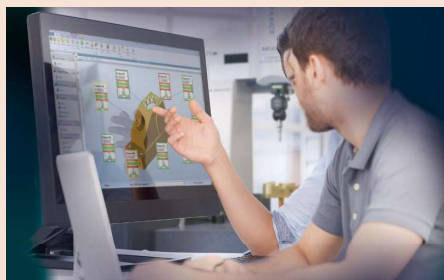


New Products

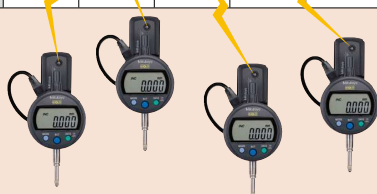


Measurement Data Network System

MeasurLink

Refer to pages A-5 to A-11 for details.

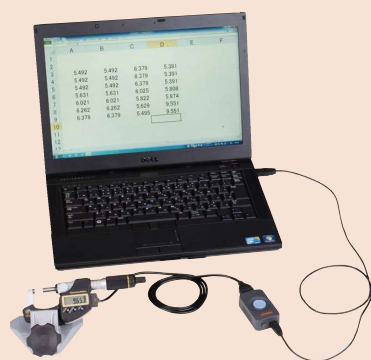
	A	B	C	D	G
1	Displacement (1)	Displacement (2)	Displacement (3)	Displacement (4)	Measurement date and time
2	0.281	0.162	0.121	0.051	2013/4/1 7:30:00
3	0.279	0.152	0.133	0.064	2013/4/1 7:30:05
4	0.265	0.149	0.142	0.089	2013/4/1 7:30:10
5					
6					



Measurement Data Management

USB-ITPAK V2.1

Refer to pages A-22 to A-24 for details.



Digimatic Gage/PC Data Input Device

USB Input Tool IT-016U/IT-007R

Refer to page A-14 for details.



Measurement Data Wireless Communication System

U-WAVE

Refer to pages A-15 to A-21 for details.



Mini-Printer Equipped with Data Logging Function

DP-1VA LOGGER

Refer to page A-25 for details.

A

Measurement Data Management

Measurement Data Management

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Measurement Data Management

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A



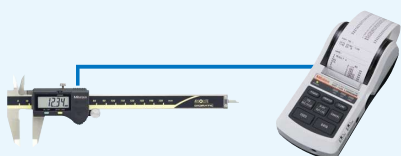
Example of Measurement Data Management System

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



DP-1VA LOGGER

A-25

Equipped with the data logger function, it allows batch transfer of stored data to a PC with a USB cable.

Direct data input to a PC

Connecting cable-integrated USB-ITN



USB Input Tool Direct

A-13

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



Input Tool Series

A-14

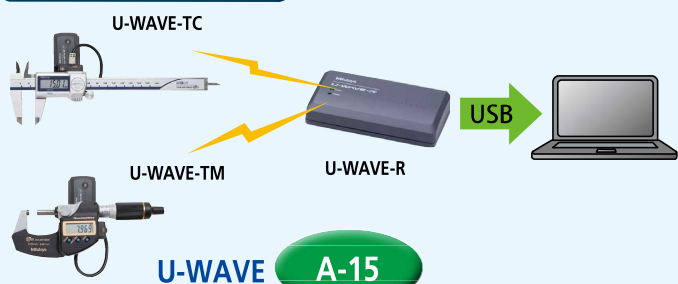
Connect to a RS-232C interface PC with 4 channels and a sequencer



Multiplexer MUX-10F

A-26

Wireless



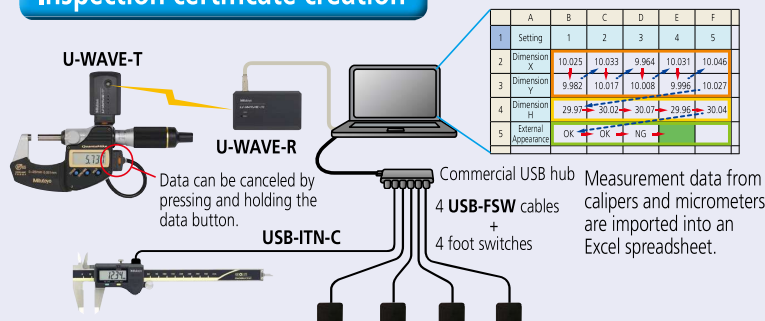
U-WAVE

A-15

Implementation Step 2

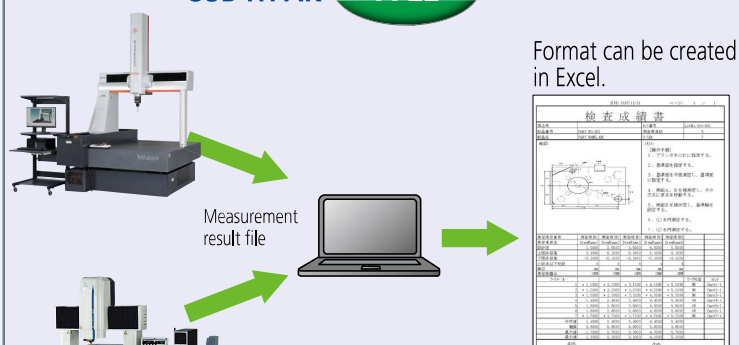
Software dedicated to inspection and quality control

Inspection certificate creation



USB-ITPAK

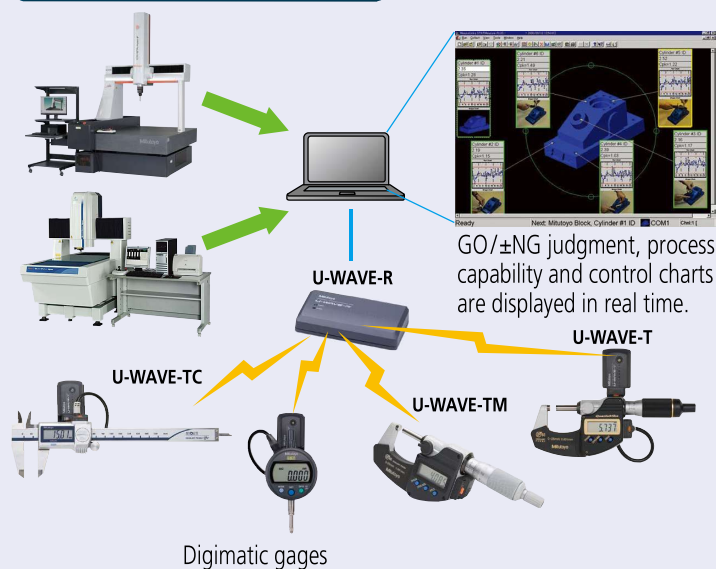
A-22



MeasureReport

A-12

Statistical Process Control



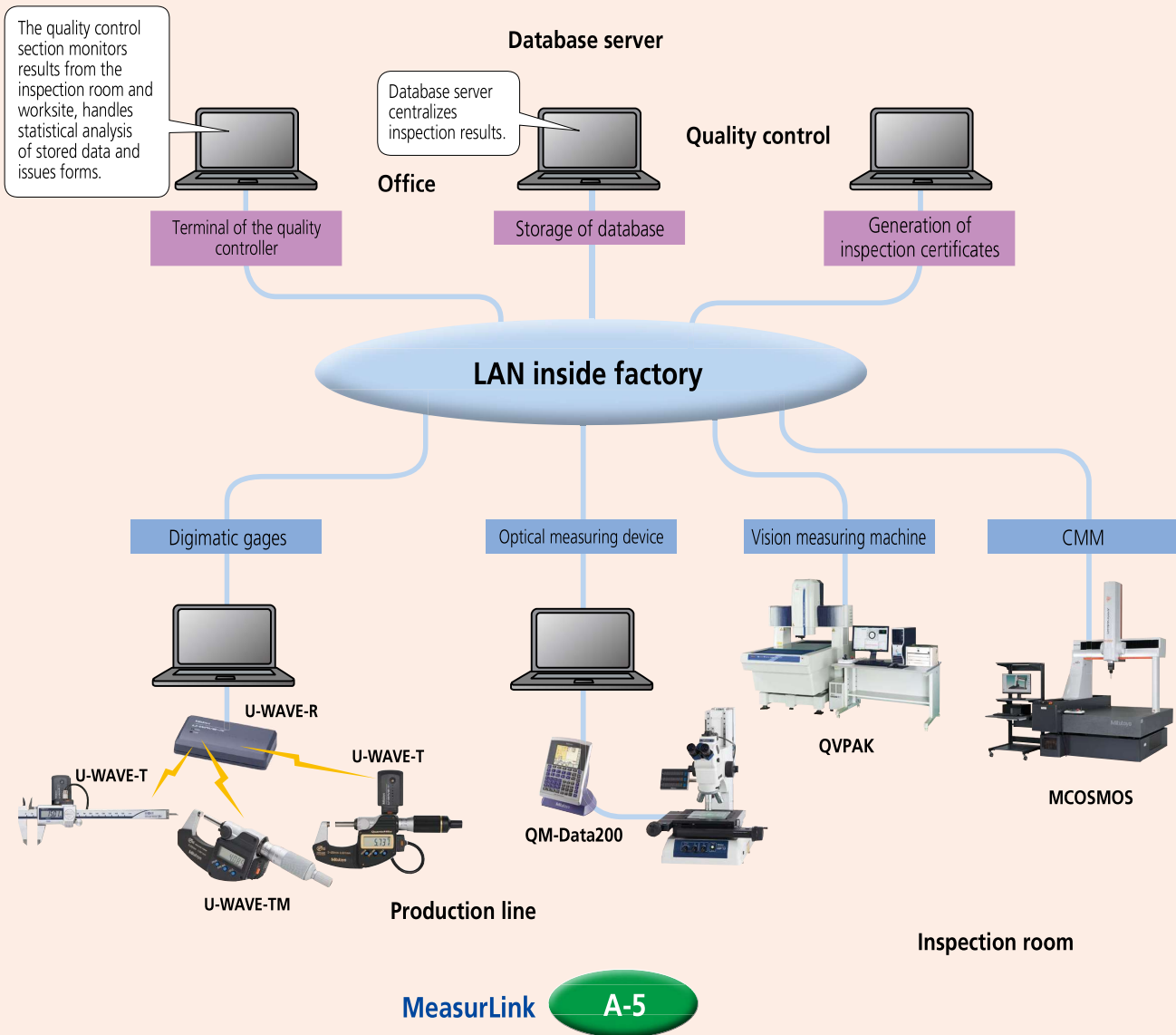
MeasurLink

A-5

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



Measurement Data Management


Convenient data collection tool and quality control software

Measurement Data Network System MeasurLink


- **MeasurLink** is a data management modular software system that enables collecting data from a wide range of Mitutoyo measuring tools and systems including Coordinate Measuring Machines.

Measurement data storage can be centralized by implementing a network system using a company LAN. Quality information such as checking, monitoring, analysis of the measurement results and creating inspection reports can be shared among separate offices to maximize efficiency.

Is the inspection record data utilized to solve quality-related problems?




Measurement results printed out in the inspection room



Measurement results manually entered in a check sheet on the machining line


Hard to identify problems with only numerical data



Current problem

- Data scattered in various locations in the plant
- Numerical data not effectively utilized
- Lack of knowledge about statistical calculations
- Management using spreadsheet software
- Problems need to be tackled by the on-site person in charge

Hard to respond quickly since it takes time to enter and analyze data. Unsure about reliability of analysis.



Isn't there any quicker, simpler and more reliable management method?

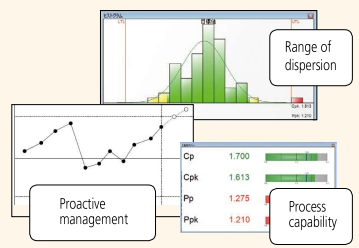
SPC management can be easily done by combining Mitutoyo measuring instruments and MeasurLink!!

Vision Measuring System

Form Measuring System

Measuring Microscopes

The SPC management can be done with MeasurLink with a surprisingly simple procedure



MeasurLink Real-Time

Coordinate Measuring Machine

Digimatic gages

MeasurLink is an IoT platform for quality management that realizes "Visualization of quality"!!

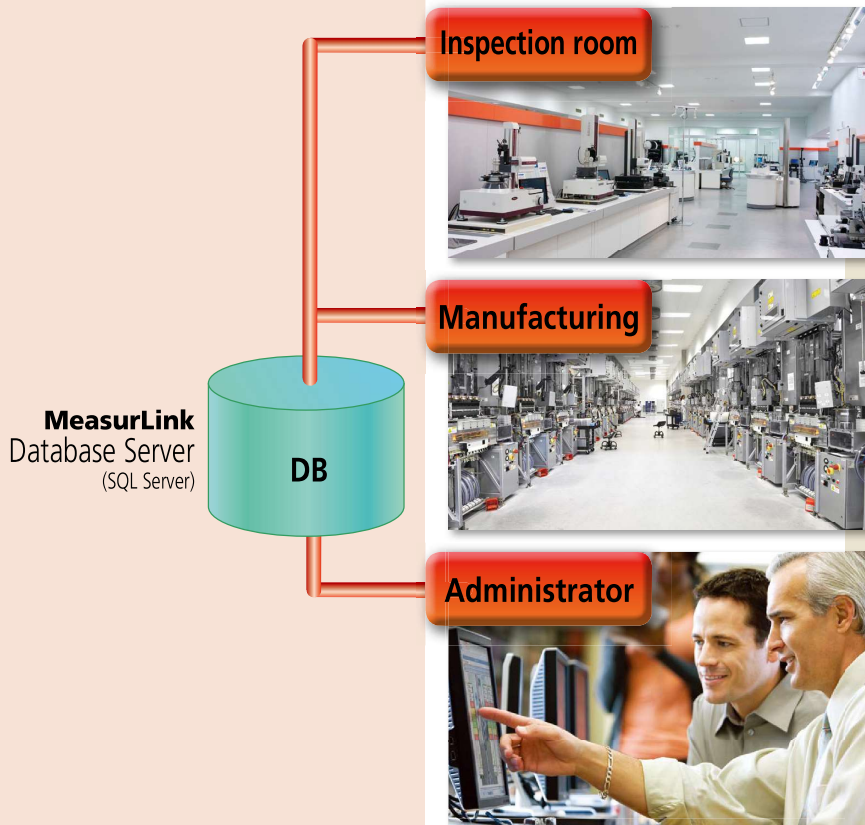
MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world
metrology software
MeasurLink



Refer to the **MeasurLink Brochure (E12028)** for more details.

• **Centralized monitoring from all MeasurLink data collection terminals networked together on the shop floor**

Enables easy networking through the Database Server (SQL Server). Comprising the following software packages as described below, data collection in the inspection room or on the shop floor and process management/analysis can be carried out depending on the application.



Data collection / Analysis module
MeasurLink Real-Time

(Refer to A-7 for details.)

This SPC software allows data collection from each tool and instrument and still allows real-time display of statistical processing data such as control charts, histograms and process capability indexes.

Automatic reporting program
MeasurLink Report Scheduler

(Refer to page A-8 for details.)

This program automatically outputs reports created by **Real-Time** or **ProcessAnalyzer** in the preset schedule.

Process Management for Administrators
MeasurLink Process Manager

(Refer to A-10 for details.)

This administrative software enables centralized monitoring of information from all **MeasurLink** data collection terminals networked together on the shop floor.

Process Analysis module for Administrators
MeasurLink Process Analyzer

(Refer to A-9 for details.)

This administrative software allows confirmation of measurement results and various statistical analyses by access to the database where the measurement data collected with **MeasurLink Real-Time** is stored.

Evaluation / Analysis Software for Measurement System Analysis (MSA)
MeasurLink Gage R&R

(Refer to A-11 for details.)

This is evaluation and analysis software compliant with MSA required in IATF 16949.

Gage Management Software
MeasurLink Gage Management

(Refer to A-11 for details.)

This software plans and implements a complete calibration schedule and incorporates a powerful retrieval function in addition to recording and managing the operational state of gages.

Measurement Data Management

Convenient data collection tool and quality control software

MeasurLink Data Collection/Analysis Software

Real-Time Standard (RT Std)

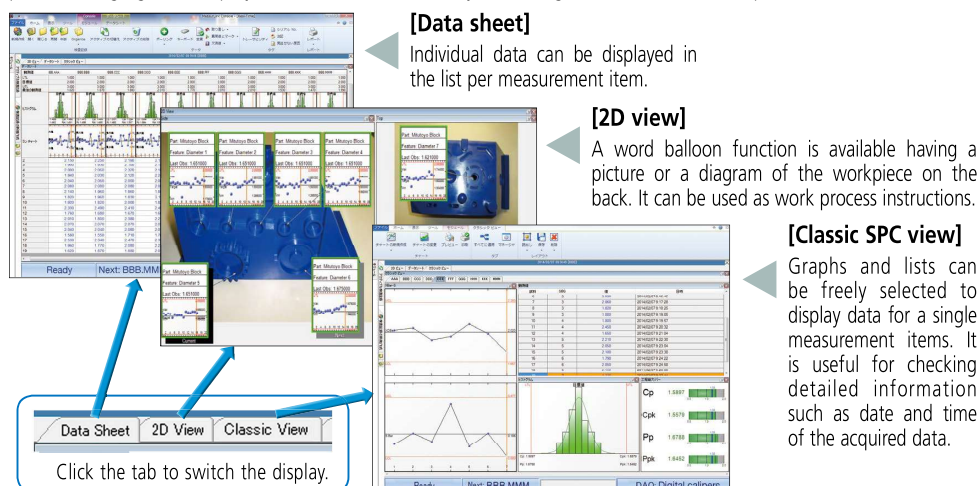
Real-Time Professional (RT Pro)

Real-Time Professional 3D (RT Pro 3D)

MeasurLink Real-Time is the Statistical Process Control (SPC) MeasurLink module that collects data from Mitutoyo and third-party measuring devices and systems to provide analysis functionality in real-time by displaying control charts or process capability indexes. Three versions are offered so that a customer can choose the version that best suits the requirements, from a standard version providing basic functionality through to the full-spec version offering data handling using Hoops 3D graphics. (Refer to Table 1 on the next page.)

• Various data views

The measurement results are displayed in various views, including statistical analysis results, data lists, and work process imaging. The display can be switched instantly according to the needs of the operator.



• Adding traceability information

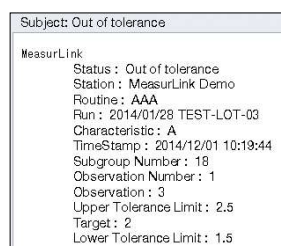
Traceability information for each workpiece can be added, for example, serial no., lot no., inspector name, machine no., or cause of problems and remedies.

This information can be used as search criteria when extracting data using the filtering function (RT Pro/RT Pro 3D) when a problem occurs.

• Alarm function

The operator is notified when an "Out of Tolerance" or "Out of Control Limit" situation occurs.

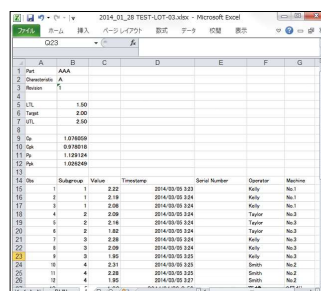
The method of notification can be selected from a pop-up window, E-mail (Fig. 1), or log file recording.



(Fig. 1) Alarm notification by E-mail

• Exporting data to an Excel file

Measurement data can be exported to an Excel file. This function is useful if the data needs to be used in a department that does not have MeasurLink. (Fig. 2)



(Fig. 2) Export to Excel

RT Std/RT Pro/RT Pro 3D Common Functions

- Connectable measuring instruments
 - Measuring tool with Digimatic output (equipped with PC data processing unit)
- [Supported interfaces]
 - Wireless (USB) **U-WAVE** (VCP)
 - Wired (USB) **IT-016U/USB-ITN** (VCP or HID)
 - Wireless (D-sub 9 pin) **IT-007R, MUX-10F, DP-1VA LOGGER**, and others

- Various RS-232C devices (partially restricted)
- Screen display mode when collecting data
 - Classic SPC view
 - Data sheet
 - 2D view
 - Parts data sheet, etc.
- Statistical Analysis result

[Chart]
Xbar-R, Xbar-S, X-Rs control charts, Histogram, Run chart, Pre-control chart, Tear chart, Box plot chart, Meter chart, Indicator bar, multivariate data control chart, etc.

[Statistics]
Maximum value, Minimum value, Standard deviation, Average $\pm 3\sigma/4\sigma/6\sigma$, Process capability indexes (Cp, Cpk, Pp, Ppk), Defect ratio, etc.

- Alarm function

[Target items]

- Out of tolerance
 - 1 point exceeds control limit line (following are related to management chart)
 - Consecutive 9 points on one side of center line
 - 6 points successively increasing or decreasing
 - Others including 8 judgment criteria for Shewhart control chart

- Adding traceability information
 - Measurement date (automatically added)
 - Serial No. (Keyboard entry)
 - Special causes and remedies
 - Selection from comment list registered as an option
 - Enter from keyboard when measuring classified title registered as an option (e.g. Lot No. LOT 001)
- Report print out function
 - Measurement values, analysis calculation results and various charts can be arranged to output according to requirements.

- Export function of measuring result

• Excel format

• CSV format

- Security function

• Once the access authorization is set, it requires "User name" and "Password" input before the program will start. Data editing actions such as reference, entry and changes require authorization according to the user's role in order to preserve data reliability.

- Operation languages

17 languages are supported:

• English, Japanese, French, German, Dutch, Spanish, Swedish, Polish, Italian, Turkish, Korean, Chinese (simplified/traditional), Czech, Finnish, Portuguese, Russian

MeasurLink Common Functions

- Operating environments
[Operating System]
Microsoft Windows 7 (32-bit/64-bit)
Microsoft Windows 8.1 (32-bit/64-bit)
(Microsoft Windows 8.1 RT is not supported)
Windows 10 (32-bit/64-bit)
(Windows 10 Mobile and IoT editions are not supported)
[Data base]
Microsoft SQL Server 2017 Standard / Enterprise Edition
Microsoft SQL Server 2016 Standard / Enterprise Edition
Microsoft SQL Server 2014 Standard / Business Intelligence / Enterprise Edition

RT Pro/RT Pro 3D Common Functions

- Connectable measuring instrument
 - Mitutoyo Measurement Data Management System (equipped with PC data processing unit)
- [Supported data processing software]
 - CMM: **MCOSMOS V3.2** or later
 - Vision System: **QVPAK V10.0** or later/**QSPAK V10.2** or later/**QSPAK MSE V3.1** or later/**QIPAK V4.1** or later
 - Vision unit: **QSPAK VUE V4.1** or later
 - Surface Roughness/contour instruments: **FORMTRACEPAK V5.311** or later
 - Roundness instruments: **ROUNDPAK V7.0** or later
 - Hardness testing machines: **AVPAK V2.0** or later
- Filter function
- Keyword items for data extraction
 - Measurement data (year, month, day, time, week, etc.)
 - Serial No.
 - Traceability information (e.g. Inspectors, Machine No., etc.)
 - Alarm item
- Import function for text data
 - Default format files (mbf, dfq, etc.)
 - Customize function
- A template can be created according to the ASCII file to be imported.

RT Pro 3D functions

- Screen display mode when collecting data
- 3D view

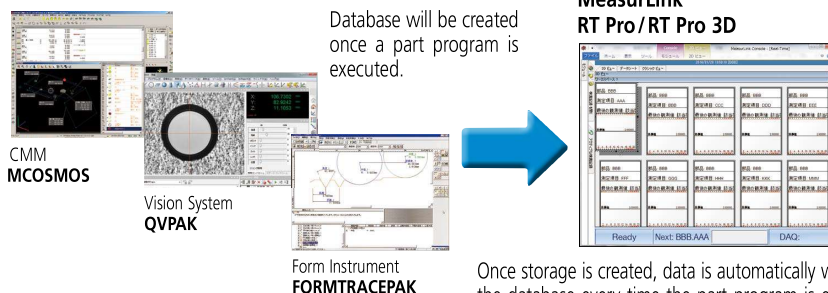
Functions		Data collection software		
		Real-Time Standard	Real-Time Professional	Real-Time Professional 3D
Collected data display	Classic SPC view	✓	✓	✓
	Data sheet	✓	✓	✓
	2D view	✓	✓	✓
	3D view (Hoops)			✓
Data extract	Filter		✓	✓
Input from tools and devices	Measuring tools (RS-232C, USB)	✓	✓	✓
	Measuring instruments (DDE)		✓	✓
Text input	Import		✓	✓

Table 1 Data collection/analysis software **Real-Time** functional comparison

• **Real-time Professional 3D** is a full-spec package. The feature to be measured can be displayed in detail using 3D CAD data.

• Automatic linking with part programs

Linking with part programs created in CMM or Vision Measuring Systems, data such as part no.; measurement item; nominal size; tolerance value and more can be loaded from a part program. A database to store all of the data is automatically configured when a part program is run.



• Filtering function

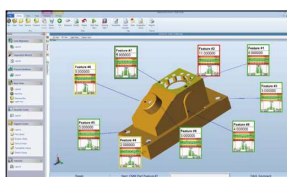
Required data can be easily extracted based on the date and time of the measurement, added comments, or alarms.

• Import function

Measurement data saved in ASCII files can be loaded. Also, a feature to customize a template for loading according to the format is provided.

• Real-time Professional 3D is a full-spec package

The feature to be measured can be displayed in detail using 3D CAD data.



[3D view]

3D graphics library HOOPS displays real view of the workpiece using an hsf file created from 3D CAD data. The displayed workpiece image can be freely turned, translated, or scaled so that you can get a clear view of the feature to be measured.

The word balloons and lead lines that display the measurement result and measured feature will move following the CAD data translation.

MeasurLink Automatic Report Generation Program MeasurLink Report Scheduler

Automatically generates a report created by the **Real-Time (RT Std/RT Pro/RT Pro 3D)** or **Process Analyzer (PA Lite/PA Pro)** modules, each of which is connected to the network according to a specified schedule.

The Use of MeasurLink Report Scheduler

• Typical applications

- Automatic generation of a weekly report specified from among last week's data.
- Automatic report generation by extracting only data with tag information about "tool replacement" (due to wear, breakage, etc.)
- Automatic generation of a daily report for each shift by filtering inspection record data on the basis of a shift



MeasurLink Report Scheduler common functions

• Report output destinations

- Printer, file, E-mail (as an attached document)

Measurement Data Management

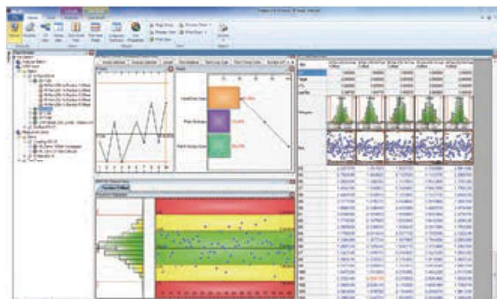
Convenient data collection tool and quality control software

MeasurLink Optional Process Analysis Software for Administrators Process Analyzer Professional (PA Pro)

Process Analyzer is an optional software package provided for administrators who are authorized to access the database storing measurement data collected by MeasurLink **Real-Time** for the purpose of checking and analyzing measurement results.

- **PA Pro** is a full-spec package that provides additional data check and analysis capability.

Can also perform various analyses by filtering, data processing, etc., in addition to data checking.



The same data displayable by data collection software can be displayed, including measurement results, charts, and statistical calculation results with the look and feel of Windows Explorer.

- Filtering function that allows data extraction and grouping

Data can be extracted or grouped by selecting the date and time and other traceability information as keywords.

Example) Filtering data by an operator name Displays statistical analysis result in charts (Xbar-R, for example).

Filter Item

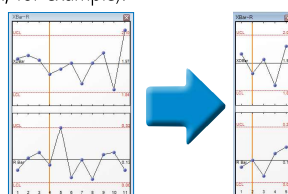
Type: Traceability Name: Operator

Expression: Kelly

Value Style: 1

Value: Kelly

Filtering item selection menu



Result of filtering in the chart

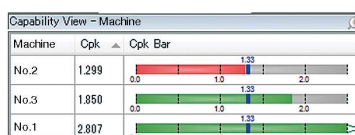
Example) Grouping by Machine No. Cp, Cpk comparison

Capability Characteristic: AAA.C

Group By: Traceability Machine

Display: Data

Item selection for grouping



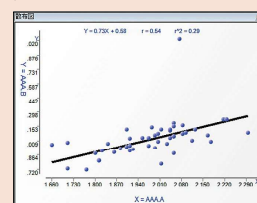
Cpk value and bar graph per machine

PA Pro Functions

- Result display
 - Classic SPC view
 - Data sheet
 - 2D view
 - Parts data sheet, etc.
- Statistical Analysis result [Chart]
 - Xbar-R, Xbar-S, X-Rs control charts, Histogram, Run chart, Pre-control chart, Tear chart, Box plot chart, Meter chart, Indicator bar, multivariate data control chart, etc.
- [Statistics]
 - Maximum value, Minimum value, Standard deviation, Average $\pm 3\sigma/4\sigma/6\sigma$, Process capability indexes (Cp, Cpk, Pp, Ppk), Defect ratio, etc.
- Report print out function
 - Measurement values, analysis calculation results and various charts can be arranged to output according to requirements.
- Exporting function of measurement result
 - Excel format
 - CSV format

PA Pro Functions

- Statistical analysis result [Chart]
 - Scatter plots: The relationship between two items can be plotted.



- Filter function
 - Keyword items for data extraction
 - Measurement data (year, month, day, time, week, etc.)
 - Serial No.
 - Traceability information (e.g. Inspectors, Machine No., etc.)
 - Alarm item
- Data processing
 - Data file merging, Copying
 - Editing
- Data processing capability
 - Old data can be displayed extracting from the list of the data collection software.
- Electronic certification function
 - Conforms to FDA 21CFR PART11

Function	Process analysis software	
	Process Analyzer Professional	
Result display	Classic SPC view	✓
	Data sheet	✓
	2D view	✓
Data extract	Filter	✓
Data processing	Data file merging, Copying, Editing	✓
Masking	Archive data	✓

Loggable Event

- Start and end of measurement
- Recollection/change of measurement data
- Irregular value occurrence
(Out of tolerance, out of management, sequence, tendency, etc.)
- Unmissable causes
- Change of process capability index
(Acceptance to rejection/Rejection to acceptance)

Contents of Call-out Display

- Station name
(terminal name of each measuring instrument)
 - Inspection procedure
(measuring procedure name for each part)
 - Final revision date/time (data input time, etc.)
 - Measured item information: Displays the designated number of items from the top
 - 1) Inspection record file name*
 - 2) Measurement item*
 - 3) Process capability index*
- * (Cp, Cpk, Pp, Ppk, etc., multiple selection available)
- * Measurement items are sortable
(ascending, descending order)

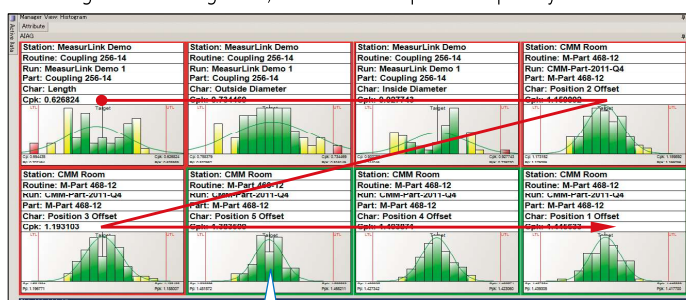
MeasurLink Process Management for Administrators

Process Manager

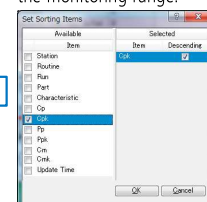
MeasurLink Process Manager enables centralized monitoring of real-time measurement information and checking of detailed information from all **MeasurLink** data collection terminals networked together on the shop floor. Measurement results can be checked in real-time to enable minimizing defects without visiting the shop floor. In addition to simple GO/NG judgments, use of tools such as Manager View, histograms, process capability indexes, etc., make it possible to find abnormal process trends easily.

• Manager View

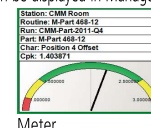
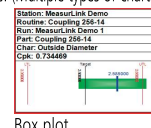
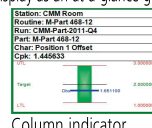
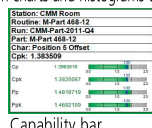
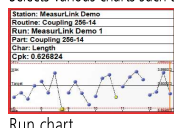
Displays various types of charts as an at-a-glance guide. The administrator can narrow down all items of data currently being measured into a specific monitoring range of those of critical importance or sort those data (in ascending or descending order) on the basis of process capability index.



Possible to sort charts in the view and narrow down the monitoring range.



Selects various charts such as run charts and histograms to display as an at-a-glance guide. (Multiple types of charts can be displayed in Manager View.)



• Global measurement value view

Station	Run	Part	Characteristic	Cp	Cpk	Pp	Ppk	Cmk	Update Time
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Length	0.8324					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Outside Diameter	0.7949					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Inside Diameter	0.8171					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 2 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 3 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 4 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 5 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 6 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 7 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 8 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 9 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 10 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 11 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 12 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 13 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 14 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 15 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 16 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 17 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 18 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 19 Offset	0.8362					
2016/10/31 18:44	MeasurLink Demo	Coupling 256-14	Position 20 Offset	0.8362					

Displays bar graphs that can determine good or bad process capability indexes at a glance. This allows the administrator to sort all current measurement data (in ascending or descending order) on the basis of process capability index, measurement date and time, part name, etc.

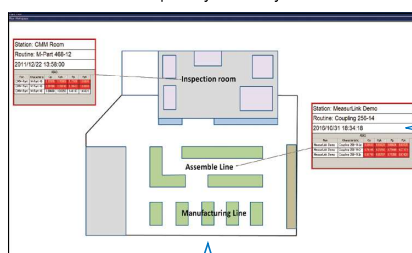
• Log view

Displays various types of events that occur during measurement. This allows the administrator to grasp the state of measurement operation (measurement start/termination, etc.) and the occurrence of an abnormal event (out-of-tolerance, etc.) for all current measurement data.

TimeStamp	Station	User	Routine	Run	Description	Characteristic	Observation Number	Observation 1	Acceptable Cause	Corrective Action
2016/10/31 17:03	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Data Modified	Outside Diameter	49	0.661		
2016/10/31 16:50	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Data Modified	Outside Diameter	50	0.661		
2016/10/31 15:59	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Outside Diameter	51		Substrate Cooler	Refill Cooler Tank
2016/10/31 15:57	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Out of Tolerance	Outside Diameter	52			
2016/10/31 15:55	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Out of Tolerance	Length	53			
2016/10/31 15:53	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Out of Tolerance	Length	54			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 2 Offset	55			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 3 Offset	56			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 4 Offset	57			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 5 Offset	58			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 6 Offset	59			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 7 Offset	60			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 8 Offset	61			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 9 Offset	62			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 10 Offset	63			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 11 Offset	64			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 12 Offset	65			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 13 Offset	66			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 14 Offset	67			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 15 Offset	68			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 16 Offset	69			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 17 Offset	70			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 18 Offset	71			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 19 Offset	72			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 20 Offset	73			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 21 Offset	74			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 22 Offset	75			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 23 Offset	76			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 24 Offset	77			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 25 Offset	78			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 26 Offset	79			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 27 Offset	80			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 28 Offset	81			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 29 Offset	82			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 30 Offset	83			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 31 Offset	84			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 32 Offset	85			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 33 Offset	86			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 34 Offset	87			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 35 Offset	88			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 36 Offset	89			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 37 Offset	90			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 38 Offset	91			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 39 Offset	92			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 40 Offset	93			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 41 Offset	94			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 42 Offset	95			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 43 Offset	96			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 44 Offset	97			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 45 Offset	98			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 46 Offset	99			
2016/10/31 15:44	MeasurLink Demo	N/A	Coupling 256-14	MeasurLink Demo	Process Chart	Position 47 Offset	100			

• Plant view

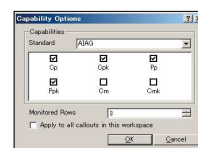
Displays a process capability index for each measuring instrument on the plant layout drawing. This allows the administrator to quickly identify the location where an abnormality has occurred.



Call-out boxes with a leader can be arranged on an instrument-by-instrument (station-by-station) basis in conformity with the plant layout drawing in the background.

Call-out for each station

Station: MeasurLink Demo	
Routine: Coupling 256-14	
2016/10/31 18:34:18	
Run	Characteristic
MeasurLink Demo	Coupling 256-14
MeasurLink Demo	Coupling 256-14
MeasurLink Demo	Coupling 256-14



Displays graphics files (bmp, jpg, gif, png) in the plant layout drawing in the background.

Measurement Data Management

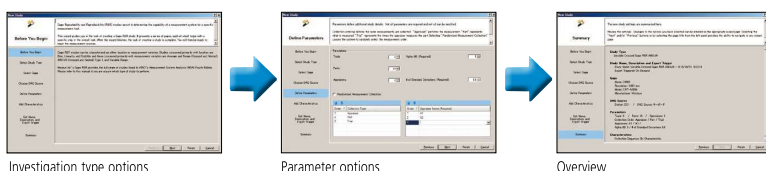
Convenient data collection tool and quality control software

MeasurLink Evaluation / Analysis Software for Measurement System Analysis (MSA) Gage R&R

This is evaluation and analysis software conforming to Measurement System Analysis (MSA) required in IATF 16949. Implementing MSA evaluation can be performed easily and quickly. ISO/TS 16949 requires that a proper measurement system be achieved by analyzing the accuracy of each instrument and variations in operator effects on repeatability using statistical methods.

• Automatic calculation of MSA evaluation results

This allows the operator to simply input an evaluation method/evaluation condition and measurement data with the Wizard function. The operator can implement MSA evaluation simply by selecting an "investigation type option", "gage option", "data input source option", "parameter option", etc.



• Evaluation method compliant with MSA (fourth edition)

The software can implement evaluation using the following methods compliant with MSA (Measurement System Analysis).

- 1) Measurement value tolerance gage R&R variance analysis method
- 2) Measurement value tolerance gage R&R range & average method
- 3) Measurement value branching gage R&R variance analysis method
- 4) Measurement value branching gage R&R average & range method
- 5) Measurement value range method
- 6) Measurement value simplified method
- 7) Measurement value MSA4
- 8) Deviation
- 9) Linearity
- 10) Stability

• Registration of gage-specific information

1. Registration of information on gages within the system

This allows registration of gage information on the following items and association with evaluated results.

Registration items: Gage name, maker, model, resolution, unit, measuring range, etc.

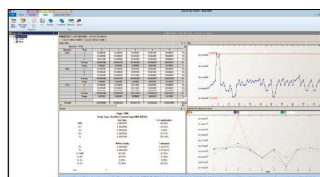
2. Information link between MeasurLink Gage Management and this software

This software can use gage information that has been registered in **Gage Management** directly as options.

Additionally, since gage R&R evaluation results are also linked with gage information, the schedule of gage R&R expiry dates can be managed by Gage Management.

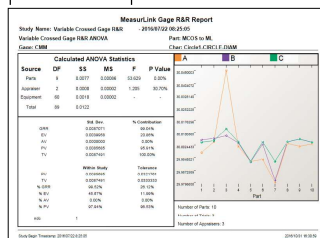
• Analysis chart view

Various charts such as the control chart are effective for analysis/judgment on variations due to operator, the adequacy of gage accuracy, etc., and remedies for problems.



• Output of results as a report

Evaluated results and charts can be printed as a report.

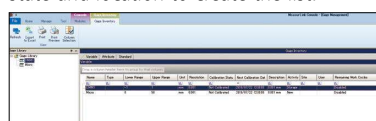


MeasurLink Gage Management Software Gage Management

This software can plan and implement a reliable calibration schedule with a powerful retrieval function in addition to recording and controlling the status of gages. It enables simple recording of gage usage state (operation, storage, calibration, gage R&R, repair and out-of-service) to speedily understand the current location and status of all gages. Common gage information can be viewed from all networked terminals in which this network-compatible software has been installed. Gage information can be shared between software packages linked to **MeasurLink Gage R&R**.

• Creation of a list of calibration-targeted gages from the gage management table

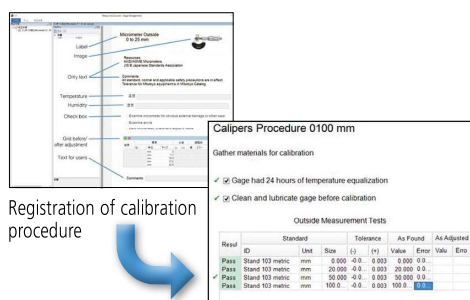
The target gages are retrieved from a variety of search items such as gage ID, gage type, model, maker, distributor, calibration date, current usage state and location to create the list.



Gage management table

• Registration and running a calibration procedure

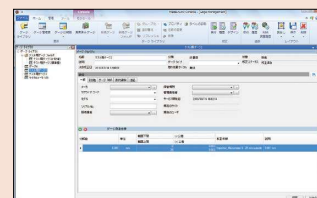
Allows simple registration of the calibration procedure for each gage and implementation of the calibration.



Calibration run

• Confirmation of detailed gage information

Allows confirmation of detailed information on individual gages. The software allows you to display a list of gages depending on "Calibration Overdue", "Next Month Due", etc., by setting a calibration date and confirm detailed information on the calibration history of gages.



Display of detailed gage information



Display of gages listed depending on calibration date



Display of calibration history

Main specifications of MeasureReport

- Document creation:
Automatic creation of template sample style (Number of items × 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 × Max. 2,000 workpieces
3) MeasurLink database import
Max. 200 items × Max. 2,000 workpieces or
Max. 2,000 items × 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

Measure Report operation environment (recommended)

- OS: Windows 2000
Windows XP
Windows Vista (32-bit)
Windows 7 (32-bit/64-bit)
Windows 10 (64-bit)
- Microsoft Excel: 2000/2002/2003/2007/2010/2013/2016/2019

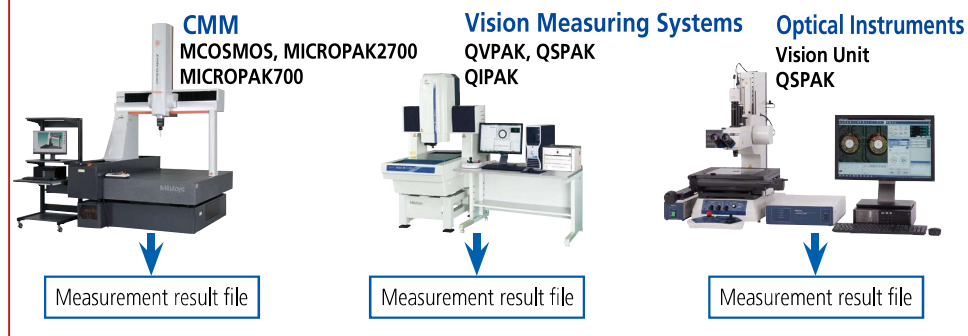
(Only 32-bit edition is available regardless of Windows version. It doesn't work on 64-bit Windows.)

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

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).
- A customized format can be created for an inspection sheet using simple editing (copy & paste, etc.) by using a sample format as the template.
- The computation function is available for tolerance judgment, workpiece judgment, statistical calculation and other types of processing at inspection-table generation time.

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.

The image shows a sample of an inspection table. It has a header section with Japanese text '検査成績書' (Inspection Results Sheet) and a table body with multiple columns. The columns include item numbers, design values, tolerance values, and judgment results (OK or NG). There are also some graphical representations of parts and data plots within the table.

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.

Measurement Data Management

Convenient data collection tool and quality control software

Digimatic Gage/PC Data Input Device USB Input Tool Direct USB-ITN

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.

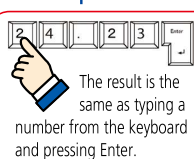
In common with the popular model IT-016U, this device is capable of entering measurement data to Microsoft Excel or a memo pad. Application example: using USB-ITN standalone to input data while selecting the data entry point flexibly during a measurement whose procedures cannot be determined in advance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

Using USB-ITN in combination with dedicated options

Refer to pages A-22 to A-24 for details.

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.

Input data to the PC with the push of a button.



Just press the data button to send the displayed value to the PC.

Can be connected directly to a USB port on a PC with 1 cable.

USB Input Tool Direct
USB-ITN-B

USB Input Tool Direct is automatically recognized as a HID* keyboard device (standard driver of Windows) by connecting it to a USB port.
* Human Interface Device

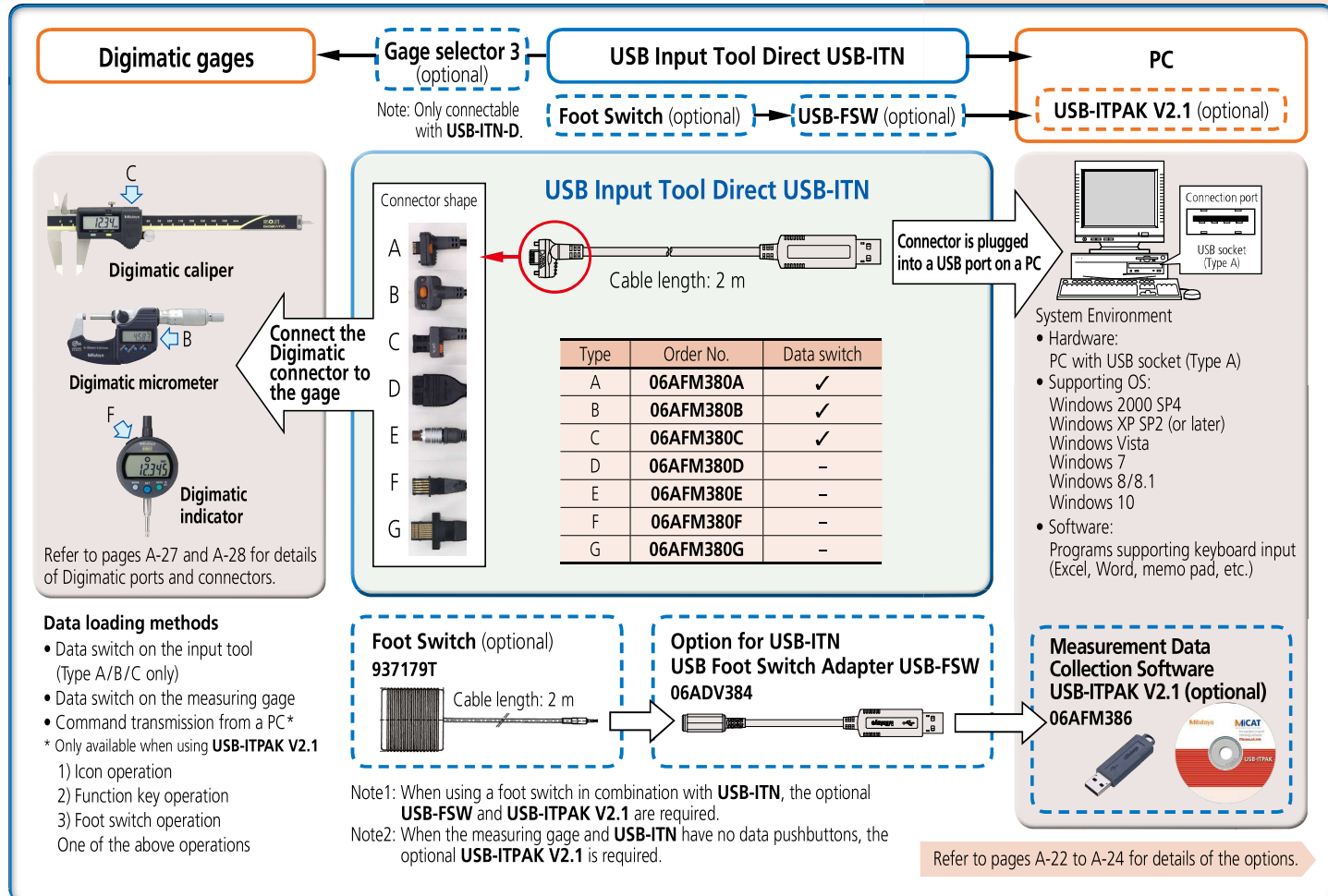


USB-ITN

Main specification

- Output compatibility: USB1.0 or 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: 12 Mbps (Full Speed)
 - Power supply: USB bus power
 - Mass: 59 g
 - USB2.0 certificate
 - Conforms to EU EMC Directives.
- * Since this device is compatible with Windows standard driver software, dedicated driver software is not required.

USB-ITN System Configuration



Specifications of IT-007R RS-232C Communication

- Output specification: RS-232C compliant
- Communication method: Full duplex
- Communication speed: 2400 bps (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

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
Data parts (floating decimal point)												
CR												

2) Error code output

D1	D2	D3	D4
CR			

Example of format
Display → Output data
0.123 → 01A + 0000.123CR →
-0.1234 → 01A - 000.1234CR

Error code No.
1: No data input
2: Loaded data with format other than specified

• 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 functions
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	+12 V power supply from the PC*
5	GND	—	Ground
6	DSR	OUT	Not used
7	RTS	IN	+12 V power supply from the PC*
8	CTS	OUT	Not used
9	(N.C.)	—	No connection

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

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

USB Keyboard Signal Conversion Type IT-016U

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 ø4 mm to ø18 mm.
- Durability of the push button increased 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.

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: 12 Mbps (Full Speed)

Power supply: USB bus power

USB2.0 certificate

Conforms to EMC Directives

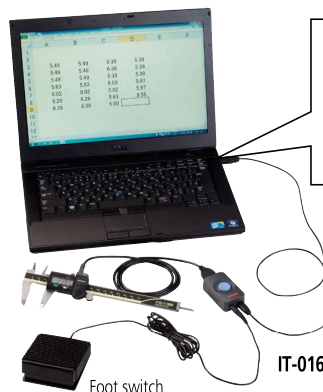
* This product is compatible with the standard driver software for Windows. No dedicated driver software is required.



IT-016U



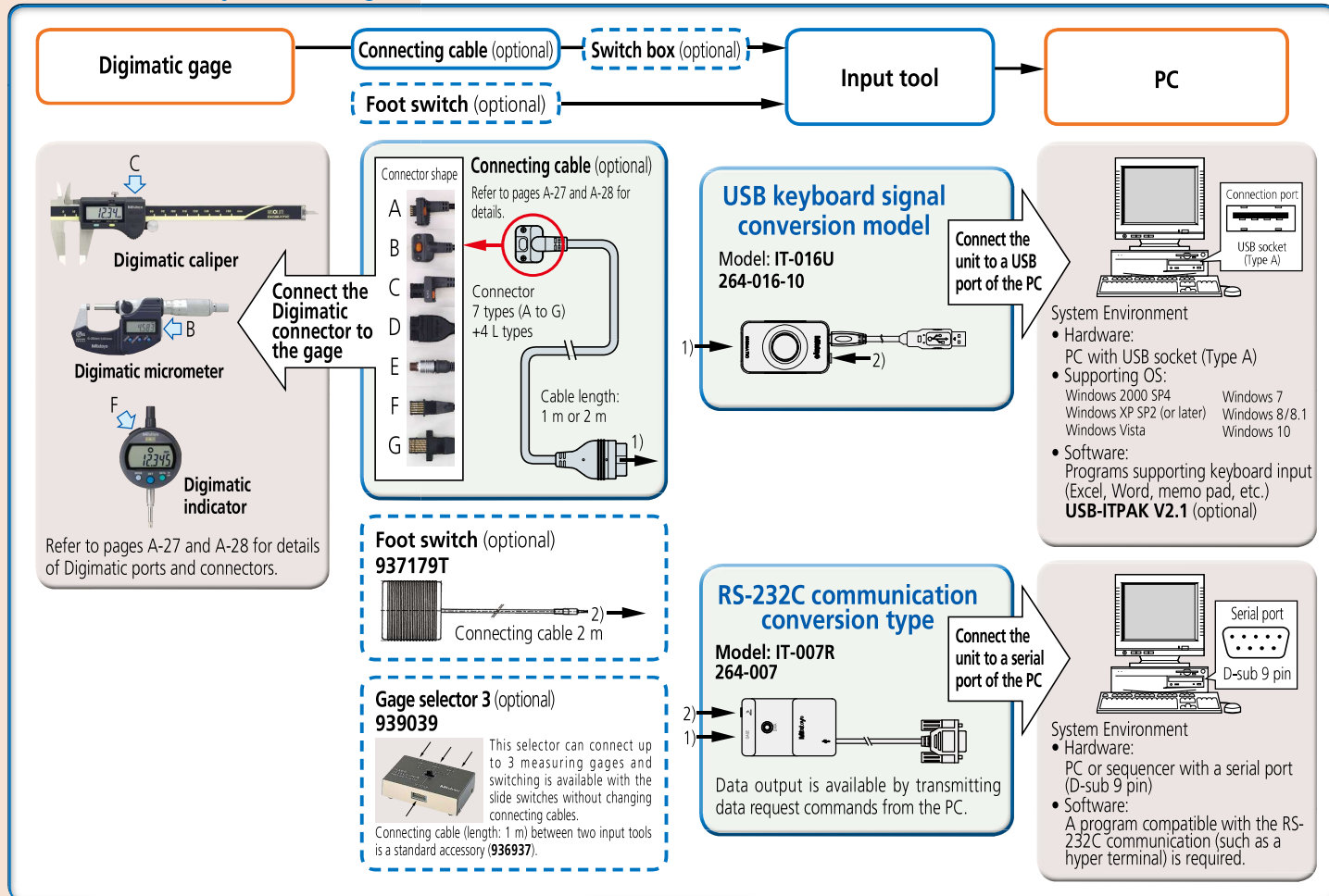
IT-007R



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

* HID (Human Interface Device)

IT-016U/IT-007R System Configuration



Measurement Data Management

Convenient data collection tool and quality control software

Measurement Data Wireless Communication System

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

- Bluetooth® communication allows for wireless transmission of measurement data from digimatic micrometers and calipers to PCs, smartphones, tablets and other such terminals.
- More compact and thinner for a better fit with Digimatic gages, and featuring improved operability and performance inherited from its predecessor, U-WAVE-TCB/TMB is now available with Bluetooth® wireless technology. No receiver is required, and one PC can connect up to seven units of Mitutoyo Bluetooth® U-WAVE. Dust/water-proof models are also available for arduous shop floor usage.
- Bluetooth® communication not only allows cost reduction, as it does not require the conventional dedicated receiver unit, but it also improves operability.
- The application software for transferring measurement data to smartphones and tablets, or the application **U-WAVEPAK-BM** (English version only) is available at app stores (Google Play, Apple Store) for download.

U- WAVEPAK-BM



- **U-WAVEPAK-BW**, the computer communication software for transferring measurement data to computer software, is available for download from our company's website.

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



Bluetooth® communication not only allows cost reduction, as it does not require the conventional dedicated receiver unit, but it also improves operability.

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

• Wireless Communication Specifications

Wireless communication	Bluetooth® 4.2 Low Energy
Wireless communication distance	Approx. 16 m (line of sight) Approx. 10 m (in a factory environment)
Transmission output	3.2 mW (5 dBm) or less (Class2)
Modulation method	FH-SS (Frequency-hopping spread spectrum)
Communication frequency	2.4 GHz band

Note1 To use **U-WAVE-TCB/TMB**, conformity to the radio law of each country is required. Please contact your dealer or nearest Mitutoyo sales office.

Note2 **U-WAVE-TCB/TMB** is not compatible with **U-WAVE fit**, for which communication specifications are different.

Optional Accessories

Model No.	USB-ITPAK V2.1
Order No.	06AFM386
Compatible OS (Windows)	10 (64 bit)
Compatible Excel version	2016 (The operation with Excel for MAC OS is not guaranteed.)

Note: Refer to pages A-22 to A-24 for details of **USB-ITPAK V2.1**.

USB-ITPAK V2.1



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



Refer to the Measurement Data Wireless Communication System **Mitutoyo Bluetooth® U-WAVE** Brochure (**E12048**) for more details.

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

Transmitter / Receiver



264-626



264-625

SPECIFICATIONS

	For Digimatic micrometers		For Digimatic calipers	
Order No.	264-626	264-627	264-624	264-625
Model	U-WAVE-TMB (IP67 type dust/water-proof)	U-WAVE-TMB (buzzer type)	U-WAVE-TCB (IP67 type dust/water-proof)	U-WAVE-TCB (buzzer type)
Protection level	IP67	N/A	IP67	N/A
Data reception indication	LED	LED, buzzer	LED	LED, buzzer
Power supply	Lithium battery CR2032×1			
Battery life	Approx. 1 year under normal conditions of use, but varies according to usage.			
Mass (g)	18			



02AZF310



02AZF300

Choose a connecting unit compatible with your gage.

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

U-WAVE fit
U-WAVE-TM compatible
Digimatic micrometers/heads

Model	Protection level	Order No.	Order No.	Order No.
Standard	IP67	264-626	264-627	264-624
Water-proof type	IP67	264-626	264-627	264-624
Coolant-proof type	IP67	264-626	264-627	264-624
Standard	IP67	264-626	264-627	264-624
Water-proof type	IP67	264-626	264-627	264-624
Coolant-proof type	IP67	264-626	264-627	264-624

For model compatibility information, refer to "U-WAVE fit Compatible Devices", a separate sheet provided with **Catalog No. 12000**: Measurement Data Wireless Communication System U-WAVE.
https://www.mitutoyo.co.jp/support/service/catalog/09_system/1200_appendix.pdf

Compatibility of measuring tool and unit

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

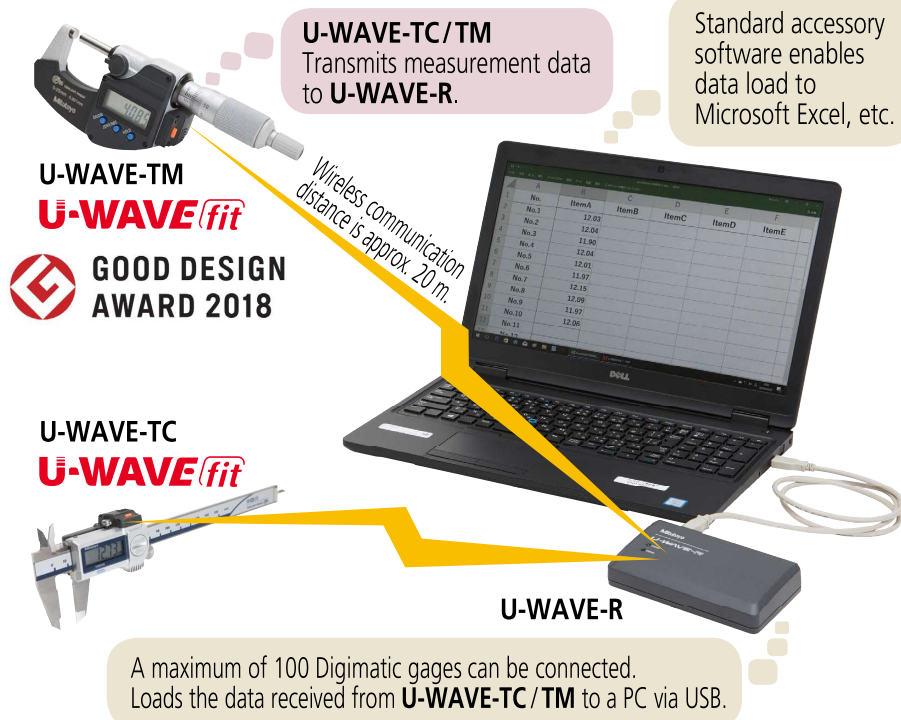
Measurement Data Management

Convenient data collection tool and quality control software

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 and 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 (Microsoft Excel, Notepad, etc.) by keyboard input.
- Wireless communication eliminates cabling, improving measuring operability.
- By combining with **USB-ITPAK V2.1**, recording of inspections using Excel becomes more efficient. Loading multiple measurement data into separate Excel sheets, or simultaneous measurement using the event driven is now available without the need for macro programming yourself. (Automatic loading in a certain interval is available with a timer function.)

U-WAVE fit system configuration



U-WAVE-R

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

Model	U-WAVE-R
Order No.*	02AZD810D/02AZD810E/02AZD810F
Power supply	USB bus power system
Number of U-WAVE-R units that can be connected to one PC	Up to 15
Number of U-WAVE-T units that can be connected	Up to 100
External dimensions	140×80×31.6 mm
Mass (g)	130

* Order No. differs depending on the destination country.

U-WAVEPAK software (standard accessory)

System Environment: Compatible OS
Windows 2000 Professional (SP4 or later)
Windows XP Home Edition (SP2 or later)
Windows XP Professional (SP2 or later)*
Windows Vista*, Windows 7*, Windows 8/8.1*
Windows 10*

* 32-bit, 64-bit OS supported
<Versions confirmed operational on Windows 10>
• **U-WAVEPAK Version1.020** or later

Connectability confirmed for tablet PC

- Microsoft Surface Pro 6 (the version whose operation on Windows 10 Professional is confirmed)
- Required environment: DVD drive (required for installation), USB port x2 ports or more

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

U-WAVE-R main unit



USB2.0 cable (1 m) attached

U-WAVEPAK



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

System Communication Specifications

• Wireless communication

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

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



Refer to the **U-WAVE Brochure (E12000)** for more details.

For model compatibility information, refer to "U-WAVE fit Compatible Devices", a separate sheet provided with **Catalog No. 12000: Measurement Data Wireless Communication System U-WAVE**.

Main specifications of U-WAVEPAK

- Setup of dedicated driver software (USB and virtual COM port)
- Initial setting of ID number and frequency selection (required only once for the first time)
- Load data to Microsoft Excel or Notepad through the data interface function

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

Type of transmission unit



264-622



264-621

SPECIFICATIONS

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

Connectable measuring instruments	Micrometer		Caliper	
Order No.	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 CR2032×1			
Battery life	Approx. 400,000 times continuous data transmission			
External dimensions (mm)	41.9×12.9×38.8		56×11.45×30.4	
Mass (g)	18			

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

Note: IP67 type is water/dust-proofed suitable for the factory floor. Buzzer type is not water/dust-proofed.



02AZF310



02AZF300

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

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

Note: **02AZF310** ensures water-proof performance only when attached to measuring instruments of IP67 type.

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

Compatibility of measuring tool and unit

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

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

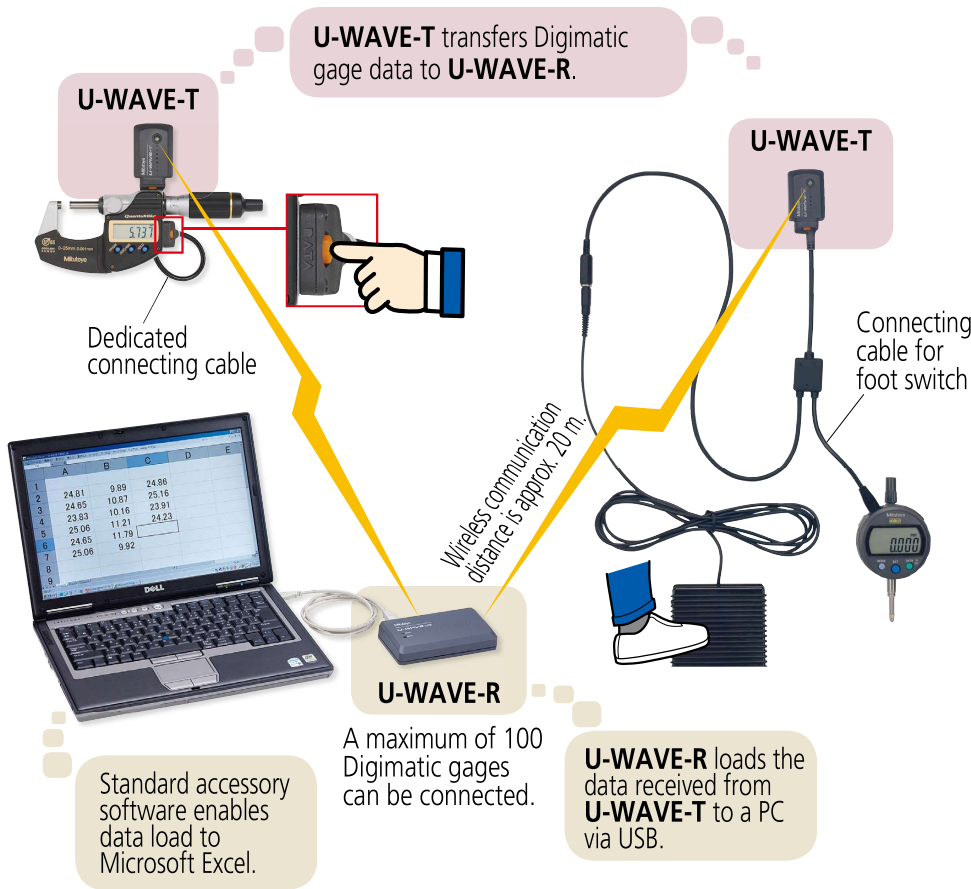
Measurement Data Management

Convenient data collection tool and quality control software

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 event driven is now available without the need for macro programming yourself.
(Automatic loading in a certain interval is available with the timer function.)

U-WAVE system configuration



U-WAVE-T System Communication Specifications

• Wireless communication

Order No. *	02AZD730G/02AZD730H/ 02AZD880G/02AZD880H	02AZD730J/02AZD880J
Transmission output	1 mW (0 dBm) or less	5 mW (7 dBm) or less
Wireless specifications	IEEE802.15.4 base	
Wireless communication distance	Approx. 20 m (within visible range)	
Wireless communication speed	250 kbps	
Modulation method	DS-SS (Direct Sequence - Spread Spectrum) Resistant to interfering signals and noise	
Communication frequency	2.4 GHz band (ISM band: Universal frequency)	
Used band	15 channels (2.405 to 2.475 GHz at intervals of 5 MHz) The noise search function avoids interference with other communication devices.	

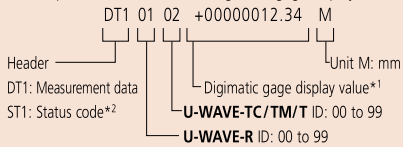
* Order No. differs depending on the destination country.
Note: To use **U-WAVE-T**, the conformity to the radio law of each country is required. If you use this product outside the country of purchase, please contact your dealer or nearest Mitutoyo sales office.



Refer to the **U-WAVE Brochure (E12000)** for more details.

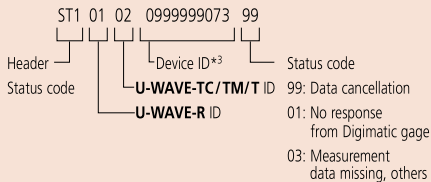
• Data format

Example of format when the Digimatic gage displays 12.34



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

*2 Example of status code format



*3 Unique number assigned to U-WAVE at shipment

Notes on Identification of Measurement Data and Multiple Systems Operation

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

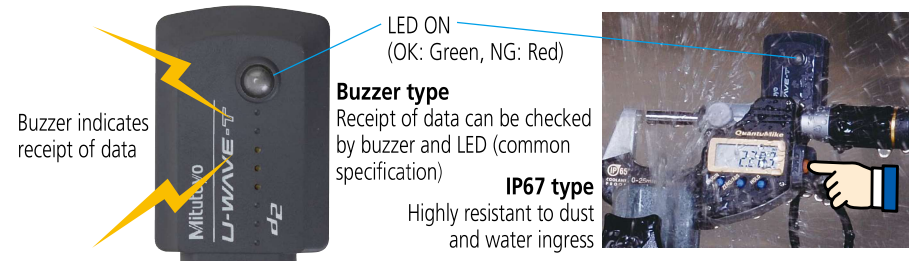
Measurement Data Wireless Communication System U-WAVE

U-WAVE-T

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

Model	U-WAVE-T (IP67 type)	U-WAVE-T (Buzzer type)
Order No.*	02AZD730G/02AZD730H/02AZD730J	02AZD880G/02AZD880H/02AZD880J
Protection Rating	IP67	None
Data reception indication	LEDs	Buzzer and LEDs
Power supply	Lithium battery CR2032×1	
Battery life	Approx. 400,000 transmissions	
Dimensions (mm)	44×29.6×18.5	
Mass (g)	23	

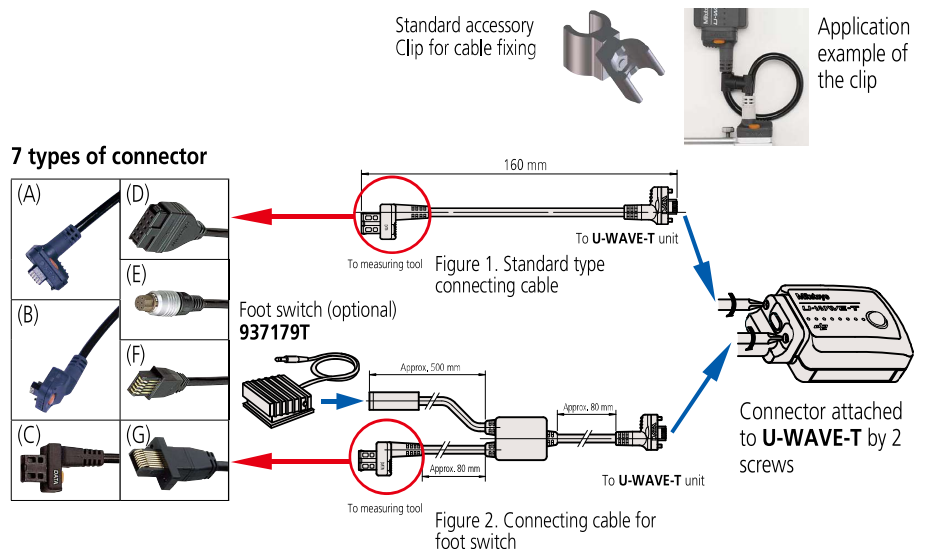
* Order No. differs depending on the destination country.



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-27 and A-28 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 Order No.	Connecting cable for foot switch Order No.
(A) Water-proof model with output button	02AZD790A	02AZE140A
(B) Water-proof model with output button	02AZD790B	02AZE140B
(C) With data-out button	02AZD790C	02AZE140C
(D) 10-pin plain type	02AZD790D	02AZE140D
(E) 6-pin round type	02AZD790E	02AZE140E
(F) Plain type straight	02AZD790F	02AZE140F
(G) Plain type straight water-proof model	02AZD790G	02AZE140G



Measurement Data Management

Convenient data collection tool and quality control software

Measurement Data Wireless Communication System U-WAVE

Optional Accessories for U-WAVE-T

U-WAVE-T mounting plate

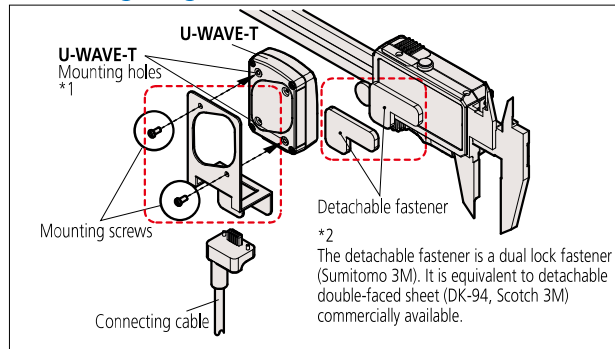
Since the standard cable clip is not sufficient to support the **U-WAVE-T** on a Digimatic gage, a mounting plate is provided. The mounting plate can be fixed to the gage by the easily detachable hook-and-eye type fasteners provided. Batteries can be replaced without needing to detach the **U-WAVE-T**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



**U-WAVE-T mounting plate
02AZE200**

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

Mounting diagram (02AZE200)



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

Typical applications of the mounting plate

Super Caliper CD67-S15PM



QuantuMike MDE-25MX



Digimatic Indicator ID-C112XB



Applications of the 'Event driven' mode

Data request support from PC

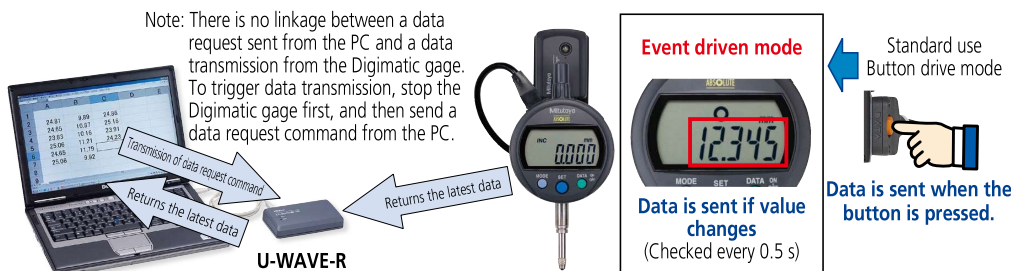
The currently displayed data can be sent by pressing the data switch. This is called **"button drive mode"**.

In the **"event driven 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 driven" is enabled by **U-WAVEPAK**.

In the event driven 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, U-WAVEPAK must be in the event driven mode.

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 driven please note:

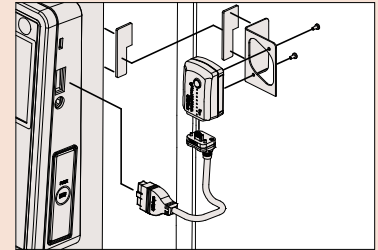
- The battery life is shorter than in normal mode. The battery lasts approximately 20 days with continuous use. Switching to the button mode when the battery is not in use extends the battery life.
- When using several Digimatic gages (**U-WAVE-T**), communication errors may occur because of radio interference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

U-WAVE-T mounting plate for QM-Height 02AZE990

Standard accessories

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

Mounting Diagram for QM-Height (02AZE990)



Refer to the **U-WAVE Brochure (E12000)** for more details.

Order No.

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

Upgrade pricing from V1.0 and V2.0 is not available. Please purchase V2.1.

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 2002 Excel 2003 Excel 2007 Excel 2010 Excel 2013 Excel 2016
Hard disk	Free space of more than 10 MB
CD-ROM drive	For 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)

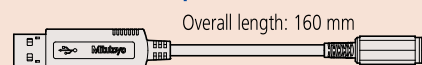
Language support

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

Order No.

Model No.	USB-FSW
Order No.	06ADV384

Foot Switch Adapter USB-FSW



Overall length: 160 mm

Measurement Data Collection Software

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

- **USB-ITPAK V2.1** 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 measurement.

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-24 for details).

• Control item and instruction at data input

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

*1 Not available during individual measurement.

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

• Number of connectable gages

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

- **Data loading time:** when using IT-016U/USB-ITN, 0.2 s to 0.3 s per gage unit

U-WAVE event driven mode: 0.5 s data refresh interval

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

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

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

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

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

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

Optional Accessories for USB-ITPAK

USB Foot Switch Adapter USB-FSW

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

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

Main specification

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

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

Foot switch (937179T)



USB-FSW

Measurement Data Management

Convenient data collection tool and quality control software

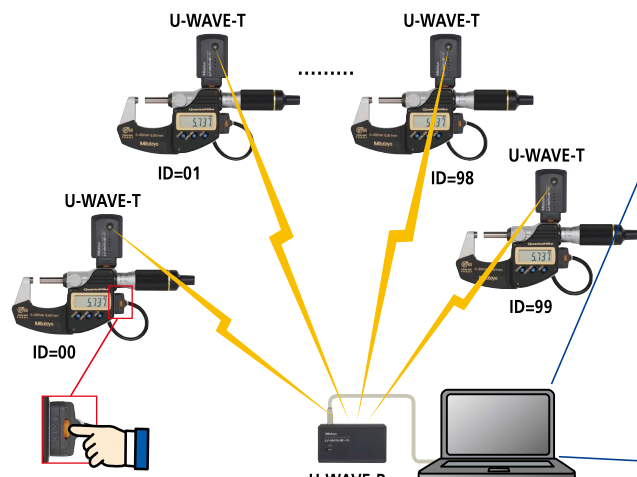
Measurement Data Management

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 (U-WAVE-T, U-WAVE-TM/TC) sent to separate Excel sheets



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

USB-ITPAK V2.1 (Individual measurement)

ID=98	A	B	C	ID=99
1	2.341	2.274	2.007	2.341
2	2.039	1.963	2.274	2.039
3	1.996	2.152	2.007	1.996

Sheet 98

ID=00	A	B	C	ID=01
1	2.039	1.963	2.274	2.039
2	1.996	2.152	2.007	1.996
3	2.341	2.274	2.007	2.341

Sheet 00

Sheet 01

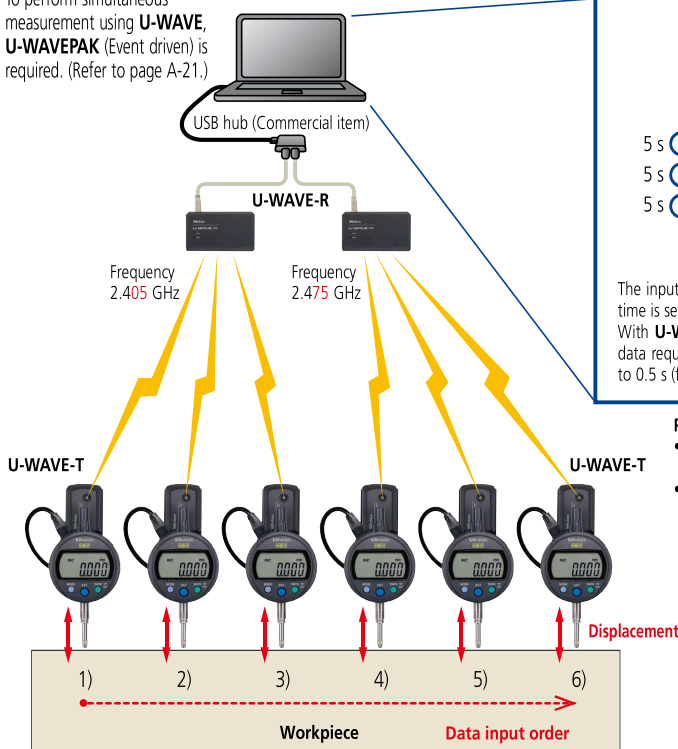
- Entry point can be specified per gage (by U-WAVE-T ID).
- Specifying an Excel file: Excel Book (full path) +sheet name
 - Specifying data input cells (example: A1:C3)
 - Specifying cursor move (right or down)

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

Automatically obtains displacement data in a certain input interval

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

To perform simultaneous measurement using U-WAVE, U-WAVEPAK (Event driven) is required. (Refer to page A-21.)



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

	A	B	C	D	E	F	G
1	Displacement 1)	Displacement 2)	Displacement 3)	Displacement 4)	Displacement 5)	Displacement 6)	Measurement date/time
2	0.281	0.162	0.121	0.051	0.011	-0.001	2013/4/1 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							

The input interval can be arbitrarily set by 0.1 s intervals up to 24 hours. If a smaller value than the data loading time is set, the actual measurement time will be the input interval.

With U-WAVE, an error (no data) may occur if less than 0.5 s is set for the input interval. This is because the data request signal is issued before the data comes in, based on the event driven data refresh interval that is set to 0.5 s (fixed).

Points to note when performing simultaneous measurement using U-WAVE and USB-ITPAK V2.1

- 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.

Measurement Data Management

Convenient data collection tool and quality control software

Mini-Printer Equipped with Data Logging Function SERIES 264 — Digimatic Mini-Processor DP-1VA LOGGER

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 Xbar-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).



Example of printout

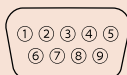
MODE1

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.

LIMIT DATA 1	
LSL	19.11 mm
USL	21.00 mm
TOL	1.89 mm
1 20.14 mm	
2 20.18 mm	
3 19.66 mm	
4 20.77 mm	
5 20.27 mm	
6 20.28 mm	
7 19.31 mm	
8 19.64 mm	
9 19.93 mm	
10 19.30 mm	
11 19.56 mm	
20 20.82 mm	
30 20.82 mm	
PART NO.:	
DATE 2018/ 2/15	
TIME 12: 8	
NAME:	
* RESULT *	
MAX	21.30 mm
MIN	18.99 mm
R	2.07 mm
X	19.950 mm
σn-1	0.4501 mm
σn	0.4578 mm
-NG	1
P	6.667 %
Cp	0.688
Cpk	0.618
* HISTOGRAM *	
LSL	19.11 mm
USL	21.00 mm
TOL	1.89 mm
DIV	10
-NG	
LSL	
USL	
TOL	
DIV	
-NG	
LSL	
USL	
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Specifications

- **264-002**
- 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: 300/600/1200/2400/9600/19200 bps
- Connector specification:

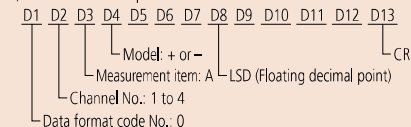


Pin No.	Signal	Function	in/out
1	CD		out
2	RD	Received data	out
3	TD	Communication data	in
4			
5	GND	Ground	
6	DR		out
7			
8	CS		out
9			

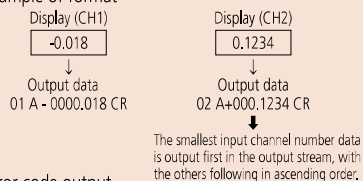
Note: For connection with a PC, use a commercially available RS-232C straight cable.

Data format

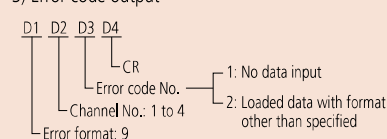
1) When data output



2) Example of format



3) Error code output



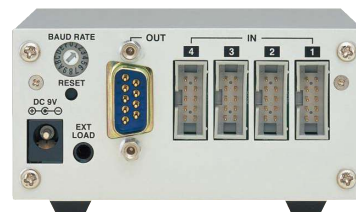
- Power supply: AC adapter (9 V, 500 mA)
 - External dimensions: 91.4 (W) × 92.5 (D) × 50.4 (H) mm
- Note: Communication software is not included.

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

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



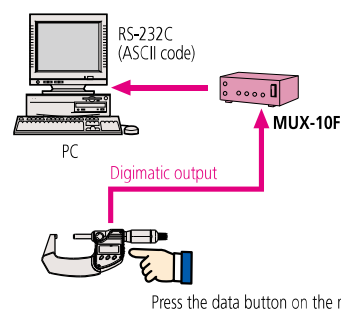
264-002
MUX-10F



Typical Application

Data input using the data button on the Digimatic gage

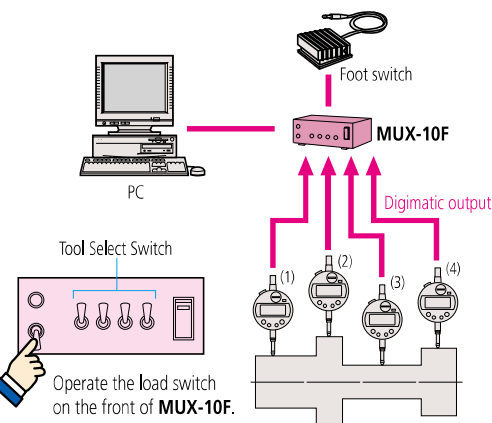
- If the Digimatic gage has a data button, data is sent to the **MUX-10F** from the gage, converted to RS-232C and sent out.



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-10F** 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.

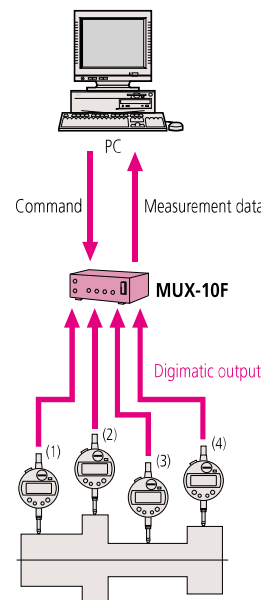


Data input using the external commands

- Data from a specified measuring gage connected to **MUX-10F** can be polled (ch 1 to 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.







Measurement Data Management




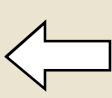
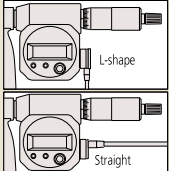
Convenient data collection tool and quality control software

Digimatic Data Cable Selector (including USB Input Tool Direct)

1) 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 switch (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.
2) IT-016U/IT-007R/DP-1VA LOGGER/MUX-10F/EC Counter  Connector (11 types, A to G) Type D on the other end for all models	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 switch (cable outlet is right)
	Order No.	1 m	05CZA624	05CZA662	959149	04AZB512
		2 m	05CZA625	05CZA663	959150	04AZB513
3) 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 switch (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-29.	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 switch (cable outlet is right)
	Picture of gage connector					
	Data switch		Available	Available	Available	Available






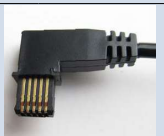




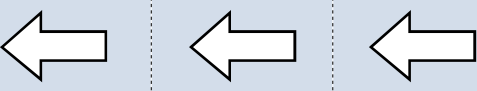

Digimatic ports on gage Please note that some high-precision Digimatic gages are capable of displaying the measurement result to more than 6 digits. However, according to the Digimatic output specification, the result may be output in 6 digits only. Digimatic gages whose display may exceed 6 digits • Laser Scan Micrometers • Litematic • Linear gage counter (EH)	Picture of Digimatic port				
	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 293-140-30 / 293-141-30 , etc. 293-230-30 etc. 340-251-30 / 340-252-30 293-666-20 / 293-667-20 , etc. 227-201-20 / 227-203-20 , etc. 227-205-20 / 227-206-20 , etc. 227-221-20 etc. 227-223-20 etc. • 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.	• Digimatic micrometer 293-582 / 293-583 , etc. 389-514 / 389-714  Type C straight connectors are available, but may interfere with thimble operation.

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 water-proof type
USB-ITN-D 06AFM380D	USB-ITN-E 06AFM380E	USB-ITN-F 06AFM380F	No applicable models USB-ITN-F is 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 water-proof 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 water-proof type
02AZD790D	02AZD790E	02AZD790F	No applicable models 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 water-proof type
						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
						
<ul style="list-style-type: none"> • Digimatic indicator ID-H (Note 1) • 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 (Note 1), EC-101D (Note 1) • 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 HV-110/120 	<ul style="list-style-type: none"> • Hardness testing machines HM-100 HM-200 HV-100 HR-300/400/500 HH-411 	<ul style="list-style-type: none"> • Digimatic indicator ID-CX, ID-C (Peak-Value Hold Type), ID-C (Calculation type), ID-C (Bore Gage Type), ID-U (Note 1), ID-SS (Note 1), ID-SX (Note 1) • Digimatic height gage 192-663-10/192-613-10/570-322/570-227, etc. (Flat L-shape, cable outlet is right) • ABS borematic 568-361/568-362, etc. • Scale unit 572-460/572-560/572-480-10/572-580-10, etc. 	<ul style="list-style-type: none"> • Digimatic bore gage 511-501/511-502, etc. • Hardness testing machines HH-300 • Digimatic depth gage Digimatic type (ID-CX) 			<ul style="list-style-type: none"> • Digimatic indicator ID-N ID-B

