-proofed suitable for the factory floor.

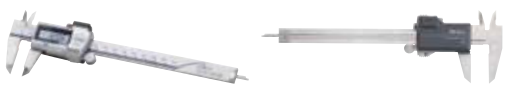
02AZF310

02AZF300

Fixed to transmission unit and inserted into output connector of digimatic gage

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

Compatibility of measuring tool and unit

Digimatic gage		Assembled appearance (Front / Back)	Connecting unit	Transmission unit
Micrometer	Standard		02AZF310	U-WAVE-TM (Buzzer type) 264-623 U-WAVE fit
	Water/ dustproof type			U-WAVE-TM (IP67 type) 264-622 U-WAVE fit
Caliper	Standard		02AZF300	U-WAVE-TC (Buzzer type) 264-621 U-WAVE fit
	Water/ dustproof type		02AZF310	U-WAVE-TC (IP67 type) 264-620 U-WAVE fit

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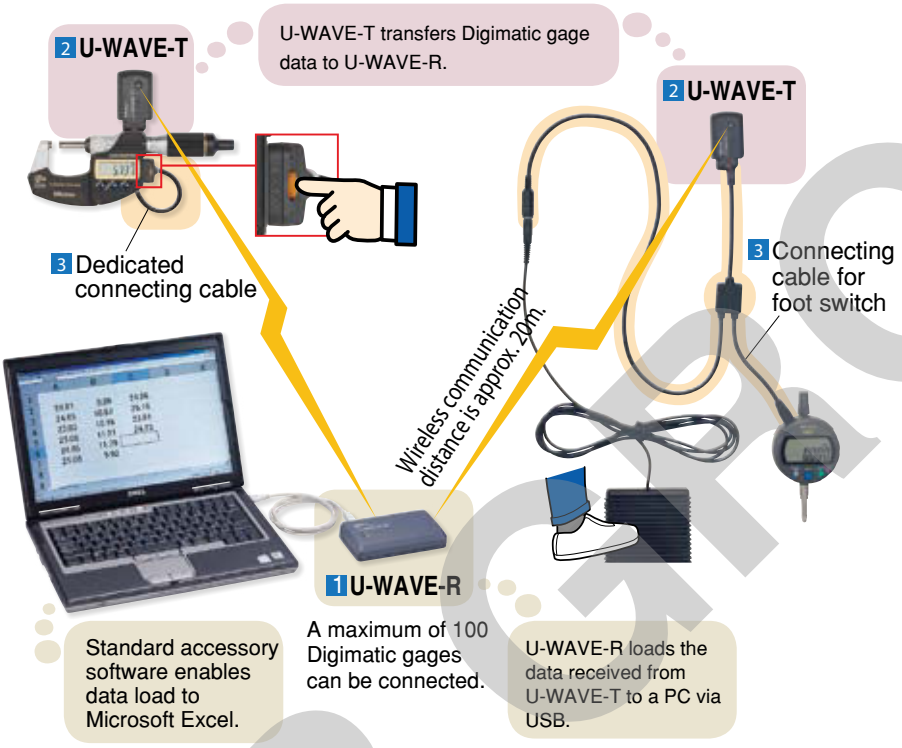
Measurement data wireless communication system U-WAVE

- Data from Digimatic gages can be loaded to a PC easily.
- Wireless communication eliminates cabling, improving measuring operability.
- The Data Interface Function of the U-WAVE-R standard accessory software enables data input to commonly available software by keyboard input (Microsoft Excel*, Notepad, etc.).
- USB-ITPAK V2.1 supports U-WAVE
  Loading multiple measurement data into separate Excel sheets, or simultaneous measurement using the special event drive is now available without the need for macro programming.
  (Automatic loading in a certain interval is available with the timer function.)

U-WAVE system configuration



Data from Digimatic gages can be loaded to a PC easily by using items 1 to 3 below.

U-WAVE-R

Receives data from U-WAVE-T and loads to a PC via USB.

Model	U-WAVE-R
Order No.	02AZD810D
Power supply	USB bus power system
Number of U-WAVE-R unit that can be connected to one PC	Up to 15
Number of U-WAVE-t unit that can be connected	Up to 100
External dimensions	140x80x31.6mm
Mass	130g

U-WAVE-R main unit

USB 2.0 cable (1m) 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

*Revision history (U-WAVEPAK)
Ver1.010 or later is compatible with 32/64-bit OS.
Ver1.020 or later is compatible with Windows 8.
Ver1.021 or later is compatible with Windows 8.1.
Ver1.002 or later is compatible with Windows 10.

Main specifications
- Setup of dedicated driver software (USB and virtual COM port)
- Initial setting of ID number and frequency selection (required only once for first time)
- Load data to Microsoft Excel or Notepad through data interface function
- Note: Cannot be connected to a device other than a PC (such as DP-1VR LOGGER, PDA, or controller).

U-WAVE-T System communication specifications

- **Wireless communication**

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

Use of U-WAVE is allowed in the following countries:
This product is a radio equipment classified in the 2.4GHz Wide-band Low Power Data Communication System. To use this product, conformity to the radio law of each county is required.
For use tn countries other than those below, please contact your dealer or nearest Mitutoyo sales office.
To use in countries other than the country where you purchased the product, please contact your dealer or nearest Mitutoyo sales office.

Applicable models	• 02AZD810D • 02AZD880G • 02AZD730G
Asia	Japan,China, Vietnam, Taiwan, Indonesia, Thailand, Malaysia, Philippines, India, Singapore
North American	US, Canada
Central and South America	Mexico, Costa Rica, Argentina
Europe	28 EU member nations (UK, France, Germany, Italy, Netherlands, Belgium, Luxembourg, Spain, Portugal, Austria, Sweden, Finland, Denmark, Bulgaria, Cyprus, Czech, Slovakia, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Poland, Romania, Slovenia) 4 EFTA member nations (Norway, Switzerland, Iceland, Liechtenstein) Turkey, Russia

Applicable models	02AZD810E 02AZD880H 02AZD730H
Central and South America	Brazil

Applicable models	02AZD810F 02AZD880J 02AZD730J
Asia	Brazil

As of August, 2018

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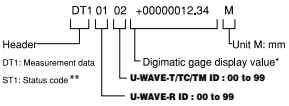
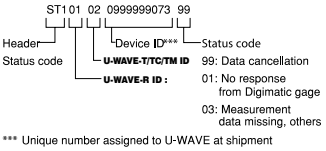
• Data format
Example of format when the Digimatic gage displays 12.34



* Data interface function is switchable to "Measurement value only"
e.g.) +00000012.34
** Example of status code format



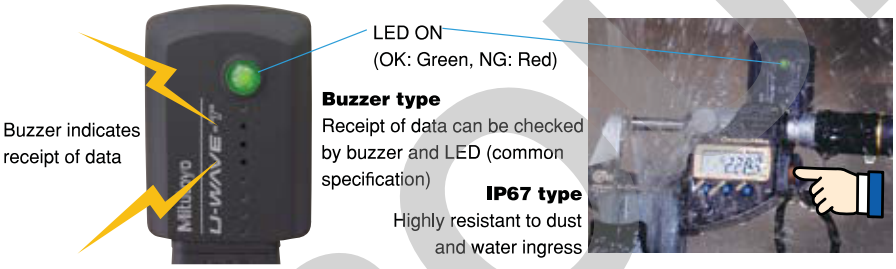
*** Unique number assigned to U-WAVE at shipment

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

Transmits measurement data to U-WAVE-R. Select IP67 or buzzer model, according to your application. U-WAVE-R can be connected to Digimatic gages by dedicated cable for U-WAVE-T (option).

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 supply	Lithium battery CR2032x1	
Battery life	Apporx. 400,000 transmissions	
Dimensions	44x29.6x18.5 mm	
Mass	23g	

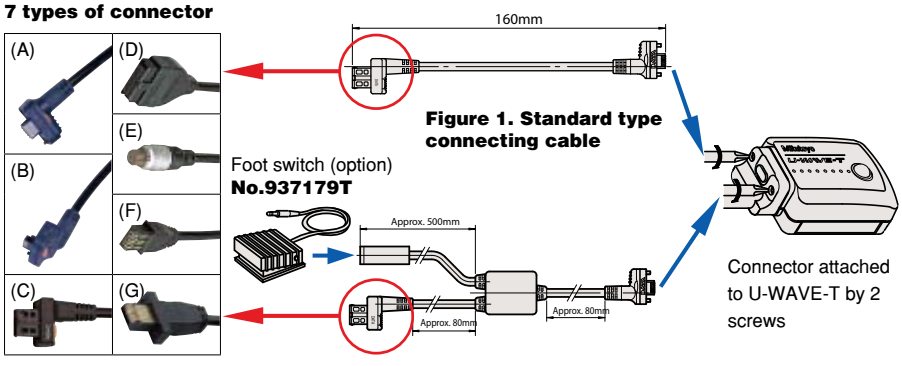


U-WAVE-T dedicated connection cable

A dedicated cable connects a Digimatic gage to U-WAVE-T. Check the connector (A to G; 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
	Part Nos.	Part Nos.
(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**

7 types of connector



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MEASUREMENT DATA MANAGEMENT
ระบบบริหารจัดการข้อมูลการวัด

Mitutoyo

ระบบบริหารจัดการข้อมูลการวัด
Measurement data Management
U-WAVE

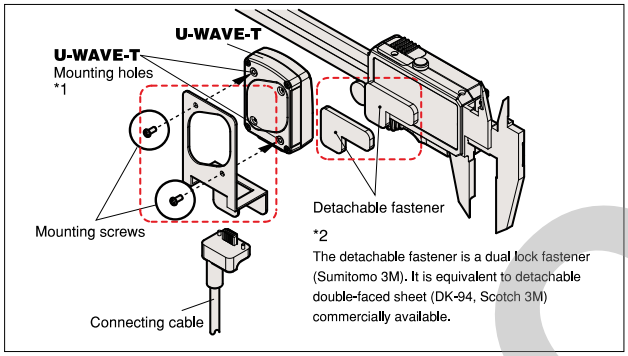
Optional Accessories for U-WAVE-T

U-WAVE-T Mounting plate

Since the standard cable clip is not sufficient to support the U-WAVE-T on a Digimatic gage, a mounting plate is provided. The mounting plate can be fixed to the easily detachable hook-and-eye type fasteners provided. Batteries can be replaced without needing to detach the U-WAVE-T from the gage.

U-WAVE-T mounting plate
Part No.02AZE200
Standard accessories
• Detachable fasteners : 1 set
• Mounting screw 2pcs.

Mounting diagram (No.02AZE200)

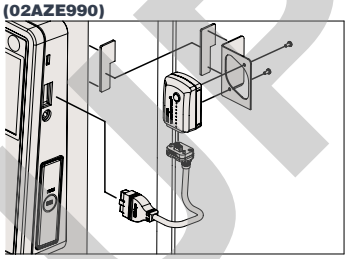


*1 To avoid damaging the threaded holes in the plastic body of the U-WAVE-T unit, the mounting screws should be tightened only just sufficiently to grip. Repeated removal of these screws should also be avoided for the same reason.
*2 In order to avoid loss of adhesion, do not allow oil or coolant to come into contact with the bonding surfaces of the detachable fasteners.

U-WAVE-T mounting plate for QM-Height
Order No.02AZE990

Standard accessories
• Detachable fasteners: 1 Set
• Mounting screw: 2 pcs.

Mounting diagram for QM-Height (02AZE990)



Application examples of the mounting plate

Super Caliper CD67-S15PM

Front view

Rear view

QuantuMike MDE-25MX

Front view

Rear view

Digimatic Indicator ID-C112XB

Front view

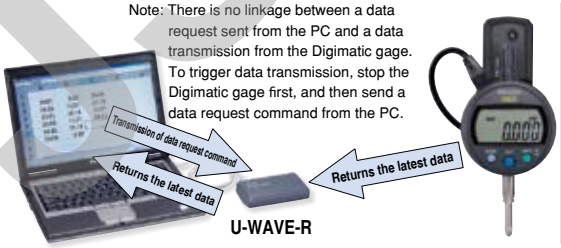
Rear view

Application example of the 'event drive' mode

Data request support from PC. Special order U-WAVEPAK (Event drive)

For standard type U-WAVE, the currently displayed data can be sent by pressing the data switch. This is called "button drive mode".
In the "event drive mode", the measurement value is checked every 0.5 seconds and measurement data is automatically sent if there is a change. At this time, the data switch is disabled. The sent data is written in the U-WAVE-R memory, and only the latest data is kept, it is not output to the PC. The data is loaded to the PC from the U-WAVE-R memory when the data request command is sent. The mode switching between "button drive" and "event drive" is enabled by the special order U-WAVEPAK (Event drive).
In the event drive mode, pressing the data switch on the Digimatic gage is not necessary. PC operation enables loading data from multiple gages at once.
To perform simultaneous measurement using USB-ITPAK V2.1, a special order U-WAVEPAK (Event drive) is required.

Note: There is no linkage between a data request sent from the PC and a data transmission from the Digimatic gage. To trigger data transmission, stop the Digimatic gage first, and then send a data request command from the PC.



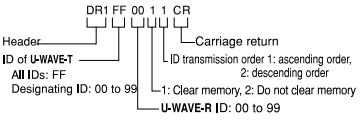
When using the event drive please note:
• The battery life is shorter than in normal mode.
The battery lasts approximately 20 days with continous use.
Switching to the button mode when the battery is not in use extends the battery life.
• When using several Digimatic gages (U-WAVE-T), communication errors may occur because of radio interference in simultaneous measuring.
Therefore, it is required to add U-WAVE-R and set different frequencies (15ch) to avoid radio wave interference.

Special order U-WAVEPAK (Event drive)
This is a special order product. For the latest pricing, please contact your dealer or the nearest Mitutoyo Service Center.
Product configuration : Program on CD

For **U-WAVE-R**, **U-WAVE-T**, and **U-WAVE-TC / TM** please purchase the standard model. Install this special order **U-WAVEPAK** (Event driv) and gain the ability to perform setups without using the standard accessory **U-WAVEPAK.**

A program to send a data request command is separately required to load data to a PC.
Event drive supporting software:
• **USB-ITPAK V2.1** (time input enables)
• **MeasureReport** (function key operation)

Example of data request command - All Data Output:



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ซอฟแวร์สำหรับการจัดการข้อมูล
Common optional software
IT-016U/USB-ITN and U-WAVE

Order No.

Model No.	**USB-ITPAK V2.1**
Order NO.	**06AFM386**

Upgrade pricing from V1.0 is not avaliable. Please purchase V2.0

USB-ITPAK V2.1 USB dongle

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

Operating environment

Compatible OS*1	Windows 2000 SP4 Windows XP SP2 or later Windows Vista Windows 7 Windows 8 Windows 8.1 Windows 10
Supported Excel versions *2	Excel 2000 Excel 2002 Excel 2003 Excel 2007 Excel 2010 Excel 2013 Excel 2016
Hard disk	Free space of more than 10MB
CD-ROM drive	Free program installation
USB port*3	2 ports or more
Monitor resolution	800x600, 256 colors or more

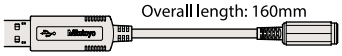
*1 : 32-bit, 64-bit OS supported
*2 : Operation with Excel for MAC OS is not guaranteed.
*3 : A commercially available hub can be used.
(USB certified product is recommended)

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

Order No. Price

Model No.	**USB-FSW**
Order NO.	**06ADV384**

Foot Switch Adapter USB-FSW



Upgraded USB-ITPAK now supports U-WAVE, a wireless communication system.
Both wired connection (IT-016U/USB-ITN) and wireless system (U-WAVE) are supported.

New functions of USB-ITPAK V2.1
- Supports the U-WAVE wireless communication system
- Timer input function
- Measurement data/time display
- Other: Compatible with Windows 8, 64-bit OS, and Russian included in the operating language selection

USB-ITPAK V2.0 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 USB-ITPAK V2.1 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 measurment.

Main features of USB-ITPAK V2.1

- **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-012 for details).
- **Control item and instruction at data input** (Note 1: Not available during individual measurement, Note 2: Not available during simultaneous measurement in the event drive mode)

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

- **Number of connectable gages** (Note 3: The actual number can be less depending on the system configuration.)

Available devices	Maximum number of connection (total of (1), (2) and (3)	Other
(1) **IT-016U/USB-ITN**	For Windows 2000XP Up to 100 unit (Note3)	• Maximum registration (total of (1), (2), and (3)) 400 unit
(2) **USB-FSW**		
(3) **U-WAVE-R** (up to 100 gages can be per one unit of **U-WAVE. U-WAVE-T** ID: 00 to 99)	For Windows Vista/7/8/8.1/10 Up to 20 unit (Note3) (For U-WAVE-R, plus 100 per unit in terms of available gages.)	• 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**

- **Data loading time:** when using **USB-ITN**, 0.2s to 0.3s per gage unit
U-WAVE event drive mode: 0.5s data refresh interval
- **Timer input function** (only in simultaneous measurement)
Input interval (time): 0.1s (Note 4) to 24 hours at maximum
(Note 4: If a shorter time is set, a priority is given to the longer time compared with the actual communication time.)
- **Measurement date/time display function** (available in sequential and simultaneous measurements)
The display format is subject to the setting of the Excel sheet.

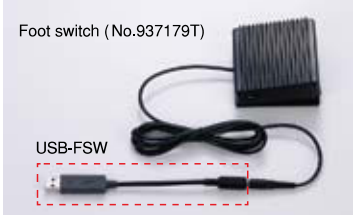
USB Foot Switch Adapter USB-FSW

This USB adapter for connecting a PC is required when using the Foot Switch (**No. 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.)

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



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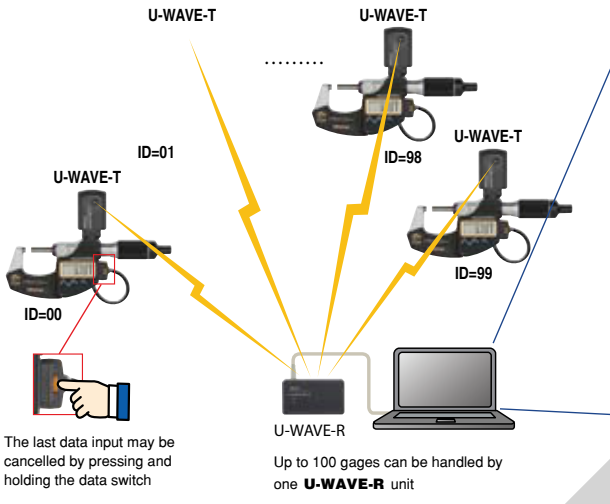
MEASUREMENT DATA MANAGEMENT
ระบบบริหารจัดการข้อมูลการวัด

Mitutoyo

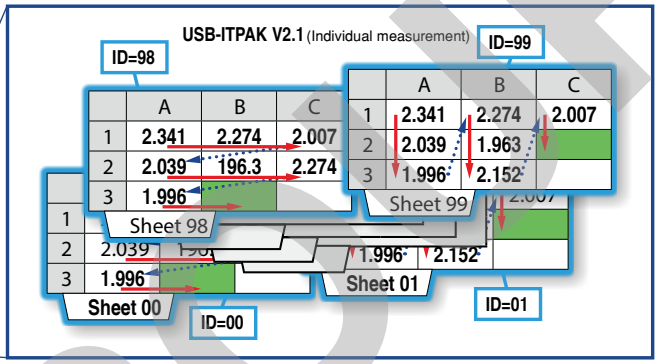
ซอฟแวร์สำหรับการจัดการข้อมูล
Measurement data Management
USB-ITPAK V2.1 USB-ITPAK V2.1 (IT-016U/USB-ITN/U-WAVE/DP-1VA LOGGER connectable)

More applications can be handled due to new features (Wireless (**U-WAVE**) support, Timer input, Measurement date/time display)
Example of measurement using the U-WAVE wireless communication system - data sorting of individual measurements

Data from multiple Digimatic gages 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.

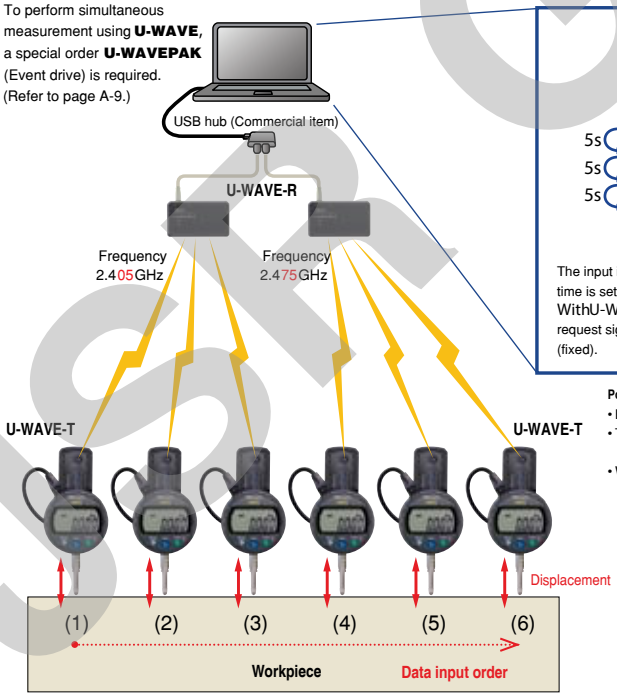


Entry point can be specified per gage (by **U-WAVE-T** ID).
- Specifying an Excel file: Excel Book (full path) + sheet name
- Specifying data input cells (example: A1:C3)
- Specifying cursor move (right or down)

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

To perform simultaneous measurement using **U-WAVE**, a special order **U-WAVEPAK** (Event drive) is required. (Refer to page A-9.)



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

USB-ITPAK V2.1 simultaneous measurement + timer input (example: 5s 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	2013/4/1 7 30 00
3	0.279	0.152	0.133	0.064	0.018	–0.003	2013/4/1 7 30 05
4	0.265	0.149	0.142	0.089	0.021	–0.007	2013/4/1 7 30 10
5							
6							

5s
5s
5s

The input interval can be arbitrarily set by 0.1s 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.
WithU-WAVE, an error (no data) may occur if less than 0.5s is set for the input interval. This is because the data request signal is issued before the data comes in, based on the event drive data refresh interval that is set to 0.5s (fixed).

Points to note when performing simultaneous measurement using U-WAVE and USB-ITPAK V2.1
- Besides **U-WAVE**, a special order **U-WAVEPAK** (Event drive) is required.
- The battery life of **U-WAVE-T** becomes shorter in the event mode, reducing to approximately 20 days for continuous measurement.
- When using several Digimatic gages, communication errors may occur because simultaneous transmission from all gages may cause radio interference.
  With U-WAVE, radio wave interference can be mostly avoided if data is transmitted after making sure there is no other radio communication.
  CSMA/CA method: this avoids radio interference and enables successful simultaneous data transmission of three U-WAVE-T units per **U-WAVE-R**.
  To perform simultaneous measurement with more than three units of U-WAVE-T, add U-WAVE-R and set different frequencies (15 ch) to avoid radio interference.

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Create Microsoft Excel input procedures with USB-ITPAK V2.1 to handle data from U-WAVE or the USB Input Tool Direct Measurement applications of USB-ITPAK V2.1 (Three examples of how USB-ITPAK V2.1 can be deployed are shown below)

Sequential measurement

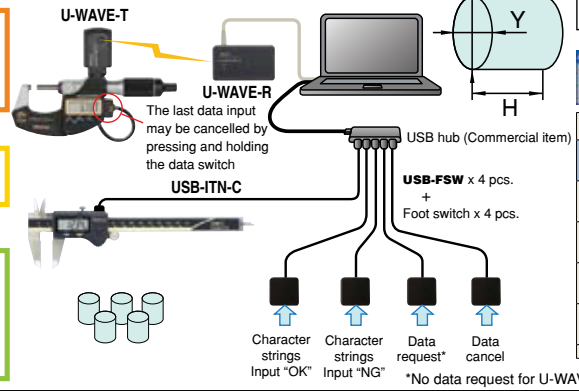
Measurement values are input one by one according to a procedure previously defined by using one or morel Digimatic gages (via **UIT-016U/USB-ITN** or **U-WAVE**).

(Measurement example – see figure at right)

(1) Measure outside diameter at X and Y of 5 workpieces with a micrometer.

(2) Measure length H of 5 workpieces.

(3) Inspect external view to check if there are any scratches or color shading and input "OK" or "NG".



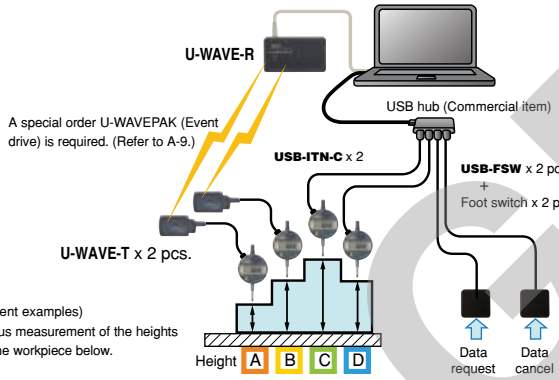
When a measuring procedure is executed, a window (as below) is displayed. "Data request*", "Data cancel *", "Data skip *", "Aborting", "Complete" can be specified.
* These operations can be allocated to the function key or foot switch (via USB-FSW).

	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/USB-ITN, U-WAVE)**



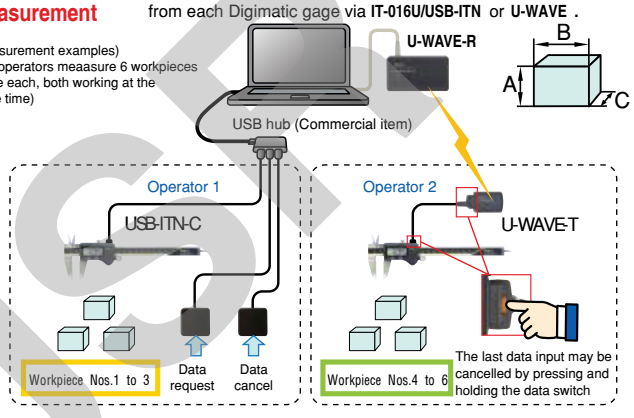
	A	B	C	D	E
1		Height A	Height B	Height C	Height D
2	1	5.02	8.03	9.96	6.03
3	2	4.98	8.02	10.01	5.99
4	3	4.97	8.04	10.07	5.96
5	4				
6	5				

First measurement (finished)
Second measurement (finished)
Third measurement (finished)
Fourth measurement (Wait for next input)

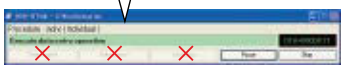
Individual measurement

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

(Measurement examples)
Two operators meaasure 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 windows 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	

Operator 1
Cell that will receive next input
Operator 2
Cell that will receive next input

Notes on using USB-ITPAK V2.1:
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.

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MEASUREMENT DATA MANAGEMENT
ระบบบริหารจัดการข้อมูลการวัด

Mitutoyo

เครื่องปริ้นขนาดเล็ก
Mini-Printer Equipped with Data Logging Function
SERIES 264 - Digimatic Mini-Processor DP-1VR LOGGER

264-505E
DP-1VR LOGGER

FEATURE

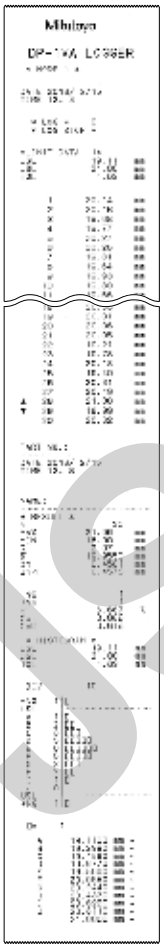
- In addition to the conventional (DP-1VR) printing and statistical calculation functions, data logger and USB output functions are added and enhanced!
- This is a palm-sized printer used to print measurement data from Digimatic gages or to perform statistical analysis.
- The versatile DP-1VA LOGGER printer not only prints measurement data, but performs a variety of statistical analyses, draws histograms and D-charts and also performs complex operations on X-bar R control charts.
- The data logger function allows storage of up to 1,000 pieces of data in memory, and batch transfer of stored data to an Excel-format inspection certificate, etc., by connecting to a PC with a USB cable (Optional).

Examples of printout

MODE 1
Various statistical calculations are executed using all input data. If the tolerance limits have been set, GO/±NG judgment and histogram creation are also enabled.

MODE 2
In addition to the MODE1 function, measurements within the tolerance limits are printed out as a D chart*. This chart allows you to identify the trend of variations in measurement data.
* D chart stands for Displacement chart.

MODE 3
Only input of data automatically enables calculation processing of complex control limit values as well as calculation for creating an Xbaar-R control chart.



Examples of printout

Mode 0	Modes 1,2	Mode 3
GO/±NG judgment	N: Number of dara MAX: Maximum value MIN: Minimum value R: Range $\bar{X}$: Average value σn: Standard deviation of the sample (N) σn-1: Sample standard deviation (N-1) -NG: Number of data smaller than lower limit value +NG: Number of data larger than upper limit value P: Fraction defective Cp: Process capability index Cpk: Process capability index (process target centered)	N: Number of data MAX: Maximum value MIN: Minimum value n: Number of subgroup (Max.10) $\bar{X}$: Average value of subgroup R: Range of subgroup $\bar{\bar{X}}$: Mean value $\bar{X}$-UCL: Upper control limit $\bar{R}$: Mean (R control) R-UCL: Upper control limit (R control) R-LCL: Lower control limit (R control)

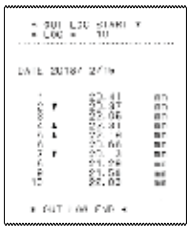
Specifications

- **Order No.: 264-505E**
- Model: DP-1VR LOGGER
- Data input : Digimatic input, RS-232C input (specific to Mitutoyo KA counter)
- Data processing capacity:
  Mode 0: 100,000 data items
  Modes 1,2: 9,999 data items
  Mode 3: Sample size (10 x subgroup 9,999=99,990 data)
- GO/±NG judgment (five sets can be defined)
- Output : (1) USB output (2) RS-232C output at TTL level (3) GO/±NG judgment output (+NG, GO, -NG)
- Input timer: Input intervals
  0.25s, 1s, 5s, 30s, 1min, 30min, 60min
- Printing method: Thermal line printer
- Printing speed: 0.8s per line (6.5mm/s) (using AC adapter)
- Printing line: 10,000 lines of normal characters per roll
  7,000 lines of large characters per roll
- Printing paper: High durability thermo-sensitive paper
  Width 58mm x length 48m
  Note: Printed characters do not fade if a printout is stored in a cool dark place, but if it is to be used for official documents, or stored more than 5 years, it is recommended that a copy be made.
- Power supply: 2 power methods
  (1) AC adapter 100-240V 50/60Hz AC adapter (6V, 2A) as a standard accessory.
  (2) 4pcs. of LR6/AA size (alkaline or Ni-Mh)
  Note: Manganese dioxide batteries are not usable.
- Battery life: About 10,000 lines (if data is printed once every 5 seconds using 1,600mA NiMH batteries at 20oC)
  Note: This is a typical value and is not guaranteed.
- External dimensions: 94 (W) x 201 (D) x 75.2 (H) mm
- Mass: 390g (main unit)
- Optional Accessories:
  1. USB cable (A-microB) : **06AFZ050** (1m)
  2. RS-232C output cable : **09EAA084** (1m, D-SUB 9pin)
  3. GO/±NG judgment cable : **965516** (2m, 10pin terminal/separate)
  4. Foot switch: **937179T** (2m)
- Consumable items:
  Printing paper (10 rolls) : **09EAA082**

Example of batch printing log data
In OUT LOG Setting 1

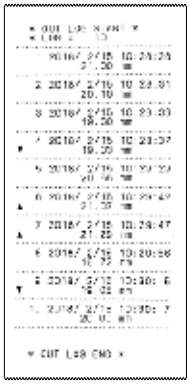
This setting allows printout of measurement time, measurement value, and GO/±NG judgment result.

In OUT LOG Setting 2



This setting allows printout of data number, measurement value, and GO/±NG judgment result.

In OUT LOG Setting 3



This setting allows printout of data number, measurement date and time, and GO/±NG judgment result.

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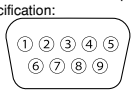
มัลติเพล็กซ์เซอร์
Digimatic / RS-232C Interface Unit
Multiplexer MUX-10F

Specifications

- **Order No.: 264-002E**
- Model: MUX-10F
- Data input port: 4 channels for Digimatic gages
- Output: (RS-232C)
- Data output Via RS-232C interface:
  Data transmission method: Half-duplex
  Data transmission code: ASCII/JIS
  Data length: 8 bits
  Parity check: None
  Stop bit: 1
  Data transmission speed:
  300/600/1200/2400/9600/19200bps
- Connector specification:

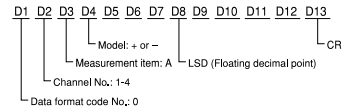


Pin No.	Signal	Function	in/out
1	CD		out
2	RD	Received data	out
3	TD	Communication data	in
4			
5	GND	Ground	
6	DR		out
7			
8	CS		out
9			

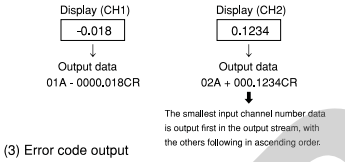
* For connection with a PC, use a commercially available RS-232C straight cable.

- Data format

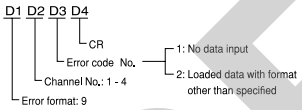
(1) When data output



(2) Example of format



(3) Error code output



- Power supply: AC adapter (9V, 500mA)
  External dimensions: 91.4 (W) x 92.5 (D) x 50.4 (H) mm

Note : Communication software is not attached.

246-002E
MUX-10F

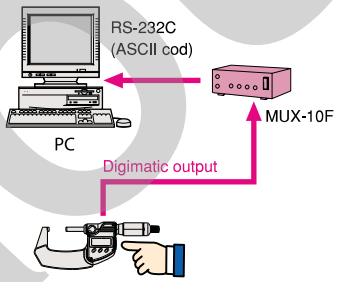
FEATURE

- Multiplexer MUX 10F is a measurement data transfer device that converts incoming Digimatic output measurement data to RS-232C and outputs it to an external device such as a PC. Up to four measuring instruments with Digimatic output can be connected.

Usage Example

Data input using the data button on the Digimatic gage

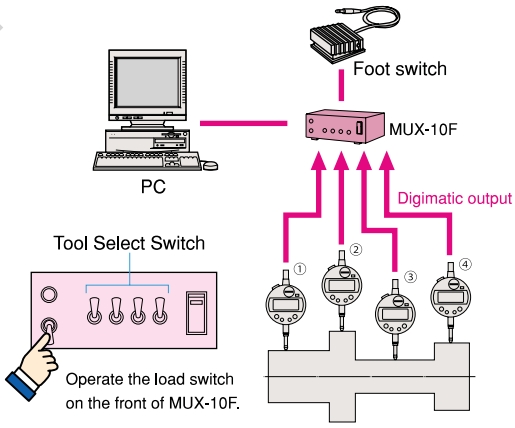
- If the Digimatic gage has a data button, data is sent to the MUX-10 from the gage, converted to RS-232C and sent out.



Press the data button on the measuring gage.

Data input using the load switch

- If the Digimatic gage does not have a data button, or when simultaneous measurements are performed, the MUX-10 load switch is used to poll data from the measuring gage(s) selected by the tool selection switch(es), converted to RS-232C, and sent out.
- If multiple measuring gages are selected by the tool selection switch, data is input in the order of channels 1 through 4.
- Optional foot switch (937179T) is available for quick data entry.

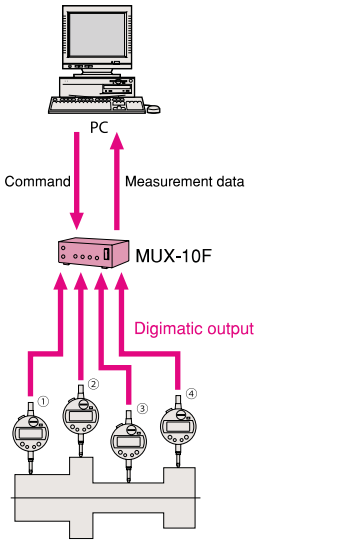


Data input using the external commands

- Data from a specified measuring gage connected to MUX-10F can be polled (ch 1- 4) by inputting a command from the PC.

Commands (ASCII)	Transfer channels
1 (ASCII code31) CR	1
2 (ASCII code32) CR	2
3 (ASCII code33) CR	3
4 (ASCII code34) CR	4
*A (ASCII code41) CR	1, 2, 3, 4
*B (ASCII code42) CR	1, 2, 4
*C (ASCII code43) CR	1, 3, 4
*D (ASCII code44) CR	2, 3, 4
E (ASCII code45) CR	1, 2, 3
F (ASCII code46) CR	1, 2
G (ASCII code47) CR	1, 3
H (ASCII code48) CR	1, 4
I (ASCII code49) CR	2, 3
J (ASCII code50) CR	2, 4
K (ASCII code51) CR	3, 4

* Command will operate the same as previous MUX-10 when 4-channel mode is turned off.



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MEASUREMENT DATA MANAGEMENT
ระบบบริหารจัดการข้อมูลการวัด

Mitutoyo

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
MeasurLink

ซอฟแวร์สำหรับการวิเคราะห์
Measurement Data Network System
MeasurLink

MeasurLink® meets the challenge of centralizing your quality data with the most versatile tool and instrument interface options available. This highend statistical platform delivers real-time data —when you need it most— with instant message capabilities and comprehensive quality reporting.
MeasurLink® provides part inspection visualizations that are second to none, ensuring a clear view of your inspection process and your measurement results.

Whether used as an enterprisewide quality data solution or as a standalone quality data station, MeasurLink® provides the complete situational awareness that you need to successfully manage your process improvement and defect prevention efforts.

MeasurLink® is backed by Mitutoyo, the global leader in metrology— combining a full product line of precision measuring tools, instruments and equipment with a worldwide information network that understands the unique precision measurement and quality management needs of every industry that it serves.

Most of Mitutoyo's electronic instruments can output data via optional connecting cables or wireless transmitters and receivers in the form of the Digimatic code. The Digimatic code can also be converted into RS-232C format with several available gage multiplexers. In this way, digital data can be sent to PCs for data acquisition and advanced statistical analysis.

As a client/server application, MeasurLink gives you the performance you need through distributed processing. Combined with a multi-user relational database, MeasurLink® delivers a safe and organized data warehousing system, making quality data available for viewing and analysis by any member of the production, engineering and managerial staff throughout your company. Inspection in the factory produces data for analysis, corrective action and various reporting needs. As the backbone of your quality efforts, MeasurLink® is guaranteed to reduce your production costs and increase your bottom line.

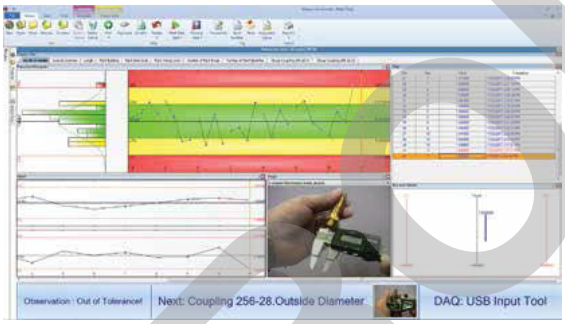
MeasurLink 8 System Requirements

Database Management System (DBMS) Requirements
MeasurLink 8 Ships with a copy of Microsoft® SQL Express 2014 SP1, which can be for a standalone or a workgroup installation. MeasurLink 8 also support:
- Microsoft® SQL Server 2014
- Microsoft® SQL Server 2012
- Microsoft® SQL Server 2008

Operating Syatem Requirements
All MeasuLink 8 products are supported on the following Microsoft Windows Operating System version:
- All Windows® 10 Versions
- All Windows® 8 Versions
- All Windows® 7 Versions
- 32-bit and 64-bit supported

Microsoft SQL Server
Microsoft Partner
Gold Application Development

Windows 10 Compatible
Windows 8 Compatible
Compatible with Windows 7



MeasurLink Suite of Software

MeasurLink is an easy-to-use, Windows-based family of quality data management software applications. MeasurLink combines real-time data acquisition, on-line statistical analysis, integrated networking and quality information sharing into a comprehensive data management solution.

- **Real-Time**
  Real-time data collection
- **Process Analyzer**
  Analysis of all data
- **Process Manager**
  Network monitoring dashboard
- **Gage R&R**
  Gage repeatability and reproducibility
- **Gage Management**
  Gage inventory and calibration control

User-friendly
Click a gage button and watch the charts update in real-time. This helps the operator stay on top of the process. Begin collecting data in minutes with the newly designed Inspection Wizard.

Data acquisition
Collects data from digital micrometers, calipers, indicators, bore gages, etc. Keyboard entry is a snap. Collect data for one or a million parts.

Comprehensive SPC
Easy-to-use control charts, histograms, capability, detailed statistics, assignable causes, corrective actions, and traceability all make this software "best in class."

Variable data
Collect dimensional data (length, width, height, outside diameter, inside diameter weight, etc.). Supports derived features (calculations for run out, volume, true position, etc.)

Attribute data
Collect data from visual inspections (burrs, cracks, dents, missing holes, etc.) to determine the fitness of a part. Track failures using a go/no-go style or count the defects on a characteristic to determine if a part is defective. There is complete flexibility to study the individual characteristics and as a group of them, too.

Engineering specifications
Attach drawings to parts, routines or individual characteristics for viewing. Most file formats are supported as an attachment (e.g. Word, PDF, CAD).

Multimedia aids
Attach movies (AVI, MOV, MPG), sound (WAV) and images (BMP, JPG, TIF) to parts, routines or individual characteristics as instructional aides for an operator.

Revision history
Track specification adjustments and preserve historical data.

Mathematically derived features
Fully functioning real-time calculator with standard math functions including square root, exponential, trigonometric, sum, average, max, min, calculations.

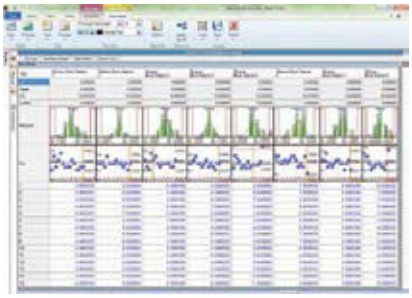
Part pictures
View scanned blueprints, digital photographs at a glance. On-screen guided sequencing keeps the operator moving to the right feature.

Data tests
Full support of Western Electric and Nelson Tests for pattern recognition in control charts (e.g. extreme point, trend, stratification, oscillation, etc.) along with various alerts for each failed test.

Forced assignable cause
Force assignable cause tags on Inspector during collection if process is out of control. Empower operator to build on existing pick list.

Corrective action plans
Operators choose corrective action as applied to the part or process. Multiple corrective actions can be applied to any subgroup. Empower operator to build on existing corrective action list.

Sequenced and random gage input
Flexible data input. Collect data by feature, by part or randomly. Guided sequencing minimizes inspection errors.



Time-stamped date
All observation data is marked with the date and time from the computer clock.

Flexible reporting
Build report templates with company logos and free-form text. Select and position chart types to customer specification.

Mixed variable/attribute data
Mix your dimensions and non-conformances in the same inspection routine. Track defects along with your dimensional data.

Crystal Reports
Create your own customized Crystal Reports for use with part or run data.

FDA 21CFR Part11 support
Provides support for medical and pharmaceutical manufacturers' electronic records, including audit trails, e-signatures (Process Analyzer Professional only) and advanced security.

Inspection wizard
Begin collecting data in minutes by defining features, tolerances and input method.

Easy-to-use MeasurLink® provides to you the most intuitive interface with complete SPC functionality to help monitor and manage your manufacturing processes. With MeasurLink®, you can easily manage the quality levels of your parts, identify problem areas and apply corrective action to areas in need of attention.

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ซอฟแวร์สำหรับการวิเคราะห์ - โมดูลสำหรับวิเคราะห์ / รวบรวมข้อมูล
Real-Time Data Collection Midule
MeasurLink® Real-Time

FEATURE

MeasurLink Real-Time enables you to connect and acquire data from virtually any measuring device. It supports the full range of metrology technology, including calipers, micrometers, indicators, CMMs, vision systems and more. Select the edition to fit the device and your needs.

Real-Time Standard Edition

Designed for customers who want to acquire and analyze data in real-time and check variable and attribute inspection to maximize production and minimize defects. It has views to allow the user to create parts, and characteristics with nominal and tolerance and traceability lists. The data collection interface provides real-time graphics for run charts, control charts, histograms and statistics. Standard views include Datasheet (observations and charts), Classic View (chart windows), and 2D view (part images with callouts that include charts and statistical data) along with a customizable Info View and additional Manager views. Full reporting template functionality is also provided.

Supported data sources: keyboard, RS232 and USB devices.

Order No.	Description
64AAB470	MeasuLink 8 Real-Time Standard Edition

Note: Upgrade packages are also available.
Please contact our sales department for details.

Real-Time Professional Edition

Enables customers to connect and acquire data from Mitutoyo Coordinate Measuring Machines, Vision and Form Measuring Systems via native integration (DDE). ASCII and QMD (xml-based) file import is supported for third-party equipment. In addition to all of the features supported by **MeasurLink 8 Real-Time Standard Edition**, this application also supports data filters. Full reporting functionality with templates is also provided.

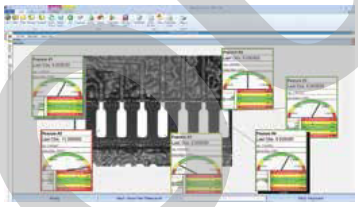
Supported data sources: keyboard, RS232 and USB devices, Mitutoyo (DDE), ASCII and QMD (xml-based) file import.

Import templates
Easily create an import template that maps data in a text file to MeasurLink. Templates are saved to the database for everyone to use and can be added as data sources to data collection stations. An import template can be verified against the source file without adding data to the system.

Direct data transfer
Collect data into MeasurLink from Mitutoyo capital equipment running Mitutoyo software that is MeasurLink enabled. This provides a tighter and more robust interface than importing data from files.

Filter data
All data collected within a Real-Time run is related. Often, especially for runs containing a large volume of subgroups, requests are made for subsets of data that are further related from the entire run's population. MeasurLink provides robust filtering capabilities to comply with these requests.

Import data
When set up as a data source, import templates are readily available to the operator or periodic imports can be executed.



Order No.	Description
64AAB471	MeasuLink 8 Real-Time Professional Edition

Note: Upgrade packages are also available.
Please contact our sales department for details.

Real-Time Professional 3D Edition

Designed for customers who want to collect data using the Hoops 3D graphics view, in addition to all features offered by MeasurLink 8 Real-Time Professional Edition. Hoops 3D files can be exported from most CAD systems and provide the operator with a real view of the part. Camera angle and position can be saved for each characteristic providing for an intuitive prompt-guided sequencing for the inspector.

Supported data sources: keyboard, RS232, and USB devices, Mitutoyo (DDE), ASCII and QMD (xml-based) file import.

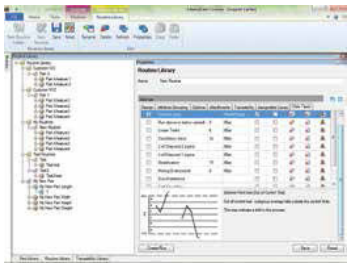
3D view
True three-dimensional model support with Hoops streaming files (*.HSF). Export your part's model from Catia, Solidworks or other CAD software and place callouts in the 3D space.

Flexible callout design
Callouts provide part acceptability at a glance. You can design them the same way as the twodimensional view to include charts or statistical information with the ability to size any element inside the callout.

Guided sequence
The display can automatically change during data collection to show the next or last observation point, providing a simple guided sequence for the inspection procedure. By saving a different view for each characteristic to be inspected, you can have the model rotate, pan or zoom to show the operator details of the part.

Order No.	Description
64AAB472	MeasuLink 8 Real-Time Professional 3D Edition

Note: Upgrade packages are also available.
Please contact our sales department for details.



MeasurLink is designed to detect and display patterns and provide additional statistical information. Many patterns can be seen appearing on SPC charts, including:

- Cycles
- Trends
- Freaks
- Mixtures
- Grouping or "bunching" of measurements
- Gradual change in level
- Sudden shift in level
- Instability (abnormally large fluctuations)
- Stratification (abnormally small fluctuations)
- Interactions (two or more variables acting together)
- Systematic variation
- Tendency of one chart to follow another

EDITION DEFINITIONS

Dunction	Real-Time Standard Edition	Real-Time Professional Edition	Real-Time Professional 3D Edition
Classic SPC view	x	x	x
Datasheet	x	x	x
2D view	x	x	x
Manager views	x	x	x
Hoops 3D View			x
Filter		x	x
CMM/Vision/Form connectivity		x	x
Import (ASCII)		x	x
Audit Trails	x	x	x

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MEASUREMENT DATA MANAGEMENT
ระบบบริหารจัดการข้อมูลการวัด

Mitutoyo

ซอฟแวร์สำหรับการวิเคราะห์ - โมดูลวิเคราะห์กระบวนการสำหรับผู้ดูแลระบบ
Data Analysis Module
MeasurLink® Process Analyzer

FEATURE

Process Analyzer is an invaluable tool for your quality team. It gives you the flexibility to analyze your processes, identify problem areas and take corrective action to improve your product's quality. Inspection runs can be sorted by Inspection Station, Routine or Part, and are displayed with the look and feel of Windows Explorer. Inspection data can be merged, filtered, grouped, charted and printed in the way you want it.

Process Analyzer Lite Edition

Designed for offline viewing of Real-Time data in a networked environment. All views that are available in Real-Time Standard Edition are supported, with the exception of the Manager Views. Full reporting template functionality is also provided.

Review inspection data
Analyze inspection data, view notes and traceability. Open data from different runs to compare the data and process behavior.

Switch between databases
For larger installations that use different databases, the ability to switch the connection allows an engineer to analyze data from all sources.

Tree control navigation
Self-organized inspection data provided in an easyto-use navigation tree. Sort data by station or Inspection routine, part, year, month or day.

Reporting
Reporting is made easy through the use of a "what you see is what you get" style of template creation, which allows you to pick chart and data through drag and drop with resizing. Several standard report templates are provided.

Order No.	Description
64AAB474	MeasuLink 8 Process Analyzer Lite Edtion

Note: Upgrade packages are also available.
Please contact our sales department for details.

Process Analyzer Professional Edition

Designed for more robust manipulation of Real-Time data in a networked environment using advanced features not available in MeasurLink Process Analyzer Lite Edition. It enables quality engineers to manipulate the data in meaningful ways that contribute to quality control initiatives.
For larger installations that use different databases, the ability to switch the connection allows an engineer to analyze data from all sources.

Group, Search and Sort data
View data by run status, part, routine, station, year, month, day. Apply saved filters to data and search for specific traceability or serial number criteria.

Merge Data
Combine lot based or just-in-time collected data to get a bigger picture of process variation and production quality.

Scatter Plots
Perform correlation studies to identify process interactions.

Electronic Signatures
The e-signatures can be applied to runs only in Process Analyzer Professional. When combined with Audit Trails available in Real-Time, and security is implemented, then MeasurLink provides support for FDA requirements for medical and pharmaceutical manufacturers.

Filter Data
Robust filtering capabilities are provided. Often, for runs containing a large volume of data, requests are made for subsets of data.

Compare Capability to Traceability
Easily view charts showing the capability of a characteristic based on the traceability, subgroup or time. Compare the capability of machines, for example. The Cpk shows green for exceeding requirements and red for failing.

Order No.	Description
64AAB475	MeasuLink 8 Process Analyzer Professional Edition

Note: Upgrade packages are also available.
Please contact our sales department for details.

Dunction	Process Analyzer Lite Edition	Process Analyzer Professional Edition
Classic SPC view	x	x
Datasheet	x	x
2D view	x	x
Filter		x
Audit Trails	x	x
Merge, Copy and Edit data		x
Scatter Chart		x
Archive Data		x
Electronic Signatures		x

ซอฟแวร์สำหรับการวิเคราะห์ - ประเมินสำหรับการวิเคราะห์ระบบการวัด
Measurement Systems Analysis Module
MeasurLink® Gage R&R

FEATURE

Determines the repeatability and reproducibility, linearity, bias and stability of inspection systems, allowing you to isolate gaging problems.

Gage R&R Standard Edition

These techniques provide information about a measurement system's reproducibility, repeatability, location or stability. Graphical tools allow for isolation of gaging problems including inconsistencies in technique between operators or inspectors.

Study Wizard
User-guided study setup defines the study that needs to be performed in order to determine the measurement system's capabilities. All elements required for the selected study to be completed are captured before the study is created, and the user is warned to provide any missing information before beginning the study.

Data Input
The data for the study can be collected directly from a gage connected to the system or transferred from Mitutoyo Coordinate Measuring Machines, Vision and Form Measuring Systems via native integration (DDE). Users can also key in their data.

Group Studies
All studies in the database are visible and can be organized using different criteria. Randomized Collection Sequence As recommended by the academic community, the collection sequence can be automatically randomized.

Study Types
MeasurLink Gage R&R uses calculation methods based on AIAG's Measurement Systems Analysis, Fourth Edition (commonly known as MSA 4).
The following study types are supported:

Location
- Bias
- Linearity

Reproducibility
- Type I
- Variable Range Method

Repeatability & Reproducibility
- Crossed ANOVA
- Crossed Average & Range
- Nested ANOVA
- Nested Average & Range Stability
- Stability

In addition to the standard calculations, the software provides graphical tools for analysis of the measurement system. The Xbar and R chart can show whether there is adequate gage discrimination to record part to part variation in production and if operators are consistent. The Part-by-Appraiser plot can show if there is a lack of consistency between operator inspection techniques.

Order No.	Description
64AAB477	MeasurLink 8 Gage R&R

Note: Upgrade packages are also available.
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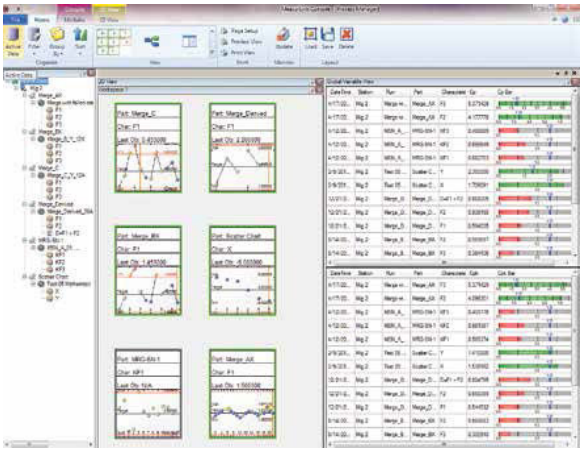
ซอฟแวร์สำหรับการวิเคราะห์ - การจัดการกระบวนการสำหรับผู้ดูแลระบบ
Network Monitoring Dashboard Module
MeasurLink® Process Manager

FEATURE

Real-time monitoring of data as it is collected. Provides the QC/production manager with the perfect tool to organize and maintain a shop-wide quality program at a glance.

Process Manager Standard Edition

Process Manager provides a method to audit the entire shop-floor inspection activity from a single PC. Easily see process information without walking from one inspection area to another by viewing current production across all machines. Show clients your quality operation for the entire facility.



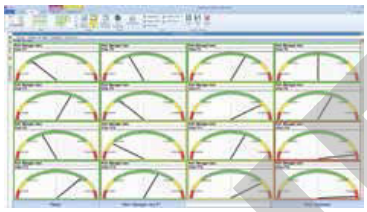
Log View
Designed to display information from multiple stations in a tabular view format. The user can select the type of events to be monitored.

Group, Search and Sort Data
View data by part, routine or station. Apply saved filters to data so you monitor only the data that you are responsible for.

Manager View
Display a snapshot window of characteristics that are currently being collected in MeasurLink Real-Time. The data can be sorted by station, capability or time stamp.

Global Variable View
Display process capability across all operations in your plant.

Remote viewing
See what the operators see and what your customers will see before product is delivered. Drill down through data to see detailed information. View Traceability, Assignable Causes, Corrective Action, Notes and raw data for current production across all machines.



MeasurLink Process Manager displays
snapshot windows of characteristics that are currently being collected in MeasurLink Real-Time. The data can be sorted by station, capability or time stamp.

Plant View
Allows users the highest level view of their shopfloor processes. Call-outs have a meaningful border color related to tests for capability that have been enabled in each routine's properties.

Order No.	Description
64AAB476	MeasurLink 8 Process Manager Standard Edition

Note: Upgrade packages are also available.
Please contact our sales department for details.

ซอฟแวร์สำหรับการวิเคราะห์ - ซอฟแวร์การจัดการเกจ
Gage Inventory and Calibration Control Module
MeasurLink® Gage Management

FEATURE

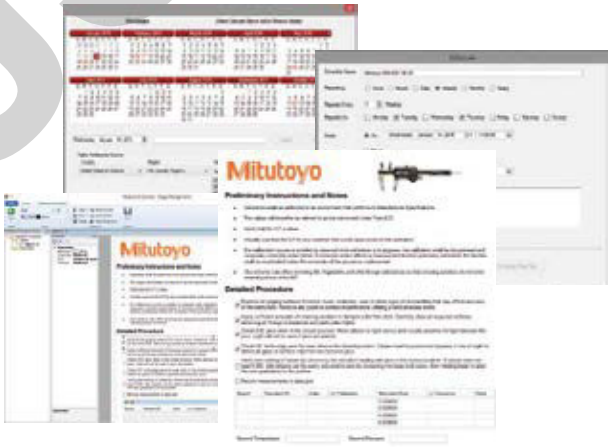
Gage Management is essential for monitoring the calibration history of a gage. Periodic adjustments may be required to bring a gage into specification.

Gage Management Standard Edition

A Microsoft® Windows®-based gage calibration tracking software. It is networkable and shares the same database used by the rest of the MeasurLink® software family. This assists users in developing, maintaining, organizing and managing information about their gages. Information such as gage inservice dates, calibration recall dates, gage R&R dates and general gage event history is provided in an intuitive interface with complete reporting abilities. MeasurLink® Gage Management also supports the creation of vendor contact and user lists. It comes equipped with a "smart" calendar that allows you to define working days.

Order No.	Description
64AAB478	MeasurLink 8 Gage Management

Note: Upgrade packages are also available.
Please contact our sales department for details.



- Gage inventory management
- Gage calibration recall system
- Gage calibration procedure
- Assessment and reporting
- Gage vendor management
- Gage location management
- Gage R&R history

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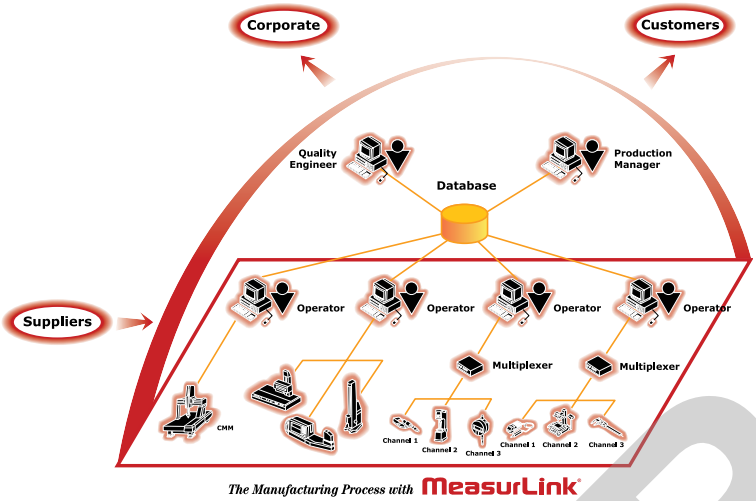
Mitutoyo

ซอฟแวร์สำหรับการวิเคราะห์
Packages and Bundles
MeasurLink® Workgroup and site License Packages

The MeasurLink suite is best acquired as a Workgroup or Site License. These packages are a mix and match bundle of any module. Workgroups are 5, 10 and 15 seats. A Site License is 30 or more seats of MeasurLink. The package can be any combination of Real-Time*, Process Analyzer, Process Manager, Gage R&R and/or Gage Management modules. All of the stations in the installation store their data in an SQL Database located on the user's network.
*Real-Time Professional 3D Edition has an additional surcharge per seat.



Benefits include:
- Better unit cost
- Mix and match desired modules
- Site Licenses can be shared among multiple facilities.
- Security Center can manage users access with each module.
- Support Center allows users to manage the suite through the network, eliminating interruption in data collection.

MeasurLink Group Licensing

Order No.	Description
64AAB479	MeasurLink 8 Site License

MeasurLink 8 Site License is a bundle package that provides the customer with the ability to install up to and including 30 copies (any combination) of any application in the MeasurLink 8 suite.

Order No.	Description
64AAB480	MeasurLink 8 Workgroup License

MeasurLink 8 Workgroup License is a bundle package that provides the customer with the ability to install up to and including 15 copies (any combination) of any application in the MeasurLink 8 suite.

Order No.	Description
64AAB482	MeasurLink 8 Workgroup License -10 Pack

MeasurLink 8 Workgroup License – 10 Pack is a bundle package that provides the customer with the ability to install up to and including 10 copies (any combination) of any application in the MeasurLink 8 suite.

Order No.	Description
64AAB483	MeasurLink 8 Workgroup License -5 pack

MeasurLink 8 Workgroup License – 5 Pack is a bundle package that provides the customer with the ability to install up to and including 5 copies (any combination) of any application in the MeasurLink 8 suite.

Order No.	Description
64AAB484	MeasurLink 8 Academic License

MeasurLink 8 Academic License a bundle package that provides Universities and Technical Colleges with the ability to install up to and including 20 copies (any combination) of any application in the MeasurLink 8 suite for educational purposes.

Note: Upgrade packages are also available.
Please contact our sales department for details.

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Floating License Upgrade Option
MeasurLink® Floating License

Users who want to use MeasurLink in a terminal server environment or want to have a number of concurrent users should consider the Floating License upgrade option. This upgrade is available in packs of 5, 10, 15 and 30. This upgrade includes a licensing sever, DeployLX version 5, that manages the number of seats available.

This type of installation is common in modern IT infrastructure. Thin-Client hardware or traditional PCs can utilize this option. A user could choose to upgrade a portion of or their entire number of seats to the Floating License upgrade option.

Benefits include:
- Easier maintenance of installations
- Most flexible use of modules
- Cost effective way to include more users without purchasing additional seats.
- Can be added to an existing installation or integrated during the initial installation.

MeasurLink Floating Option

Order No.	Description
64AAB479F	MeasurLink 8 Floating License Option 30

MeasurLink 8 Floating License Option 30 adds the Floating Option to a new or an existing installation. Must already have a minimum of 30 seats to add this option.

Order No.	Description
64AAB480F	MeasurLink 8 Floating License Option 15

MeasurLink 8 Floating License Option 15 adds the Floating Option to a new or an existing installation. Must already have a minimum of 15 seats to add this option.

Order No.	Description
64AAB482F	MeasurLink 8 Floating License Option 10

MeasurLink 8 Floating License Option 10 adds the Floating Option to a new or an existing installation. Must already have a minimum of 10 seats to add this option.

Order No.	Description
64AAB483F	MeasurLink 8 Floating License Option 5

MeasurLink 8 Floating License Option 5 adds the Floating Option to a new or an existing installation. Must already have a minimum of 5 seats to add this option.

Note: Upgrade packages are also available.
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Data Conversion Program into Inspection Certificates in Excel Format MeasureReport

- Data from a measurement result file generated with a CMM, vision measuring machine or other machine can be output to an inspection table generated with Excel. Data from multiple measuring machines can be combined into a single inspection table (up to 200 measurement items).
- The computation function is available for tolerance judgment, workpiece judgment, statistical calculation and other types of processing at inspection-table generation time.

Main specifications of MeasureReport

- Document creation:
  Automatic creation of template sample style (Number of items x number of workpieces specified)
- GO/±NG Judgment:
  Tolerance judgment (marked in NG value)
  Workpiece judgment (OK or NG in judgment column)
- Statistical analysis: mean, maximum, minimum, range, standard deviation, Cp, Cpk, fraction defective, number of defectives, etc. 15 items in total.
- Capacity:
  (1) Measurement result file conversion
  (2) On-line data input
  Max. 200 items x Max. 2,000 workpieces
  (3) MeasurLink database import
  Max. 200 items x Max. 2,000 workpieces or
  Max. 2,000 items x Max. 200 workpieces
- File combined:
  A maximum of 10 measurement files can be specified and both measurement items and workpieces can be combined respectively.
- Printing and saving of inspection table:
  Automatic printing and saving in Excel format
- Comment output to the inspection table:
  30 items including part number and lot number can be input.
- Workpiece drawing output to the inspection table:
  Image files (bmp, jpg) can be displayed in arbitrary positions.
- Others:
  Decimal point digit justification, error display, automatic page break
- File conversion: Supported file formats

<CMM>
(1) MCOSMOS ASCII file (Geopak-3)
(2) MPK2700 statistic file (Binary format)
(3) MPK2700 ASCII file (Text format)

<Vision Measuring Systems>
(1) QUICK VISION QVPAK-QV Report
(2) QUICK SCOPE QSPAK measurement result file
(3) QUICK IMAGE QIPAK measurement result file

<Optical Instruments>
(1) Vision Unit QSPAK measurement result file

- MeasurLink can be exported up to Version 6.2.

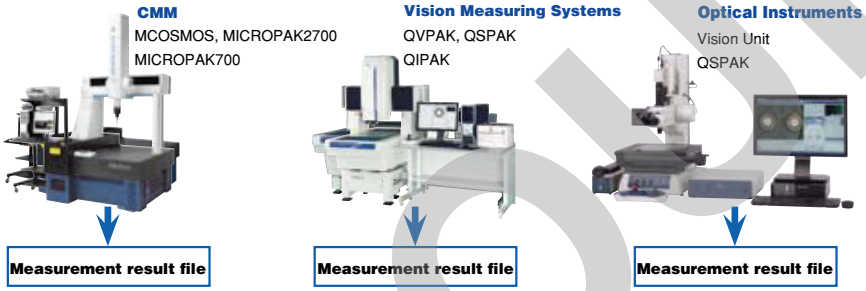
Measure Report operation environment (recommended)

- OS: Windows 2000
  Windows XP
  WindowsVista (32-bit)
  Windows 7 (32-bit/64-bit)
  Windows 10 (64-bit)
- Microsoft Excel: 2000/2002/2003/2007/2010/2013/2016*

*Only 32-bit edition is available regardless of Windows version. It doesn't work on 64-bit Windows.

- CPU: Processor of 1 GHz or more
- Memory: 2GB or more
- Hard disk: 3GB or more free space
- Display: 1024 x 768 or larger
- Drive: CD-ROM or DVD drive (required for installation)

Create inspection table from measurement result file for each measuring machine (PC data processing)



Measurement result file conversion

Select and extract data, design value, tolerance value, etc., and output in specified Excel format.

Example of inspection table.

Excel inspection table creation macro program

- Measurement result file, data loaded from on-line communication, or data specified from database file of MeasurLink can be output to an Excel table.
- Original format can be created by simple editing with sample style as a template.
- Desired template style can be automatically created by specifying required number of items and workpieces.
- Tolerance judgment (*marked in NG data), workpiece judgment (OK or NG is indicated in judgment column), statistical analysis, page break are automatically processed.
- Data from several measuring machines can be combined in one inspection table.

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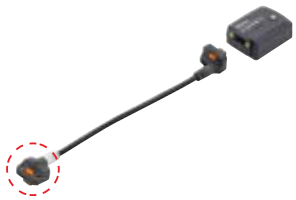
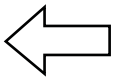
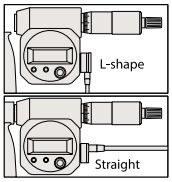
สายต่ออุปกรณ์
Digimatic Data Cable Selector (including USB Input Tool Direct)

USB Input Tool Direct USB-ITN	Connector Type	**(A)** Water-proof type with output button	**(B)** Water-proof type with output button	**(C)** Straight type with output button	**(CR)** L type with output swith (cable outlet is right)
	Model No. Order No.	**USB-ITN-A** **06AFM380A**	**USB-ITN-B** **06AFM380B**	**USB-ITN-C** **06AFM380C**	No applicable models USB-ITN-C is available Refer to the following figure.

IT-016U/IT-007R/DP-1VR/MUX-10F/EC Counter	Connector Type	**(A)** Water-proof type with output button	**(B)** Water-proof type with output button	**(C)** Straight type with output button	**(CR)** L type with output swith (cable outlet is right)
	Order No. 1m	**05CZA624**	**05CZA662**	**959149**	04AZB512
	Order No. 2m	**05CZA625**	**05CZA663**	**959150**	04AZB513

U-WAVE-T 	Connector Type	**(A)** Water-proof type with output button	**(B)** Water-proof type with output button	**(C)** Straight type with output button	**(CR)** L type with output swith (cable outlet is right)
	Standard	**02AZD790A**	**02AZD790B**	**02AZD790C**	No applicable models Type C connectors are available, but take care of the cable when using thimbles Refer to the following figure
	For foot switch	**02AZE140A**	**02AZE140B**	**02AZE140C**	

Select a cable (A to G) whose gage connector fits the digimatic port on your gage (check the red dotted frame in the above pictures).

Gage connectors on data cable the connector dimensions are given on page A-23	Connector Type	**(A)** Water-proof type with output button	**(B)** Water-proof type with output button	**(C)** Straight type with output button	**(CR)** L type with output swith (cable outlet is right)
	Picture of gage connector				
	Data switch	**Available**	**Available**	**Available**	**Available**
Digimatic ports on gage	Picture of Digimatic port				
Please note that some high-precision Digimatic gages are capable of displaying the measurement result to more than 6 digits. However, according to the Digimatic output specification, the result may be output in 6 digits only. Digimatic gages whose display may exceed 6 digits • Laser Scan Micrometers • Litematic • Linear gage counter (EH) • High-Accuracy Digimatic Micrometer (293-100/293-130)	Applicable models	• Digimatic caliper **500-776/500-777**, etc. **500-712-20/500-713-20**, etc. **500-712** etc. **550-301-10/550-331-10**, etc. **551-301-10/551-331-10**, etc. **552-302-10/552-303-10**, etc. **552-150-10/552-151-10**, etc. **552-155-10/552-156-10**, etc. **552-181-10/552-182-10**, etc. • Digimatic special application caliper **573-601/573-602**, etc. • Digimatic depth gage **571-251-10/571-252-10**, etc. • Digimatic scale unit **572-600, 572-601**, etc.	• Digimatic micrometer **293-100/293-130** **293-140-30/293-141-30**, etc. **293-230-30** etc. **340-251-30/340-252-30** • Dedicated micrometers for Digimatic **422-230-30/422-231-30**, etc. **406-250-30/406-251-30**, etc. **343-250-30/343-251-30**, etc. **369-250-30/369-251-30**, etc. **345-250-30/345-251-30**, etc. **314-251-30/314-252-30**, etc. • Digimatic micrometer head **350-251-30/350-261-30**, etc. • Digimatic holtest **468-161/468-162**, etc. • Digimatic depth gage **329-250-30/329-251-30**, etc.	• Digimatic caliper **500-150-30/500-151-30**, etc. **500-500-10/500-501-10**, etc. **500-443** etc. • Digimatic special application caliper **573-118-10/573-119-10**. etc. **573-116-10/573-117-10**, etc. **573-191-30/573-291-30** **573-181-30/573-182-30**, etc. • Digimatic depth gage **571-201-30/571-202-30**, etc. • Digimatic micrometer head **164-163/164-164** • Digimatic scale unit **572-203-10/572-213-10** **572-300-10/572-301-10**, etc. • Digital height master **515-374/515-376**, etc.	• Digimatic micrometer **293-582/293-583**, etc. **389-514/389-714**  Type C straight connectors are available, but may interfere with thimble operation.

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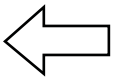
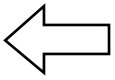
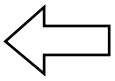
(D) Flat 10-pin type	**(E)** Round 6-pin type	**(F)** Flat straight type	**(FB)** Flat L-Shape (Cable outlet is back)	**(FR)** Flat L-Shape (Cable outlet is right)	**(FL)** Flat L-Shape (Cable outlet is left)	**(G)** Flat straight waterproof type
USB-ITN-D 06AFM380D	**USB-ITN-E 06AFM380E**	**USB-ITN-F 06AFM380F**	No applicable model USB-ITN-F available			**USB-ITN-G 06AFM380G**

(D) Flat 10-pin type	**(E)** Round 6-pin type	**(F)** Flat straight type	**(FB)** Flat L-Shape (Cable outlet is back)	**(FR)** Flat L-Shape (Cable outlet is right)	**(FL)** Flat L-Shape (Cable outlet is left)	**(G)** Flat straight waterproof type
936937	**937387**	**905338**	**905689**	**905691**	**905693**	**21EAA194**
965014	**965013**	**905409**	**905690**	**905692**	**905694**	**21EAA190**

(D) Flat 10-pin type	**(E)** Round 6-pin type	**(F)** Flat straight type	**(FB)** Flat L-Shape (Cable outlet is back)	**(FR)** Flat L-Shape (Cable outlet is right)	**(FL)** Flat L-Shape (Cable outlet is left)	**(G)** Flat straight waterproof type
02AZD790D	**02AZD790E**	**02AZD790F**	No applicable model Use **02AZD790F** or **02AZD140F**			**02AZD790G**
02AZE140D	**02AZE140E**	**02AZE140F**				**02AZE140G**

(Note 1) ID-F, EB, EC-101D, ID-U, ID-SS, ID-SX are required to use with the USB-ITN.
(Note 2) USB-ITN, IT-016U, and U-WAVE cannot be used with EF/EH, VL-50-B/50S-B, and SJ-500/SV-2100.

(D) Flat 10-pin type	**(E)** Round 6-pin type	**(F)** Flat straight type	**(FB)** Flat L-Shape (Cable outlet is back)	**(FR)** Flat L-Shape (Cable outlet is right)	**(FL)** Flat L-Shape (Cable outlet is left)	**(G)** Flat straight waterproof type
N/A	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
						
• Digimatic indicator **ID-H** **ID-F** (Note1) • High-precision height gage **QM-Height** • Mu-checker **Digital Mu-checker** (using a foot switch) • Laser scan micrometer **LSM-9506** • Linear gage counter **EF/EH (Note 2)** **EB** (Note1), **EC-101D** (Note1) • Litematic **VL-50-B/50S-B** (Note 2) • Contour measuring system **SJ-210/310/410** SJ-500/SV-2100 (Note 2) • Hardness testing machines **HM-210/220**	• Digimatic micrometer **293-666/293-667**, etc. **227-201 etc.** **369-411/369-412**, etc. • Hardness testing machines **HM-100** **HM-200** **HV-100** **HR-300/400/500** **HH-411**	• Digimatic indicator **ID-CX, ID-C (Peak-Value Hold Type)** (Note1), **ID-C (Calculation type), ID-C (Bore Gage Type), ID-U (Note2), ID-SS** (Note1), **ID-SX** (Note1) • Digimatic height gage **192-663-10/192-613-10/570-322/570-227, etc. (Flat L-shape, cable outlet is right)** • ABS boremetic **568-361/568-362**, etc. • Digimatic bore gage **511-501/511-502**, etc. • Scale unit **572-460/572-560/** **572-480-10/572-580-10**, etc. • Hardness testing machines **HH-300** • Digimatic depth gage **Digimatic type (ID-CX)**				• Digimatic indicator **ID-N** **ID-B**

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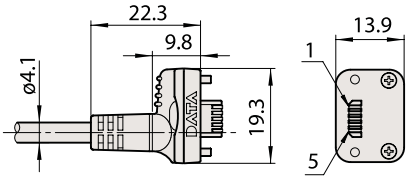
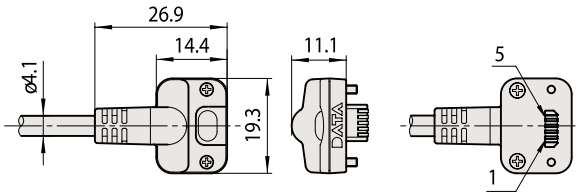
Gage connector dimension

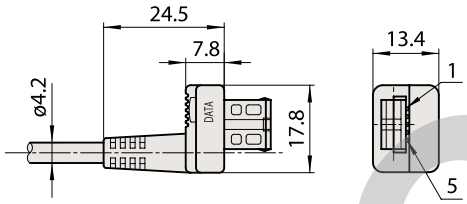
(A) (1) No.06AFM380A (2)No.05CZA624(1m) No.05CZA625(2m) (3)No.02AZD790A (Standard) No.02AZE140A (FSW)



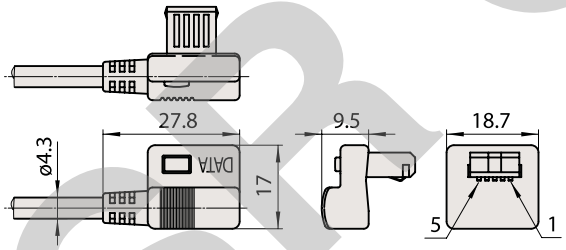
(B) (1) No.06AFM380B (2)No.05CZA662(1m) No.05CZA663(2m) (3)No.02AZD790B (Standard) No.02AZE140B (FSW)



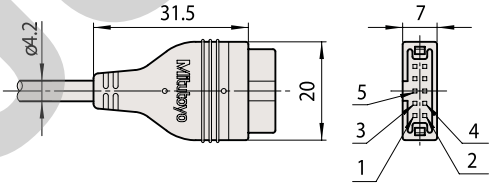
(C) (1) No.06AFM380C (2)No.959149(1m) No.959150(2m) (3)No.02AZD790C (Standard) No.02AZE140C (FSW)



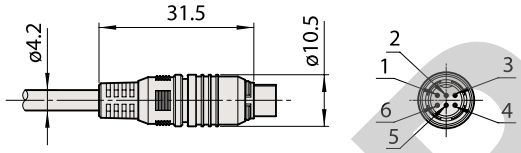
(CR) (1) No applicable models (2)No.04AZB512(1m) No.04AZB513(2m) (3) No applicable models



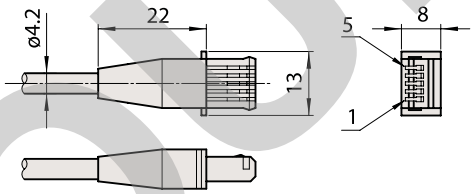
(D) (1) No.06AFM380D (2)No.9369371m) No.965014(2m) (3)No.02AZD790D (Standard) No.02AZE140D (FSW)



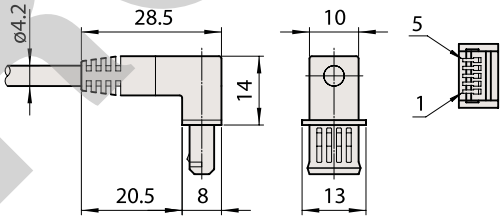
(E) (1) No.06AFM380E (2)No.937387(1m) No.965013(2m) (3)No.02AZD790E (Standard) No.02AZE140E (FSW)



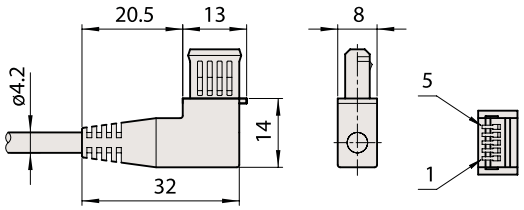
(F) (1) No.06AFM380F (2)No.905338(1m) No.905409(2m) (3)No.02AZD790F (Standard) No.02AZE140F (FSW)



(FB) (1) No applicable models (2)No.905689(1m) No.905690(2m) (3)No applicable models

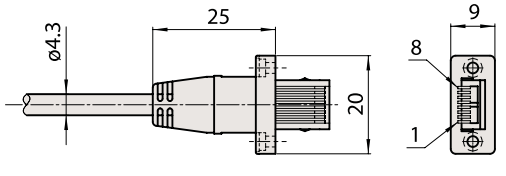


(FR) (1) No applicable models (2)No.905691(1m) No.905692(2m) (3)No applicable models



(FL) and (FR) is symmetrical and the same size

(F) (1) No.06AFM380G (2)No.21EAA194(1m) No.21EAA190(2m) (3)No.02AZD790G (Standard) No.02AZE140G (FSW)



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ห้ามนำไปเผยแพร่ก่อนได้รับอนุญาติจากทางบริษัท