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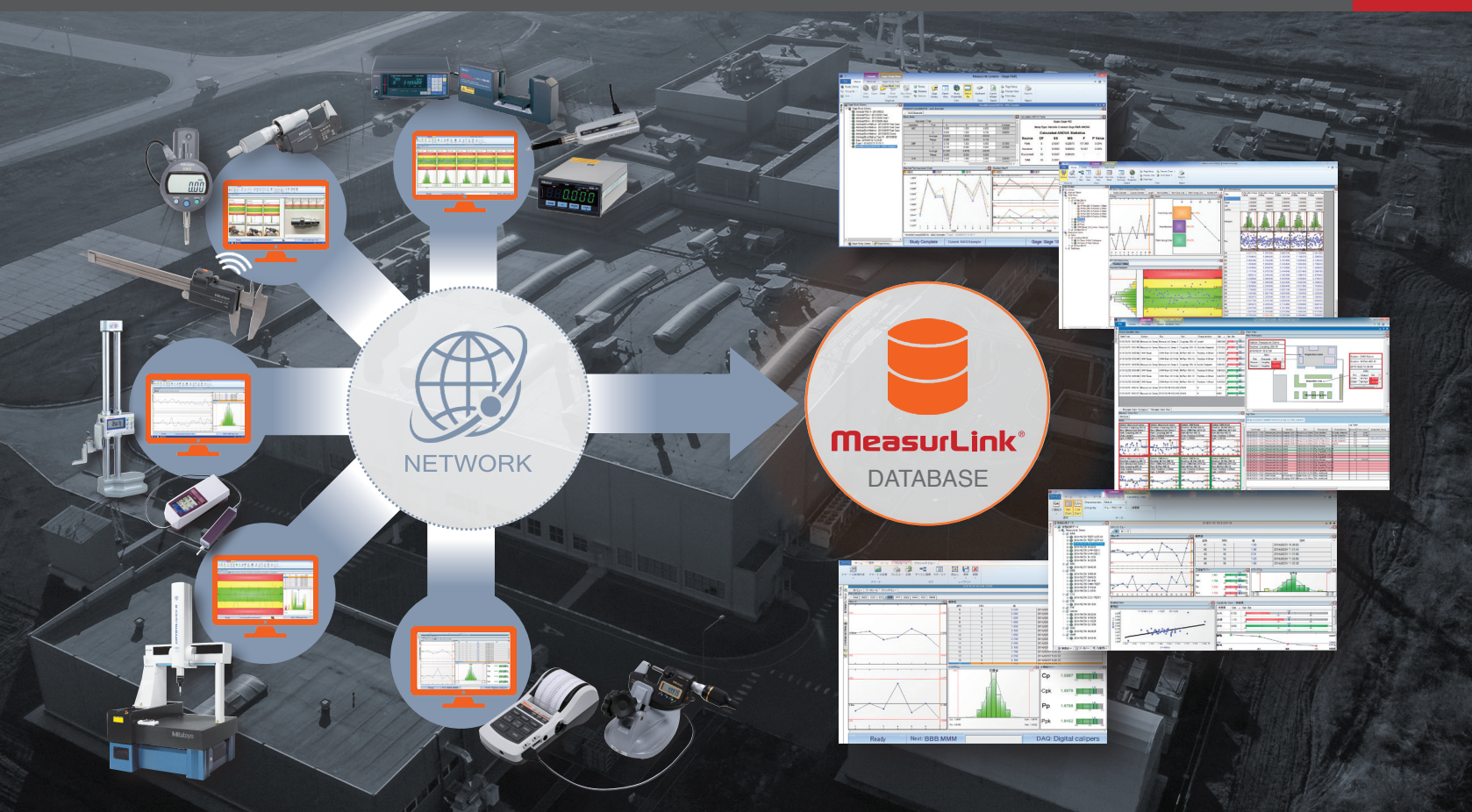
M³ InnovaTion

Data Management Systems

Small Tool Instruments and Data Management



Bulletin No. 2275

Data Management Systems

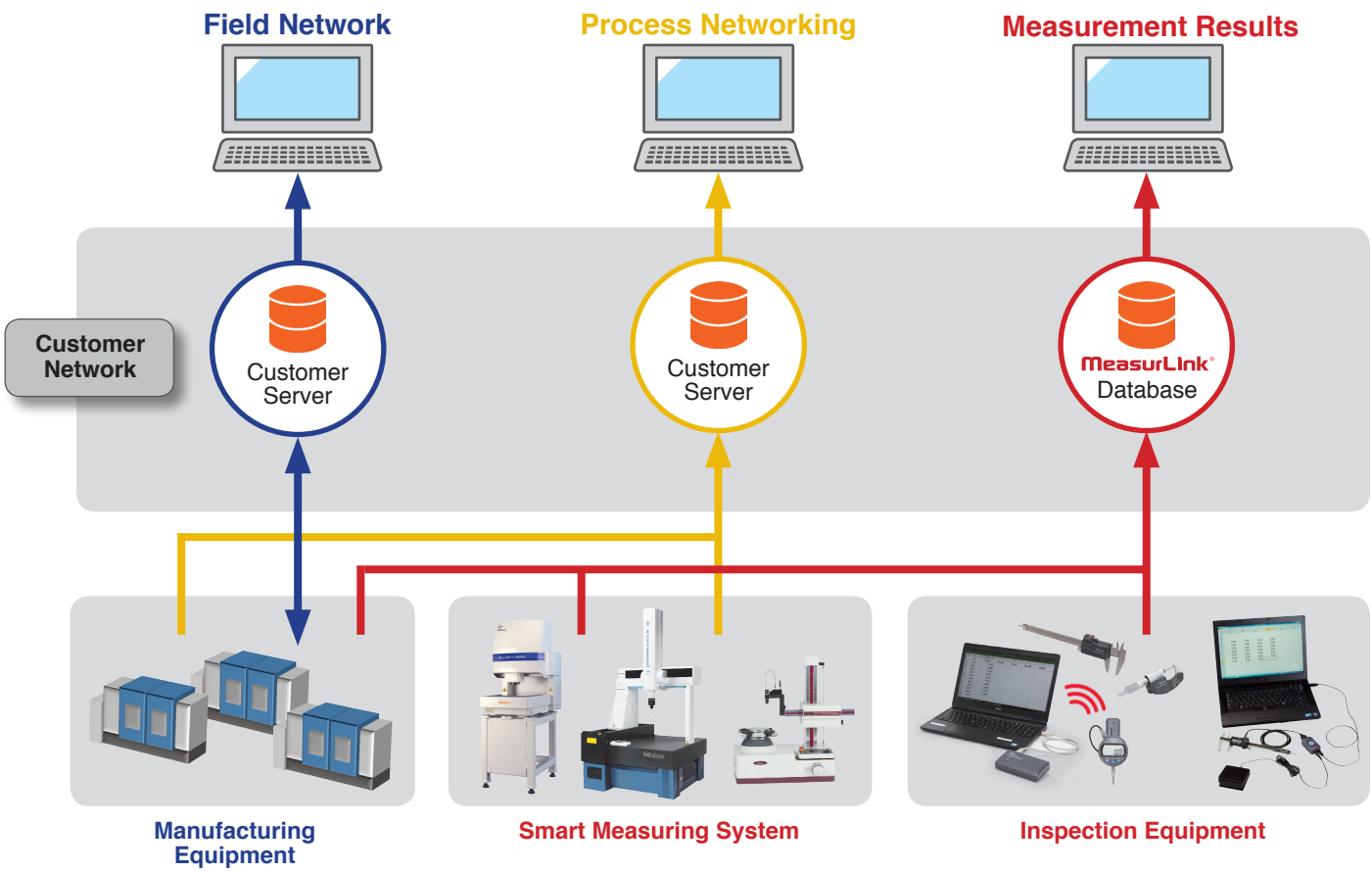
As manufacturing companies move toward implementing modern techniques such as Industrial IoT and Statistical Process Control, many companies find integrating measurement data collection into their network can be difficult. Many questions arise, such as: what technology is available, which products are 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.

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.

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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.

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.

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.

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

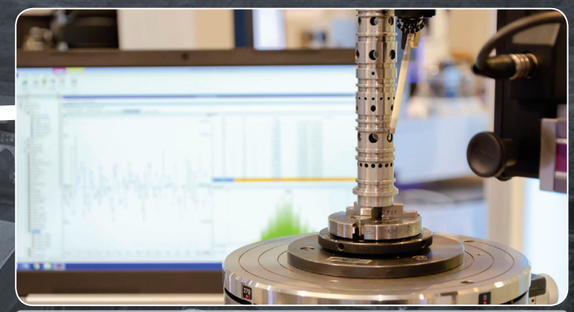
Factory View

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.

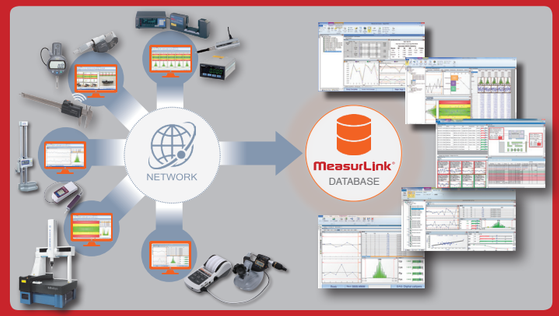
Inspection being performed at the point of manufacture. Sampling techniques based on capability reduce the time spent on inspection while still ensuring the quality of the product.

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.

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Reasons to Partner with Mitutoyo

M³ InnovaTion

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

Measure: Measure with precision
M2M: Machine-to-machine connection
Manage: 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.

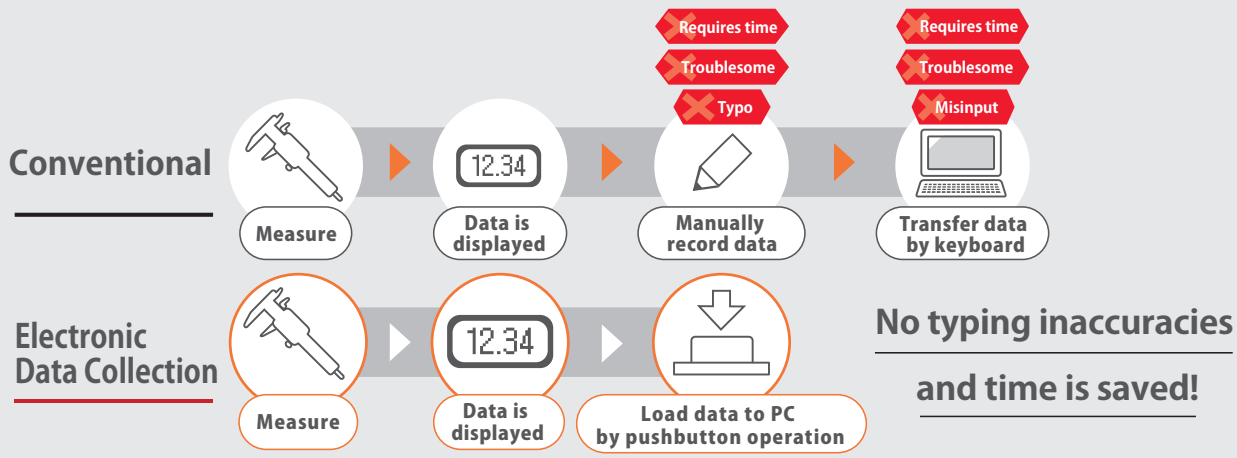
Issue

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.

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.

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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.

IP67

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

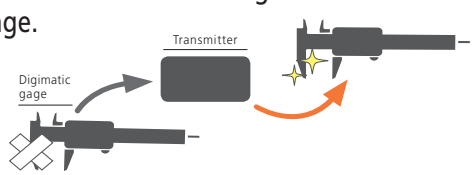
Mitutoyo's original wireless communication is based on IEEE802.15.4 for stability.

- 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

See How Gages, Hardware and Software all Connect Together

Select Gage

Digimatic gages

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.

Select Connector

USB ITN Direct

SPC Cable

Connecting cable

U-WAVE-T

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.

Select Interface

USB Input Tool

multiplexer

*Does not support ITPAK

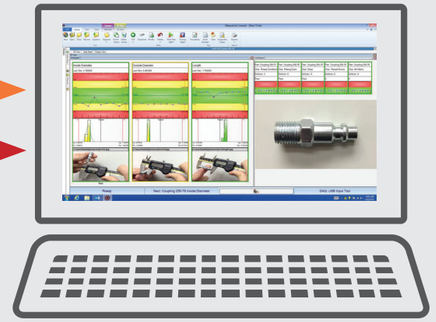
DP-1VA LOGGER

**Optional output to PC

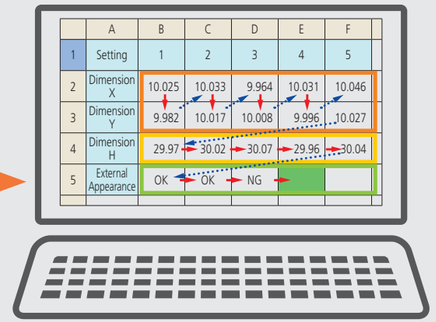
U-WAVE-R

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.

Select Software



MeasurLink®



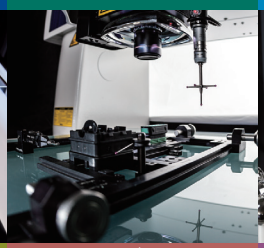
ITPAK

Spreadsheet

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®.

Coordinate Measuring Machines

Vision Measuring Systems



Form Measurement

Optical Measuring

Sensor Systems

Test Equipment and Seismometers

Digital Scale and DRO Systems

Small Tool Instruments and Date Management

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.

Find additional product literature and our product catalog

www.mitutoyo.com

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www.mitutoyo.com
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1-888-MITUTOYO (1-888-648-8869)

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