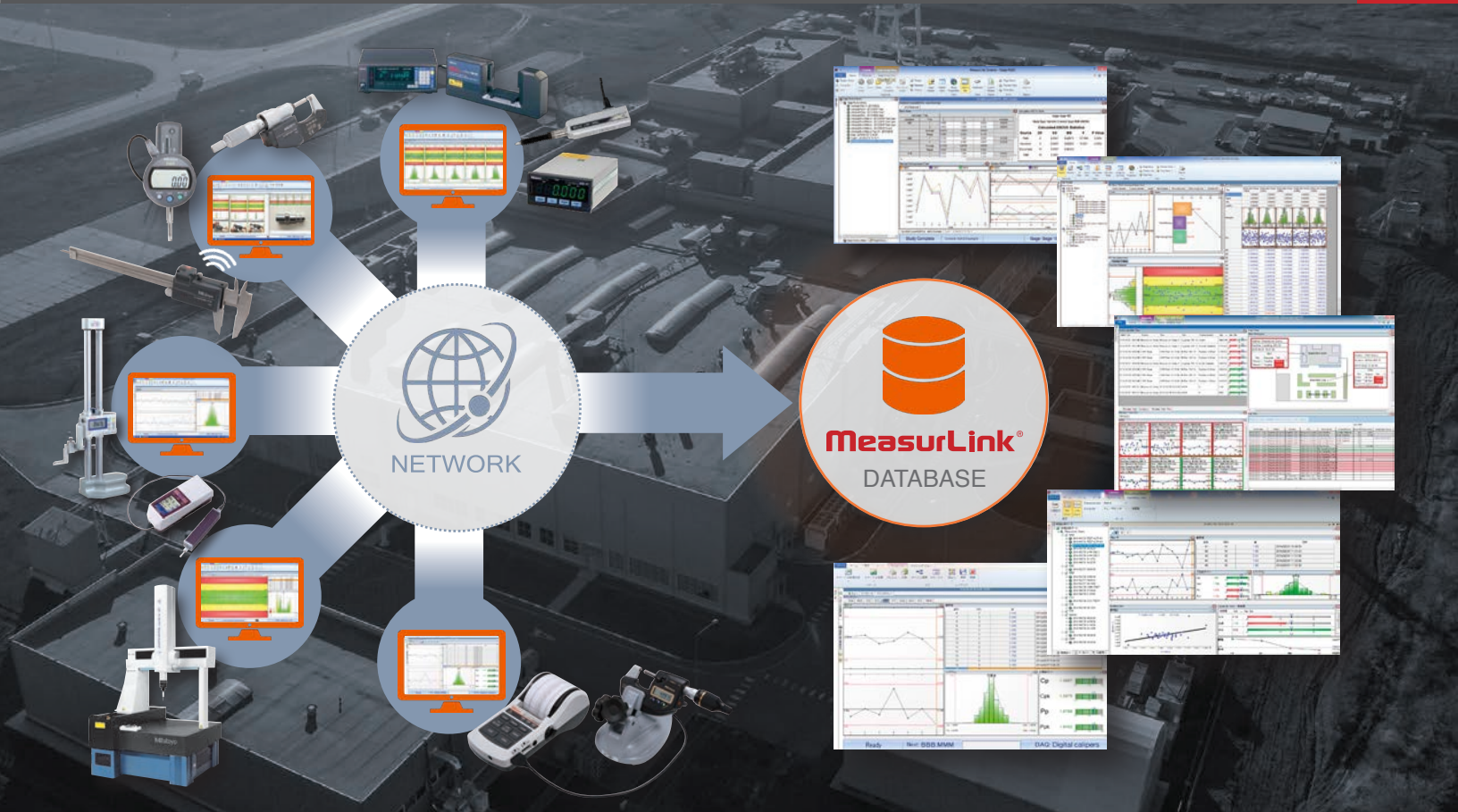




Data Management Systems

Partner with Mitutoyo to Design Your Data Management System

Small Tool Instruments
and Data Management



Data Management Systems

As manufacturing companies move toward implementing modern techniques such as Industrial IoT and Statistical Process Control, many companies find integrating measurement data collection into their network can be difficult. Many questions arise, such as: what technology is available, which products are better for an application and which supplier can be trusted as a partner to guarantee success. As a global leader in Metrology Hardware, Software and Services, Mitutoyo is frequently called upon to assist manufacturers in implementing a Data Management System.

This document details how to select the right partner, hardware and software needed to fit unique applications. Whether it is a single inspection station or a multiple facility installation, Mitutoyo offers the products and solutions to bring it all together.

Design Your Data Management System

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- ITPak Data Collection Software 22
- MeasurLink® Real-Time SPC and Data Collection Software 24

Reasons to Partner with Mitutoyo



The Mitutoyo group suggests innovation utilizing IoT for smart manufacturing through the three “M”s:

- M**easure: Measure with precision
- M**2M: Machine-to-machine connection
- M**anage: Manage measurement data & measuring machines

Our IoT support concept provides products and services that contribute to the improvement of the customers' production efficiency and product quality.

Issue

Some companies only produce gages, connection hardware or software. How can companies know products from three different suppliers will work together?

Solution

Mitutoyo is a global leader in and single provider of metrology hardware, software and services. With our diverse product line, we can provide the required gages, connection hardware and data collection and management software needed, all made and supported by Mitutoyo.

Issue

Implementing electronic data collection plant-wide seems costly, and low quality gages are not an option. How can a company meet its goal without exceeding budget?

Solution

Many companies already own and use high-quality Mitutoyo gages equipped with SPC output. These gages are ready for use in your new system which reduces the cost of having to purchase replacement gages.

Issue

Your company produces a diverse product line. You need a solution that is flexible enough to meet your current needs and your future needs as well.

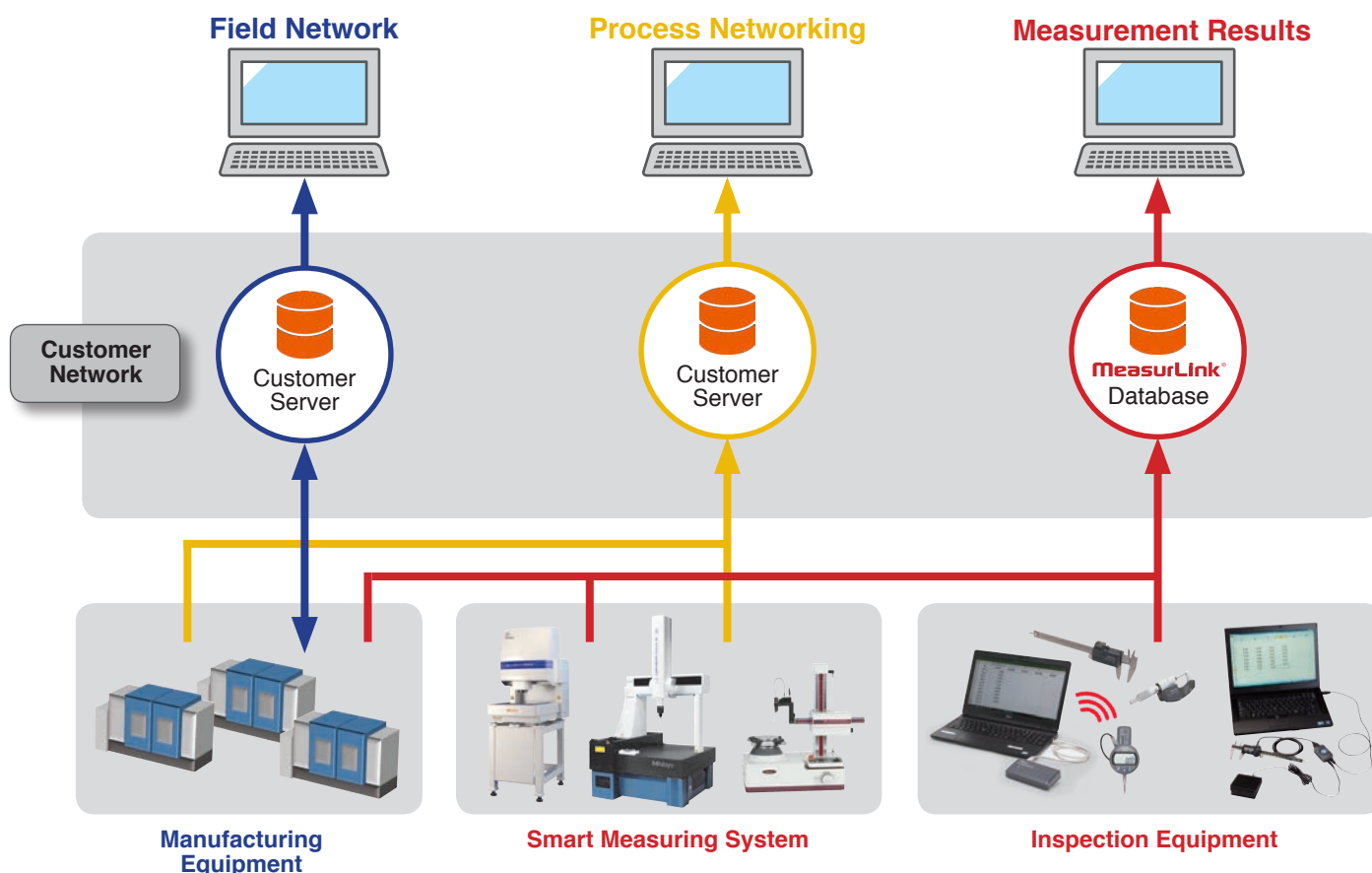
Solution

All of Mitutoyo's data management products are modular and independent from the tools, allowing for use on different gages as needed. The same data management hardware can be repurposed for future applications. Our software options are also scalable, allowing users to increase usage easily as required.

Smart Factory Concept

Below is a diagram illustrating a common initial implementation of the Smart Factory Concept. The core of the implementation is the Customer's Network. All Manufacturing equipment is directed by a system that supports techniques such as CAD/CAM program generation, pallet shuttles and robot integration, and automatic offset feedback. Process Monitoring is managed through the network resulting in visualization of uptime, machine usage and health, as well as better preventative maintenance scheduling.

Measurement Data is managed by MeasurLink[®]. All inspection data is collected by Real-Time software and stored on the customer's network in a MeasurLink[®] database. This data can be collected from hand tools connected to a PC by wired or wireless data collection systems, PC controlled systems such as Vision or Coordinate Measuring Machines, or even machine tools equipped with in-machine probing.



- Equipment is controlled through the customer's network.
- Process monitoring of machine tools and Smart Measuring Systems is also supported by the customer's network.
- Measurement Data is collected and stored in a MeasurLink[®] database which is conveniently located on the same network.

Understand the Goals of a Smart Factory

In regard to the Measurement Results, a Smart Factory concept improves work efficiency, allows the management of the measured data to be integrated within the network, and enables easy deployment. Each of these attributes is described in detail below.

1
Improves work efficiency



Press button to enter data

A Smart Factory implementation should improve work efficiency by including electronic data collection. The goals should be to eliminate errors in data, reduce wasted time during inspection process, and increase the ease of use to the operators. All of these benefits will improve work efficiency.



2
Integrated management of data




Gathering analysis through digitalization

Management of the measured data should be integrated into the customer's network. This requires digitalization. By having all of the data on the network, reporting and analysis is able to be performed more efficiently. This will also facilitate efforts to implement paperless initiatives.



3
Easily deployed



Building a low-cost system

The most important attribute of a Smart Factory implementation is that it should be easy to deploy. The implementation should be well supported by your partners, it should be affordable in initial purchase and cost of ownership, and it should be flexible enough to grow with your business.



Visit the Smart Factory Solutions Website
<https://www.mitutoyo.co.jp/eng/products/dl/solution/index.html>

Factory View

Visualize What a Factory-wide System Looks Like

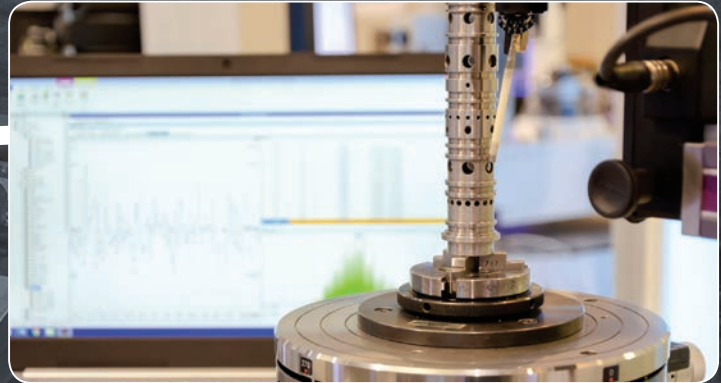
A Smart Factory is more than having just a few inspection stations or a well-equipped Quality Lab. A Smart Factory is plant wide. Inspections at the point of manufacture, audits, final inspection and quality control, and assurance checks should all be collected and managed by the same system. Using a company's network, all of the Measurement Data is centralized, increasing efficiency of analysis and reporting.



Inspection being performed at the point of manufacture. Sampling techniques based on capability reduce the time spent on inspection while still ensuring the quality of the product.



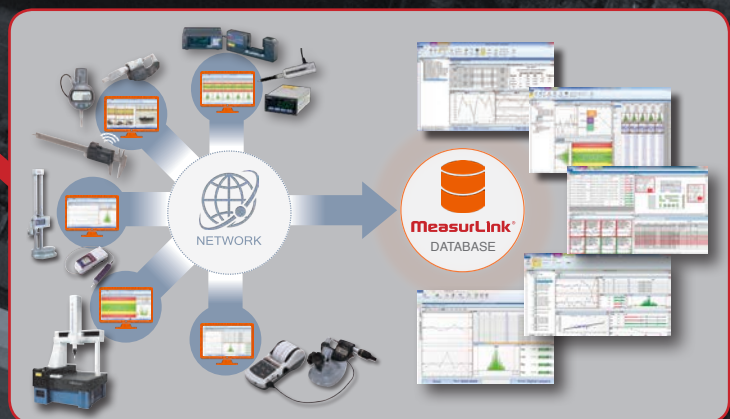
Required audits can be performed in remote locations. The data can be stored and then transferred to the network when convenient. This is also useful while sorting products for defects or reacting to nonconformities.



Quality Control and Assurance Labs contain sophisticated equipment that can check samples to ensure they are in tolerance during the many steps of manufacturing. All of this data should be collected and stored on the network.

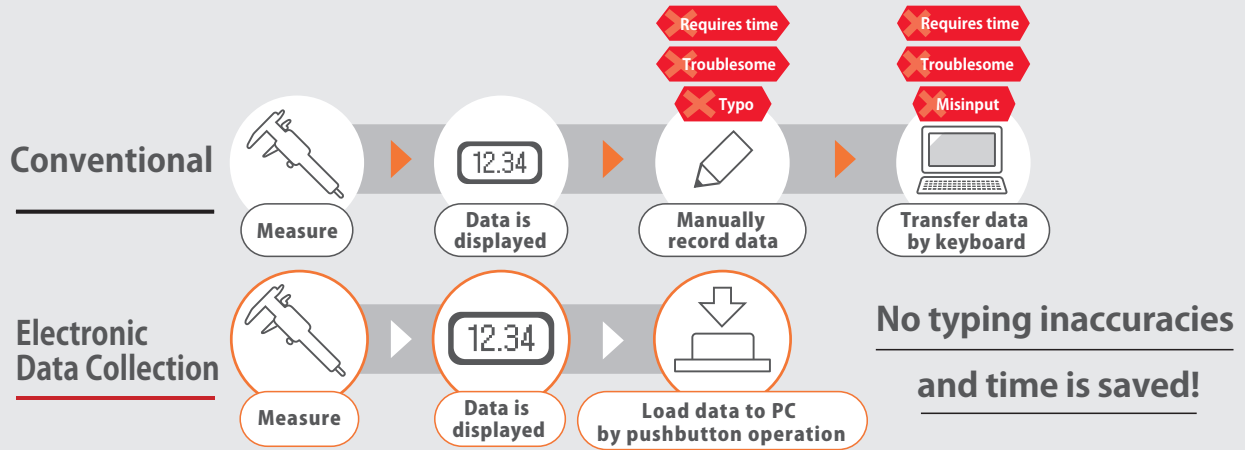


Final inspection data not only certifies the part for conformance but also predicts the conformance of future parts manufactured. This data can be collected and compared to data measured at the point of manufacture or data collected during audits.



All of the data collected is stored in a central location. This data can be accessed, analyzed and reported by anyone with access regardless of their location within the facility. This also supports data retention and accessibility.

Electronic Data Collection



Issue

Manual input of Measurement Data is inefficient and frequently generates mistakes in entering data (ie. transposing number, missing decimal, etc.)

Solution

Electronic Data Collection immediately transmits the measurement data to your PC. Errors due to manual input can be eliminated, improving data reliability and operational efficiency.

Issue

Implementing an Electronic Data Collection solution can be costly, requiring capital investment in many replacement gages.

Solution

All Mitutoyo Data Management Hardware uses existing Digimatic SPC. Whether wired or wireless is desired, existing gages can be retained and fitted with accessory cables resulting in lower implementation cost.

Issue

Wired connections, while reducing measurement error, may feel unwieldy resulting in difficulty of use.

Solution

The U-WAVE Wireless system can be used in addition to, or instead of wired solutions. The ability to be used in combination with a cable allows flexibility in the design and use of Data Collection systems.

Issue

Wireless data transmission is unreliable in a noisy, industrial environment.

Solution

U-WAVE boasts industry leading wireless signal transmission and is proven to maintain a strong signal connection that's been tested in poor conditions to replicate typical manufacturing spaces.

Understand Mitutoyo Data Management Hardware Features

Dustproof and Water Resistant IP67 Models

Data Collection Hardware is designed to match the mating gage's IP rating.



Single Button Operation

The Measurement Data can be directly sent by a single button operation.



Compatible with Excel Spreadsheets

The data can be input directly into an Excel sheet.



Greater Efficiency

Data can be input easily and in fewer steps, eliminating the need for manual input errors, greatly improving efficiency.

Digimatic 2 supports high resolution applications.



Additional Benefits of Wireless

Wireless Range up to 20m* (Line of Sight)

The measurement site can be designed with flexibility.

* May be less depending on the operating environment or if the transmitter is covered by hand when in use.



Industry Leading Wireless Communication

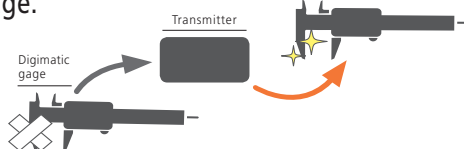
Mitutoyo's original wireless communication is based on IEEE802.15.4 for stability.

- 2.4 GHz band (ISM band: Universal frequency)
- Up to 15 units can be connected to a PC
- Up to 100 Digimatic gages can be registered
- This allows up to 1500 gages to be used in one system
- Just one CR2032 lithium battery provides power for about 400,000 data transmissions.

Low Cost of Ownership

Data Management is an Accessory

If a Digimatic Gage is damaged or being calibrated, data collection can be continued using a replacement gage.



Connectable to any Existing Digimatic Gage

- No need to buy a replacement if your tool is equipped with the Digimatic function.
- Digimatic 2 support for high resolution applications
- The same Port supports wired or wireless connection
- Hardware can easily be re-purposed for new jobs



Data Management Selection

Select Gage

Digimatic gages

Select Connector

USB ITN Direct

SPC Cable

Connecting cable + U-WAVE-T

Digimatic micrometer

Digimatic caliper

Start with selecting the appropriate gage. Ensure the tool has Digimatic SPC Output. This port has been in use for many years, so your existing gages may already be equipped.

U-WAVE^{fit}

Connecting unit + U-WAVE-TM

Connecting unit + U-WAVE-TC

Next, select the hardware that will connect to your gage. The style of the SPC Port will influence the style connector needed. In most cases, a wired or wireless solution is available.

See How Gages, Hardware and Software all Connect Together

Select Interface



USB Input Tool



multiplexer

*Does not support ITPAK



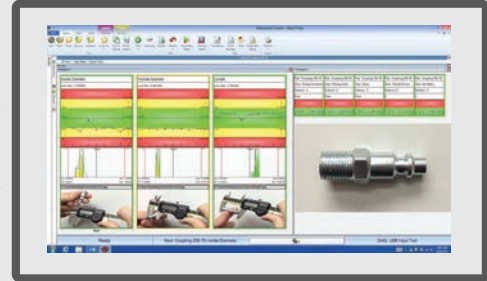
DP-1VA LOGGER

**Optional output to PC



U-WAVE-R

Select Software



MeasurLink®

	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		

ITPAK



Spreadsheet

Now, select the interface to the PC. The USB ITN Direct connects directly to the PC, but the other cables require an Input Tool or multiplexer. All transmitters require connection to a U-WAVE-R.

Finally, select the desired software. Mitutoyo's Data Management hardware can be used with Microsoft Excel®, but many users require advanced software to manage data entry such as IT-Pak and MeasurLink®.

Many companies want the benefits of electronic data collection but do not want to be connected to the PC by a cable. Mitutoyo's U-WAVE Wireless System is the solution. The U-WAVE system consists of a transmitter and connector that attaches to a gage and a receiver connects to the PC. When the data send button is pressed, data is sent from the gage wirelessly to the PC.

The U-WAVE Wireless System

- Data from Digimatic Gages can be sent to a PC easily.
- Wireless communication eliminates cabling to the PC thereby improving use.
- The Data Interface Function allows data entry by HID (Keyboard Emulation)



U-WAVE-TM Transmitter

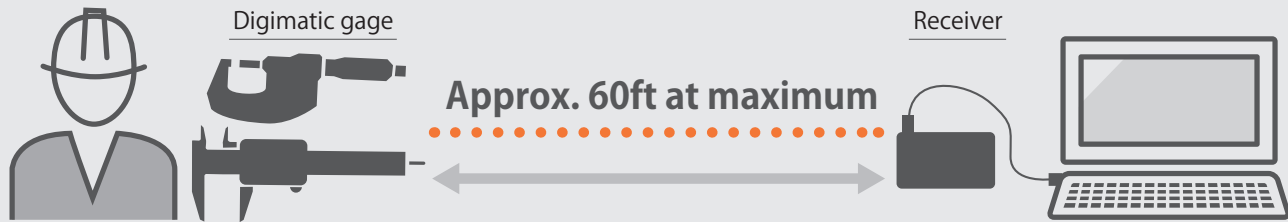
The U-WAVE-TM Transmitter is specifically designed to fit on most Mitutoyo micrometer models, allowing for less obstruction and greater comfort of use. Each transmitter is serialized allowing the data sent to be identified. Transmitters are available in IP67 Coolant Proof and Buzzer types and are connected to the gage by an IP67 Coolant Proof Connector.



Operator is using a QuantuMike micrometer to measure a sample for diameter. The micrometer is equipped with a U-WAVE-TM to allow data to be transmitted back to the U-WAVE-R. The U-WAVE-R then passes the data to a connected PC.

U-WAVE *fit*

Wireless Transmitter for Calipers



With an industry leading reliability and a range of 20m, this wireless measurement system can be deployed anywhere on the shop floor.



U-WAVE-TC Transmitter

Just like the U-WAVE-TM, the U-WAVE-TC is designed to fit on most Mitutoyo Caliper models, allowing for less obstruction of the inside jaws and greater comfort of use. This transmitter is also available in an IP67 Coolant Proof and Buzzer type and is serialized to identify data source. The transmitter can be connected to the gage by either a Standard Connector or an IP67 Coolant Proof Connector that preserves the same IP Rating as the gage.



Operator using caliper to measure sample for length. The caliper is equipped with a U-WAVE-TC that allows the data to be transmitted back to the U-WAVE-R. The U-WAVE-R then passes the data to a connected PC.

U-WAVE-T

Wireless Transmitter

U-WAVE-T transmitters are designed to fit any Digimatic Gage. Several types of connection cables allow a flexible connection to the gage allowing freedom of movement during use. An optional bracket is also available if a more rigid connection is desired. U-WAVE transmitters are available in several styles to meet your needs, but they all share common features:

- 2.4ghz IEEE802.15.4 base
- 20 Meter range
- 400,000 Transmissions battery life
- Digimatic 2 support for high resolution gages



U-WAVE-T Transmitter

The U-WAVE-T is Mitutoyo's leading wireless transmitter. This device can be added to any Digimatic Gage to allow wireless transmission of measurements. Just like the U-WAVE-TM/TC, the transmitter is serialized and available in a IP67 Coolant Proof or Buzzer Type. U-WAVE-T Transmitters are connected to the gage with a short connecting cable.



U-WAVE-T



Operator is using an Indicator Depth Gage equipped with a U-WAVE-T to measure a sample for step height. The data is transmitted back to the U-WAVE-R. The U-WAVE-R then passes the data to a connected PC.

U-WAVE-R

Wireless Receiver



Each U-WAVE-R supports 100 U-WAVE-T and/or U-WAVE-TM/TC transmitters. The U-WAVE-R can operate in 15 distinct frequencies which allows a system to support 1500 individual gages.

U-WAVE-R Receiver

The U-WAVE-R receives the signal from the U-WAVE-T or U-WAVE-TM/TC and sends the measurements to the connected PC. Keyboard emulation (HID) or Virtual COM Port (VCP) is supported, allowing the data to be used by virtually any software. Each transmitter is identified by a channel ID allowing the user to know which gages sent the measured results.



U-WAVE-R



Operator is using a micrometer to measure a sample for outside diameter. The micrometer is equipped with U-WAVE-TC to allow data to be transmitted back to the U-WAVE-R. The U-WAVE-R then passes the data to a connected PC.

USB Input Tool

Data Input Unit

The USB Input Tool is for users who require more flexibility in their wired solution. This device connects to a Digimatic Gage with an SPC Cable and to the PC with a USB Cable, offering many user-friendly features:

- The unit has a large data send button and foot switch port.
- Data can be sent by pressing the data send button on the gage, cable, the unit, or the foot switch, increasing the ease of use for the operator and allowing a hands-free operation.
- The cable supports keyboard Emulation (HID) or Virtual COM Port (VCP).
- Inputs data into virtually any software including Microsoft Excel®.
- This device also supports ITPak and MeasurLink®.

USB Input Tool

By utilizing an SPC Cable, the USB Input Tool allows a great variety in system setup. Cables can be swapped to allow multiple gages to be used in low volume applications. The data send button on the unit or the foot switch can be used to send data in situations where the inspector does not want to put additional pressure on the measuring device.



USB Input Tool



An operator is using an indicator to measure a sample for height. The indicator is equipped with an SPC cable and USB Input Tool to transfer data directly to an inspection PC.

USB Input Tool Direct

One-Piece Data Input Unit

The USB Input Tool Direct provides a simple, inexpensive method to connect a Digimatic Gage to a PC. This one-piece cable connects the gage directly to a PC and offers many user-friendly features:

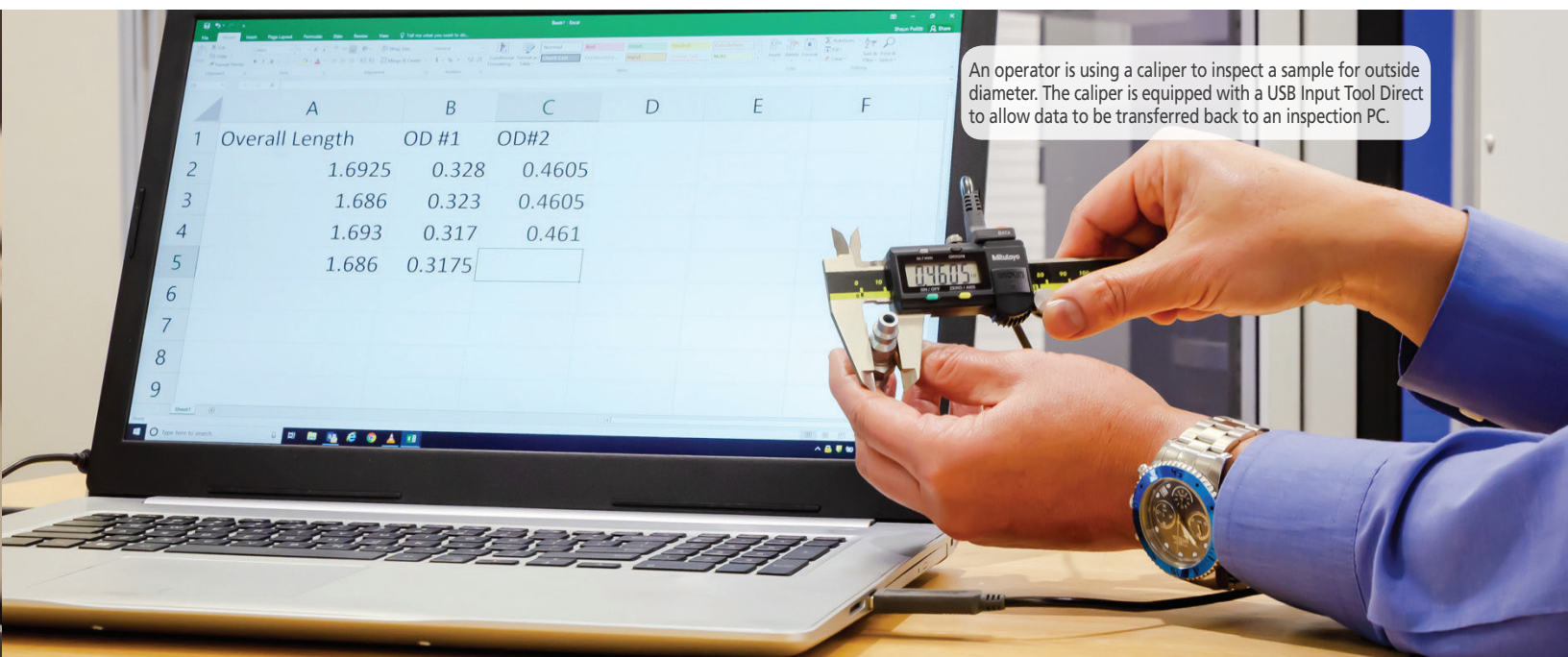
- No additional interface is required.
- The cable supports keyboard Emulation (HID) or Virtual COM Port (VCP)
- Inputs data into virtually any software including Microsoft Excel®.
- There are several connection types to ensure compatibility to any Mitutoyo Digimatic Gage.
- Some cable variations also include a data send button for gages that are not equipped with one.
- This device also supports ITPak and MeasurLink®.

USB Input Tool Direct

This one-piece, 2-meter connection cable is the simplest method to implement Electronic Data Collection. A standard USB connection ensures widespread compatibility, and keyboard emulation (HID) requires no drivers to install. Just plug it into the gage SPC port, then the PC's USB port and collect data.



USB Input Tool Direct



MIG4-USB & MIG8-USB

Digimatic Multiplexer

Many manufacturers have an inspection station with multiple gages used to inspect products. In some applications, a wired solution is a convenient way to connect the gages. The USB Multiplexer is a device that connects multiple gages with SPC Output directly to a PC. The benefits of a Digimatic Multiplexer also include:

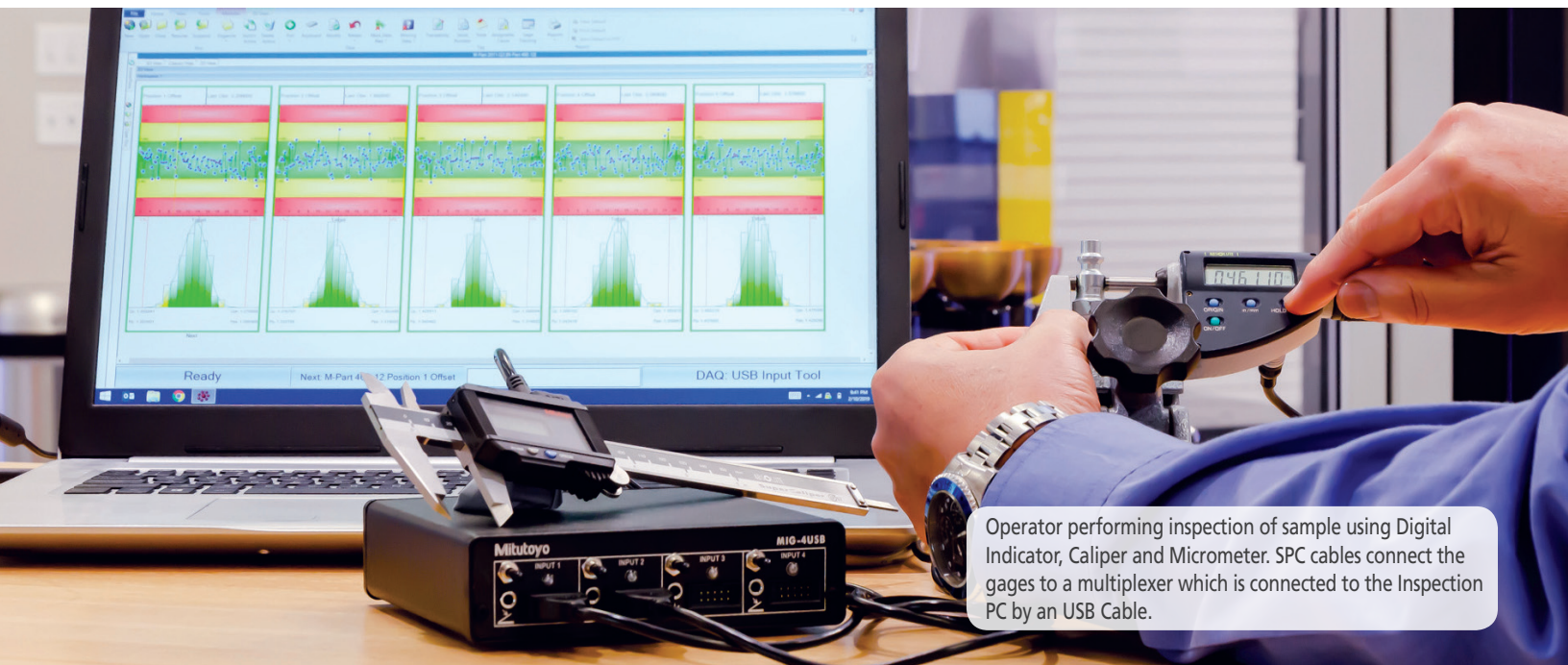
- The ability to transfer data from all of the gages to a PC and into any software such as Excel or MeasurLink®.
- Useful in multi-gage inspection stations as well as dedicated fixtures that use multiple Digimatic tools.
- Reduces the number of connections required to the PC.
- Supports keyboard Emulation (HID) or Virtual COM Port (VCP) and RS232 connections.
- The Multiplexer also supports Max, Min and TIR collection modes.

MIG4-USB/MIG8-USB Multiplexer

Mitutoyo Multiplexers are available in 4- or 8-port models. SPC Cables are used to connect gages to the Multiplexer. A USB connection to the PC allows data to be transferred by keyboard emulation (HID) or Virtual COM Port (VCP). Multiple Multiplexers can be connected together to form a system that supports up to ninety nine gages. The foot switch is also supported and can request data from individual ports or up to all ports with one trigger.



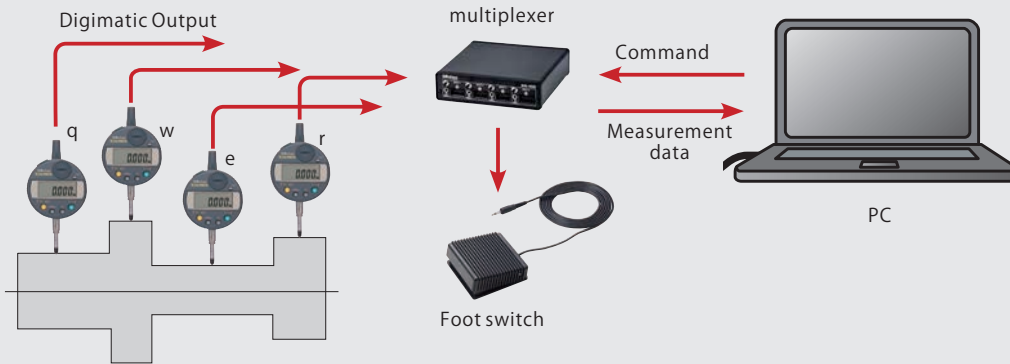
MIG-4USB



Operator performing inspection of sample using Digital Indicator, Caliper and Micrometer. SPC cables connect the gages to a multiplexer which is connected to the Inspection PC by an USB Cable.

Accessories

SPC Cables and Foot switch



In some applications, such as this Multiplexer setup, additional hardware is required to complete the system.

SPC cables and the foot switch are common accessories used by many of Mitutoyo's Data Management Hardware. The Foot switch also can trigger data collection.



SPC Cable

SPC Cables

SPC Cables are used by some interfaces to connect to the measuring tool. Cables are available in a variety of connector types and lengths. Supports USB Input Tool, multiplexer and DP-1VA Data LOGGER.



Foot switch

Foot switch

The Foot switch is an external trigger that is used to prompt the interface to trigger measurement data capture. It supports USB Input Tool, multiplexer and DP-1VA Data LOGGER and select U-WAVE Connecting Cables.



SPC Cable Connection Types

Mitutoyo SPC Cables all have a common 10-pin connector on one end. This end can connect to USB Input Tool, multiplexer or DP-1VA Data LOGGER. The other end connects to the desired gage. The most common connection types are displayed below. Be sure to chose the connector that matches the Digimatic SPC Port on your tool. Some SPC cables have an integrated Data Send Button that can be used if the tool is not equipped.



Type A



Type B



Type C



Type D



Type E



Type F



Type G

DP-1VA LOGGER

Some companies have the need to collect Measurement Data but do not want to use a PC. The DP-1VA LOGGER is a hand-held processor that can print and store the Measurement Data of any Digimatic Gage.

- Utilize tolerancing to verify conformance with Go/No Go LEDs.
- Perform basic statistics without the need of additional software.
- A timer function can automatically inspect a sample over time to check for changes due to temperature or curing.
- The printer uses thermal paper which ensures a long life without the need of costly ink cartridges.
- This processor is powered by an included AC adapter or by AA batteries, allowing flexibility of use.



DP-1VA LOGGER



DP-1VA LOGGER

The DP-1VA LOGGER requires an SPC Cable to connect to the gage. This connection allows gages to be swapped when needed. The foot switch is also supported allowing the data to be triggered hands free.



An operator is using a caliper connected to a DP-1VA LOGGER by an SPC Cable. The data collected can be printed, stored and then transferred to a PC at a later time.

Digimatic Data Logger & Printer

The DP-1VA LOGGER collects data from any Digimatic gage, which can be stored, exported to software or printed. USB connection allows collected data to be easily transferred from the DP-1VA LOGGER to the PC.

- The output is HID or VCP so data can be sent directly to Excel or data collection software such as IT-Pak or MeasurLink®.
- Digimatic 2 function allows the high resolution of the gage to be output in its entirety in metric or inch.
- The unit can store up to 1,000 measurements allowing an operator to collect a shift's worth of data before the data needs to be transferred.
- The DP-1VA LOGGER also collects data directly into a PC if connected during measurement, very similar to an USB Input Tool.



The DP-1VA LOGGER allows measurements to be recorded at the point of manufacture without the need of a PC. The DP-1VA LOGGER can be taken back to the Quality Lab and connected to a PC, and the data can then be transferred to a Microsoft Excel® spreadsheet or SPC software. Battery power increases ease of use and portability.

Large, easy-to-operate keys

[POWER] key
Press to turn power on/off.

[PRINTER] key
Press to turn on/off the print function for measurement and data logging.

[TOL.]REC/STOP key
Press briefly to enter/exit the setting mode for limit data (upper/lower tolerance). Press longer to start/stop data logging.

[FEED] key
Press and hold to feed printer paper.

[STAT.]OUT LOG key
Press to perform statistical calculation based on all input measurement data and create a histogram by printing calculation results. Press longer than usual to print and USB-output log data.

[CLEAR] key
Press to clear all measurement data.

[CANCEL] key
Press to cancel the most recently input measurement data. Press longer than 10 seconds to reset hardware, clear measurement data/log data, and initialize the current date and time.

[DATA] key
Executes data output.

USB-ITPAK

Measurement Data Collection Software

Although Measurement Data can be simply loaded directly into a Microsoft Excel® spreadsheet by connecting the instrument and input tool to a computer, using the optional USB-ITPAK software enables time-saving operations and procedures that significantly improve reliability and efficiency.

- ITPAK creates inspection routines that guide the operator through the required measurements and ensures data from each gage is input into the correct cell.
- This is a must-have software for individuals who use Microsoft Excel® spreadsheets for data collection.



■ Features of USB-ITPAK V2.1

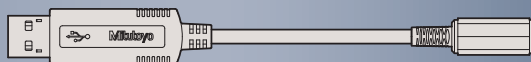
- The measuring methods can be configured, such as sequential measurement, batch measurement, individual measurement and more.
- Data can be canceled by a single operation of the foot switch or function key.
- Input range can be specified per Digimatic Gage, reducing the chance of a misinput.
- Data input or cancellation can be triggered globally for multiple features and simultaneous measurement.
- The Microsoft Excel® spreadsheet can be automatically opened for data input.
- The cursor movement after data input can be set to enable automatic input.

USB-ITPAK is best used in high volume, multiple gage applications where the operator needs to ensure multiple data points are placed into the correct cells of their spreadsheet.

USB Foot switch Adapter



The USB Foot switch Adapter converts the Mitutoyo Foot switch into a USB device allowing it to be utilized by ITPAK to perform function such as: Data trigger, data cancel, and pass or fail for attribute collection. The cables are serialized so several can be used in one routine to perform dedicated functions.



Applications

Measurement Data Collection Software

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

(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".

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

Character strings Input "OK" Input "NG" *No data request for U-WAVE.

Data request* Data cancel

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).

Cell movement direction after inputting data (down and right)
Carriage return (Low, column)
Microsoft Excel® sheet previously specified

	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		

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 special order U-WAVEPAK (Event drive) is required. (Refer to A-9.)

U-WAVE-T x 2 pcs.

U-WAVE-R

USB-ITN-C x 2

USB-FSW x 2 pcs. + Foot switch x 2 pcs.

Height A B C D

(Measurement examples)
Simultaneous measurement of the heights A to D on the workpiece below.

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

Operator 1 (USB-ITN-C) measures Workpiece Nos. 1 to 3.
Operator 2 (U-WAVE-T) measures Workpiece Nos. 4 to 6.

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

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

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

Cell that will receive next input

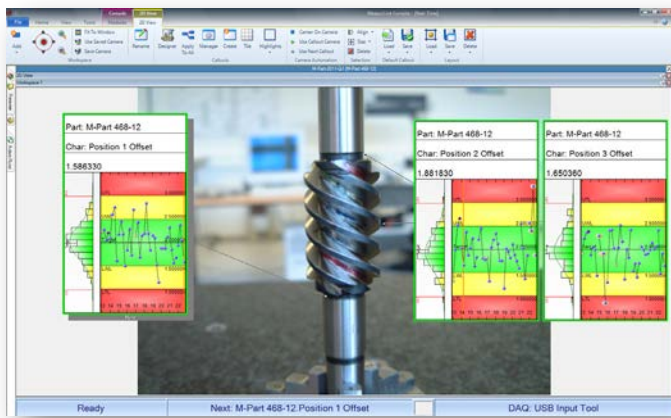
Cell that will receive next input

MeasurLink®

MeasurLink® is Mitutoyo's Data Collection and Real-Time Statistical Process Control software. The final step in designing your Smart Factory Concept is to include software that ties everything together. MeasurLink® can help to:

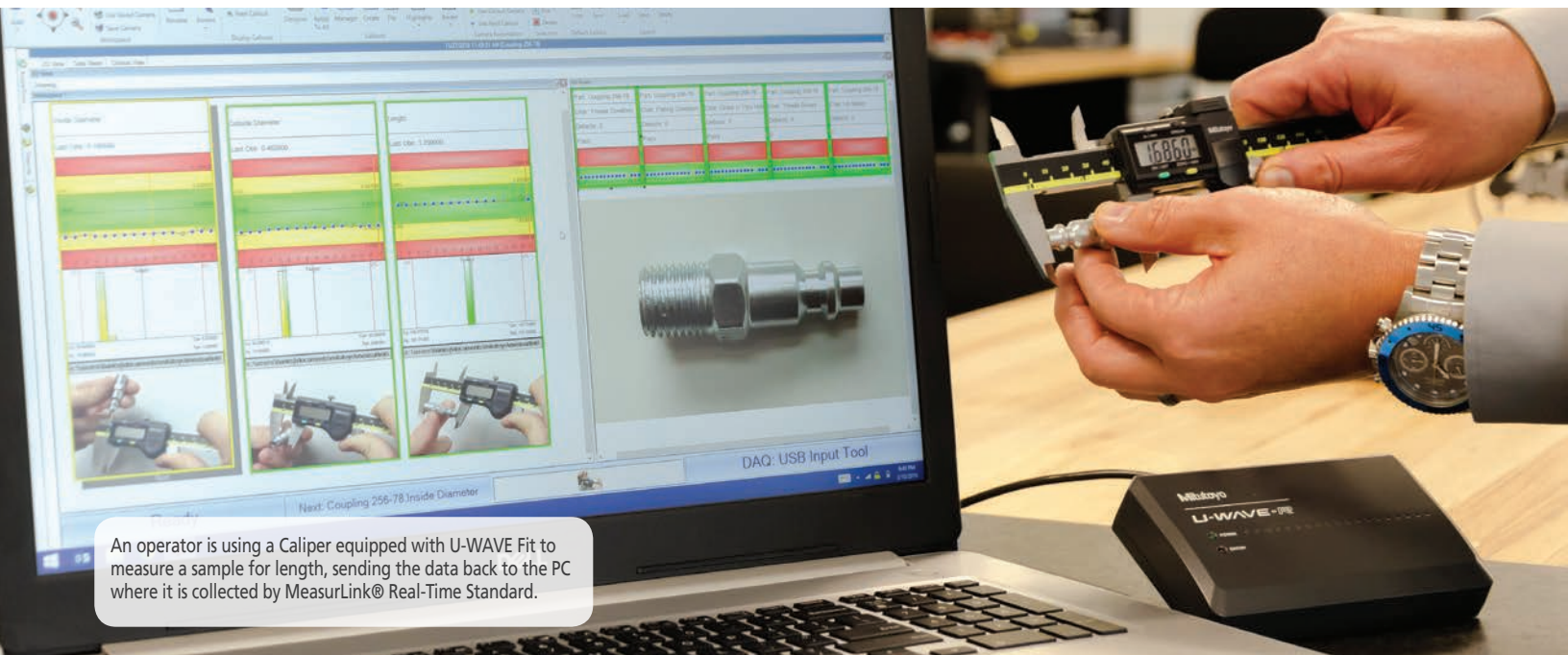


- Collect data throughout your facility.
- Guide operators on the floor collect data from automated equipment inline, assist inspectors in collecting data from hand tools and PC-driven equipment in the Quality Control and Assurance Lab and Final Inspection.
- Store data in a centralized database allowing quick, easy access by engineers and managers for analysis and reporting.



MeasurLink® Real-Time Standard

MeasurLink® Real-Time Standard is used to collect data from inspection stations using hand gages such as Calipers and Micrometers. Any connection method can be used such as USB Input Tools, U-WAVE or Multiplexers. Data from non-Mitutoyo gages can be used, and keyboard entry is available. All of this data is centralized allowing easy access and management.



An operator is using a Caliper equipped with U-WAVE Fit to measure a sample for length, sending the data back to the PC where it is collected by MeasurLink® Real-Time Standard.

Real-Time SPC & Data Collection Software

MeasurLink® has been around for more than 20 years. It's a mature, powerful software that has been and will continue to be used to help our customers improve their processes, increase the quality of their products and save money.

- MeasurLink® is successful in all industries from small job shops to large mass production facilities.
- Any company that collects any amount of data with any type of equipment could use MeasurLink® to harvest and analyze their Measurement Data.
- MeasurLink® makes it easier for supervisors and inspectors to manage the data they are gathering.
- Engineers can easily analyze and find the data they need to report to customers and improve their processes.

MeasurLink® Real-Time Professional

MeasurLink® Real-Time Professional collects data from computer-controlled equipment such as Vision Systems, Coordinate Measurement Machines and Form Equipment – even data from non-Mitutoyo metrology equipment can be used. Just like Real-Time Standard, all of this data is centralized allowing easy access and management.



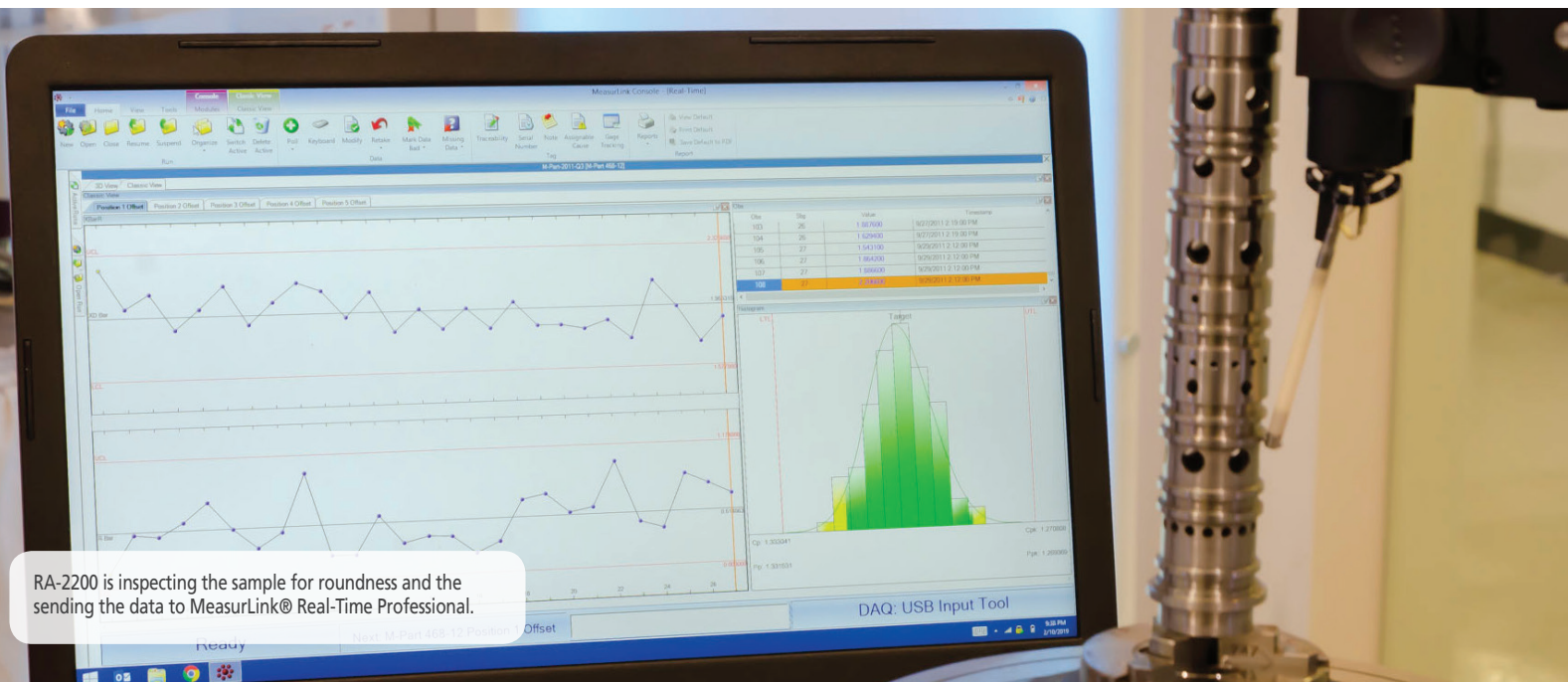
Vision



CMM



Form



MeasurLink®

Real-Time SPC & Data Collection Software

- ▶ MeasurLink® is a modular data management 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's network. Quality information such as checking, monitoring, analysis of the measurement results, and creating inspection reports can be shared among separate facilities to maximize efficiency.
- ▶ MeasurLink® supports anything from small-scale, standalone systems to large-scale systems utilizing a PC network environment. Expansion from a standalone installation to a networked system can be performed with ease, allowing a gradual upgrade from a single-test operation in one section to a full-scale operation.

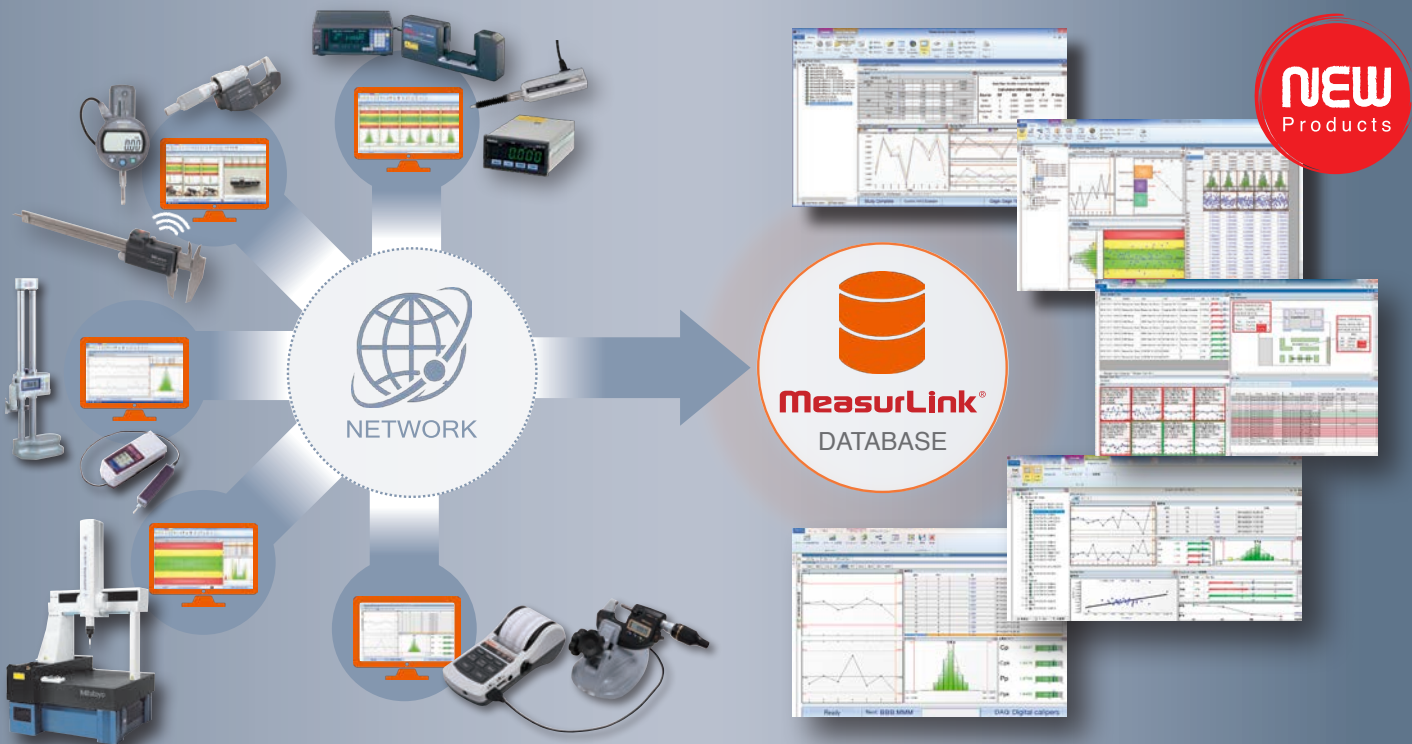


MeasurLink®
Video

■ Use MeasurLink® to:

- Reduce costs associated with inspection, rework and scrap
- Increase ease of use for Quality and Manufacturing
- Ensure part quality and consistency
- Reduce manufacturing defects using real-time SPC
- Increase data visibility and accessibility
- Retain data in a relational database

Whether collecting, monitoring, analyzing, or storing data in a single application or plant-wide, **MeasurLink® is a complete Data Management solution.**



Collection Modules

MeasurLink® Real-Time Standard

MeasurLink® Real-Time Standard supports data collection from each tool and instrument while allowing real-time display of statistical processing data such as control charts, histograms and process capability indices.

MeasurLink® Real-Time Professional

MeasurLink® Real-Time Professional also supports data collection from instruments while allowing real-time display of SPC charts while additionally supporting filter function, Import Templates and DDE DAQ Sources.

MeasurLink® Real-Time Professional 3D

MeasurLink® Real-Time Professional 3D has all the functions of Real-Time Standard and Real-Time Professional and additionally supports view of the workpiece using 3D CAD data. (HOOPS).

Analysis Modules

MeasurLink® Process Manager

MeasurLink® Process Manager enables centralized monitoring of information from all MeasurLink® data collection terminals networked together on the shop floor.

MeasurLink® Process Analyzer

MeasurLink® Process Analyzer is a powerful supervisory tool for viewing, analyzing and reporting on all data collected at any Real-Time station on the network. Additional charting options and management-friendly reports provide insight on the manufacturing process.

MeasurLink® Report Scheduler

MeasurLink® Report Scheduler automatically outputs reports created by Real-Time or Process Analyzer on a user-defined schedule.

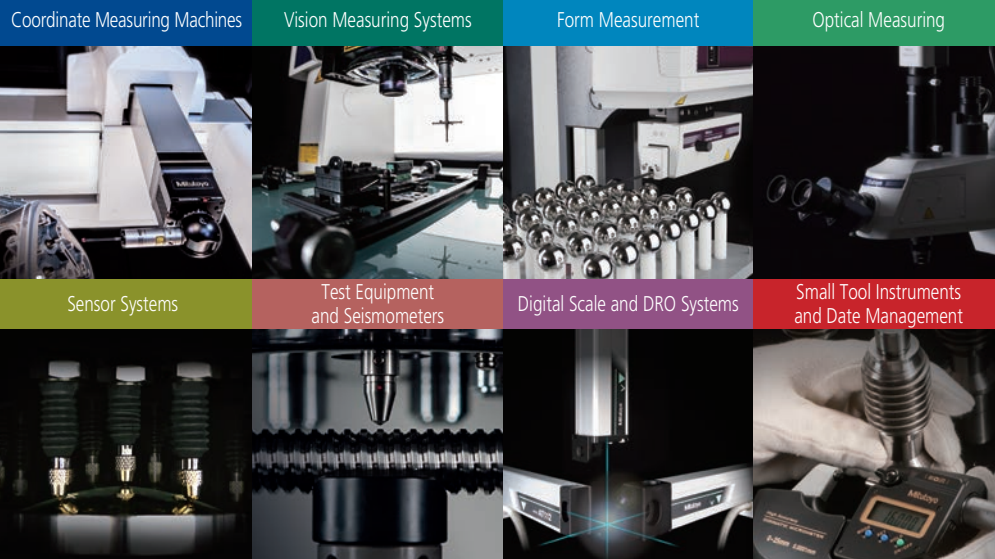
Gage Control Modules

MeasurLink® Gage Management

MeasurLink® Gage Management plans and implements a complete calibration schedule and incorporates a powerful retrieval function in addition to recording and managing the operational state of gages.

MeasurLink® Gage R&R

MeasurLink® Gage R&R is an evaluation and analysis software compliant with MSA required in ISO/TS 16949. MeasurLink® Gage R&R is ideal to check measurement systems for repeatability and reproducibility.



**Whatever your challenges are,
Mitutoyo supports you from start to finish.**

Mitutoyo is not only a manufacturer of top-quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.



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