# Mitutoyo

**MeasurLink®**
An Integrated Solution for Quality Data Management

**M³ InnovaTion**

# MEASURLINK® 9 REAL-TIME SPC SOFTWARE

MeasurLink® Version 9 is an easy-to-use, data collection and real-time statistical process control suite.

![MeasurLink - An Integrated Solution for Quality Data Management]

NETWORK

MeasurLink® DATABASE

**THE BIG PICTURE**

# Scalable Data Acquisition, Management & Analysis

Mitutoyo has been developing MeasurLink® and serving manufacturing quality programs for more than twenty years. It represents the design input of industry experts and thousands of manufacturers across the globe. It is quality inspection, management and analysis software built on a technology platform for the most robust performance and reliability. MeasurLink can serve the smallest shop to the largest multi-national enterprise with the most ease of use and power available in SPC software today. It is designed with Industry 4.0 and Smart Factory in mind and provides the scalability, extensibility and interoperability you need in your future factory!
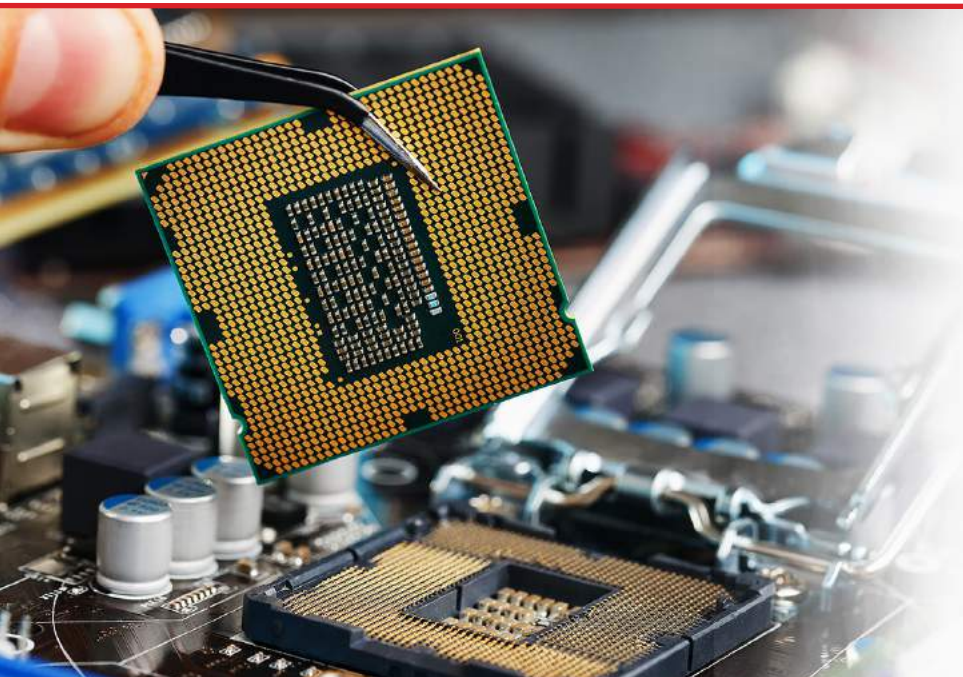
**ELECTRONICS INDUSTRY**

## Lot Acceptance

Lot inspection and acceptance allows manufacturers to assess the quality of the batches of components received and predict the quality of similar batches. This approach allows users to reduce the amount of samples that needs to be inspected. MeasurLink supports this activity by providing real-time statistics such as Cpk and Ppk. This approach allows:

✓ Reduced cost of receiving inspection
✓ Increased confidence in supplier quality
✓ Faster reaction to supplier quality issues
✓ Less risk of supplier defects impacting other processes

# DATA MANAGEMENT FOR SMART FACTORIES

Mitutoyo

MeasurLink® is Mitutoyo's data collection and Statistical Process Control (SPC) software solution.
It is the ideal solution to automate and centralize data collection, analyze inspection data,
measure processes, reduce scrap and improve customer relations.

## Why Our Products Are Leading The Way

MeasurLink combines Real-Time on-line data collection with Real-Time SPC charts and analysis for operators, and Real-Time Quality Control/Supervisor Reports and Alerts for your entire manufacturing system. MeasurLink is designed for integrated networks to create a quality information sharing system which includes a comprehensive metrology solution for your company. Assemble a software package from any of the MeasurLink® modules to satisfy your organization's specific needs.

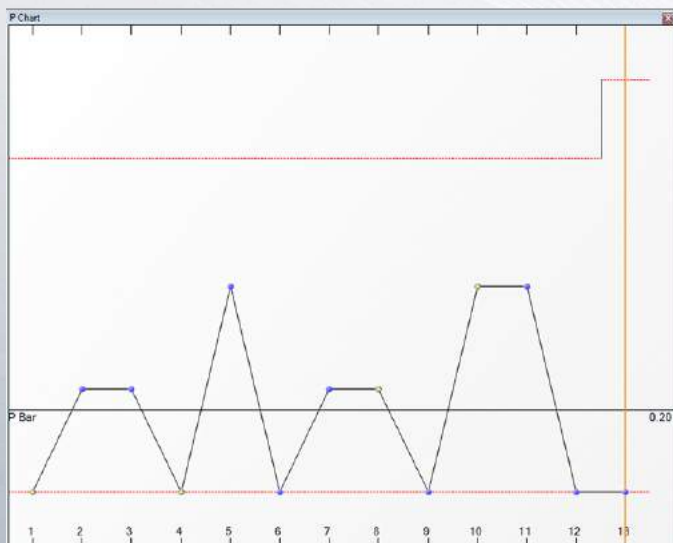Ensure part quality and consistency

Increase data visibility and accessibility

Increase ease of use for inspectors in all environments

Reduce manufacturing defects through the use of real-time SPC

THE ADVANTAGES OF
## Attributes - P Count

The most commonly used attribute control chart is the p chart. The p chart is used specifically to control the fraction or proportion non-conforming. The fraction non-conforming is the ratio or the quantity non-conforming divided by the quantity of parts. The p chart is used for several reasons:

✓ On processes that use go no-go gaging such as plug gages, ring gages and functional gages.
✓ In inspection areas to monitor or control the fraction non-conforming from the shop or supplier.
✓ In situations where visual inspection is performed.
✓ Other attribute situations where the fraction (or proportion) non-conforming requires control.
✓ Attribute Inspection where sample size varies.

# Real-Time Standard

MeasurLink Real-Time Standard Edition is designed for customers who want to acquire and analyze data in real-time and check variable and attribute inspection to maximize production and minimize defects. It has views to allow the user to create Parts, Characteristics with nominal and tolerance and Traceability lists.

Designed to collect data at the point of manufacture, operators can be alerted of trends, cycles, and nonconformance as soon as they occur. A customizable user interface allows the user nearly infinite ways to view information specific to that process. MeasurLink Real-Time has the ability to connect and acquire data from virtually any measuring device. It supports the full range of metrology technology, including calipers, micrometers, indicators, CMMs, vision systems and more.
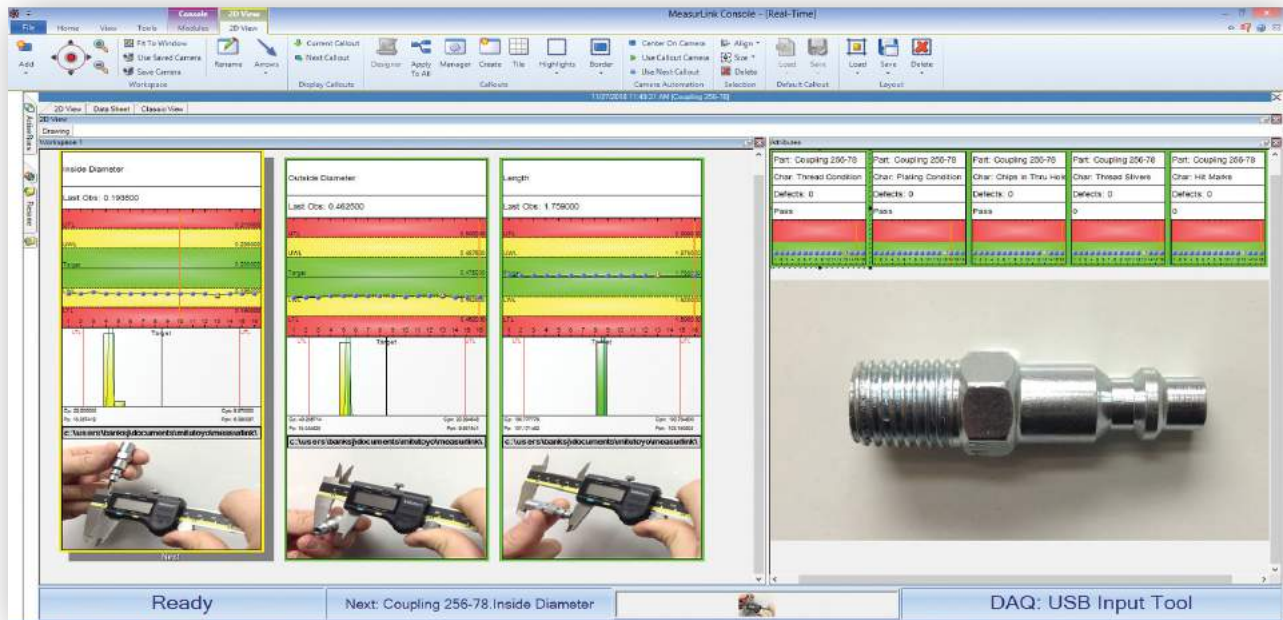
GENERAL MANUFACTURING
## Statistical Process Control

MeasurLink® is a integral part of Six Sigma activities. Unlike other software, MeasurLink® calculates and monitors statistical metrics as each part is measured. This Real-Time monitoring allows users to control the quality of the product during production and prevent costly defects

✓ Live statistical data testing
✓ Email alerts and alarms for out-of-control processes
✓ Real time Cp, Cpk, Pp and Ppk calculations
✓ Immediate pre-control, X-Bar R and IMR charting
✓ Assignable cause and corrective action data entry

MeasurLink® allows companies to control the quality of their processes by identifying and reducing process variation.

# Features & Benefits

✓**User Friendly**

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

✓**Part Pictures**

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

✓**Comprehensive SPC**

Easy-to-use Control Charts, Histograms, Capability, Detailed statistics, Assignable Causes, Corrective Actions, and Traceability all make this software "best in class".

✓**Variable Collection Frequency**

Allows characteristics of the same routine to be measured at different intervals while maintaining appropriate prompted guided sequencing.

✓**Multimedia Aids**

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

✓**Revision History**

Track specification adjustments and preserve historical data.

✓**Data Acquisition and Input**

Collects data from digital micrometers, calipers, indicators, bore gages, etc. Keyboard entry is a snap. Collect data for one or a million parts. Begin collecting data in 60 seconds with a "Quick Run" by defining features, tolerances and input method. Flexible data input. Collect data by feature, by part or randomly. Guided sequencing minimizes inspection errors.

✓**Mixed and Attribute Variable Data**

Collect dimensional data (length, width, height, outside diameter, inside diameter weight, etc.). Supports derived features (calculations for run out, volume, true position, etc.) Mix your dimensions and non conformances in the same Inspection Routine. Track defects and defectives along with your dimensional data. Collect data from visual inspections (burrs, cracks, dents, missing holes, etc.) to determine the fitness of a part. Track failures using a go/no-go style or count the defects on a characteristic to determine if a part is defective. There is complete flexibility to study the individual characteristics and as a group of them, too.

✓**Crystal and Flexible Reporting**

Create your own customized Crystal Reports for use with Part or Run data. Build report templates with company logos and free form text. Select and position chart types to customer specification.

✓**Engineering Specifications**

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

✓**Data Tests**

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

✓**Time Stamped Data**

All observation data is marked with the data and time from the computer clock.

✓**Corrective Plans**

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

✓**Forced Assignable Cause**

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

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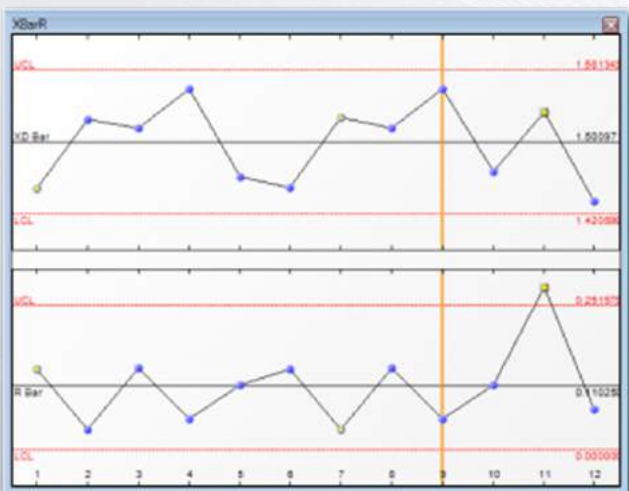


THE ADVANTAGES OF

## Control Charts

These charts are particularly helpful for machine dominant processes. The X-bar (mean) chart tells when a change has occurred in central tendency. This might be due to such factors as tool wear, a gradual increase in temperature, a new batch of material of greater toughness, or a different method by a night-shift workman. In looking for causes when an R (range) chart is out of control, look for poor repair or poor maintenance if this is a machine controlled process. Look for new operators or something disturbing the operators if this is an operator controlled process.

# Real-Time Professional

MeasurLink Real-Time Professional Edition enables customers to connect and acquire data from Mitutoyo Coordinate Measuring Machines, Vision and Form Measuring Systems via native integration (DDE).

In addition to all of the features supported by MeasurLink Real-Time Standard Edition, this application also supports data filters. Full reporting functionality with templates is also provided. Supported data sources include keyboard, RS232 and USB devices, native Mitutoyo integration (DDE) ASCII and QMD (xml-based) file import. MeasurLink also supports the Quality Information Framework (QIF) through the import of QIF Plans and the export of QIF Results and Statistics.

## Additional Features & Benefits

✓**Import Templates**

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

✓**Import Data**

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

✓**Data Transfer**

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

✓**Data Filter**

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

**CMM**

**AEROSPACE INDUSTRY**

## AS9100 Conformance

AS9100 requires a great focus on establishing and complying with design requirements. MeasurLink uses a Part, Routine and Characteristic structure that allows users to build and maintain a system to ensure the customer's design requirements are being inspected and held to conformance.

AS9102 describes the details for first article inspection while AS9103 defines the expectations for statistical process control. Multiple Routines, or the use of Variable Inspection Frequency along with Real-Time SPC, allows the user to ensure these inspection requirements are met.

# Real-Time Professional 3D

MeasurLink Real-Time Professional 3D Edition is designed for customers who wish to collect data using the Hoops 3D graphics view, in addition to all features offered by MeasurLink Real-Time Professional Edition.

Hoops 3D files can be exported from most CAD systems and provides the operator with a real view of the part. Camera angle and position can be saved for each characteristic providing for an intuitive prompted guided sequencing for the inspector. Supported data sources include keyboard, RS232, and USB devices, native Mitutoyo integration (DDE) ASCII and QMD (xml-based) file import.

## Additional Features & Benefits

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

✓**Flexible Callout Design**
Callouts provide part acceptability at a glance. You can design them the same way as the two-dimensional view to include charts or statistical information with the ability to size any element inside the callout.

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



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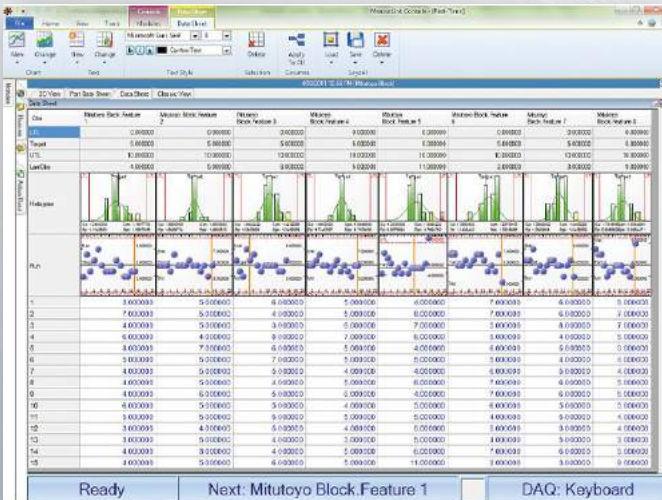
THE ADVANTAGES OF
# Observations

At the heart of any quality program is the collection of data. Whether through 100% inspection or a formal sampling plan, it is the observation data that drives all evaluations of conformance of "as manufactured" to "as designed" dimensions. Observation data drives the statistics, the control charts, the run charts, the histograms…everything.

Each observation measures one or more properties (such as size, location, weight, etc.) of observable characteristics distinguished as independent variables.

✓ The Observation Chart shows the actual data values, their data/time stamp, and the subgroup the data is in. The Data Sheet organizes the observations per characteristic. These windows provide the operator with easy editing (if allowed).

# Process Analyzer Professional

Analyze data collected on all networked Real-Time stations to identify problem areas, take corrective action, and improve the quality of your product. Inspection data can be merged, filtered, charted and printed to identify long term trends and identify root causes for process improvement.

Process Analyzer Professional Edition is designed for viewing and manipulation of Real-Time data in a networked environment. It enables Quality Engineering to slice and dice data in meaningful ways that contribute to quality control initiatives.

## Features & Benefits

✓**Review Inspection Data**

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

✓**Switch between Databases**

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

✓**Group, Search and Sort Data**

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

✓**Merge Data**

Combine lot based or just-in-time collected data to get a bigger picture of process variation and production quality. One option available for merging is to align data by serial number.
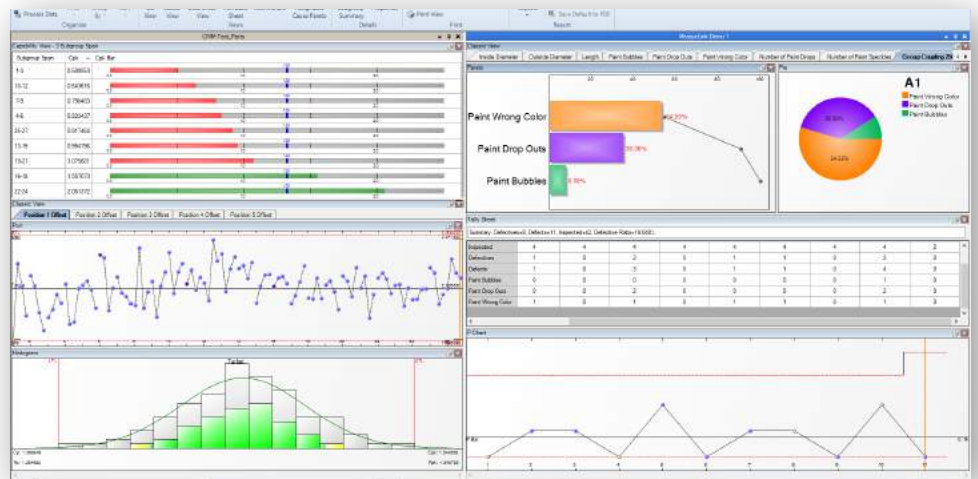
✓**Support FDA Requirements**
✓**Summary Analysis**
✓**Tree Control Navigation**
✓**Reporting**

✓**Scatter Plots**
✓**Filter Data**
✓**Compare Capability to Traceability**

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AUTOMOTIVE INDUSTRY

## Continuous Improvement

Continuous Improvement activity is nonstop in automotive facilities locally and globally. Constantly improving your process will not only improve the quality of your products, it will also save you money. By having more efficient processes, customer satisfaction will also improve. Use MeasurLink to:

✓ Reduce scrap
✓ Prevent non-conformities
✓ Reduce cycle time
✓ Improve tool life accuracy

# Process Manager Professional

Monitor data as it is collected in Real-Time. Process Manager provides managers with the perfect tool to organize and maintain a shop-wide quality program at a glance. Display snapshot windows of characteristics that are currently being collected in MeasurLink Real-Time. The data can be sorted by inspection station, capability or timestamp.

Easily see process information without walking from one inspection area to another by viewing current production across all machines. Show clients your quality operation for the entire facility.

## Features & Benefits

**✓Log View**

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

**✓Plant View**

Allows users the highest level view of their shop floor processes. Callouts have a meaningful border color related to tests for capability that have been enabled in each routine's properties.

**✓Group and Search and Sort Data**

View data by part, routine, station. Apply saved filters to data so you monitor only the data that you are responsible for.

**✓Ticker View**

Display capability values that continuously scroll on the screen.

**✓ Manager View**

Display a snapshot window of characteristics that are currently being collected in MeasurLink Real-Time. The data can be sorted by Station, Capability or Timestamp.
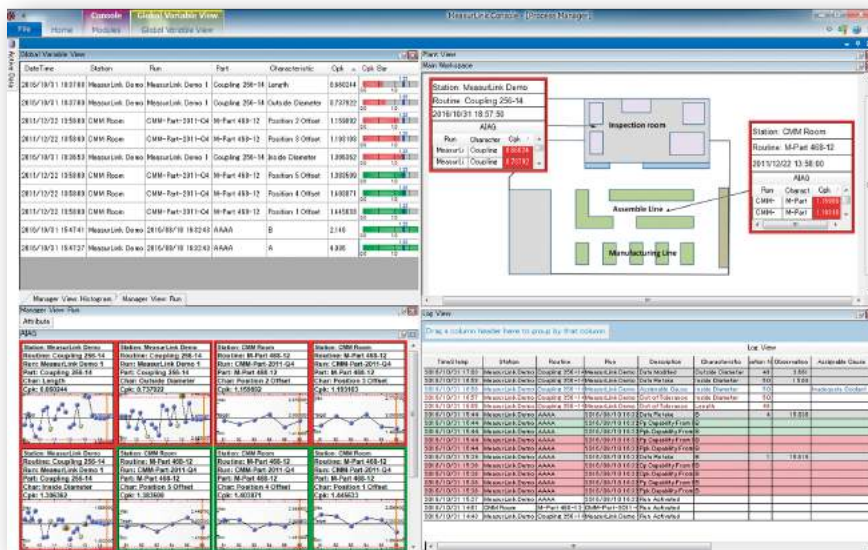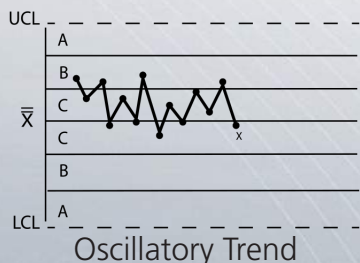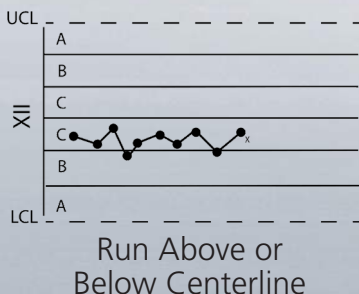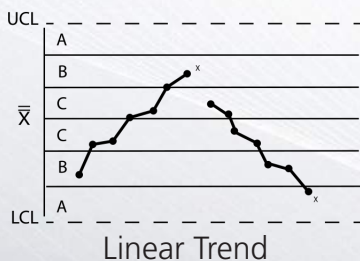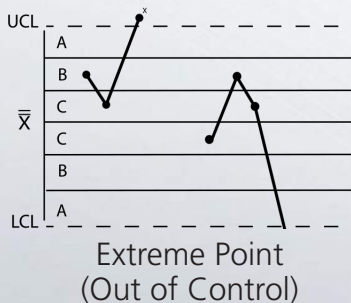


**✓Global Variable View**

Display process capability across all operations in your plant.

**✓Remote Viewing**

See what the operators see and what your customers will see before product is delivered.



Extreme Point
(Out of Control)



Linear Trend



Run Above or
Below Centerline



Oscillatory Trend

THE ADVANTAGES OF

## Statistical Data Tests

MeasurLink can check data, as it is received, for statistical patterns that indicate a change in randomness. A change in randomness can indicate that the manufacturing process has changed from its initial settings. The initial settings are designed to create the best Part possible, so when the system deviates from the initial settings operators and engineers can be alerted to bring the process back to optimum performance.

# Gage R&R Standard

MeasurLink Gage R&R Standard Edition is a collection of techniques whose purpose is to measure the capability of a measurement system for a measurement task.

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

## Features & Benefits

✓**Study Wizard**

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

✓**Data Input**

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

✓**Group Studies**

All studies in the database are visible and can be organized using different criteria.

✓**Randomized Collection Sequence**

As recommended by the academic community, the collection sequence can be automatically randomized.
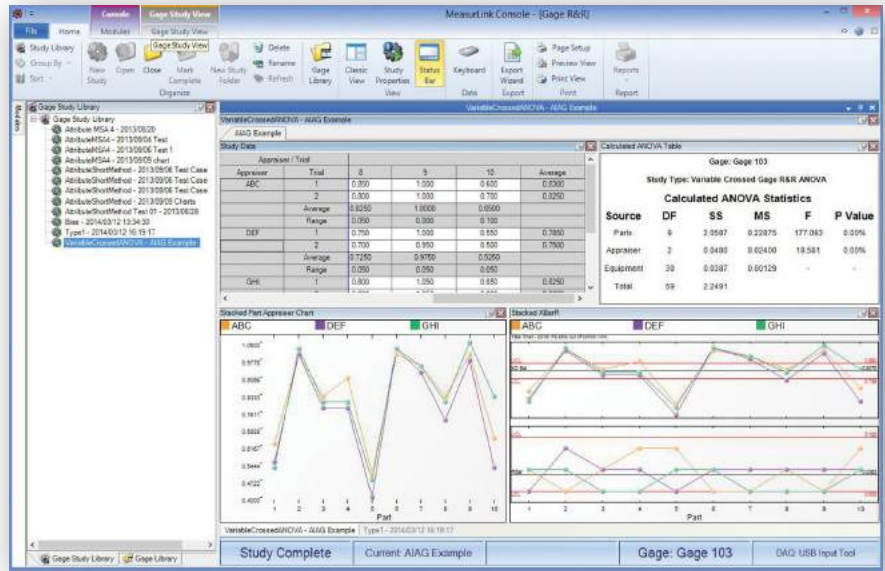


## ENERGY INDUSTRY
## Traceability

Traceability is information about a part that is important, but not a measurement. This information can be collected and used as criteria for filtering the data.

✓ Serial Number, Lot Number, Customer, Invoice, Order Fixture, Machine Line, Material type, etc

This information is just as important as the actual measurement data. Many energy components have a long life in use and retention and access to not only measurements, but traceability data that is necessary to ensure the component is up to the job. MeasurLink® data is easily retained and accessible to meet this need.

# Gage Management Standard

Gage Management Standard Edition provides a method for maintaining, organizing and managing information about gages.

Information such as measurement specifications, calibration recall dates, Gage R&R dates and general event history is provided in an intuitive user interface with complete reporting abilities. Calibration procedure setup is easy and flexible.

## Features & Benefits

✓**Gage Inventory**
Establish calibration standard and gage inventory. Build metrology asset database. Includes vendor, tolerance, range, owner, serial number, model number, etc.

✓**Calibration Procedures**
Generate calibration procedures with environmental conditions, instructions, gage block sequencing, etc.
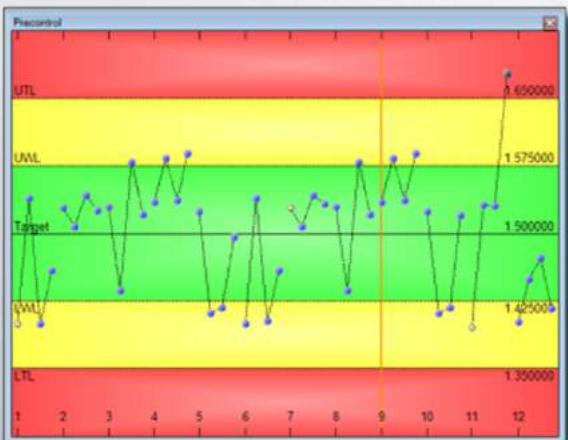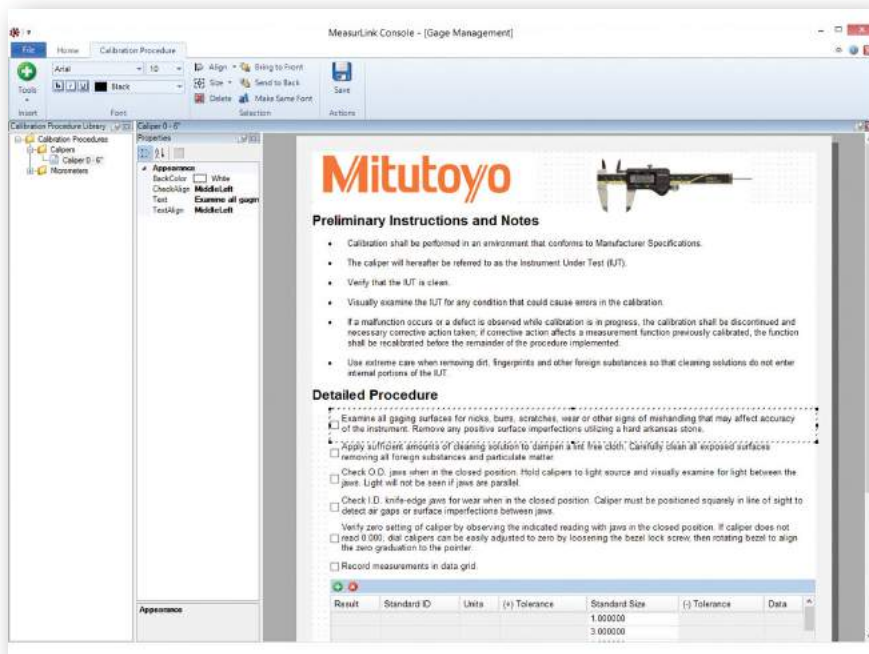
✓**Calibration Recall Reports**
View calibration due date or overdue report to collect gage

✓**Calibration Recall Reports**
View Gage R&R due date or overdue report to collect gages. Can be filtered based on various criteria.

✓ **Recall Reports**
View Gage R&R due date or overdue report to collect gages. Can be filtered based on various criteria.



### THE ADVANTAGES OF
## Run Charts

In many cases it is a good idea to start out by charting a process with this tool before applying a more powerful control chart. It will allow the user to remove inconsistencies that occur over time. A control chart might obscure some important information by averaging it out. The pre-control chart uses a technique known as "Stop Light Gaging" or "Zone Pre-Control".

✓ The green zone prompts the user to continue the run (within tolerance state) with the acceptable observations that fall within this region.

✓ The yellow zone prompts the operator to use caution (near out of tolerance state) and look for possible problem causes.

✓ The red zone prompts the operator to stop the run (out of tolerance state) and determine the cause before starting the process again.

# Report Scheduler Standard

Report Scheduler Standard Edition is a tool that provides automated report distribution from a Windows service environment. Create reporting tasks that will run on a given schedule.

## Features & Benefits

✓ **Destinations**

The reports can be printed, emailed, and exported in formats such as PDF. Multiple destinations can be assigned to a reporting task.

✓ **Assign Schedule**

Schedules can be defined on hourly, daily, weekly, monthly, and yearly intervals. Define a schedule and assign it to a report task.

✓ **View Reports**

Previewing the report allows validation of the output before scheduling the report task.
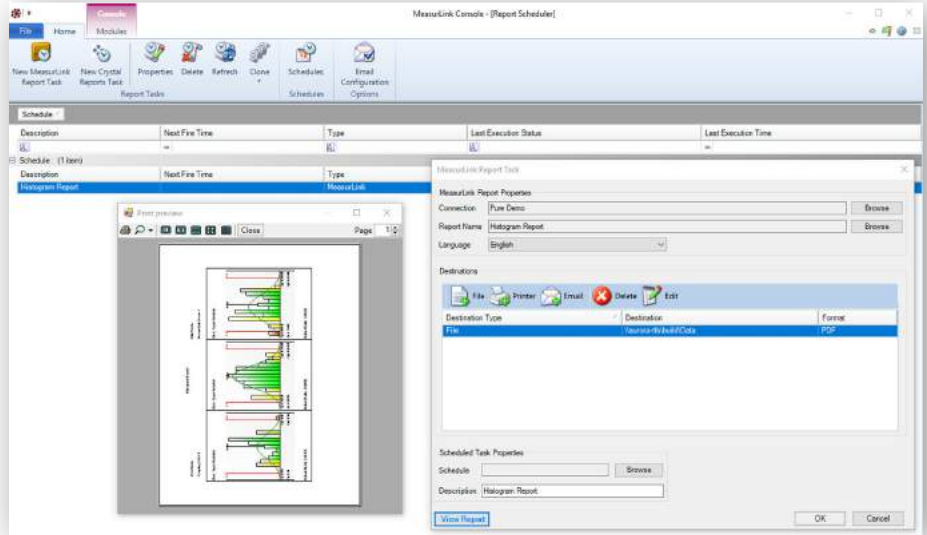


## Reporting Task Types

✓ **Crystal Reports**
Select a Crystal Reports template file and database connection to report on. Set values for parameters defined in template.

✓ **MeasurLink Reports**
Select a database connection, MeasurLink report template, run or feature run data to report on, and optionally select a filter to be applied to the data.

### MEDICAL INDUSTRY
## FDA Compliance

Part 11 applies to drug makers, medical device manufacturers, biotech and other FDA-regulated industries. It requires manufacturers implement controls including audits, system validations, audit trails, electronic signatures, and documentation for software and systems involved in processing the electronic data. MeasurLink implements strong support for these requirements. Some of the tools used in Part 11 Compliance are:

✓ Electronic signatures
✓ Audit trails
✓ Unique users and login credentials
✓ Software validation

# Support Center

Easily build up a library of parts and inspection routines with Support Center. The Support Center libraries are provided in order to prepare data collection for operators and inspectors. The libraries define what, where and how to inspect, as well as the option to track any information critical to the process such as material, temperature, lot number and machine line.

**DEFINE WHAT TO INSPECT**
## Part Library
Set names and tolerances for characteristics in each part to be inspected. Organize hundreds or thousands of part numbers in an easy-to-manage tree structure. The Part Library supports variable and attribute data as well as calculated measurements such as flatness, wall thickness, or area.

**DEFINE WHERE TO INSPECT**
## Device and Station Library
Manage all the inspection stations connected to the MeasurLink database. Choose from Mitutoyo devices such as U-Wave or USB Input Tool or add third party devices to collect measurement data with.

**DEFINE HOW TO INSPECT**
## Routine Library
Create an inspection routine of the entire part for Final Inspection or portions of parts for in-process inspection during different manufacturing operations. Set notification alerts, order of inspection, devices to use, and collection frequency at the click of a button.
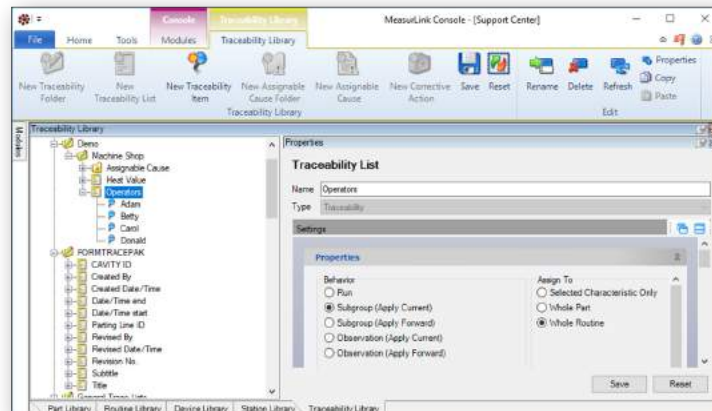
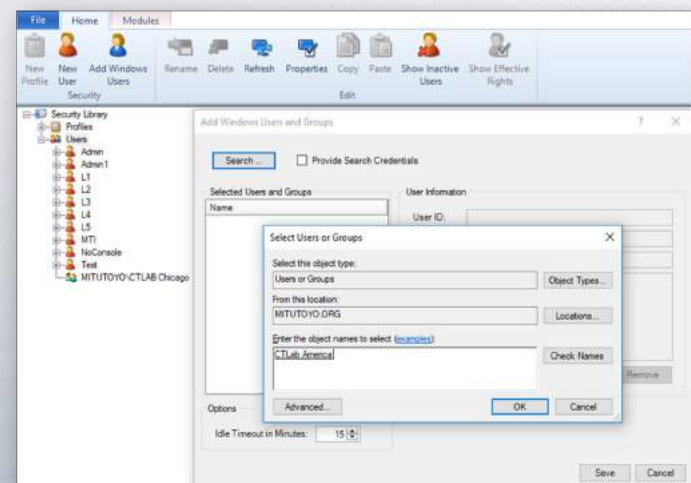**MORE THAN MEASUREMENTS**
## Traceability Library
Populate a list of items critical to the quality of product for robust root cause analysis. Track who, what, when, and where the measurement took place, why the issue occurred and how to fix it by assigning a cause and corrective action.
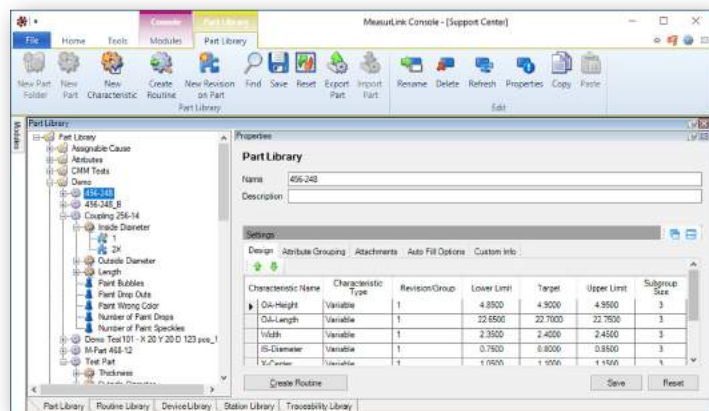

**Part Library**


**Traceability Library**


**Security Function**

## Security Center

Security Center will help manage the internal user community within the MeasurLink system. This snap-in provides a simple and efficient method of maintenance by allowing administrators the ability to manage differing levels of user permissions. Since Security Center contains only necessary management functions, it is easy to use even for those who infrequently need to access the snap-in.

## Windows Active Directory Support

The security function now includes support for Windows users and groups. Users can be exclusively controlled by domain administrators and with single sign-on capabilities, an authorized user will have the proper rights just by logging in to the computer and launching Real-Time.

# Product Licensing

MeasurLink ships with Microsoft SQL Server Express Edition and can be used on a single computer for single station data collection. For networked deployments Mitutoyo offers workgroup and site licensing options.

## Licensing Options*

✓**Site License**

MeasurLink Site License is a bundle package that provides the customer with the ability to install up to and including 30 copies (mixed and matched) of any applications in the MeasurLink suite. (Real-Time Professional 3D is not included).

✓ **Workgroup License**

Mix and match any licensed module to form a bundled package for increased flexibility and reduced cost-of-ownership. Workgroups come in packages of 5, 10, and 15. (Real-Time Professional 3D is not included).

✓**Floating Licence**

Users who want to use MeasurLink in a terminal server environment or want to have a number of concurrent users should consider the MeasurLink Floating License add-on for their Workgroup or Site License. Additionally, floating licenses give access to all licensed modules.

✓**Standalone Licence**

Any Real-Time Edition can be used on a single station to test a pilot cell, solve a specific application or monitor a critical line. Gage R&R module can be used on a standalone station to perform Gage R&R tests, or track gage inventory and calibration schedules with the Gage Management module.

✓**Academic Licence**

Mitutoyo is committed to Research and Development and Workforce Training and promotes the use of MeasurLink in Research and Educational institutions with discounted packages.

*Support Center and Security Center are included with any license purchase

## Floating License Server

5 license example: 3 users logged in, 2 still available



License Server

License File

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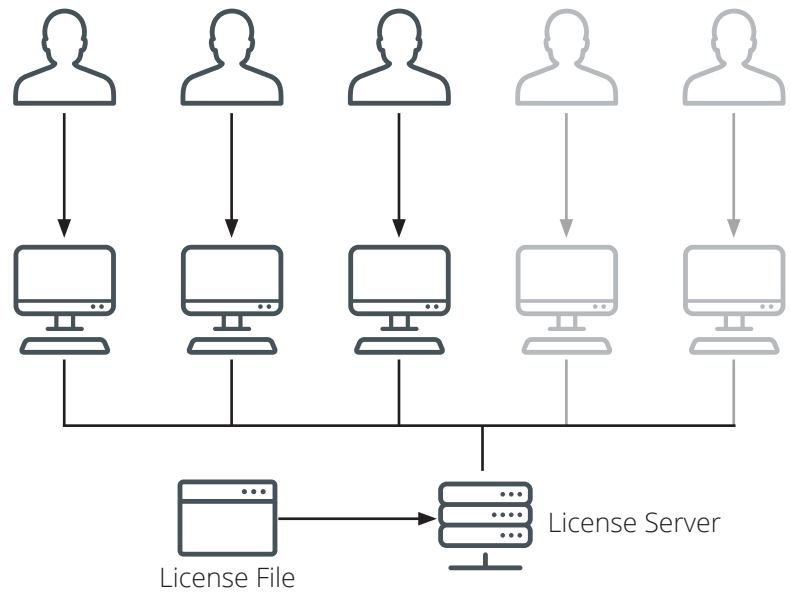
PLASTICS INDUSTRY

## Analysis of Measurement Data

Measurement data is only useful if it can be found when it is needed. Manufacturers need instant access to data regardless of when or where it was measured. MeasurLink® Process Analyzer meets the analytical and reporting needs of manufacturers.

✓ Filter data by traceability items

✓ Merge data from other Lots or processes

✓ Generate reports on current or historical data

✓ Summary reports allow complex review of large amounts of data

✓ Multivariate charting allows analysis of correlation

✓ Access data from any workstation in system, across the room or anywhere on your network

# MeasurLink® 9

| Description | Part No | Upgrade No |
|---|---|---|
| **Individual Licenses** | | |
| REAL-TIME STANDARD V9 | 64AAB606 | 64AAB606-U |
| REAL-TIME PROFESSIONAL V9 | 64AAB607 | 64AAB607-U |
| REAL-TIME PROFESSIONAL 3D V9 | 64AAB608 | 64AAB608-U |
| PROCESS ANALYZER PROFESSIONAL V9 | 64AAB609 | 64AAB609-U |
| PROCESS MANAGER V9 | 64AAB610 | 64AAB610-U |
| GAGE R&R V9 | 64AAB611 | 64AAB611-U |
| GAGE MANAGEMENT V9 | 64AAB612 | 64AAB612-U |
| REPORT SCHEDULER V9 | 64AAB613 | 64AAB613-U |
| **Workgroup & Site Licenses** | | |
| WORKGROUP LICENSE V9, 5 LICENSES | 64AAB618 | 64AAB618-U |
| WORKGROUP LICENSE V9, 10 LICENSES | 64AAB617 | 64AAB617-U |
| WORKGROUP LICENSE V9, 15 LICENSES | 64AAB615 | 64AAB615-U |
| SITE LICENSE V9, 30 LICENSES | 64AAB614 | 64AAB614-U |
| ADDITIONAL SITE LICENSE V9, 1 LICENSE AFTER 30 LICENSES | 64AAB616 | 64AAB616-U |
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## COLLECT
## UNIFY
## ANALYZE
## VISUALIZE
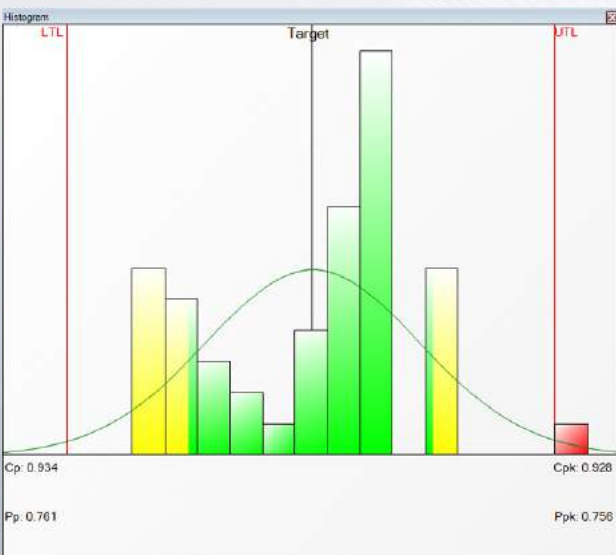
THE ADVANTAGES OF
# Histograms

The histogram is not a chart, it is a frequency distribution. The histogram is the most popular frequency distribution method in use today.

Coupled with specification limits, it can tell the operator a lot about a process. The histogram gets its name from the fact that it displays historical information. The frequency distribution is plotted as side by side columns, each having equal width.

The frequency histogram is a very effective graphical and easily interpreted method for summarizing the collected data and shows the dispersion of the process. It provides information about: the average (mean) of the data, the variation present in the data, the pattern of variation and whether the process is within specifications.

## Database Management System (DBMS) Requirements

- Microsoft® SQL Server 2014 Standard and Enterprise Editions
- Microsoft® SQL Server 2016 Standard and Enterprise Editions
- Microsoft® SQL Server 2017 Standard and Enterprise Editions

## Operating System Requirements

- All Windows® 8 Versions (except RT)
- All Windows® 10 Versions (except Mobile or IoT)
- Both 32-bit and 64-bit operating systems supported

## Hardware Requirements

- 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor
- 4 gigabytes (GB) RAM 32-bit or 8 gigabytes (GB) RAM 64-bit
- 16 GB available hard disk space (32-bit) or 20 GB available hard disk space (64-bit)
- DirectX 9 graphics device with WDDM 1.0 or higher driver
- DVD-ROM drive (Optional)

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