



Small Tool Instruments and Data Management

Measurement Data Network System MeasurLink



MeasurLink^(R) makes it possible to visualize product quality

Preventive Measures against Product Scrapping

All data from measuring tools and instruments connected to the network is collected in real time, allowing product failure prediction by implementing statistical process control.

Causal Analyses Enabled with Accumulated Data

Confirmation of measured results and various statistical analyses by accessing the database will strongly back up verification of problems.

Manufacturing







Data collection/Analysis module **MeasurLink Real-Time**

(Refer to P4 and P5 for details.)

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





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MeasurLink Data Collection/Analysis Software MeasurLink Real-Time

MeasurLink Real-time is the Statistical Process Control (SPC) MeasurLink module that collects data from Mitutoyo and thirdparty measuring devices and systems to provide analysis functionality in real-time by displaying control charts, histogram, 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 page 5.)

Real-Time Standard: Acquisition and analysis of measurement data in real-time. **Real-Time Professional:** Higher functionality with native Mitutoyo integration (DDE) connectivity. **Real-Time Professional 3D:** The full-spec version, able to display analysis results in 3D.

The Use of MeasurLink Real-Time-

• Allows prevention of product scrapping by implementing measurement data collection and statistical process control (SPC).

MeasurLink Real-Time common functions -

Various data views

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



• A wide choice of statistical analysis functions [Chart]

Measurement value: Xbar-R, Xbar-S, X-Rs, EWMA control charts, Histogram, Run chart, Pre-control chart, Tear chart, Box plot chart, Meter chart, Indicator bar, multivariate data control chart, etc. Countable number of value: p, np, c, u control charts, Pareto chart, and pie chart.

[Statistics]

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

Alarm function

The operator is notified when "Out of Tolerance" or "Out of Control Limit" occurs. The method of notification can be selected from a populu window.

selected from a pop-up window, e-mail (Fig.1), or log file recording.

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Fig.1 Alarm notification by E-mail

Report print out function

Measurement values, analysis calculation results and various charts can be arranged to output according to requirements.

Adding traceability information

Traceability information for each workpiece can be added, for example, serial no., rod 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 occurred.

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

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.

Mitutova

MeasurLink Real-Time Professional / Real-Time Professional 3D common functions

Automatic linking with part programs

Linking with software created in CMM or Vision Measuring Systems, data such as parts name; measurement item; target value; tolerance and more can be downloaded from a part program. MeasurLink parts information and inspection procedure are automatically created on the database.







Once storage is created, data is automatically saved in the database every time the part program is executed.

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 default format files (text files with the dedicated format for MeasurLink, Q-DAS files, etc.) can be loaded. Also, a feature to customize a template for loading according to the format is provided.

MeasurLink Real-Time Professional 3D functions

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 easily get a 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.

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

Functions		Data collection software					
		Real-Time Standard	Real-Time Professional	Real-Time Professional 3D			
Order No.		02NDB010C	02NDB011C	02NDB012C			
	Classic view						
Collected data display	Data sheet	•	•	•			
Collected data display	2D view	•	•	•			
	3D view (HOOPS)			•			
Data extract	Filter						
Input from tools and devices	Measuring tools (RS-232C, USB)		•	•			
	Measuring instruments (DDE)		•	•			
Text input Import							

MeasurLink common specifications

• Operating environments

(Recommended OS and DB)

[Operating System]

- Windows7 (32bit/64bit)
- Windows8.1 (32bit/64bit)
- (Microsoft Windows 8.1 RT edition is not supported) • Windows10 (32bit/64bit)
- (Microsoft Windows 10 Mobile and IoT edition are not supported)

[Data base]

Microsoft SQL Server 2014 Standard Edition Microsoft SQL Server 2014 Business Intelligence Edition Microsoft SQL Server 2014 Enterprise Edition Microsoft SQL Server 2012 Standard Edition Microsoft SQL Server 2012 Business Intelligence Edition Microsoft SQL Server 2012 Enterprise Edition

Microsoft SOL Server 2008 Standard Edition Microsoft SQL Server 2008 Enterprise Edition Microsoft SQL Server 2005 Workgroup Edition Microsoft SQL Server 2005 Standard Edition

Operation languages

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

MeasurLink Real-Time common specifications

- Connectable measuring instrument
- Measuring tools equipped with Digimatic output [Supported interfaces]

Wireless (USB) U-WAVE (VCP)

Wired (USB) USB-ITN (VCP or HID), IT-012U (HID), IT-016U Wired (D-sub 9 pin) IT-007R, MUX-10F, DP-1VR, and others Various RS-232C devices (partially restricted)

MeasurLink Real-Time Professional/Real-Time Professional 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 V5.3 or later
- Roundness instruments: ROUNDPAK V5.6 or later
- Hardness Testing Machines: AVPAK V2.0 or later

* The documentation supplied with this product is the Installation Manual. Refer to Online Help for information about how to operate the software.

Process Management for Administrators MeasurLink Process Manager

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

The Use of MeasurLink Process Manager-

• Allows prevention of product scrapping by real-time capture of production status on the shop floor.

Functions of MeasurLink Process Manager-

• Capability of real time monitoring of measurement results

This allows monitoring of current measurement results collected from all tools and instruments networked together. Measurement results can be checked without visiting the shop floor.

• Capability of early detection of an abnormal trend

This allows early detection of a trend toward process abnormality using tools such as control charts, histograms and process capability indexes as well as according to simple GO / NG judgments.



Detailed Functions of MeasurLink Process Manager -

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.







Global measured value view

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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 condition of an abnormal event (out-of-tolerance, etc.) for all current measurement data.

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[Events possible to be logged]

- Measurement start/termination
 Recollection / change of measurement
 data
- •Occurrence of outliers
- (Out-of-tolerance / out-of-control / run / trend, etc.)
- •Out-of-recognition cause
- •Change of process capability index (Acceptance to rejection / rejection to acceptance)

Plant view

Displays a process capability index for each measuring instrument on the plant layout drawing. This allows the administrator to visually grasp 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

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[Contents of call-out display]

- Station name (terminal name of each instrument)
 Inspection procedure (measuring procedure name for each part)
- Final revision date/time (data input time, etc.)
 Measured item information: Display of items for the specified number from top down
- (1) Inspection record file name *
- (2) Measured item name *
- (3) Process capability index *
- (Cp, Cpk, Pp, Ppk, etc.: two or more selectable) * Measured items can be sorted (in ascending or descending order).

Process Analysis module for Administrators MeasurLink Process Analyzer

MeasurLink Process Analyzer is a software package provided for administrators who are authorized to access the database stores measurement data collected by MeasurLink Real-time for the purpose of checking and analyzing measurement results. Two types of packages are made available: Process Analyzer Lite, the basic version; and the full-spec Process Analyzer Professional version. (see Table 1)

MeasurLink Process Analyzer Lite: A reasonable package for viewing the measurement data database. MeasurLink Process Analyzer Professional: A full-spec package that provides additional data check and analysis capability.

The Use of MeasurLink Process Analyzer -

• Confirmation of measurement results and various statistical analyses by access to the database will strongly back up verification of problems.

MeasurLink Process Analyzer common functions

Measurement data viewer function

Data stored in the MeasurLink database can be checked from a selected list.

• Display and output functions

The functions equivalent to MeasurLink Real-Time Standard are available, such as measurement result, statistical analysis result (charts and statistics), reporting, data export, and more.

Target data can be selected from the list of the Windows Explore type tree format and the measurement result and the statistical analysis result (charts and statistics) can be displayed.



MeasurLink Process Analyzer Professional functions

• 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.

(Xbar-R, for example).

Example) Filtering data by an operator name Displays statistical analysis result in charts

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Filtering item selection menu

Item selection for grouping

Example) Grouping by Machine No. Cp, Cpk comparison



Result of filtering in the chart

Cpk value and bar graph per machine

Table 1 Process Analyzer functional comparison (an option available for administrators)

Function		Process analysis software				
		Process Analyzer Lite	Process Analyzer Professional			
Order No.		02NDB013C	02NDB014C			
Result display	Classic SPC view					
	Data sheet		•			
	2D view					
Data extract	Filter					
Data processing	Data file merging, Copying, Editing		•			
Masking	Archive data					

Scatter plots

The relationship between two items can be plotted.



Various data processing capability

Files can be managed by merging, copying, and editing.

Also, the data archive allows hiding the old archived data from the Real-Time side.

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

This is evaluation and analysis software conforming to Measurement System Analysis (MSA) required in ISO/TS 16949.

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.

The Use of MeasurLink Gage R&R-

• Allows evaluation/analysis of a measurement system conforming to the MSA analysis method, thus implementing MSA evaluation easily and quickly.

Functions of MeasurLink Gage R&R

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. Measurement results, charts, and statistical calculation results are presented with the look and feel of Windows Explorer.

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Investigation type options

Evaluation method compliant with MSA (fourth edition)

The software can implement evaluation using the following methods

compliant with MSA (Measurement System Analysis).

- 1. Measured value tolerance gage R&R variance analysis method
- 2. Measured value tolerance gage R&R range&average method
- 3. Measured value branching gage R&R variance analysis method
- 4. Measured value branching gage R&R average&range method
- 5. Measured value range method
- 6. Measured value simplified method
- 7. Measured 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 R&R evaluation results are also linked with gage information, the schedule of gage R&R expiration 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 chart can be printed as a report.



Gage Management Software MeasurLink Gage Management

This software can plan and implement a reliable calibration schedule with a powerful retrieval function in addition to recording and controlling the usage state of gages.

The Use of MeasurLink Gage Management-

- Allows simple recording of gage usage state (operation, storage, calibration, gage R&R, repair, out-ofservice) to speedily grasp the current location and state of all gages.
- Allows all common gage information to be viewed from all networked terminals in which this network-compatible software has been installed.
- Allows sharing of gage information between each software package in linkage with MeasurLink Gage R&R.

Functions of MeasurLink Gage Management

• Creation of a list of calibration-targeted gages from the gage administration 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 run of calibration procedure

Allows simple registration of calibration procedure of each gage and implementation of its calibration.



• 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 calibration history of gages.





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Display of detailed gage information

Display of calibration history

Introduction of MeasurLink

Example of a Stand-alone System

Single measuring tool input

Company A: Inspection department

Workpiece: In-vehicle electronic product (molded cylindrical parts)

Measuring instrument: Digimatic Thickness Gage

Measuring locations: Outside diameter at 2 points

Purpose: • To check the condition of the mold (when the mold is worn, the diameter becomes enlarged).

To calculate the control limits for the initial run (calculates per 30 pieces).

Background: SPC is requested when the production of parts is started.



Example of a Networked System

Multiple CMM input

• Company B: Quality control department

Workpiece: Aluminum die-cast products; cylinder block or transmission casing for vehicle Measuring instrument: CNC CMM, 4 units

Purpose: • To analyze error trends and feedback to the process.

• To report the process capability index to the client when there is a change of facility or materials.

Operation and effectiveness: • A database server consolidates all the part programs and measurement data.

- Same measurement can be performed with any machines in the system, and all the data management can be unified.
- Since there are multiple machines in the system, the operator can start measurement with any of the available machines.



 \ast For networked applications a Microsoft SQL Server is required.



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 up 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 bespoke 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 catalogue

http://www.mitutoyo.co.jp/global.html

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