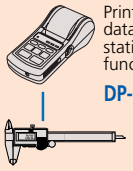
Examples of Measuring System Construction

The following introduces system construction examples in which the measurement results from various Mitutoyo measuring instruments are recorded and integrated as quality information.

Construction Step 1

- **When recording measurement results:**

To avoid handwriting

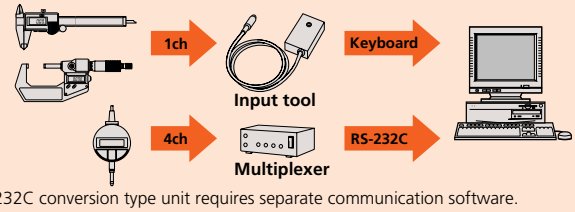


Prints out measurement data easily, providing the statistical calculation function.

DP-1VR P19

To input data to a PC

A keyboard signal conversion type Input tool can input measurement data directly in spreadsheet software such as Excel.



RS-232C conversion type unit requires separate communication software.

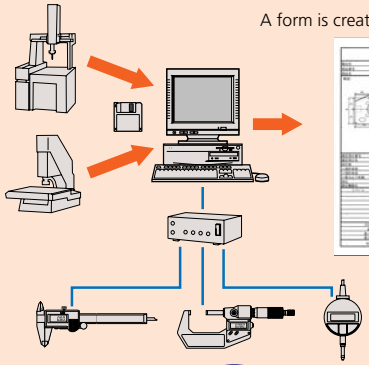
Input tool series P23 Multiplexer MUX-10F P23

Construction Step 2

- **When requiring the packaged software dedicated to inspection and quality control:**

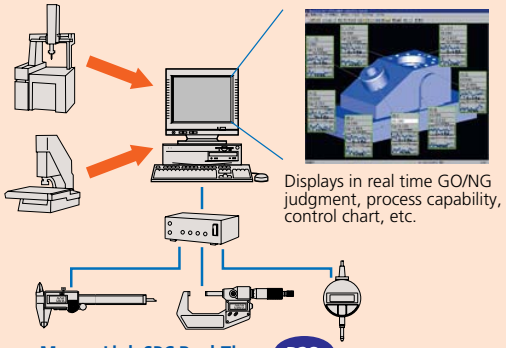
To perform statistical process control

A form is created freely with Excel.



MeasureReport P24

To perform statistical process control



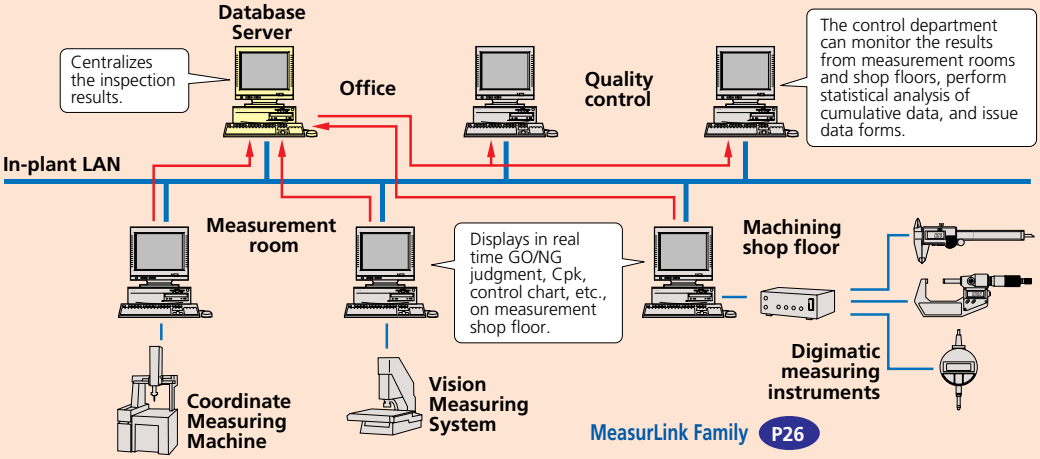
Displays in real time GO/NG judgment, process capability, control chart, etc.

MeasurLink SPC Real-Time P28
MeasurLink SPC Real-Time PLUS P28

Construction Step 3

- **When networking quality information dispersed in factories:**

To centralize and share the quality information of measurement results

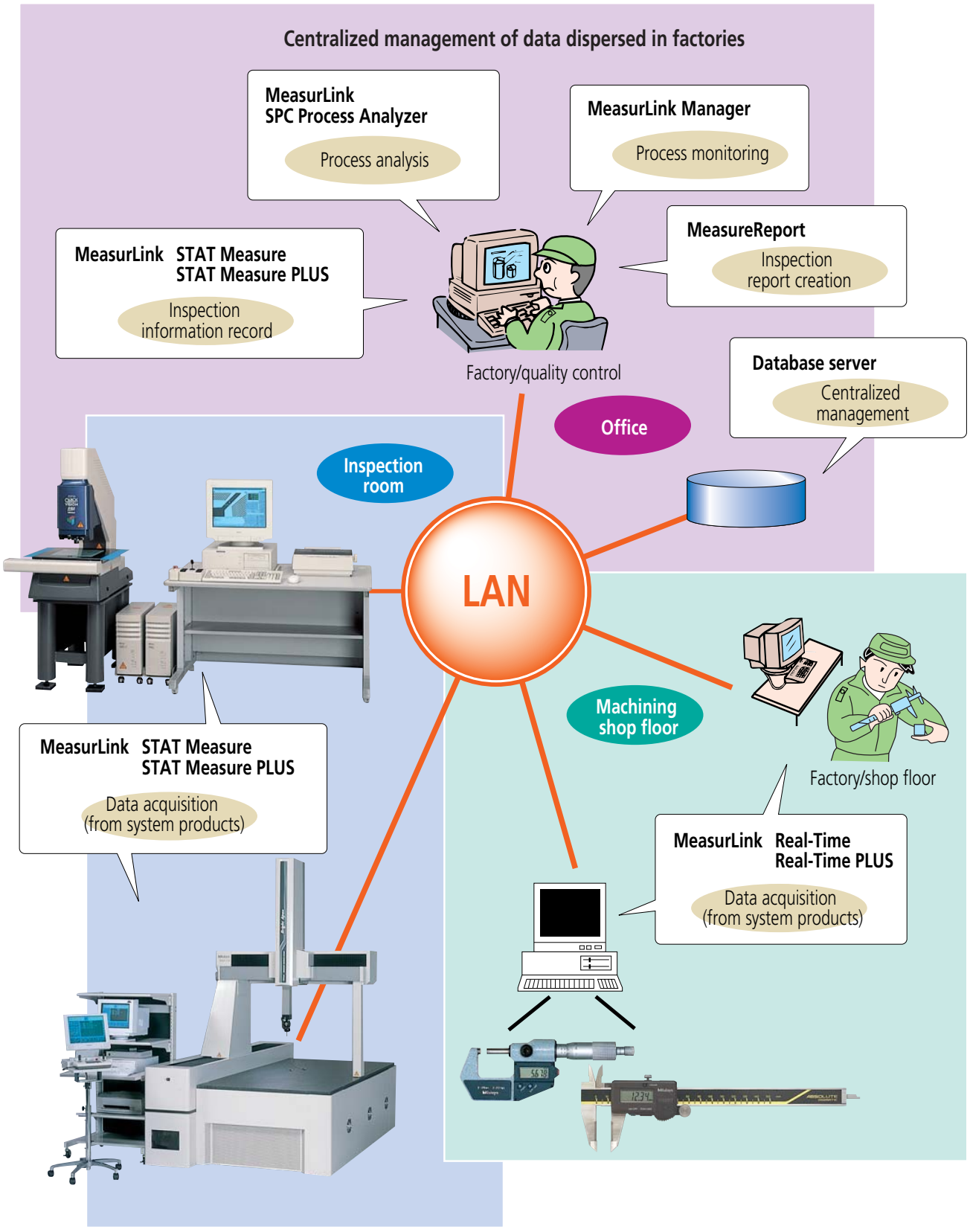


MeasurLink Family P26

MeasurLink Family

Measurement Data Network System

Data Centralized Management by Measurement Networking

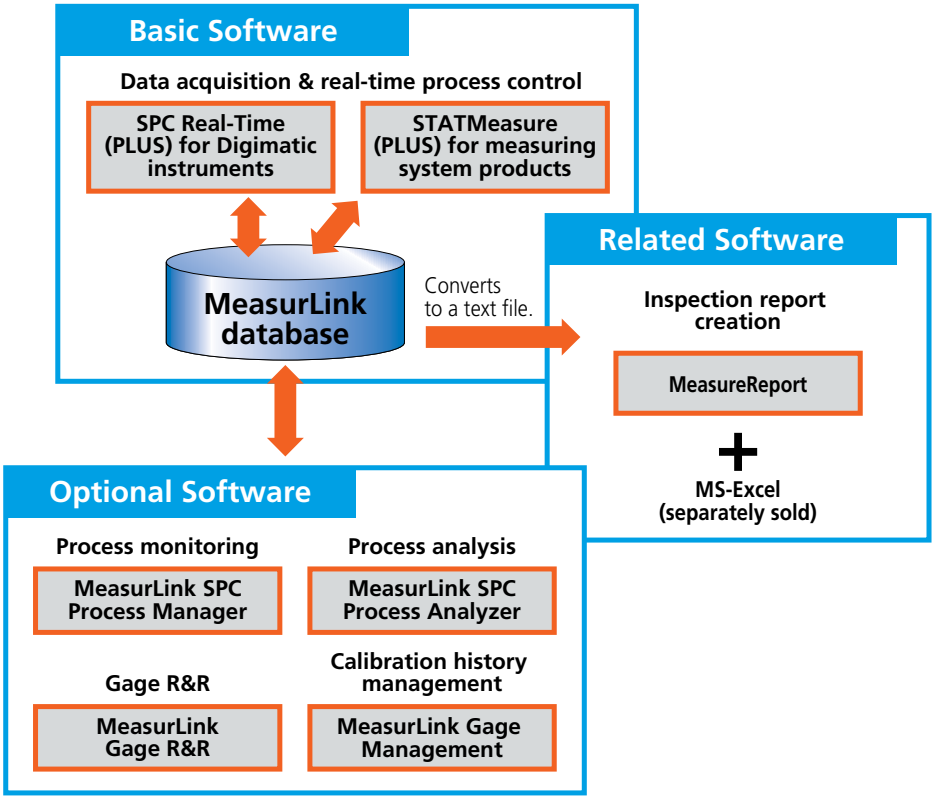


MeasurLink Package Configuration

The Measurlink Quality Management Software combines real-time data acquisition, on-line SPC analysis, integrated networking, and quality information sharing into a comprehensive solution for your company. The Measurlink family consists of a number of different software modules that allow users to determine the level of depth they want in a quality management system. Starting with a Real-Time package, users can acquire and analyse data in real-time and check variable, attribute and short-run inspection to maximise production and minimise defects. Other Measurlink packages allow for management of the manufacturing process, process analysis, gauge management, gauge repeatability and reproducibility, gauge tracking and statistical analysis.

	Package name
Basic software	MeasurLink SPC Real-Time (PLUS) (for Digimatic instruments)
	MeasurLink STATMeasure (PLUS) (for measuring system products)
Optional software	MeasurLink SPC Process Manager (for process monitoring)
	MeasurLink SPC Process Analyzer (for process analysis)
	MeasurLink Gage R&R (for gage R&R calculation)
	MeasurLink Gage Management (for calibration history management)
Related software	MeasureReport (for inspection report creation)

Note: Database software is separately required for network construction.



MeasurLink SPC Real-Time (PLUS)

Real-time Process Control Program (for Digimatic Instruments)

MeasurLink STATMeasure (PLUS)

Real-time Process Control Program (for Measuring Instrument Products)

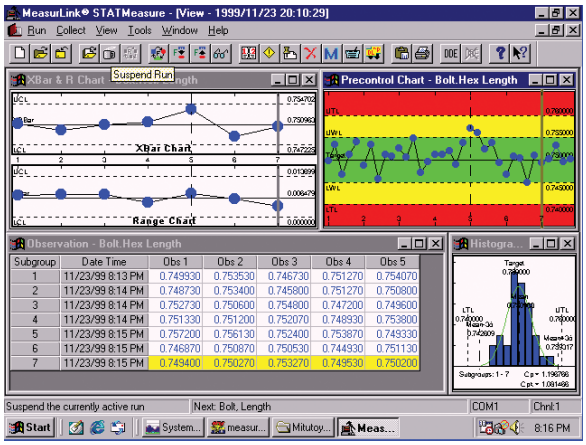
- This software performs data acquisition, registration, and real-time statistical processing.

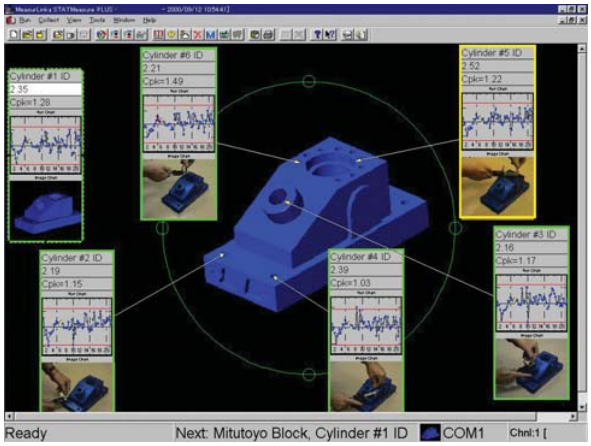
Recommended Operating Environments

*The specification in parentheses ( ) indicates that of servers.

OS	Windows95/98/NT4.0/2000
Database	Sybase SQL Anywhere*
CPU	Pentium II 266MHz (333MHz)
Memory	128MB or more
Hard disk	500MB or more (1GB or more)
Display	SVGA
Others	CD-ROM drive, keyboard, mouse**

* If used in a network, it is necessary to purchase the database license according to the number of servers and clients.
** If used in a network, the parts comprising the network environments such as LAN card, LAN cables and hub are required.





Visceral and user-friendly measurement screen

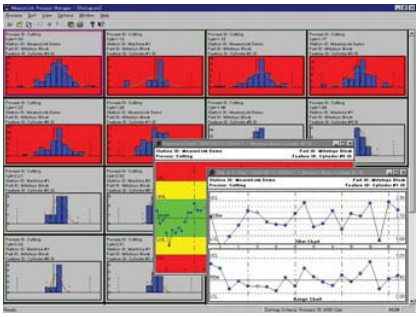
Major specifications

Control chart by indiscrete value		$\bar{X}$-R, $\bar{X}$-S, X-Rs, pre-control chart, histogram, dia-chart, run chart, short-run $\bar{X}$-R, short-run X-Rs
Control chart by discrete value		p, pn, c, u, Pareto diagram
Statistical calculation item		Mean, maximum value, minimum value, percent defective, standard deviation, Cp, Cpk, CR, CPL, CPU, Pp, Ppk, PR, $\bar{X}$, Rbar, mean±3s/4s/6s, PPM
Alarm function	Check item	Out-of-tolerance, out-of-control limit, luck, trend, vibration trend, various checks based on sigma, others
	Alarm level	Select one from among four levels, (1): none, (2): status bar setting display, (3): beep sound + (2), and (4): pop-up window + (3).
Item window display (for PLUS only)	Item information data	Part name, item name, measurement value, design value, upper limit value, lower limit value, sub-group No., sample No., revision No., process ID
	Result	Cp, Cpk, Pp, Ppk, standard deviation, $\bar{X}$, $\bar{R}$, MAX, MIN
	Chart	Select optionally from various control charts and meter charts, histogram, box whisker, indicator bar, and control indicator light.
Addition of part history/ process history information		Historical information about operator, machine tool, delivery destination, purchase destination, etc., can be registered and printed. This information can be used for analysis with "ML Analyzer".
Statistics report		• Report print function that can optionally mix charts and statistical values. • Integrated report print based on part in a fixed format.
Security function		The administrator can set the restrictions on operation range and read/write according to the content of user task.
File input/output		Input/output of text data
Applicable measuring instrument		• MeasurLink STATMeasure/STATMeasure PLUS compatible instruments (Digimatic measuring instruments and measuring system products) (1) Measuring instruments with Digimatic output (e.g. MUX-10F, IT-007R (2) Measuring instruments with RS-232C output (e.g. linear gage, laser scan micrometer, other companies' counters)* (3) Coordinate measuring machines (MICROPAK5000L, 2900/2, 11000, MCOSMOS) (4) Vision measuring systems (QVPAK 4.2 or newer, QSPAK 4.0 or newer) (5) Contour measuring instruments (FORMPAK1000, ROUNDPAK, SURFPAK) (6) Optical measuring instruments (MICROPAK9, QM-DATA 200) • MeasurLink SPC Real-Time/SPC Real-Time PLUS compatible instruments (Digimatic measuring instruments) (1) and (2) above are only applicable. * To connect these instruments, the communication specification must meet certain conditions.

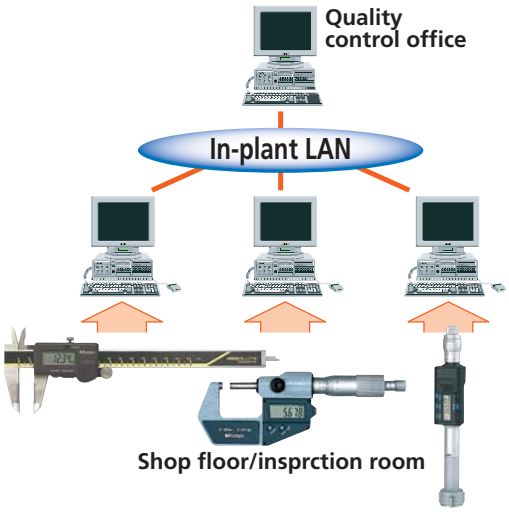
Optional Software

MeasurLink SPC Process Manager

Process Monitoring Program



Displays the list of entire process states to check process in detail.

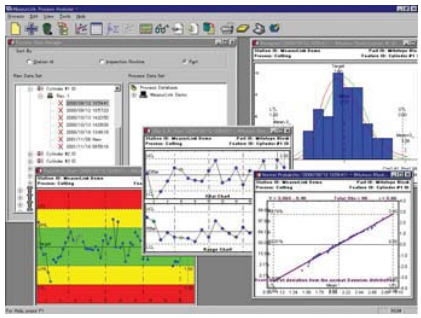


- This program can monitor each inspection process state on the network even in the QC office.
- This program quickly notifies the administrator of a problem that occurs in a process with the alarm function.

MeasurLink SPC Process Analyzer

Process Analysis Program

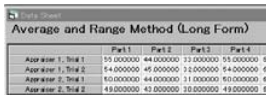
- This program supports verification of problems through various analyses according to historical information (such as environment, time, machine tool, and operator) about parts and processes using the database in which data has been acquired and accumulated by MeasurLink SPC.
- This program allows differential analysis under a specific condition with the filter function and grasp of long-term trend with the combination function.



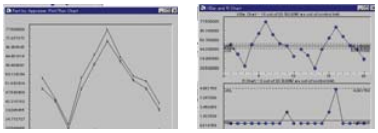
MeasurLink Gage R&R

Gage R&R Assessment Program

(1) Selection of an assessment method Select one from among seven assessment methods.
(2) Selection of trial conditions
Select the number of assessors, number of parts, and number of trial times.
(3) Measured data input



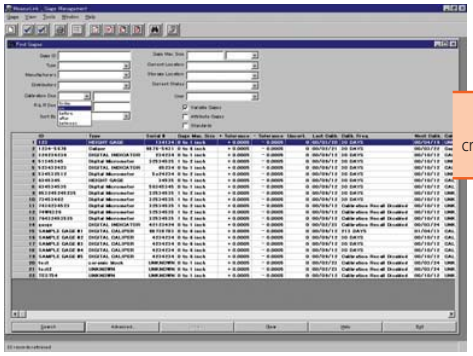
Display of evaluation results
(1) Gage R&R
(2) EV (Equipment Variable)
(3) AV (Assessor Variable)
(4) PV (Part Variable)
Analysis charts (5 types)



- This program can perform gage R&R assessment required by QS-9000 in simple operation.

MeasurLink Gage Management

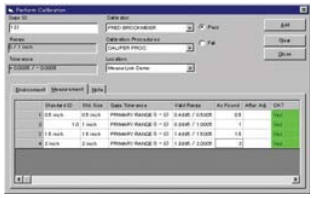
Calibration History Management Program



Powerful search function using an optional item (e.g. next calibration date) as a keyword

List creation

Calibration execution



- This program allows historical record of each measuring instrument operating states to support proper management of calibrations without omission with the powerful search function.